Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Contents

Description Page
Table 1. Revision notes ........................................ 3
Table 2. Circuit breaker catalog number convention. ........................................ 4
Table 3. Electronic trip unit catalog number convention .................................. 5
Table 4. Thermal magnetic trip unit catalog number convention ....................... 5
Table 5. Symmetrical RMS interruption ratings $I_{cu}$ (kA) for each breaker frame ............ 6
Table 6. Curve notes .................................................. 6

Labels

Figure 1. Power Defense frame 3 trip unit front labels. ........................................ 7

PXR electronic trip unit curves

Figure 2. PXR 20D / PXR 25 - $I^2t$ long delay and flat short delay. ......................... 8
Figure 3. PXR 20 $I^2t$ long delay and flat short delay ........................................ 9
Figure 4. PXR 20D / PXR 25 - $I^2t$ long delay and $I^2t$ short delay .................... 10
Figure 5. PXR 20 $I^2t$ long delay and $I^2t$ short delay ........................................ 11
Figure 6. PXR 20D / PXR 25 - $I^2t$ long delay and flat short delay .................... 12
Figure 7. PXR 20D / PXR 25 ground (earth) flat delay .................................... 13
Figure 8. PXR 20D / PXR 25 -ground (earth) $I^2t$ delay .................................. 14
Figure 9. PXR 20 - ground (earth) flat delay .................................................. 15
Figure 10. PXR 20 - ground (earth) $I^2t$ delay ............................................... 16
Figure 11. PXR 20D / PXR 25 - instantaneous and override for 125A frame ............. 17
Figure 12. PXR 20D / PXR 25 - instantaneous and override for 250A frame ............. 18
Figure 13. PXR 20D / PXR 25 - instantaneous and override for 400A frame ............. 19
Figure 14. PXR 20D / PXR 25 - instantaneous and override for H250A frame ............ 20
Figure 15. PXR 20D / PXR 25 - instantaneous and override for H400A frame .......... 21
Figure 16. PXR 20D / PXR 25 - instantaneous and override for 600A frame ............. 22
Figure 17. PXR 20D / PXR 25 - instantaneous and override for 630A frame .......... 23
Figure 18. PXR 20 / PXR 10 - instantaneous and override for 125A frame ............... 24
Figure 19. PXR 20 / PXR 10 - instantaneous and override for 250A frame ............... 25
Figure 20. PXR 20 / PXR 10 - instantaneous and override for 400A frame ............... 26
Figure 21. PXR 20 / PXR 10 - instantaneous and override for H250A frame ............. 27
### Technical Data

**Effective November 2019**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>PXR 20 / PXR 10 - instantaneous and override for H400A frame.</td>
</tr>
<tr>
<td>23</td>
<td>PXR 20 / PXR 10 - instantaneous and override for 600A frame.</td>
</tr>
<tr>
<td>24</td>
<td>PXR 20 / PXR 10 - instantaneous and override for 630A frame.</td>
</tr>
<tr>
<td>25</td>
<td>PXR 20 / PXR 20D / PXR 25 - maintenance mode.</td>
</tr>
<tr>
<td>26</td>
<td>PXR 10 LI 125A frame</td>
</tr>
<tr>
<td>27</td>
<td>PXR 10 LI 250A frame</td>
</tr>
<tr>
<td>28</td>
<td>PXR 10 LI 400A frame</td>
</tr>
<tr>
<td>29</td>
<td>PXR 10 LI H250A frame</td>
</tr>
<tr>
<td>30</td>
<td>PXR 10 LI H400A frame</td>
</tr>
<tr>
<td>31</td>
<td>PXR 10 LI 600A frame</td>
</tr>
<tr>
<td>32</td>
<td>PXR 10 LI 630A frame</td>
</tr>
<tr>
<td>33</td>
<td>PXR 10 LSI profile for short flat curves</td>
</tr>
<tr>
<td>34</td>
<td>PXR 10 LSI profile for I²t short curves</td>
</tr>
</tbody>
</table>

