Technical Data **TD012064EN**

Effective April 2022
Supersedes December 2019

Time current curves Power Defense MCCB Frame 2 thermal-magnetic and PXR electronic trip units Standards: UL, CSA, IEC, CCC

Contents

Powering Business Worldwide

Table 1. Revision notes

Note: Unless noted below, all curves remain unchanged from their prior revision.

Revision	Curve number	Page	Date
1 Power Defense frame 2 initial release			02/15/2019
2 Short delay time tolerance changes on PXR curves. Updated let through curves.			12/2019
3 Added 415V-480V Current Limiting curves.			04/2022

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

PDG2 3 M 0225 P 2 M J

Breaker family
PDG2 = Frame 2 Global UL / CSA / IEC / GB
PDF2 = Frame 2 Global-100% UL / CSA / IEC / GB (uses PDG trip units)
PDD2 = Frame 2 IEC / GB
PDC2 = Frame 2 IEC / GB
PDC9 = Frame 9 IEC / GB

Interrupting rating designator	
kA at 480 V (UL)	**IA at 415 V (IEC)**
F = 25	25
G = 35	35
K = 50	50
M = 65	70
N = 85	70
P = 100	100

Poles
1 = 1 pole
2 = 2 pole
3 = 3 pole
4 = 4 pole with 100% neutral protection
6 = 4 pole with 60% neutral protection
0 = 4 pole with 0% neutral protection

Continous current rating
0015 = 15 A
0020 = 20 A
0025 = 25 A
0030 = 30 A
0035 = 35 A
0040 = 40 A
0045 = 45 A
0050 = 50 A
0060 = 60 A
0063 = 63 A IEC only
0070 = 70 A
0080 = 80 A
0090 = 90 A
0100 = 100 A
0110 = 110 A
0125 = 125 A
0150 = 150 A
0160 = 160 A IEC only
0175 = 175 A
0200 = 200 A
0225 = 225 A
0250 = 250 A IEC only

ETU trip unit style
B = PXR 10
E = PXR 20
D = PXR 200
P = PXR 25
Thermal magnetic style
T = Thermal
V = Thermal 50° C calibrated

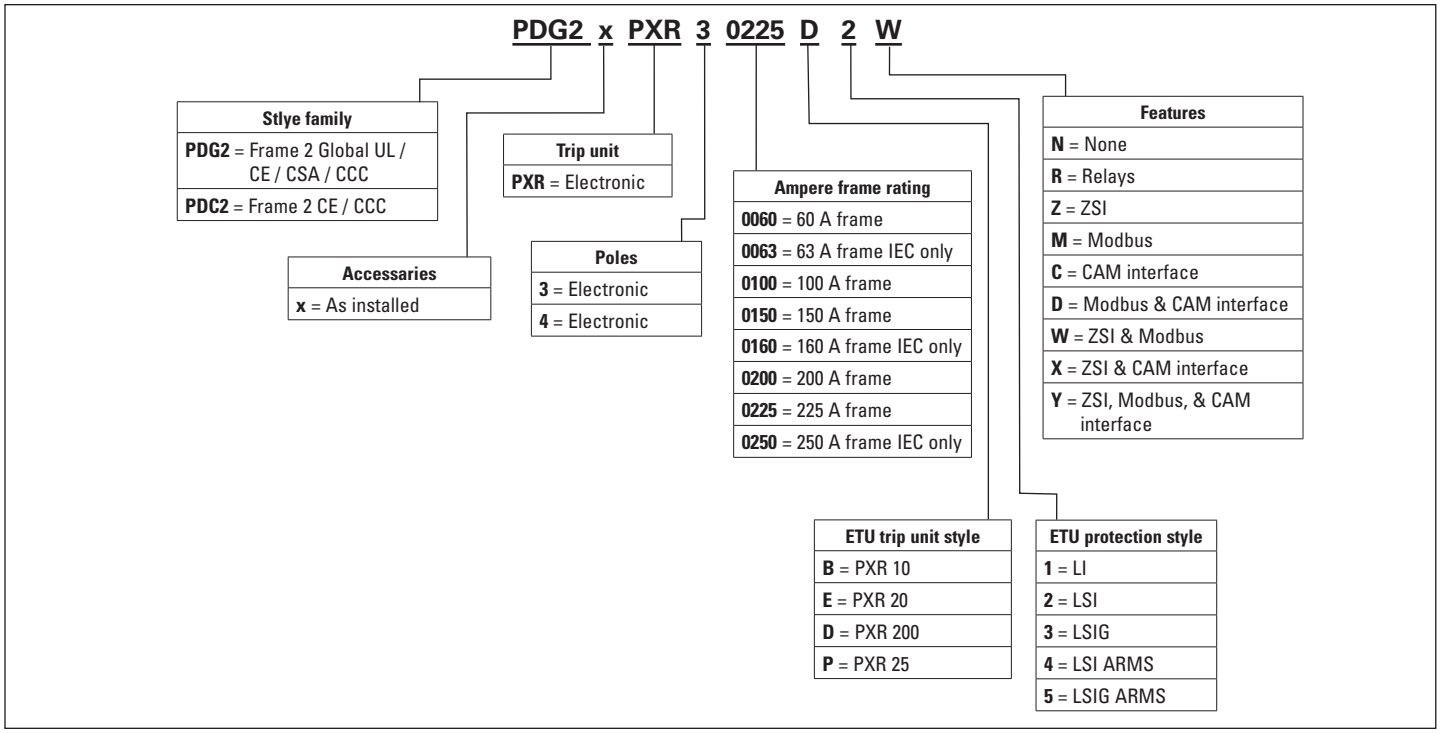
Features
N = None
R = Relays
Z = ZSI
M = Modbus
C = CAM interface
D = Modbus & CAM interface
W = ZSI & Modbus
X = ZSI & CAM interface
Y = ZSI, Modbus, & CAM interface
Magnetic Protection
A = Adjustable magnetic
F = Fixed magnetic

ETU protection style
1 = LI
2 = LSI
3 = LSIG
4 = LSI ARMS
5 = LSIG ARMS
Thermal magnetic style
F = Thermal
A= Thermal 50° C calibrated

Terminals included
N = No terminals
J = Line and load terminals
K = Line only terminals
L = Load only terminals

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

Table 3. Electronic trip unit catalog number convention

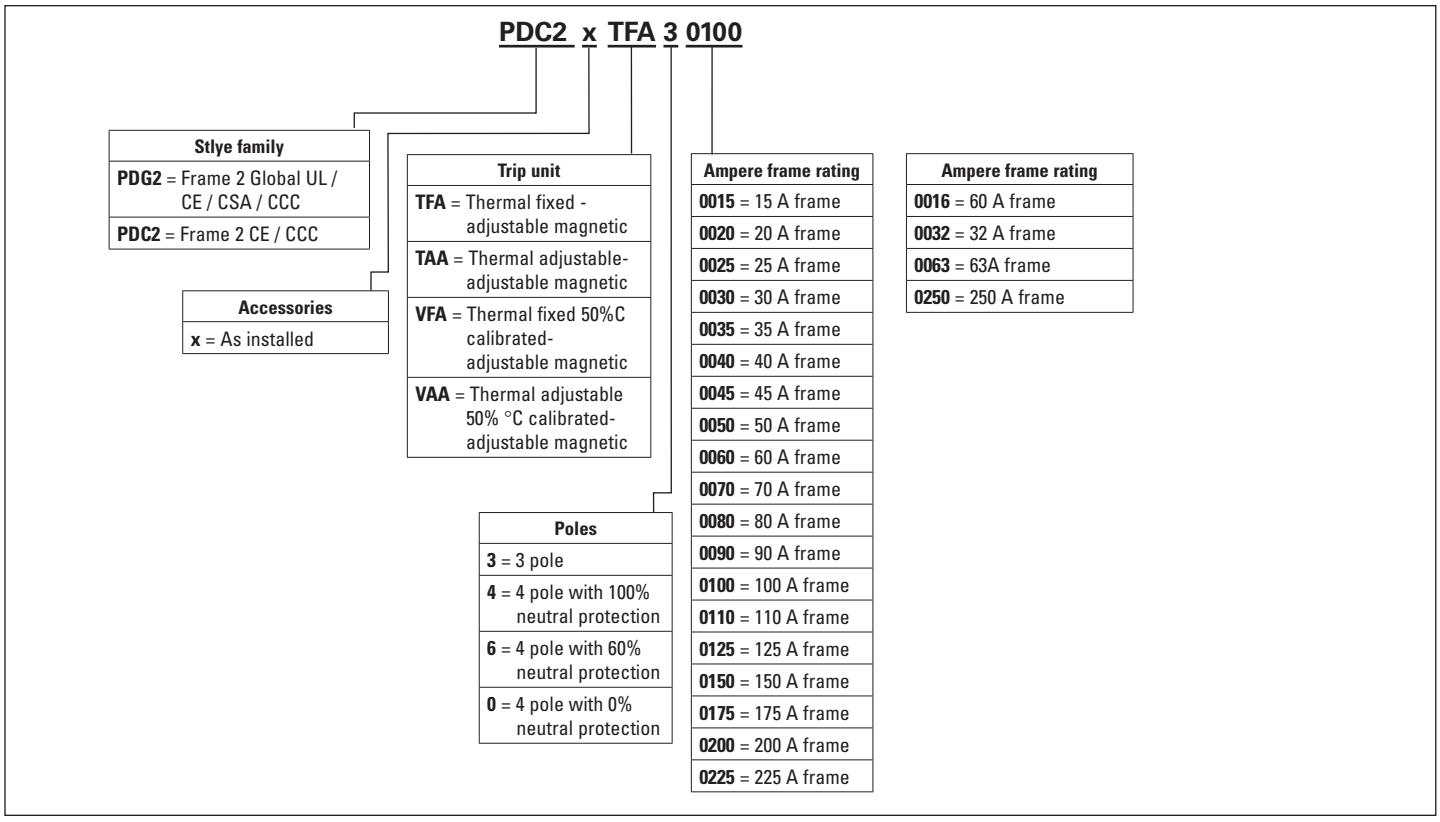


Note: IEC standard breakers include the CE mark; GB standard breakers include the CCC mark.

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. Thermal magnetic trip unit catalog number convention



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

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

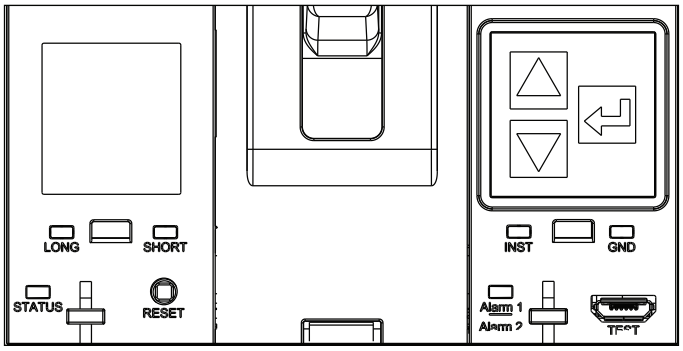
		UL / CSA			IEC / CCC							
	Voltage / Frame	240V	480V	600V	240V	415V	440V	480V	525V	690V	125Vdc	250Vdc*
Globally rated	**PDG2xF**	35	25	14	35	25	25	20	18	-	10	10
	PDG2xG	65	35	18	55	36	30	25	20	8	10	10
	PDG2xK	85	50	22	85	50	35	35	30/25	10	10	10
	PDG2xM	100	65	25	100	70	50	50	30/25	10	22	22
	PDG2xN	150	85	30/25	150	70	70	65	30/25	10	22	22
	PDG2xP	200	100	35/25	200	100	100	65	35/25	10	22	22
IEC / GB	**PDC2xF**	-	-	-	35	25	25	20	18	-	10	10
	PDC2xG	-	-	-	55	36	30	25	20	8	10	10
	PDC2xK	-	-	-	85	50	35	35	30/25	10	10	10
	PDC2xM	-	-	-	100	70	50	50	30/25	10	22	22
	PDC2xN	-	-	-	150	70	70	65	30/25	10	22	22
UL/CSA Rated up to 240V	**PDD2xF**	35	-	-	-	-	-	-	-	-	10	10
	PDD2xG	65	-	-	-	-	-	-	-	-	10	10
	PDD2xK	85	-	-	-	-	-	-	-	-	10	10
	PDD2xM	100	-	-	-	-	-	-	-	-	22	22
	PDD2xN	150	-	-	-	-	-	-	-	-	22	22
	PDD2xP	200	-	-	-	-	-	-	-	-	22	22

* Two poles in series

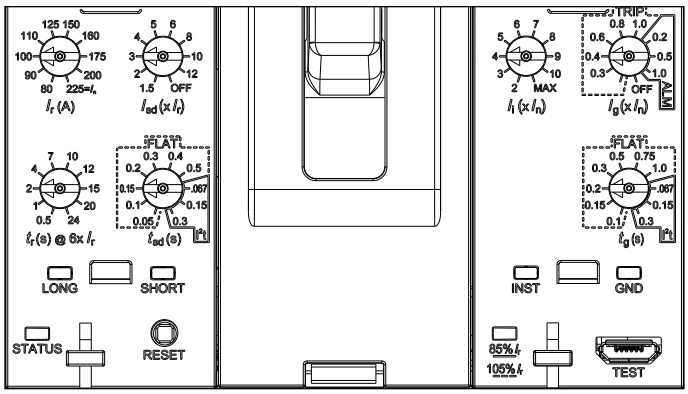
Table 6. Curve notes

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 40°C ambient, cold start. Tested with 4 feet of rated wire (75°C) 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 time current data for PXR is based on 3 phase testing. For ground testing refer to Instruction Leaflet IL012125EN..