#### Thermal magnetic trip unit curves

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>100A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>36</td>
<td>125A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>37</td>
<td>150A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>38</td>
<td>175A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>39</td>
<td>200A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>40</td>
<td>225A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>41</td>
<td>250A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>42</td>
<td>300A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>43</td>
<td>350A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>44</td>
<td>400A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>45</td>
<td>250A/320A/400A adjustable thermal adjustable magnetic</td>
</tr>
<tr>
<td>46</td>
<td>250A/320A/400A adjustable thermal adjustable magnetic - current limiting.</td>
</tr>
<tr>
<td>47</td>
<td>250A – 600A fixed thermal adjustable magnetic</td>
</tr>
<tr>
<td>48</td>
<td>500A/630A adjustable thermal adjustable magnetic</td>
</tr>
</tbody>
</table>

#### Peak let through curves

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Peak let through current 400A @ 240V.</td>
</tr>
<tr>
<td>50</td>
<td>Peak let through energy 400A @ 240V.</td>
</tr>
<tr>
<td>51</td>
<td>Peak let through current 400A @ 415V.</td>
</tr>
<tr>
<td>52</td>
<td>Peak let through energy 400A @ 415V.</td>
</tr>
<tr>
<td>53</td>
<td>Peak let through current 400A @ 415V-480V.</td>
</tr>
<tr>
<td>54</td>
<td>Peak let through energy 400A @ 415V-480V.</td>
</tr>
<tr>
<td>55</td>
<td>Peak let through current 400A @ 600V.</td>
</tr>
<tr>
<td>56</td>
<td>Peak let through energy 400A @ 600V.</td>
</tr>
<tr>
<td>57</td>
<td>Peak let through current 400A @ 690V.</td>
</tr>
<tr>
<td>58</td>
<td>Peak let through energy 400A @ 690V.</td>
</tr>
<tr>
<td>59</td>
<td>Peak let through current selective frames 600A @ 240V.</td>
</tr>
<tr>
<td>60</td>
<td>Peak let through energy selective frames 600A @ 240V.</td>
</tr>
<tr>
<td>61</td>
<td>Peak let through current selective frames 630A @ 240V.</td>
</tr>
<tr>
<td>62</td>
<td>Peak let through energy selective frames 630A @ 240V.</td>
</tr>
<tr>
<td>63</td>
<td>Peak let through current selective 600A @ 415V-480V.</td>
</tr>
<tr>
<td>64</td>
<td>Peak let through energy selective 600A @ 415V-480V.</td>
</tr>
<tr>
<td>65</td>
<td>Peak let through current selective 630A @ 415V-440V.</td>
</tr>
<tr>
<td>66</td>
<td>Peak let through energy selective 630A @ 415V-440V.</td>
</tr>
<tr>
<td>67</td>
<td>Peak let through current selective 600A @ 600V.</td>
</tr>
<tr>
<td>68</td>
<td>Peak let through energy selective 600A @ 600V.</td>
</tr>
<tr>
<td>69</td>
<td>Peak let through current selective 630A @ 690V.</td>
</tr>
<tr>
<td>70</td>
<td>Peak let through energy selective 630A @ 690V.</td>
</tr>
</tbody>
</table>