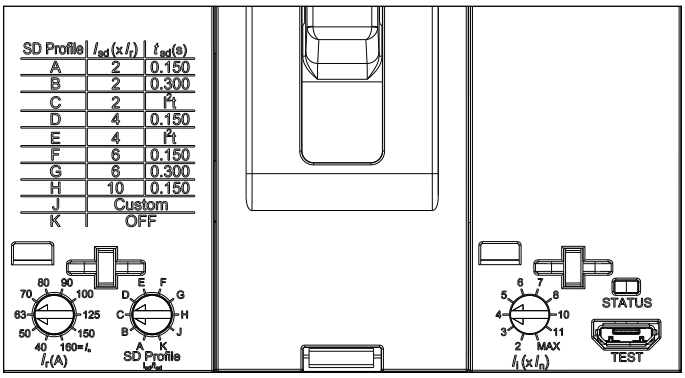
Labels



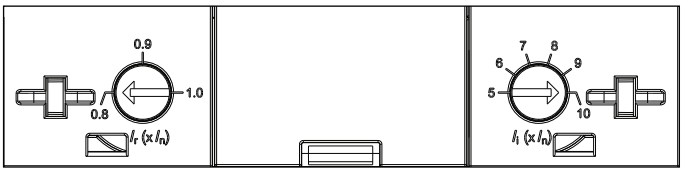
PXR 25 and PXR 20 – unit with LSIG protection pictured



PXR 20 – unit with LSIG protection pictured



PXR 10 – unit with LSI protection pictured



Adjustable thermal, adjustable magnetic unit pictured

Figure 1. Power Defense frame 2 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

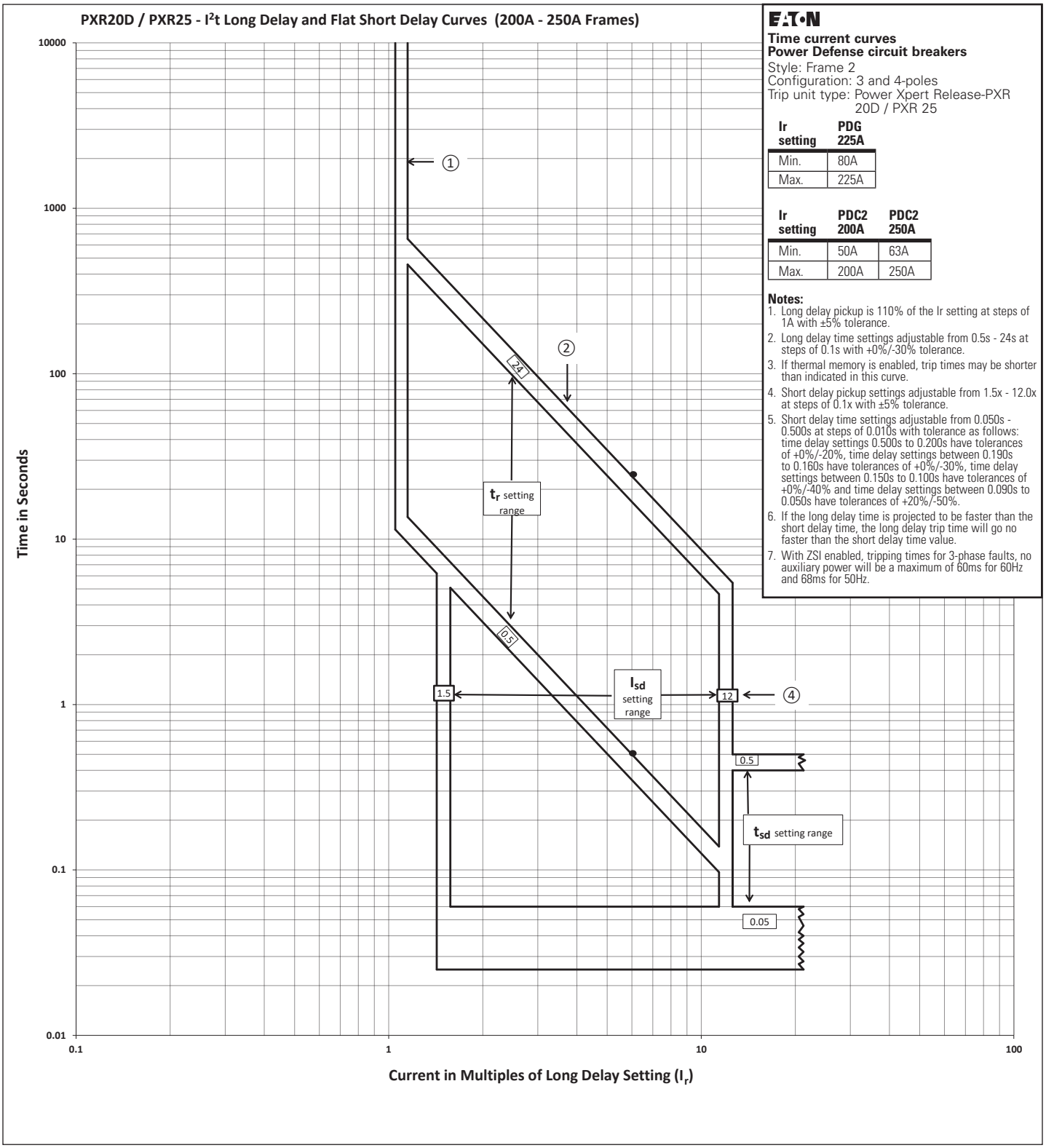


Figure 2. PXR 20D / PXR 25 - I²t long delay and flat short delay for 200A - 250A frames. **April 2022**

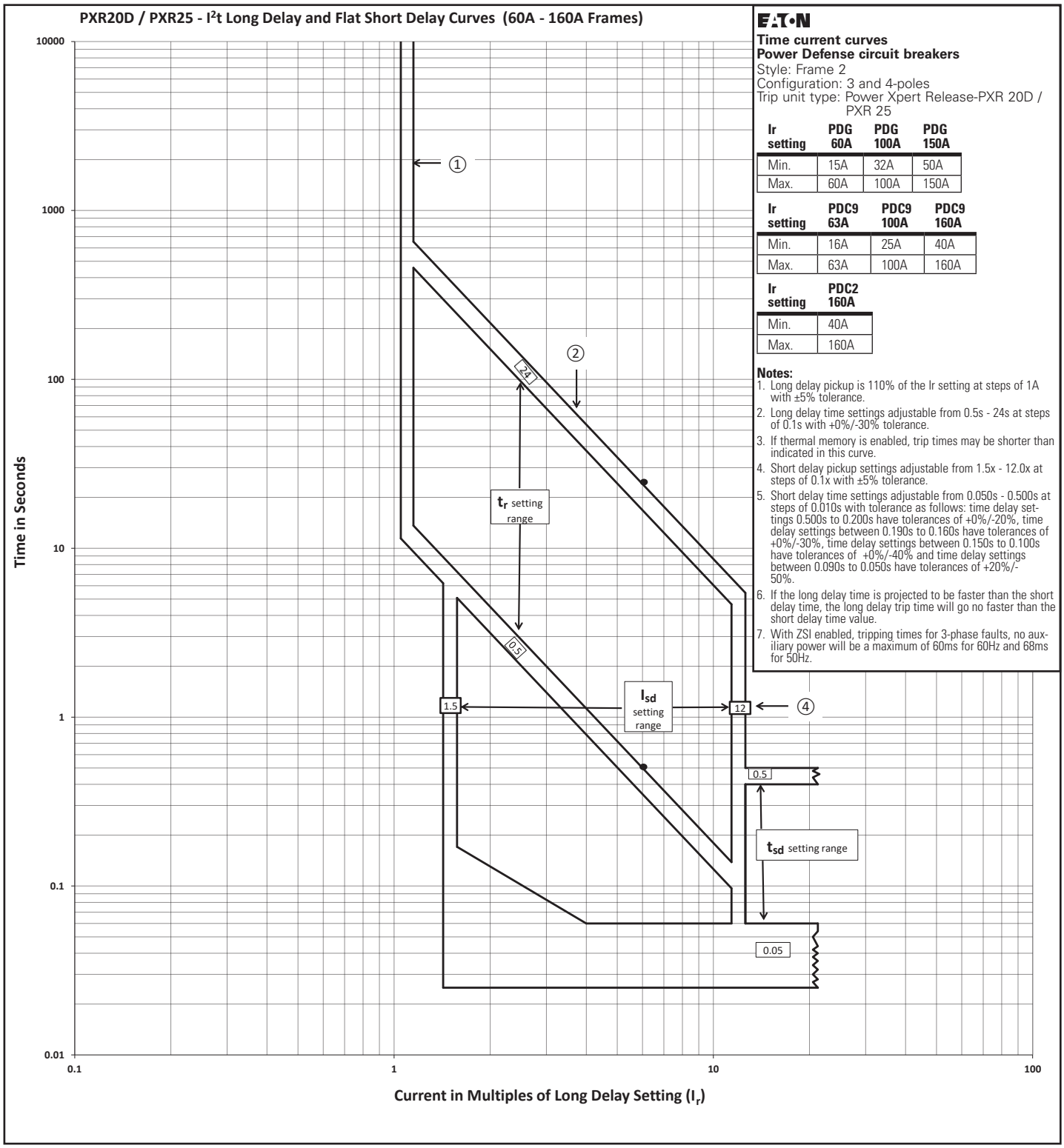


Figure 3. PXR 20D / PXR 25 - I²t long delay and flat short delay for 60A - 160A frames. **April 2022**

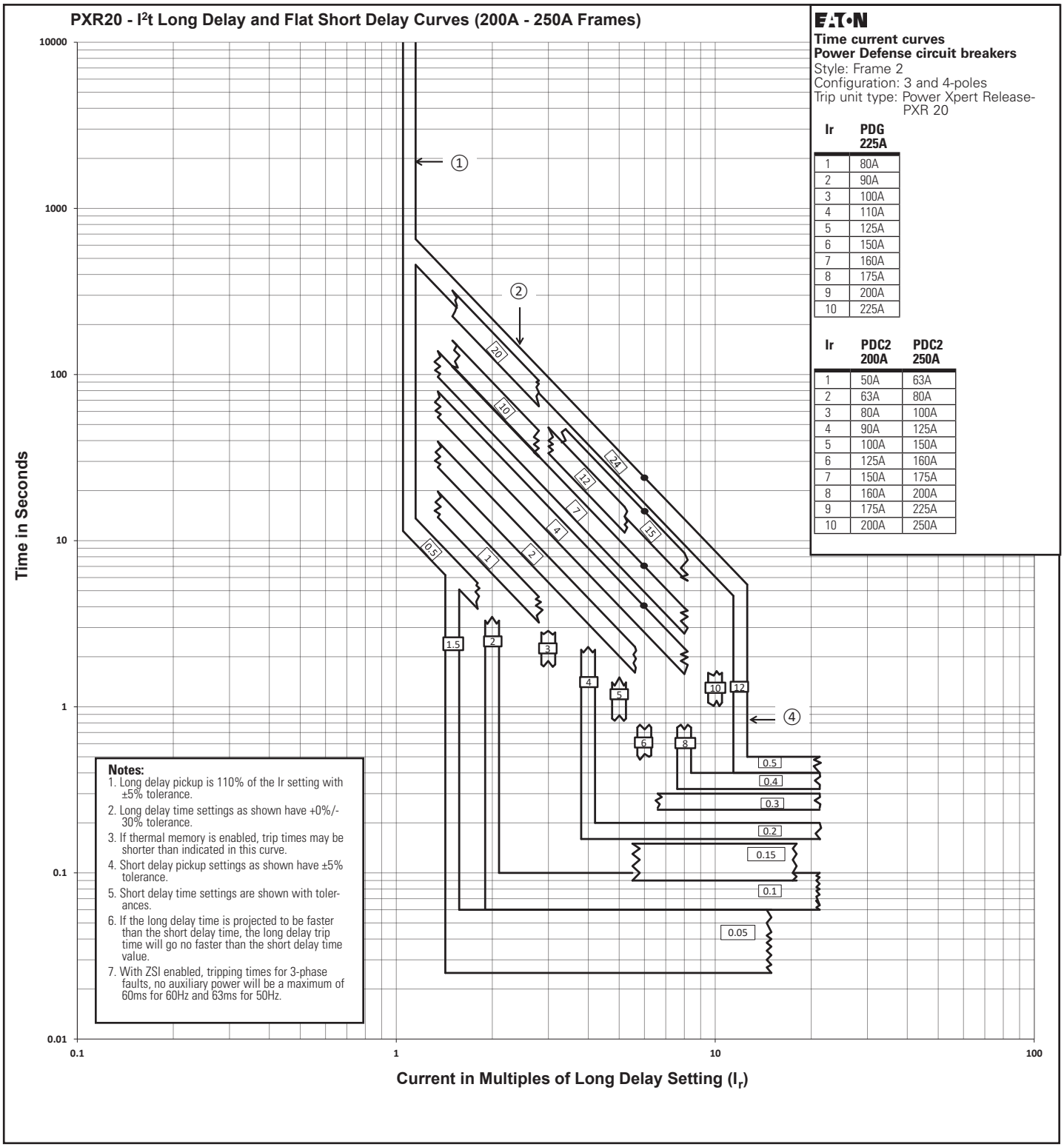
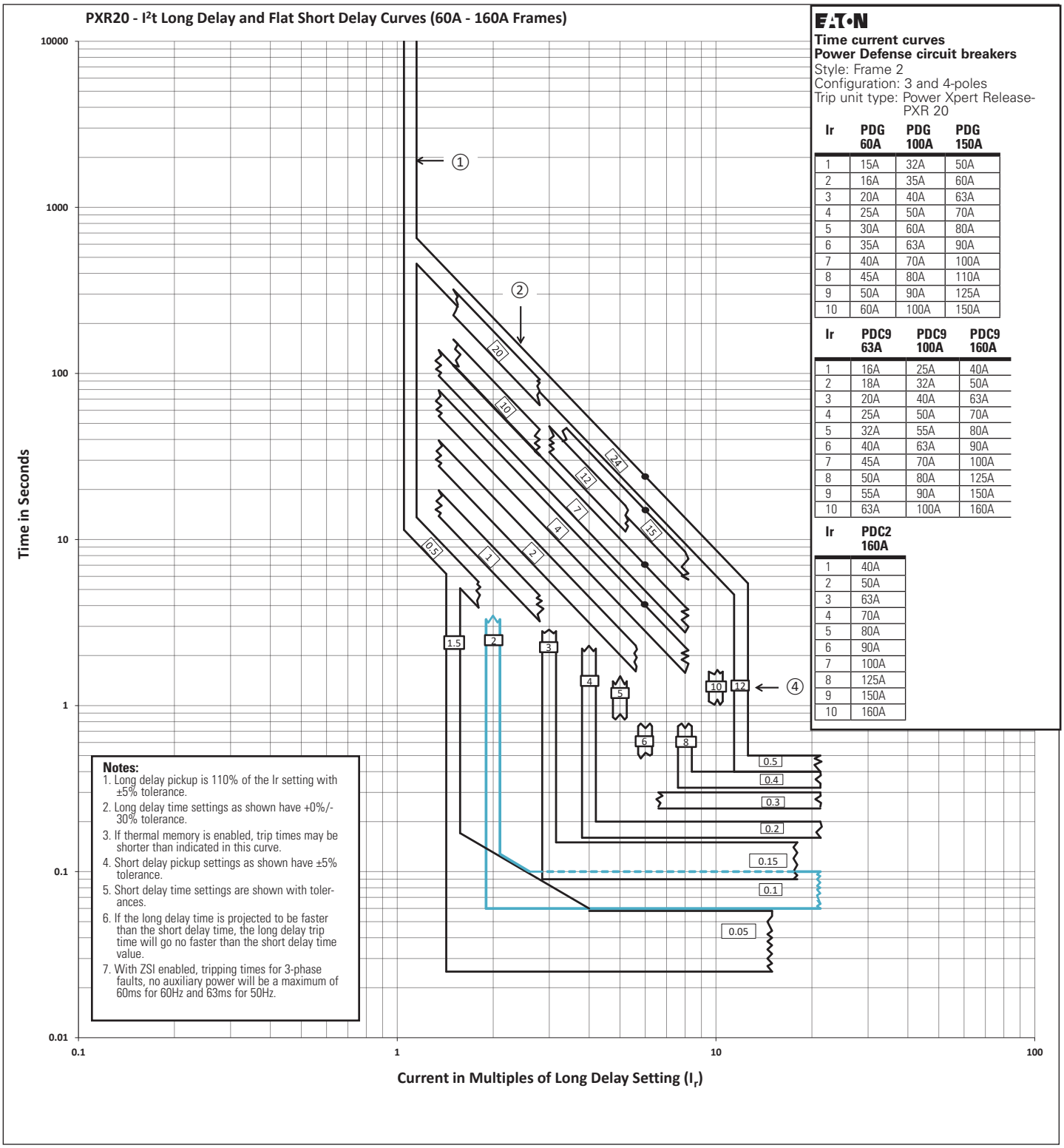


Figure 4. PXR 20 - I²t long delay and flat short delay for 200A - 250A frames. **April 2022**

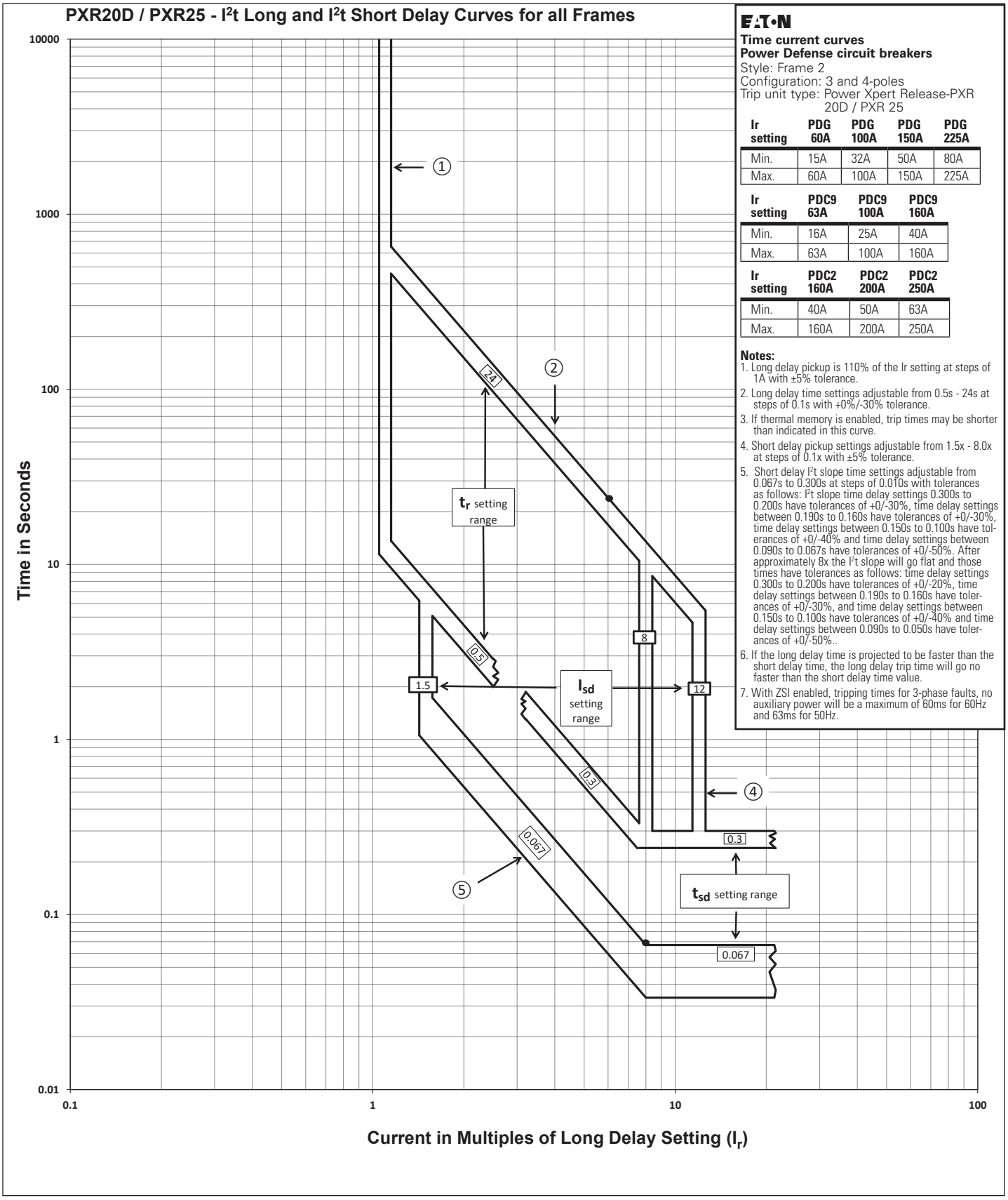


Ir	PDG 60A	PDG 100A	PDG 150A
1	15A	32A	50A
2	16A	35A	60A
3	20A	40A	63A
4	25A	50A	70A
5	30A	60A	80A
6	35A	63A	90A
7	40A	70A	100A
8	45A	80A	110A
9	50A	90A	125A
10	60A	100A	150A

Ir	PDC9 63A	PDC9 100A	PDC9 160A
1	16A	25A	40A
2	18A	32A	50A
3	20A	40A	63A
4	25A	50A	70A
5	32A	55A	80A
6	40A	63A	90A
7	45A	70A	100A
8	50A	80A	125A
9	55A	90A	150A
10	63A	100A	160A

Ir	PDC2 160A
1	40A
2	50A
3	63A
4	70A
5	80A
6	90A
7	100A
8	125A
9	150A
10	160A

Figure 5. PXR 20 - I²t long delay and flat short delay for 60A - 160A frames. **April 2022**



EATON

Time current curves
Power Defense circuit breakers
Style: Frame 2
Configuration: 3 and 4-poles
Trip unit type: Power Xpert Release-PXR 20D / PXR 25

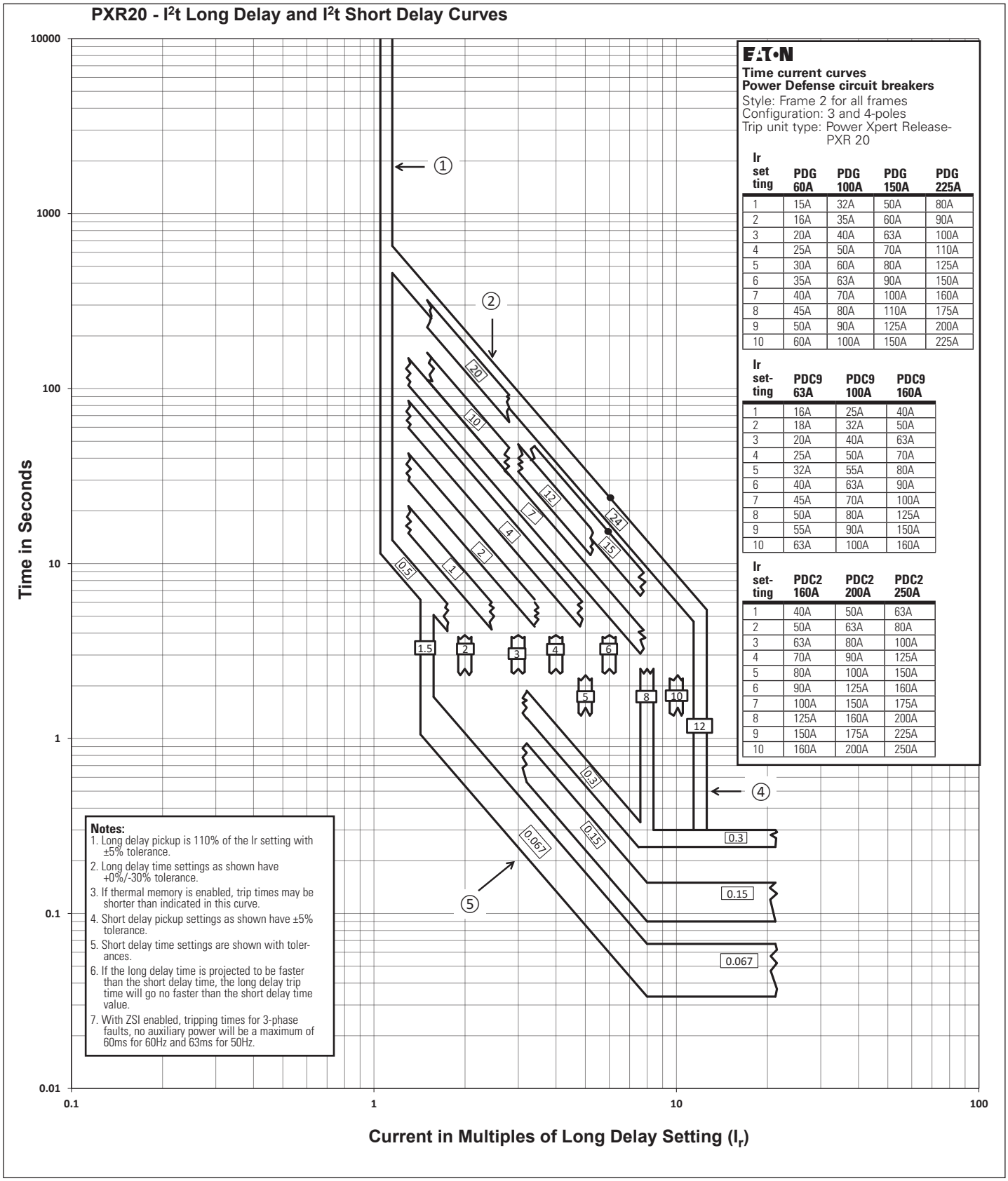
Ir setting	PDG 60A	PDG 100A	PDG 150A	PDG 225A
Min.	15A	32A	50A	80A
Max.	60A	100A	150A	225A

Ir setting	PDC9 63A	PDC9 100A	PDC9 160A
Min.	16A	25A	40A
Max.	63A	100A	160A

Ir setting	PDC2 160A	PDC2 200A	PDC2 250A
Min.	40A	50A	63A
Max.	160A	200A	250A

Notes:
1. Long delay pickup is 110% of the Ir setting at steps of 1A with ±5% tolerance.
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 - 8.0x at steps of 0.1x with ±5% tolerance.
5. Short delay I^2t slope time settings adjustable from 0.067s to 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/-30%, time delay settings between 0.150s to 0.100s have tolerances of +0/-40% and time delay settings between 0.090s to 0.067s 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 0.300s 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% 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, tripping times for 3-phase faults, no auxiliary power will be a maximum of 60ms for 60Hz and 63ms for 50Hz.