Standards: UL, CSA, IEC, CCC
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 3 initial release.</td>
<td></td>
<td></td>
<td>02/12/2019</td>
</tr>
<tr>
<td>2 Short delay tolerances adjusted for phase and ground on I’t slopes.</td>
<td></td>
<td></td>
<td>11/2019</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>Interrupting Rating Designator</th>
<th>Trip Unit Type</th>
<th>Terminals Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDG3</td>
<td>F 25 G 35 K 50 M 65 N 85 P 100</td>
<td>T# Thermal Magnetic Trip Unit (1)</td>
<td>N No Terminals</td>
</tr>
<tr>
<td></td>
<td>ka at 480V (UL) ka at 415V (IEC)</td>
<td>V# 50°C Calibrated Thermal Magnetic Trip Unit (1)</td>
<td>J Line and Load Terminals</td>
</tr>
<tr>
<td>PDF3</td>
<td></td>
<td>B# PXR 10 (1)</td>
<td>K Line only terminals</td>
</tr>
<tr>
<td>PDD3</td>
<td></td>
<td>E# PXR 20 (1)</td>
<td>L Load only terminals</td>
</tr>
<tr>
<td>PDC3</td>
<td></td>
<td>D# PXR 20D (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>KNS Molded Case Switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SNN Switch Disconnecter</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Continuous Current Rating</th>
<th>PDG3 3 M 0400 P2M J</th>
</tr>
</thead>
<tbody>
<tr>
<td>0100 100 A</td>
<td></td>
</tr>
<tr>
<td>0125 125 A</td>
<td></td>
</tr>
<tr>
<td>0150 150 A</td>
<td></td>
</tr>
<tr>
<td>0175 175 A</td>
<td></td>
</tr>
<tr>
<td>0200 200 A</td>
<td></td>
</tr>
<tr>
<td>0225 225 A</td>
<td></td>
</tr>
<tr>
<td>0250 250 A</td>
<td></td>
</tr>
<tr>
<td>0300 300 A</td>
<td></td>
</tr>
<tr>
<td>0350 350 A</td>
<td></td>
</tr>
<tr>
<td>0400 400 A</td>
<td></td>
</tr>
<tr>
<td>0500 500 A</td>
<td></td>
</tr>
<tr>
<td>0600 600 A</td>
<td></td>
</tr>
<tr>
<td>H250 250 A High Override</td>
<td></td>
</tr>
<tr>
<td>H400 400 A High Override</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. See catalog for # (protection type and available configured options)
2. All PD-3 2-pole breakers are physically the same size as a 3-pole frame with the outer poles used for electrical connections.
3. IEC standard breakers include the CE mark; GB standard breakers include the CCC mark.
Table 3. Electronic trip unit catalog number convention

<table>
<thead>
<tr>
<th>Style Family</th>
<th>Ampere Frame Rating</th>
<th>Features</th>
<th>ETU Protection Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDG3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X PXR 3 0400 D 2 W</td>
<td>0115 115A Frame</td>
<td>None</td>
<td>1 LI (PXR10 IEC only)</td>
</tr>
<tr>
<td></td>
<td>0125 125A Frame</td>
<td>R Relays</td>
<td>2 LSI</td>
</tr>
<tr>
<td></td>
<td>0250 250A Frame</td>
<td>Z ZSI, Relays</td>
<td>3 LSIG</td>
</tr>
<tr>
<td></td>
<td>0400 400A Frame</td>
<td>M Modbus, Relays</td>
<td>4 LSIA ARMS</td>
</tr>
<tr>
<td></td>
<td>0600 600A Frame</td>
<td>C CAM Interface, Relays</td>
<td>5 LSIG ARMS</td>
</tr>
<tr>
<td></td>
<td>0630 630A Frame</td>
<td>W ZSI, Modbus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>X ZSI, CAM Interface, Relays</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y ZSI, Modbus, CAM Interface, Relays</td>
<td></td>
</tr>
</tbody>
</table>

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

Note: The Selective frame styles have a higher override value for higher selective coordination capability.

Table 4. Thermal magnetic trip unit catalog number convention

<table>
<thead>
<tr>
<th>Style Family</th>
<th>Ampere Frame Rating</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDG3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X TFA 3 0400</td>
<td>0100 100A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0125 125A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0150 150A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0175 175A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0200 200A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0225 225A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0250 250A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0300 300A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0350 350A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0400 400A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0500 500A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0600 600A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0630 630A Frame</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H250 250A (High Magnetic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H300 300A (High Magnetic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H350 350A (High Magnetic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H400 400A (High Magnetic)</td>
<td></td>
</tr>
</tbody>
</table>

Note: IEC standard breakers include the CE mark; GB standard breakers include the CCC mark.
### Technical Data