Figure 6. PXR 20D / PXR 25 - I^2t long delay and I^2t short delay for all frames. **April 2022**



Ir set ting	PDG 60A	PDG 100A	PDG 150A	PDG 225A
1	15A	32A	50A	80A
2	16A	35A	60A	90A
3	20A	40A	63A	100A
4	25A	50A	70A	110A
5	30A	60A	80A	125A
6	35A	63A	90A	150A
7	40A	70A	100A	160A
8	45A	80A	110A	175A
9	50A	90A	125A	200A
10	60A	100A	150A	225A

Ir set-ting	PDC9 63A	PDC9 100A	PDC9 160A
1	16A	25A	40A
2	18A	32A	50A
3	20A	40A	63A
4	25A	50A	70A
5	32A	55A	80A
6	40A	63A	90A
7	45A	70A	100A
8	50A	80A	125A
9	55A	90A	150A
10	63A	100A	160A

Ir set-ting	PDC2 160A	PDC2 200A	PDC2 250A
1	40A	50A	63A
2	50A	63A	80A
3	63A	80A	100A
4	70A	90A	125A
5	80A	100A	150A
6	90A	125A	160A
7	100A	150A	175A
8	125A	160A	200A
9	150A	175A	225A
10	160A	200A	250A

Figure 7. PXR 20 I²t long delay and I²t short delay for all frames.

April 2022

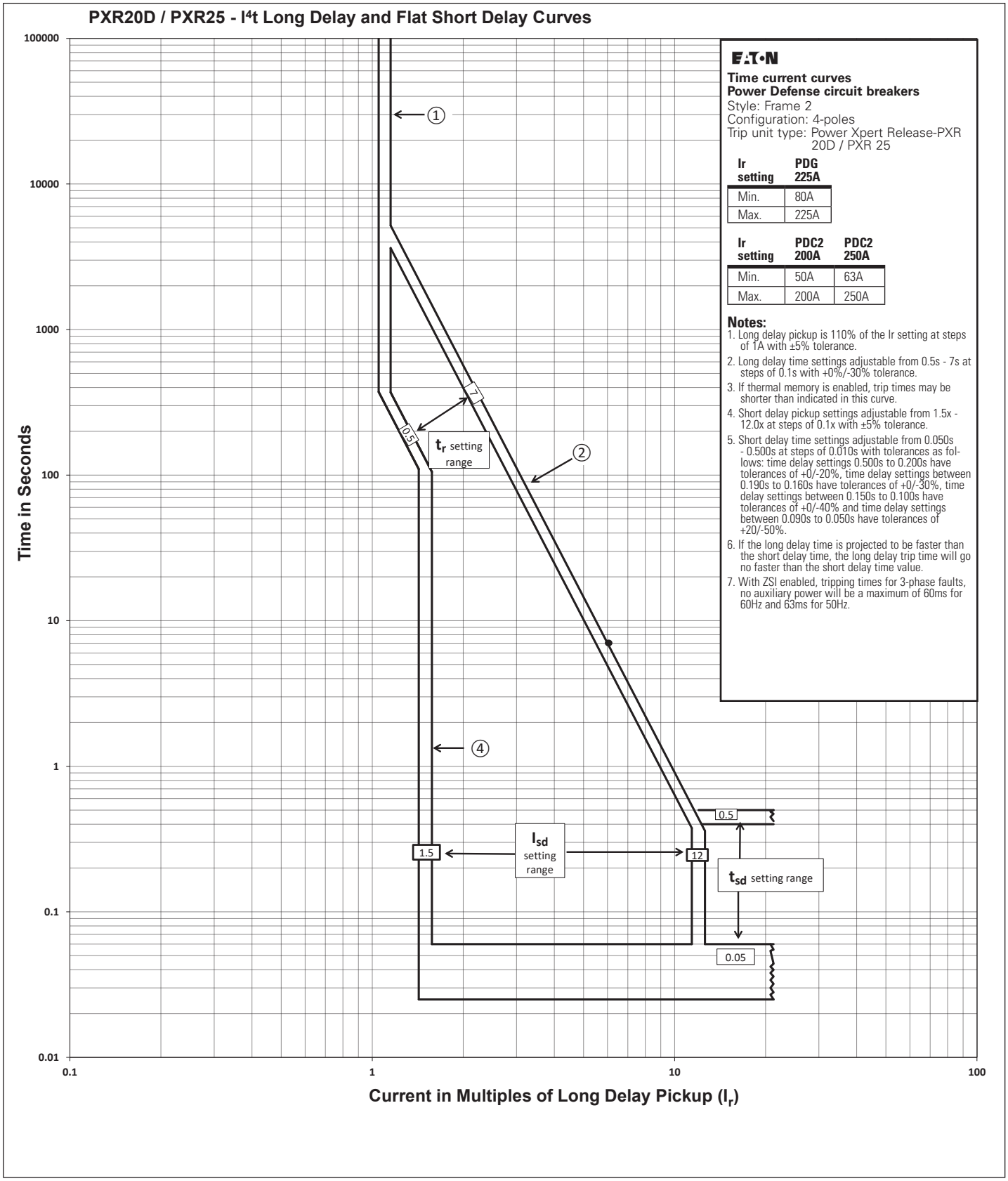


Figure 8. PXR 20D / PXR 25 - I4t long delay and flat short delay for 200A - 250A frames. **April 2022**

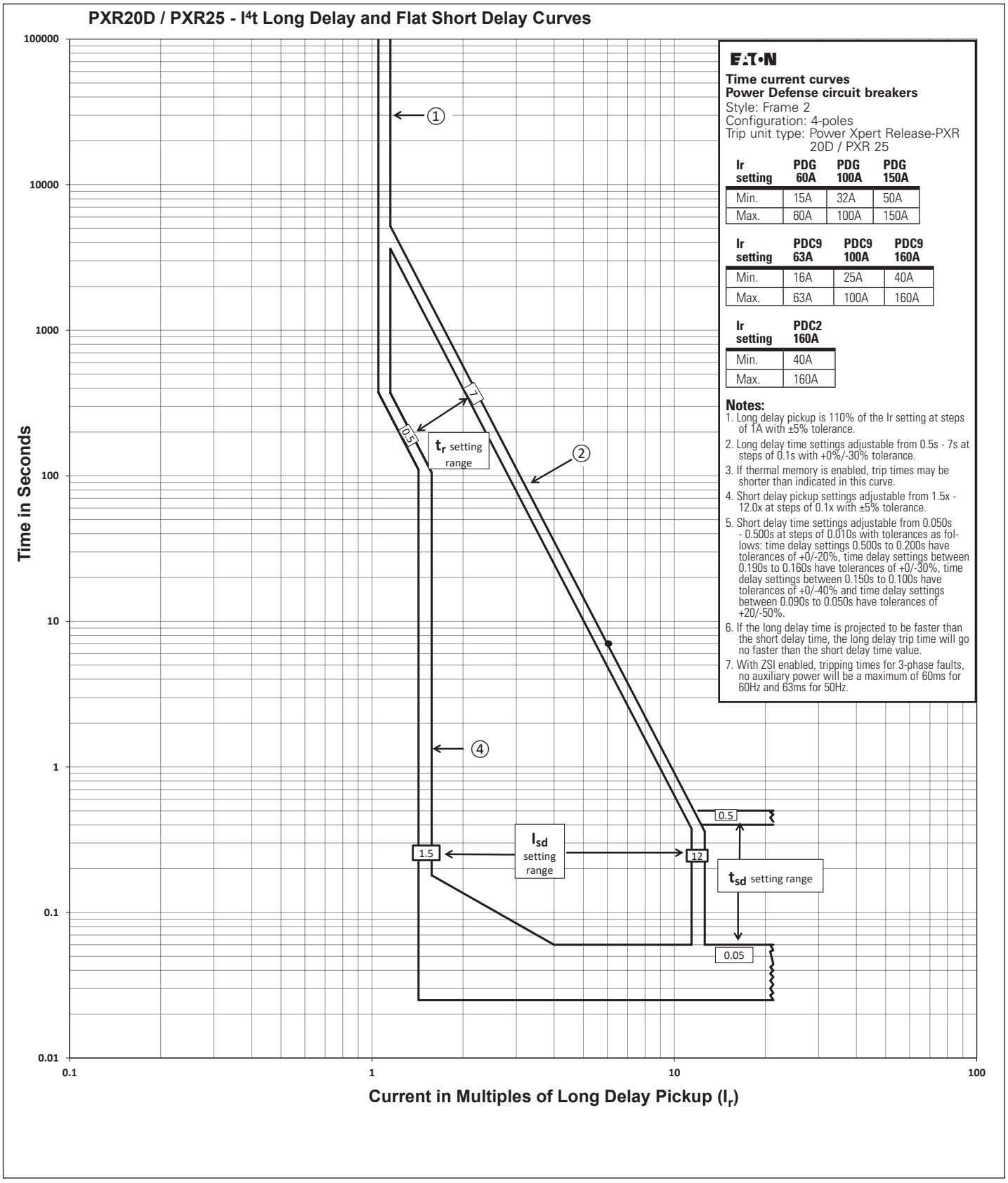


Figure 9. PXR 25 - I⁴t long delay and flat short delay for 60A - 160A frames.

April 2022

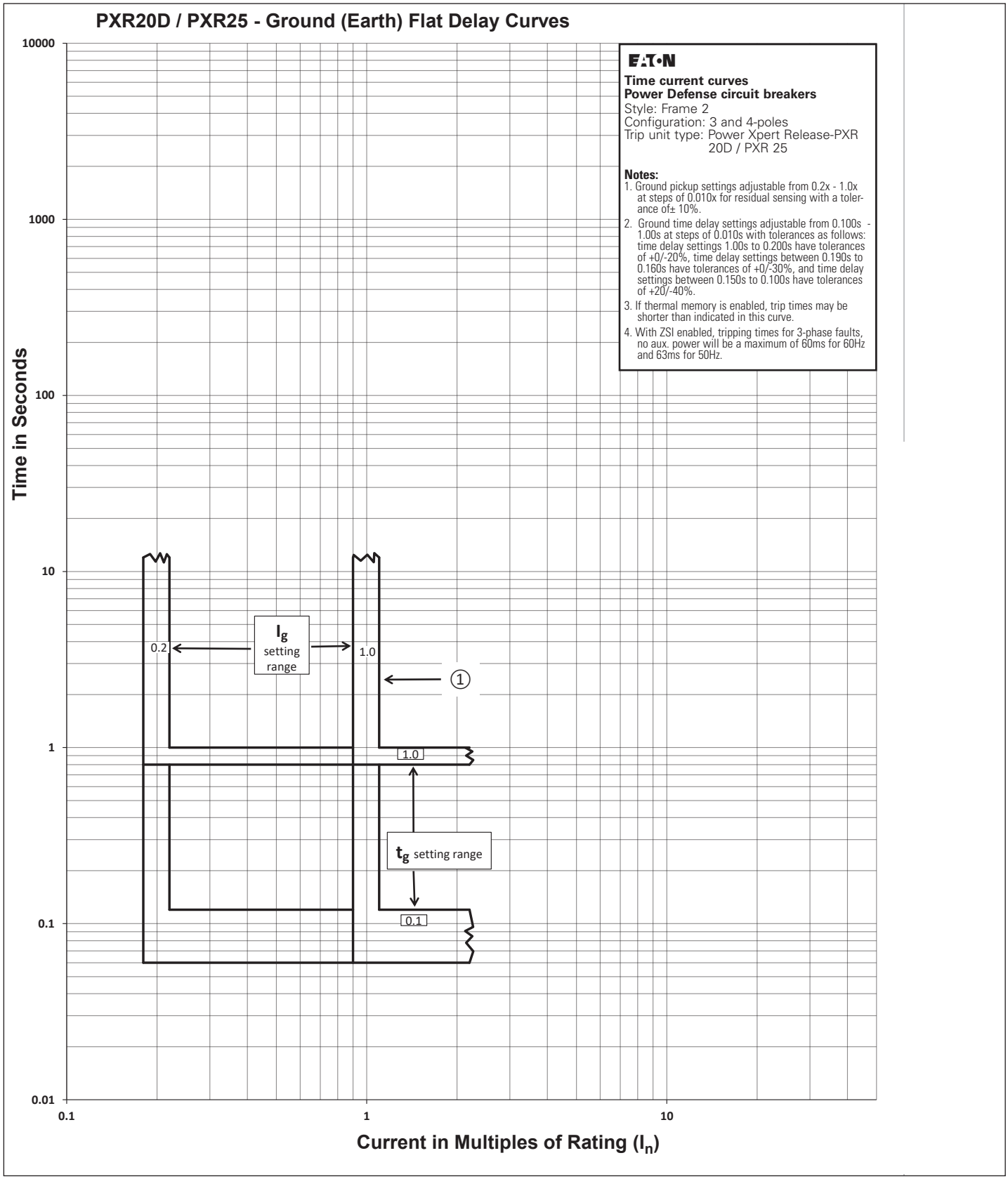


Figure 10. PXR 20D / PXR 25 ground (earth) flat delay.

April 2022

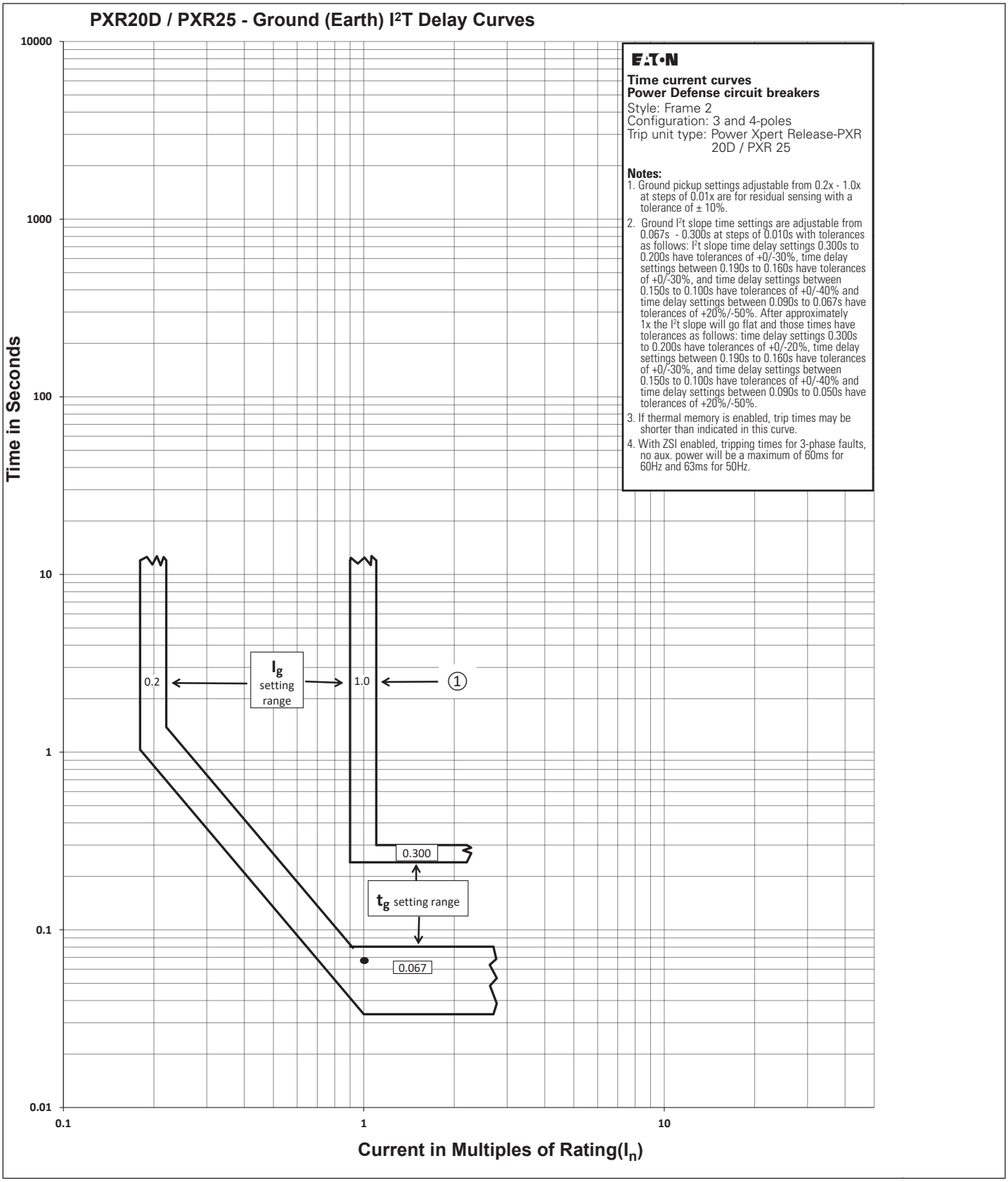


Figure 11. PXR 20D / PXR 25 -ground (earth) I²t delay.

April 2022

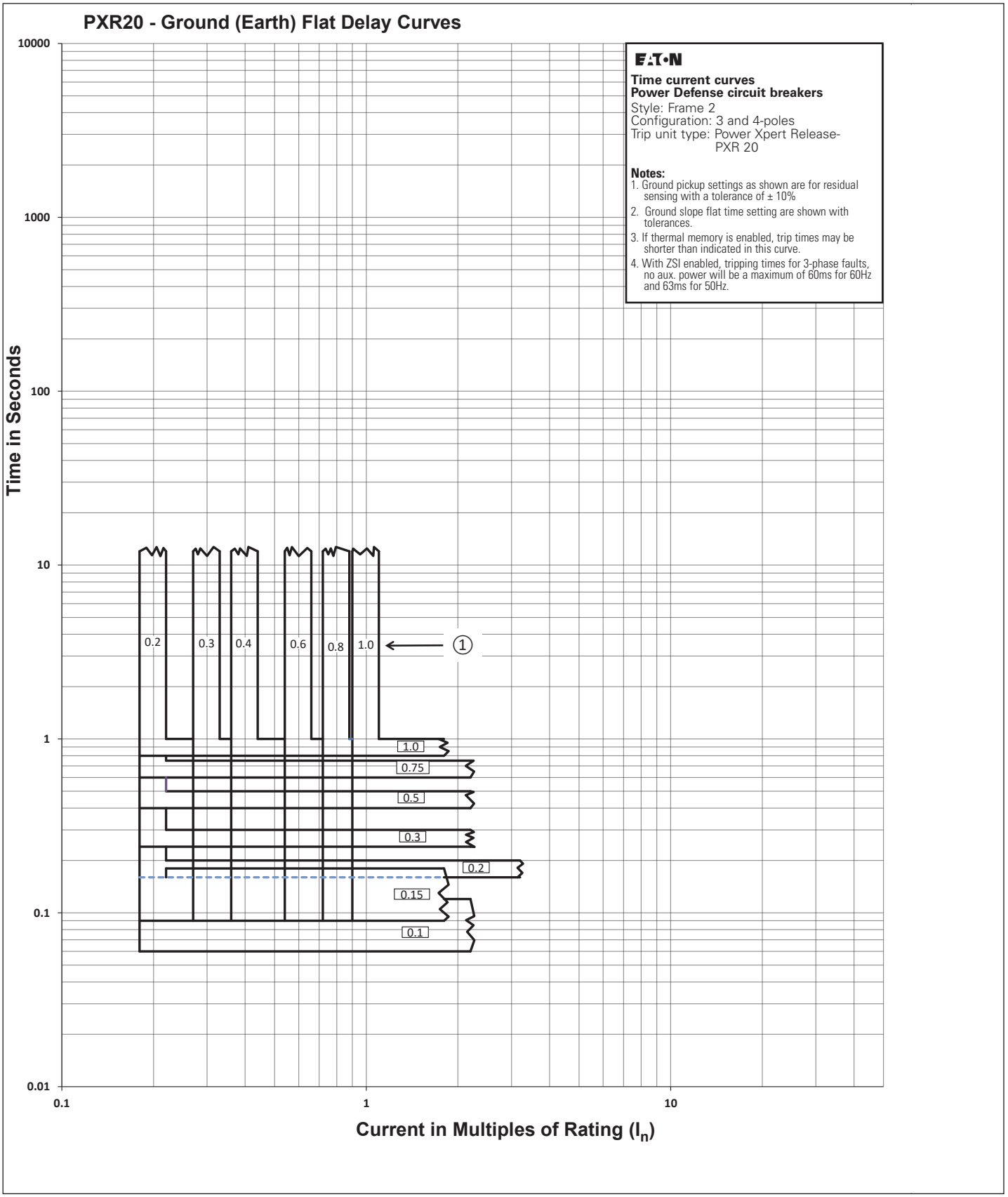


Figure 12. PXR 20 - ground (earth) flat delay.

April 2022

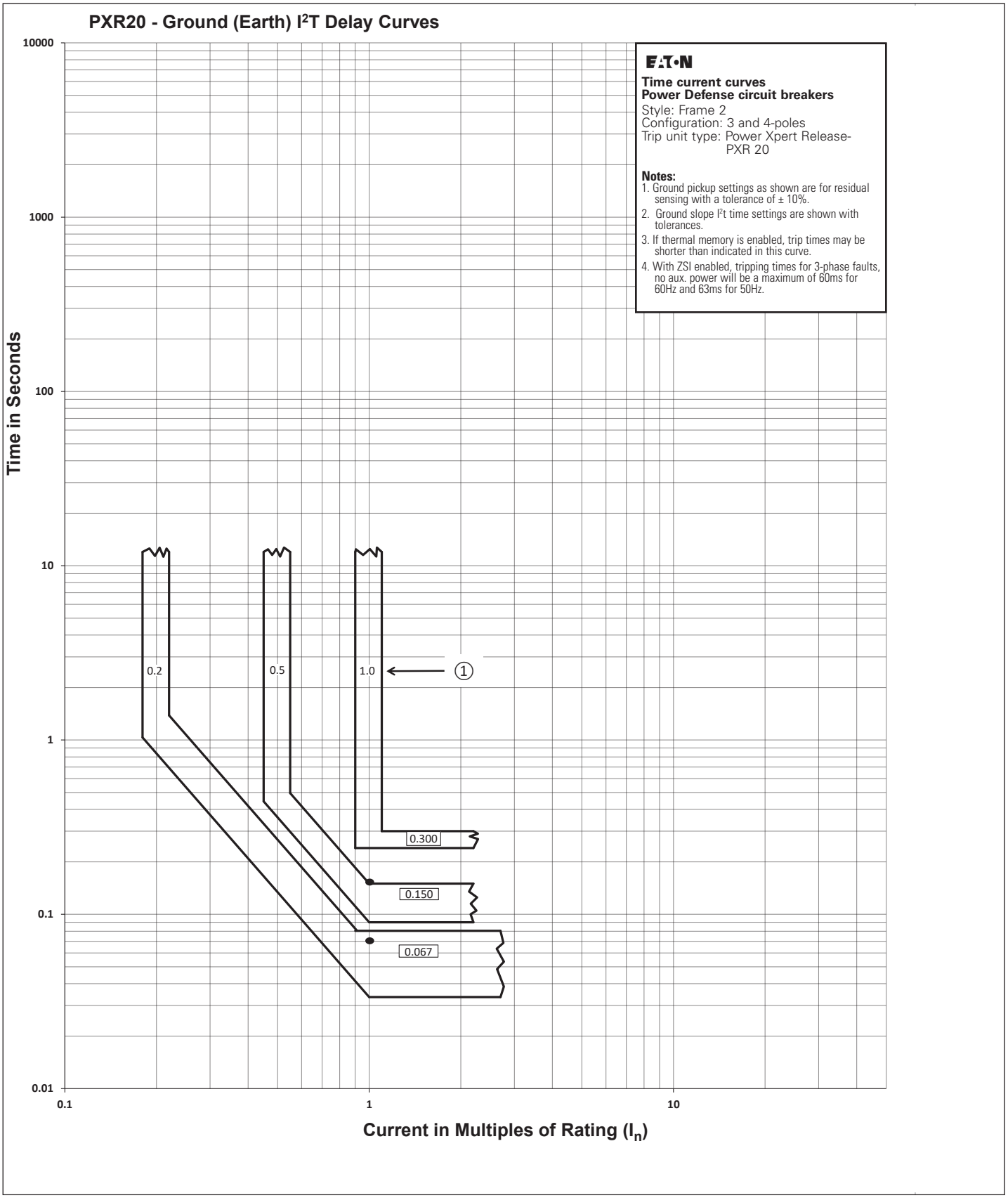


Figure 13. PXR 20 - ground (earth) I²t delay.

April 2022

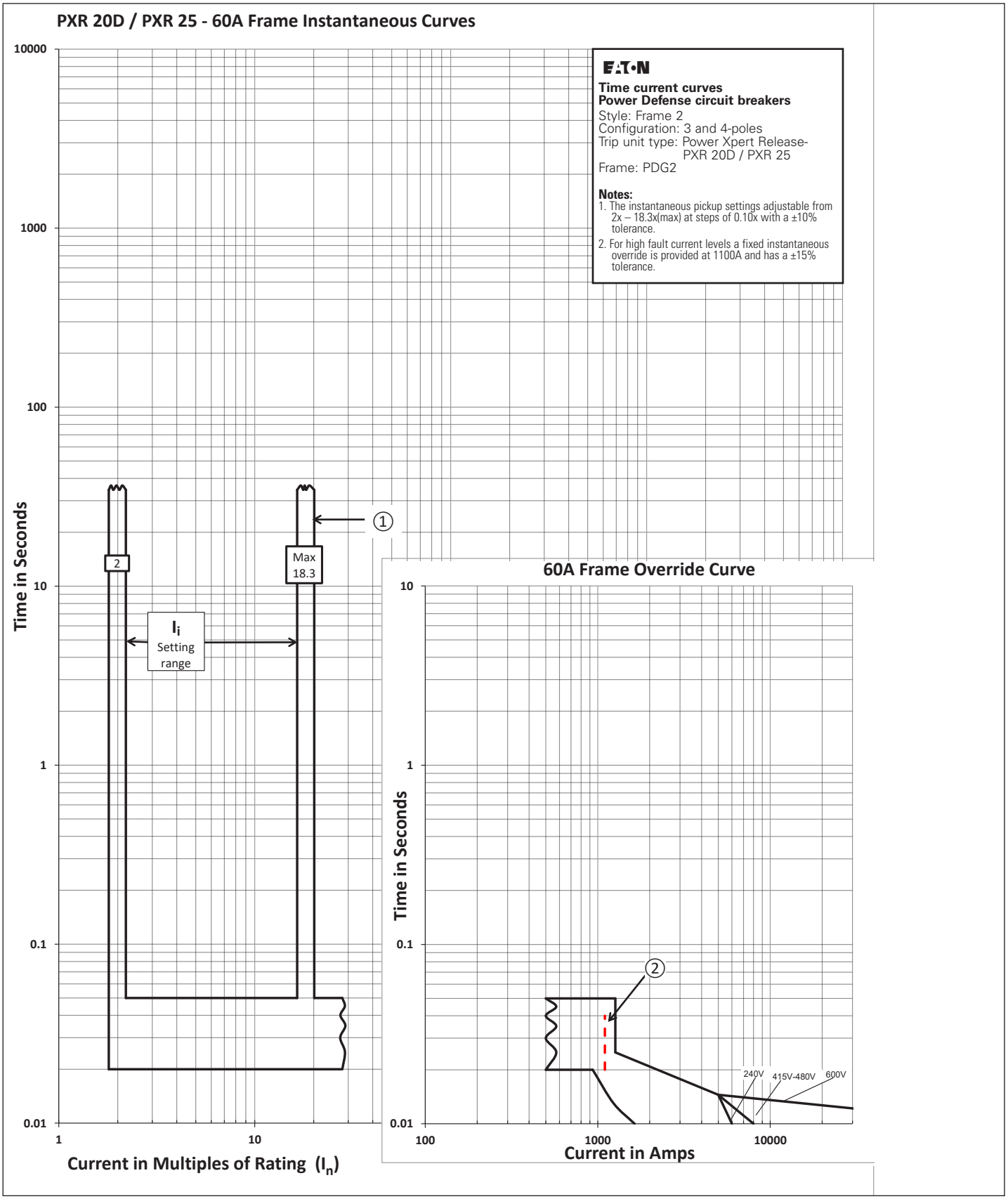


Figure 14. PXR 20D / PXR 25 - instantaneous and override for 60A frame.