**Effective November 2019**

### Time current curves Power Defense MCCB

Frame 3 thermal-magnetic and PXR electronic trip units

**Standards: UL, CSA, IEC, CCC**

---

**Table 5. Symmetrical RMS interruption ratings** \( I_{\text{cu}} \) **(kA) for each breaker frame**

<table>
<thead>
<tr>
<th>Frame</th>
<th>Voltage</th>
<th>UL / CSA</th>
<th>IEC / CCC</th>
<th>250 Vdc* 400A frame</th>
<th>250 Vdc* 600A/830A frame</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>240V</td>
<td>480V</td>
<td>600V</td>
<td>240V</td>
<td>415V</td>
</tr>
<tr>
<td>Globally rated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDG3xF</td>
<td>35</td>
<td>25</td>
<td>14</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>PDG3xG</td>
<td>65</td>
<td>35</td>
<td>18</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>PDG3xK</td>
<td>85</td>
<td>50</td>
<td>25</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>PDG3xM</td>
<td>100</td>
<td>65</td>
<td>35</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>PDG3xN</td>
<td>150</td>
<td>85</td>
<td>50</td>
<td>150</td>
<td>70</td>
</tr>
<tr>
<td>PDG3xP</td>
<td>200</td>
<td>100</td>
<td>65</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Globally rated (UL 100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF4xF</td>
<td>35</td>
<td>25</td>
<td>14</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>PDF4xG</td>
<td>65</td>
<td>35</td>
<td>18</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>PDF4xK</td>
<td>85</td>
<td>50</td>
<td>25</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>PDF4xM</td>
<td>100</td>
<td>65</td>
<td>35</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>IEC / GB only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC3xF</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>PDC3xG</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>55</td>
<td>36</td>
</tr>
<tr>
<td>PDC3xK</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>PDC3xM</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>PDC3xN</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>150</td>
<td>70</td>
</tr>
<tr>
<td>UL/CSA Up to 240V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDD3xF</td>
<td>35</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDD3xG</td>
<td>65</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDD3xK</td>
<td>85</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDD3xM</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDD3xN</td>
<td>150</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDD3xP</td>
<td>200</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Two poles in series

---

**Table 6. Curve notes**

1. These curves apply for 50Hz and 60Hz applications.
2. The maximum voltage rating for the frame style is stated in Table 5.
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. Thermal Magnetic trip unit calibration based on 40ºC ambient, cold start. Tested with 4 feet of rated wire (75ºC) per terminal. Tested in open air with current in all poles.
7. Thermal Magnetic trip unit instantaneous calibration based on single pole testing.
8. All electronic trip units have an over temperature protection feature that will trip the breaker when the internal temperature of the ETU is over 105ºC.
9. All time current data for PXR is based on 3 phase testing.
Labels

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

PXR 20 – unit with LSIG protection and maintenance mode pictured

PXR 10 – unit with LSI protection pictured

Adjustable thermal, adjustable magnetic unit pictured

Figure 1. Power Defense frame 3 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.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Curves

Figure 2. PXR 20D / PXR 25 - $\text{I_r} \cdot t$ 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 1A.
2. Long Delay Time Settings adjustable from 0.5s - 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 0.200s have tolerances of +0/-20%, time delay settings between 0.190s to 0.160s have tolerances of +0/-30%, and time delay settings below 0.150s to 0.100s have tolerances of +0/-40% and time delay settings between 0.090s to 0.050s 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 3. PXR 20 - \(i^2t\) long delay and flat short delay.
**Technical Data**

**TD012065EN**

**Effective November 2019**

**Time current curves Power Defense MCCB**

**Frame 3 thermal-magnetic and PXR electronic trip units**

**Standards: UL, CSA, IEC, CCC**

---

**EATON**

www.eaton.com

---

**Figure 4. PXR 20D / PXR 25 - \(I^2t\) long delay and \(I^2t\) short delay.**

---

**Time Current Curves**

**Power Defense Circuit Breakers**

**Style:** Frame 3

**Configuration:** 3 and 4 Poles

**Trip Unit Type:** Power Xpert Release – PXR 20D / PXR 25

**Curve:** Long \(I^2t\) Delay and Short \(I^2t\) 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 1A.

2. Long Delay Time Settings adjustable from 0.5s - 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 \(I^2t\) slope time settings adjustable from 0.067s - 0.300s at steps of 0.010s with tolerances as follows: \(I^2t\) slope time delay settings 0.300s to 0.200s have tolerances of +0/-30%, time delay settings between 0.190s to 0.160s have tolerances of +0/-40%, and time delay settings between 0.150s to 0.100s have tolerances of +0/-50%. After approximately 8x the \(I^2t\) slope will go flat and those times have tolerances as follows: time delay settings 0.190s to 0.160s have tolerances of +0/-30%, time delay settings between 0.150s to 0.100s have tolerances of +0/-40% and time delay settings between 0.090s to 0.050s 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.
**Technical Data**