April 2022

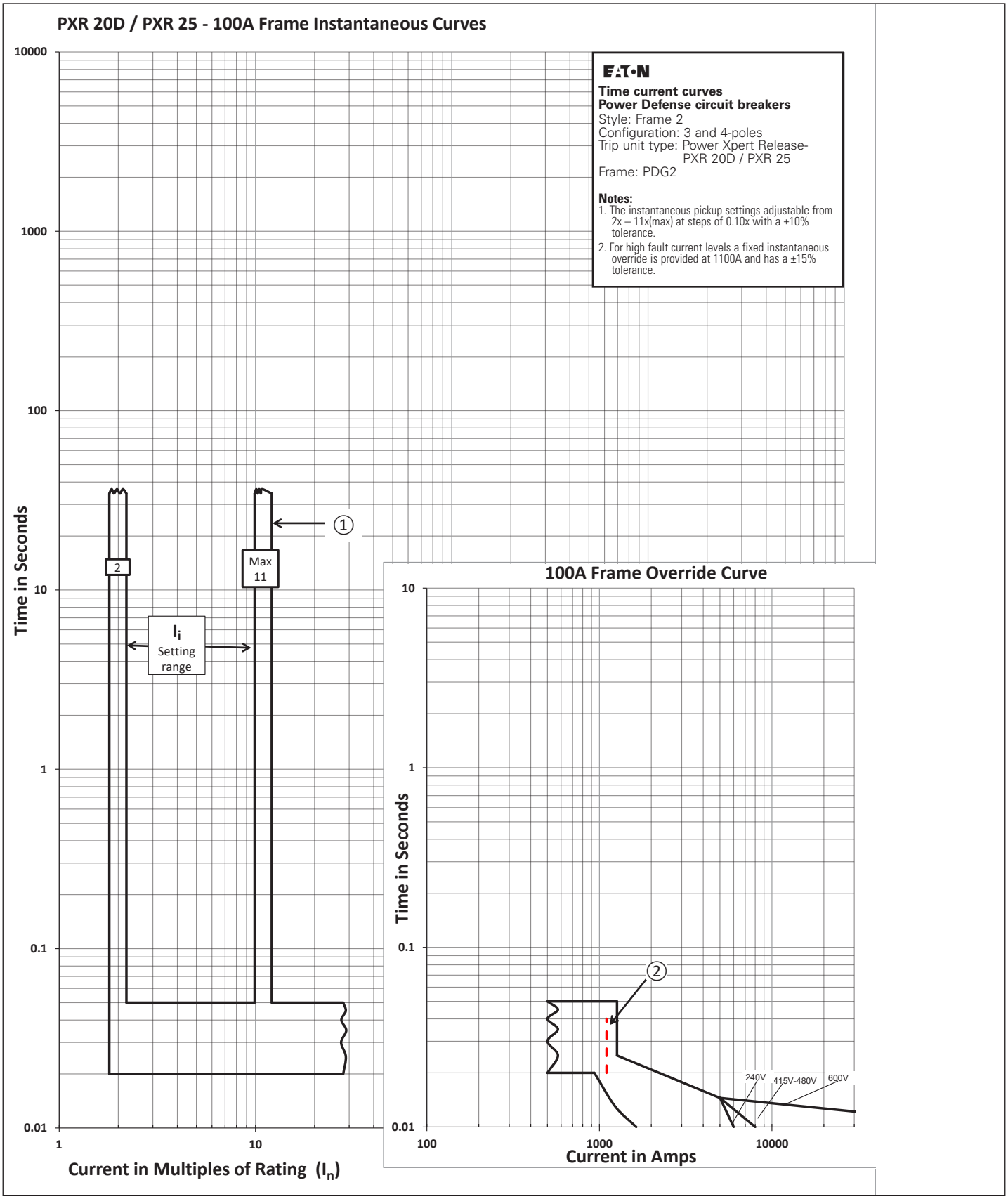


Figure 15. PXR 20D / PXR 25 - instantaneous and override for 100A frame.

April 2022

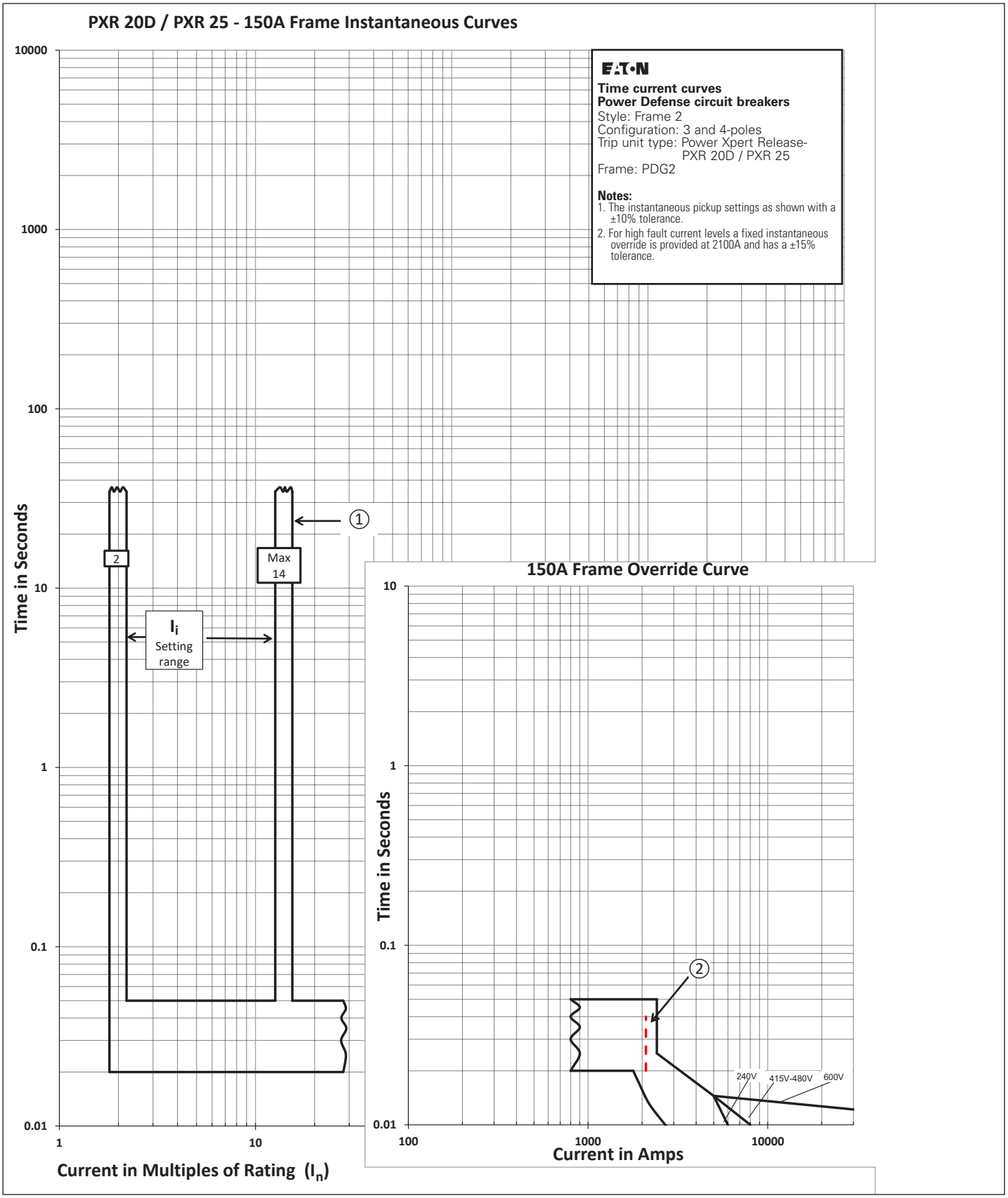


Figure 16. PXR 20D / PXR 25 - instantaneous and override for 150A frame.

April 2022

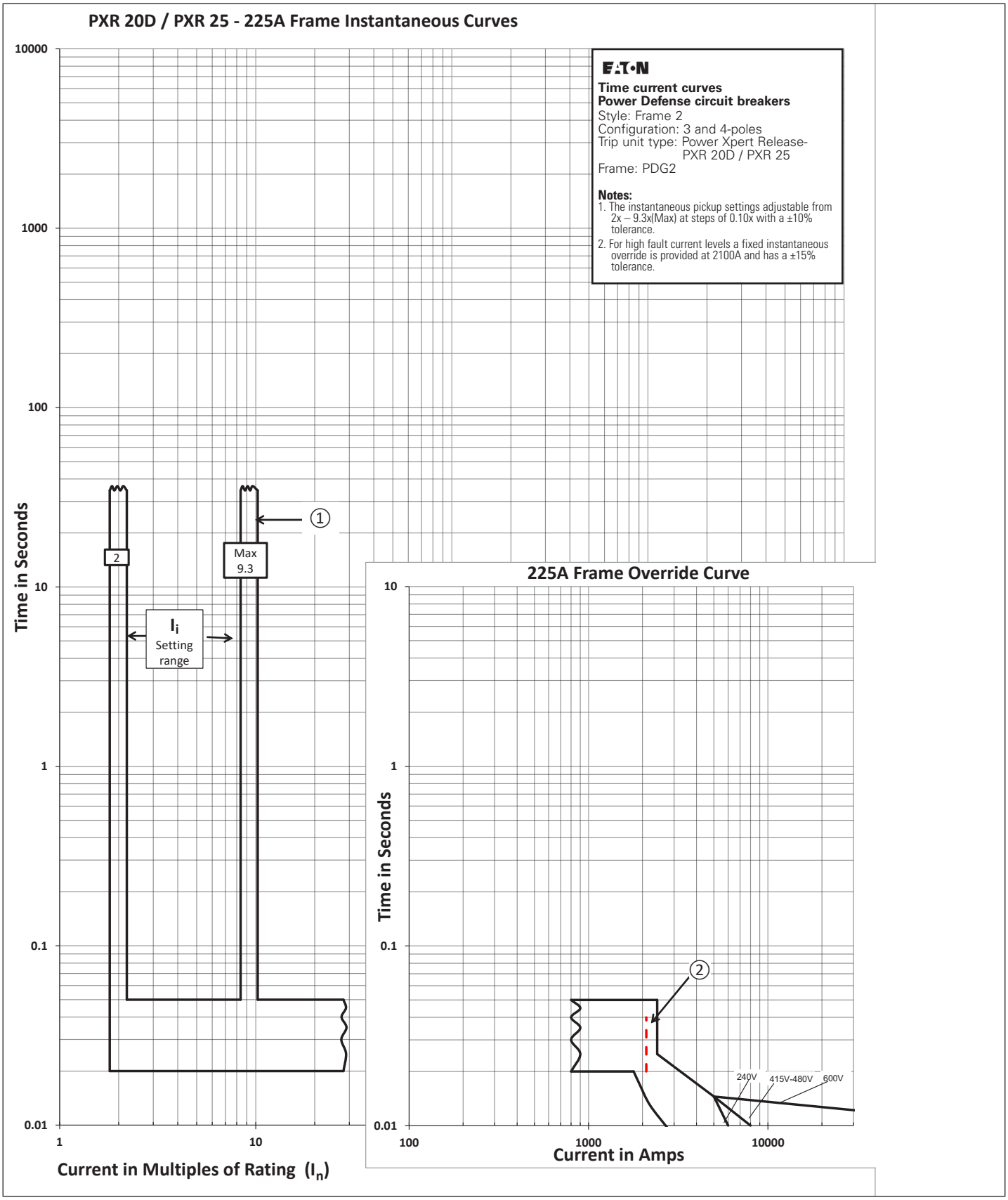


Figure 17. PXR 20D / PXR 25 - instantaneous and override for 225A frame.

April 2022

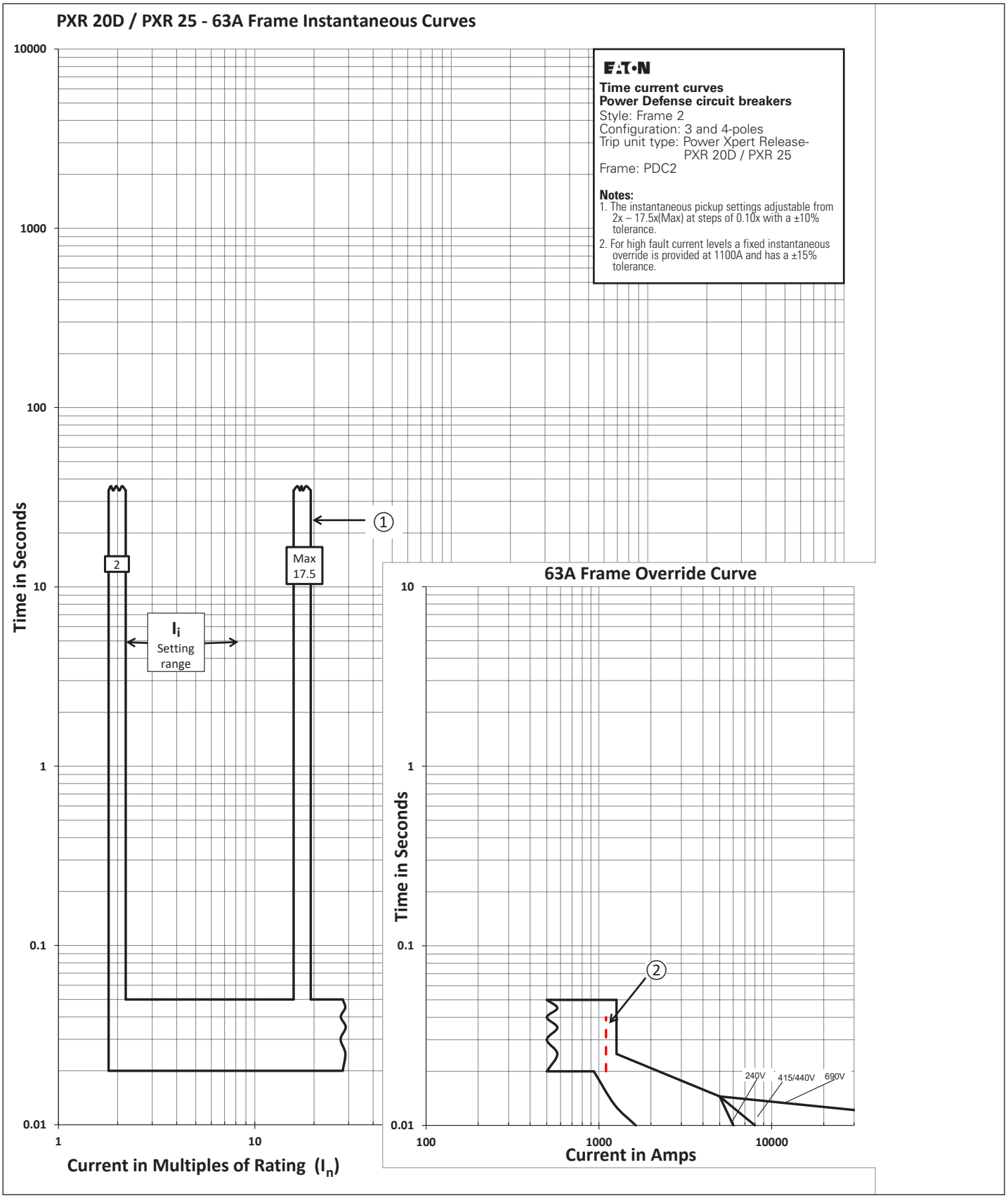


Figure 18. PXR 20D / PXR 25 - Instantaneous and override for 63A frame.

April 2022

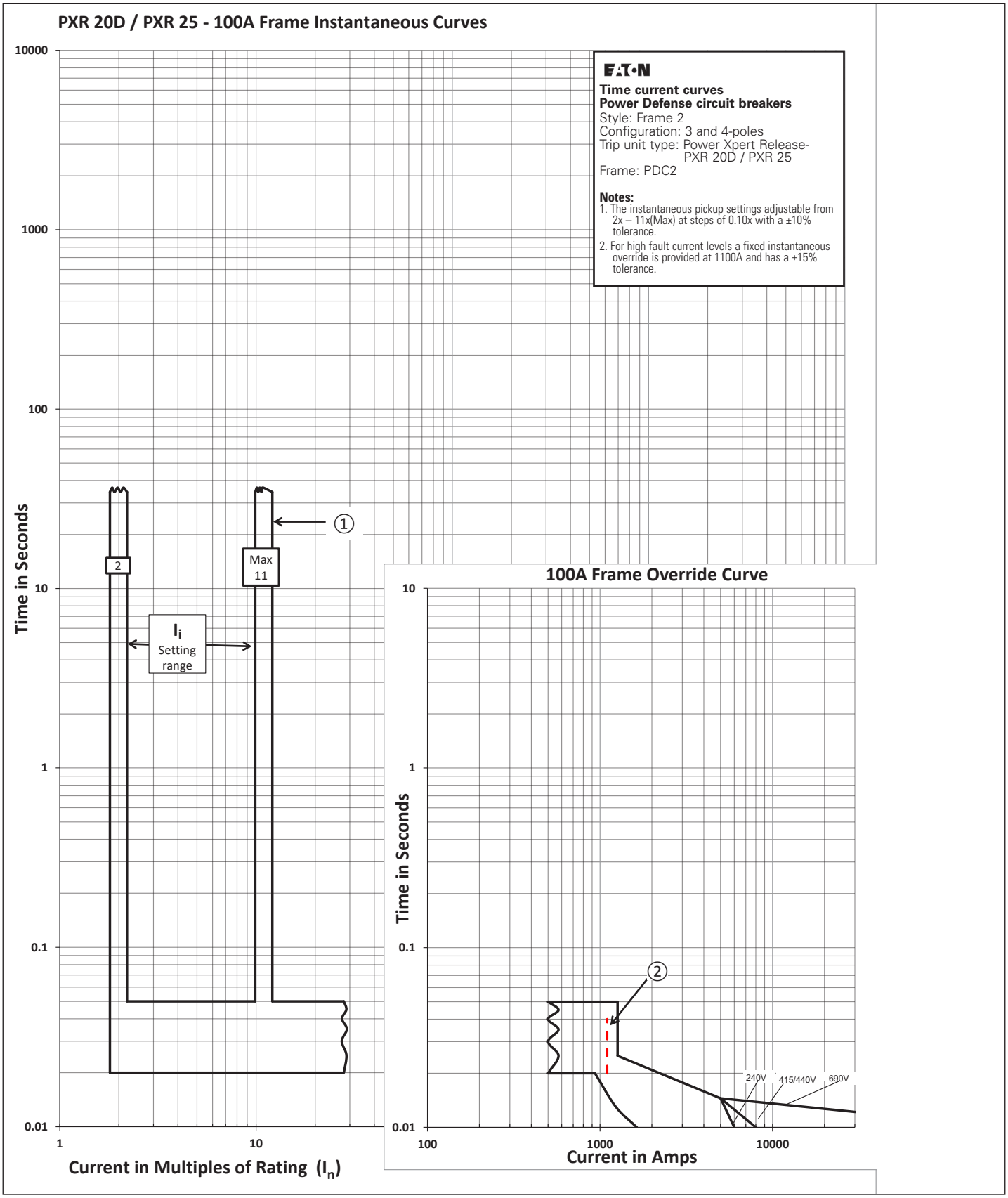


Figure 19. PXR 20D / PXR 25 - instantaneous and override for 100A frame.

April 2022

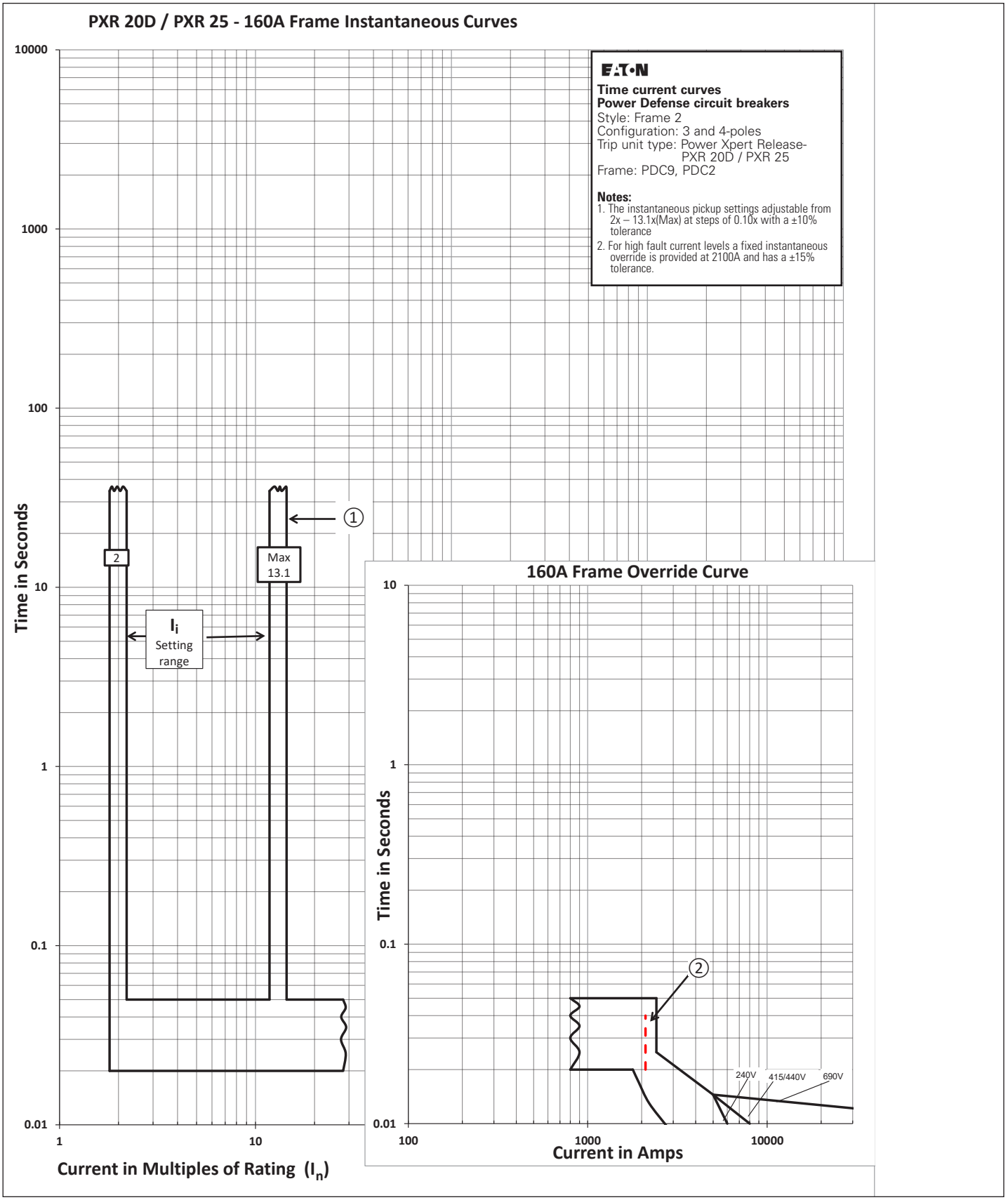


Figure 20. PXR 20D / PXR 25 -instantaneous and override for 160A frame.

April 2022

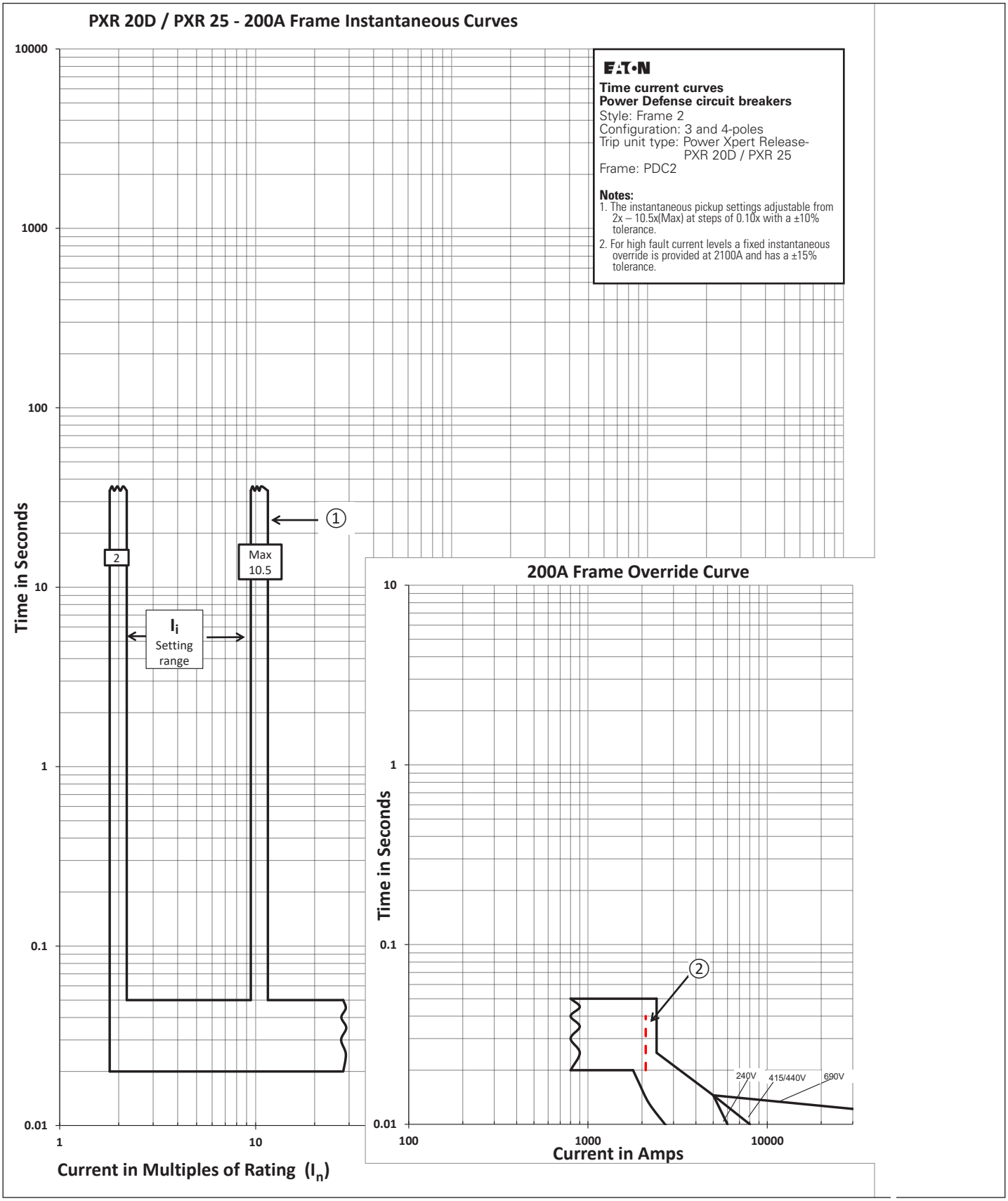


Figure 21. PXR 20D / PXR 25 - instantaneous and override for 200A frame.