**TD012065EN**

**Effective November 2019**

**Frame 3 thermal-magnetic and PXR electronic trip units**

**Standards:** UL, CSA, IEC, CCC

---

**Time current curves Power Defense MCCB**

**Configuration:** 3 and 4 Poles

**Trip Unit Type:** Power Xpert Release – PXR 20

**Curve:** Long I$^2$t Delay and Short I$^2$t Delay

**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 Delay I$^2$t slope time settings are as follows: I$^2$t slope time delay setting 0.300s has a tolerance of ±0%/±30%, time delay setting 0.150s has a tolerance of ±0%/±40% and time delay setting 0.067s has a tolerance 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 5. PXR 20 I$^2$t long delay and I$^2$t short delay.**

---

**EATON**

www.eaton.com
Figure 6. 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 1A.
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 0.050s - 0.500s at steps of 0.010s with ±5% tolerance.
   - Time delay settings between 0.150s to 0.160s have tolerances of ±0%/±30%.
   - Time delay settings below 0.150s to 0.100s have tolerances of ±0%/±40% and time delay settings between 0.090s to 0.050s 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.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 7. PXR 20D / PXR 25 ground (earth) flat delay.

Notes:
1. Ground Pickup settings adjustable from 0.2x - 1.0x at steps of 0.010x for Residual sensing with a tolerance of ± 10%.
2. Ground flat delay time settings adjustable from 0.100s – 1.000s at steps of 0.010s with tolerances as follows: time delay settings from 1.00s to greater than 0.500s have tolerances of +0/-20%, time delay settings of 0.500s to 0.200s have tolerances of +0/-30%, time delay settings between 0.200s to 0.100s have tolerances of +0/-40%.
4. 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.
**Technical Data**

**TD012065EN**  
**Effective November 2019**

**Time current curves Power Defense MCCB**  
**Frame 3 thermal-magnetic and PXR electronic trip units**  
**Standards: UL, CSA, IEC, CCC**

---

**Figure 8.** PXR 20D / PXR 25 - ground (earth) I²t delay.

---

**Notes:**

1. Ground Pickup settings adjustable from 0.2x to 1.0x at steps of 0.01x are for Residual sensing with a tolerance of ±10%.
2. Ground I²t slope time settings are adjustable from 0.067s to 0.300s at steps of 0.010s with tolerances as follows: I²t slope time delay settings 0.300s to 0.200s have tolerances of +0/-30%, time delay settings between 0.190s to 0.160s have tolerances of +0/-40% and time delay settings between 0.150s to 0.100s have tolerances of +0/-50%. After approximately 8x the I²t slope will go flat and those times have tolerances as follows: time delay settings 0.300s to 0.200s have tolerances of +0/-20%, time delay settings between 0.190s to 0.160s have tolerances of +0/-30%, and time delay settings between 0.150s to 0.100s have tolerances of +0/-40%.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. 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. PXR 20 - ground (earth) flat delay.
Figure 10. PXR 20 - ground (earth) \(I^2t\) delay.
Technical Data
TD012065EN
Effective November 2019

Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Eaton
www.eaton.com

Figure 11. PXR 20D / PXR 25 - instantaneous and override for 125A frame.
Figure 12. PXR 20D / PXR 25 - instantaneous and override for 250A frame.
Figure 13. PXR 20D / PXR 25 - instantaneous and override for 400A frame.
Figure 14. PXR 20D / PXR 25 - instantaneous and override for H250A frame.
Figure 15. PXR 20D / PXR 25 - Instantaneous and override for H400A frame.
Figure 16. PXR 20D / PXR 25 - instantaneous and override for 600A frame.

Notes:
1. The instantaneous pickup settings adjustable from 2x – 11.4x (Max) at steps of 0.10x with a ±10% tolerance.
2. For high fault current levels a fixed instantaneous override is provided at 7200A and has a ±15% tolerance.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Eaton www.eaton.com

Figure 17. PXR 20D / PXR 25 - instantaneous and override for 630A frame.
Technical Data TD012065EN

Effective November 2019

Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 18. PXR 20 / PXR 10 - instantaneous and override for 125A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

EATON www.eaton.com

Figure 19. PXR 20 / PXR 10 - instantaneous and override for 250A frame.

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 4400A and has a ±15% tolerance.
Figure 20. PXR 20 / PXR 10 - instantaneous and override for 400A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Effective November 2019

Figure 21. PXR 20 / PXR 10 - instantaneous and override for H250A frame.
Figure 22. PXR 20 / PXR 10 - instantaneous and override for H400A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Effective November 2019

EATON www.eaton.com

Figure 23. PXR 20 / PXR 10 - instantaneous and override for 600A frame.
Figure 24. PXR 20 / PXR 10 - instantaneous and override for 630A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 25. PXR 20 / PXR 20D / PXR 25 - maintenance mode.
Time current curves Power Defense Circuit Breakers

**Style:** Frame 3

**Configuration:** 3 and 4 Poles

**Trip Unit Type:** Power Xpert Release – PXR 10

**Trip Unit Style:** LI

**Curve:** Long P.I Delay and Instantaneous with Override for 125A frame

---

**Ir setting**

<table>
<thead>
<tr>
<th>PDG</th>
<th>125A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45A</td>
</tr>
<tr>
<td>2</td>
<td>50A</td>
</tr>
<tr>
<td>3</td>
<td>60A</td>
</tr>
<tr>
<td>4</td>
<td>63A</td>
</tr>
<tr>
<td>5</td>
<td>70A</td>
</tr>
<tr>
<td>6</td>
<td>80A</td>
</tr>
<tr>
<td>7</td>
<td>90A</td>
</tr>
<tr>
<td>8</td>
<td>100A</td>
</tr>
<tr>
<td>9</td>
<td>110A</td>
</tr>
<tr>
<td>10</td>
<td>125A</td>
</tr>
</tbody>
</table>

**Notes:**

1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Setting has +0%/-30% tolerance.
3. Instantaneous pickup settings have ±10% tolerance.
4. For high fault current levels a fixed instantaneous override is provided at 3000A and has a ±15% tolerance.
5. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.

---

**Figure 26. PXR 10 LI 125A frame.**

---

Technical Data TD012065EN
Effective November 2019

Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC
Figure 27. PXR 10 LI 250A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 28. PXR 10 LI 400A frame.

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Setting has +0%/-30% tolerance.
3. Instantaneous pickup settings have ±10% tolerance.
4. For high fault current levels a fixed instantaneous override is provided at 4400A and has a ±15% tolerance.
5. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Technical Data
TD012065EN
Effective November 2019

Figure 29. PXR 10 LI H250A frame.

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Setting has +0%/-30% tolerance.
3. Instantaneous pickup settings have ±10% tolerance.
4. For high fault current levels a fixed instantaneous override is provided at 7200A and has a ±15% tolerance.
5. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
Figure 30. PXR 10 LI H400A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

**Figure 31. PXR 10 LI 600A frame.**

---

**Notes:**
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Setting has ±0%/-30% tolerance.
3. Instantaneous pickup settings have ±10% tolerance.
4. For high fault current levels a fixed instantaneous override is provided at 7200A and has a ±15% tolerance.
5. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
Figure 32. PXR 10 LI 630A frame.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Effective November 2019

Figure 33. PXR 10 LSI profile for short flat curves.

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Setting has +0%/-30% tolerance.
3. Instantaneous pickup settings have ±10% tolerance.
4. Short Delay pickup settings as shown have ±5% tolerance.
5. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
6. Profile I is set at a default value of 10x with 300ms time delay but is programmable with tld 2.0x to 10.0x in steps of 0.5x and tld 50ms to 300ms in steps of 50ms and I2t slope as an option.
7. When Profile K is selected, PXR10 LI style curve should be used.
Figure 34. PXR 10 LSI profile for \( I^2t \) short curves.
Figure 35. 100A fixed thermal adjustable magnetic.
Figure 36. 125A fixed thermal adjustable magnetic.
Figure 37. 150A fixed thermal adjustable magnetic.
175A Fixed Thermal Adjustable Magnetic

Figure 38. 175A fixed thermal adjustable magnetic.
Figure 39. 200A fixed thermal adjustable magnetic.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 40. 225A fixed thermal adjustable magnetic.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 41. 250A fixed thermal adjustable magnetic.
Figure 42. 300A fixed thermal adjustable magnetic.

**300A Fixed Thermal Adjustable Magnetic**

- **Time Current Curves**
  - **Power Defense Circuit Breakers**
  - **Style:** Frame 3
  - **Configuration:** 2, 3 and 4 Poles
  - **Trip Unit Type:** Thermal Magnetic
  - **Trip Unit Style:** Fixed Thermal – Adjustable Magnetic
  - **Breaker Frame:** PDG, PDD, or PDF style

- **Notes:**
  2. DC instantaneous trip values are approximately 40% higher.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 43. 350A fixed thermal adjustable magnetic.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

400A Fixed Thermal Adjustable Magnetic

Maximum Single Pole Trip Times at 25°C

Minimum Tolerance

Maximum Tolerance

Adjustable magnetic trip

Time in Seconds

Current in Amperes

Notes:
1. Single pole test data at 25°C based on NEMA procedures (AB 4) for verifying performance of molded case circuit breakers.
2. DC instantaneous trip values are approximately 40% higher.

E:T:N
Time Current Curves
Power Defense Circuit Breakers
Style: Frame 3
Configuration: 2, 3 and 4 Poles
Trip Unit Type: Thermal Magnetic
Trip Unit Style: Fixed Thermal – Adjustable Magnetic
Breaker Frame: PDG, PDD, or PDF style

Eaton Corporation
January 2012

www.eaton.com

Figure 44. 400A fixed thermal adjustable magnetic.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 45. 250A/320A/400A adjustable thermal adjustable magnetic.
Technical Data TD012065EN
Effective November 2019

Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 46. 250A/320A/400A adjustable thermal adjustable magnetic - current limiting.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Effective November 2019

Figure 47. 250A – 600A fixed thermal adjustable magnetic.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

500A/630A Adjustable Thermal - Adjustable Magnetic

Rated Amps Available
In

<table>
<thead>
<tr>
<th>Amps</th>
<th>500A</th>
<th>630A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. DC Instantaneous trip values are approximately 40% higher.
2. Magnetic settings are a multiple of In rating.

Figure 48. 500A/630A adjustable thermal adjustable magnetic.
Figure 49. Peak let through current 400A @ 240V.
Figure 50. Peak let through energy 400A @ 240V.
Figure 51. Peak let through current 400A @ 415V.
Figure 52. Peak let through energy 400A @ 415V.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 53. Peak let through current 400A @ 415V-480V.
Figure 54. Peak let through energy 400A @ 415V-480V.

November 2019
Figure 55. Peak let through current 400A @ 600V.
Figure 56. Peak let through energy 400A @ 600V
Figure 57. Peak let through current 400A @ 690V.
Figure 58. Peak let through energy 400A @ 690V.
Figure 59. Peak let through current selective frames 600A @ 240V.
Figure 60. Peak let through energy selective frames 600A @ 240V.
Figure 61. Peak let through current selective frames 630A @ 240V.
Figure 62. Peak let through energy selective frames 630A @ 240V.
Time current curves Power Defense MCCB
Frame 3 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Figure 63. Peak let through current selective 600A @ 415V-480V.
Figure 64. Peak let through energy selective 600A @ 415V-480V.
Figure 65. Peak let through current selective 630A @ 415V-440V.
Figure 66. Peak let through energy selective 630A @ 415V-440V.
Figure 67. Peak let through current selective 600A @ 600V.
PD3 Selective 600A 600V
Peak Let Through Energy

Available Short Circuit Current, kA rms

Figure 68. Peak let through energy selective 600A @ 600V.
PD3 Selective 630A 690V
Peak Let Through Current

Figure 69. Peak let through current selective 630A @ 690V.
Figure 70. Peak let through energy selective 630A @ 690V

Peak Let-Through Energy, $I^2t$, A$^2$ sec

Available Short Circuit Current, kA rms

Eaton Corporation
September 2017  Rev. 1

Eaton is a registered trademark.
All other trademarks are property of their respective owners.