April 2022

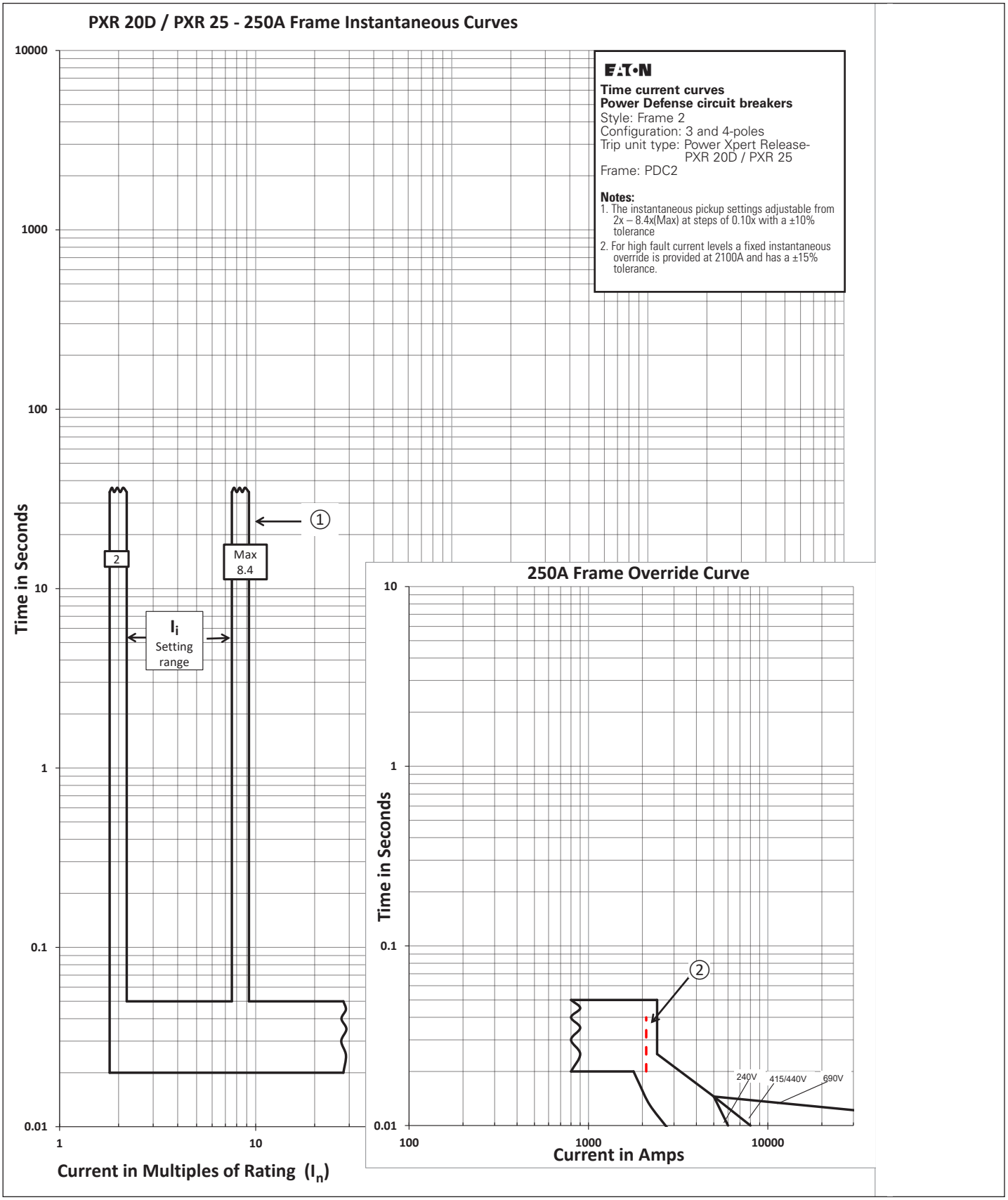


Figure 22. PXR 20D / PXR 25 - instantaneous and override for 250A frame.

April 2022

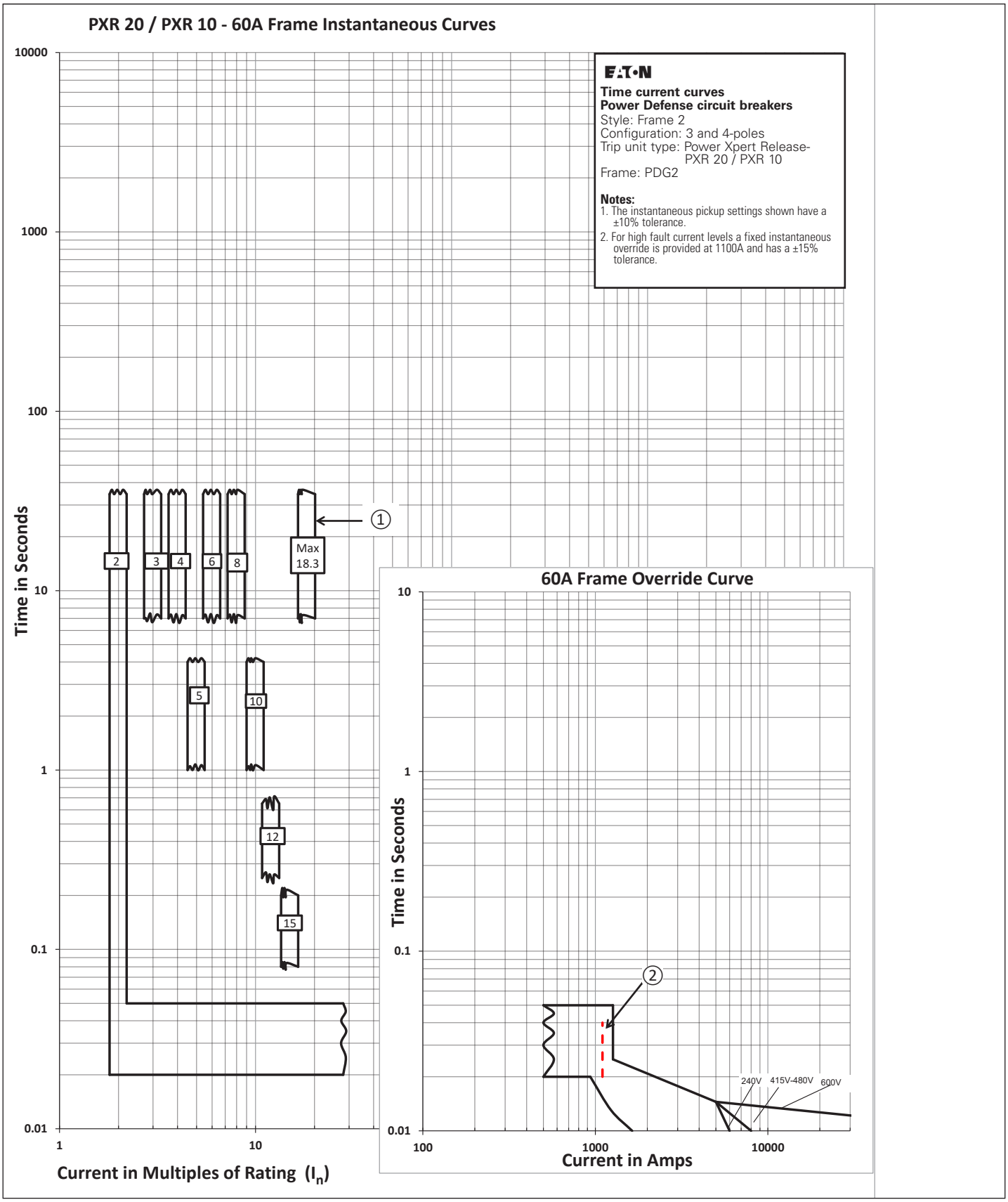


Figure 23. PXR 20 / PXR 10 - instantaneous and override for 60A frame.

April 2022

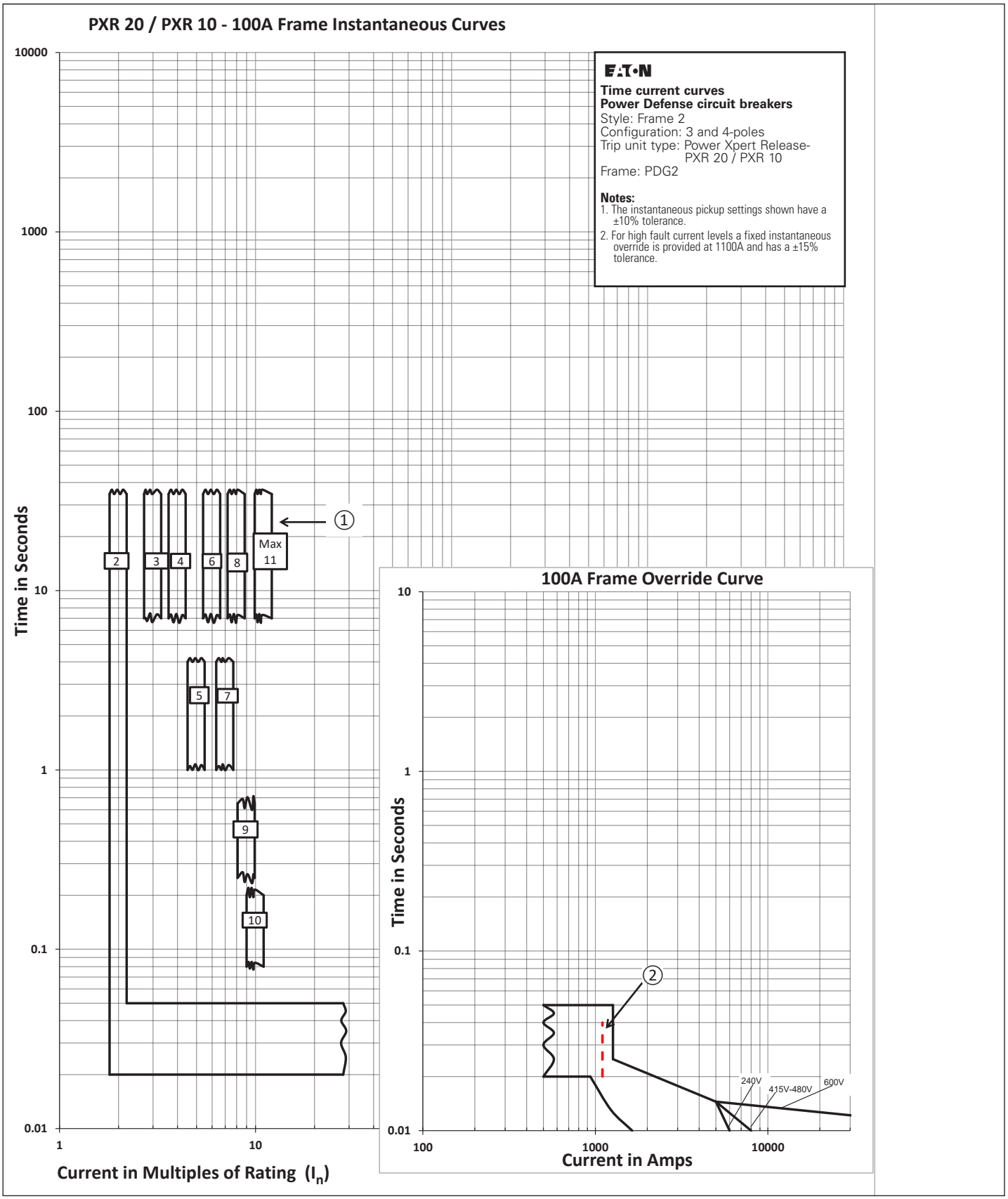


Figure 24. PXR 20 / PXR 10 - instantaneous and override for 100A frame.

April 2022

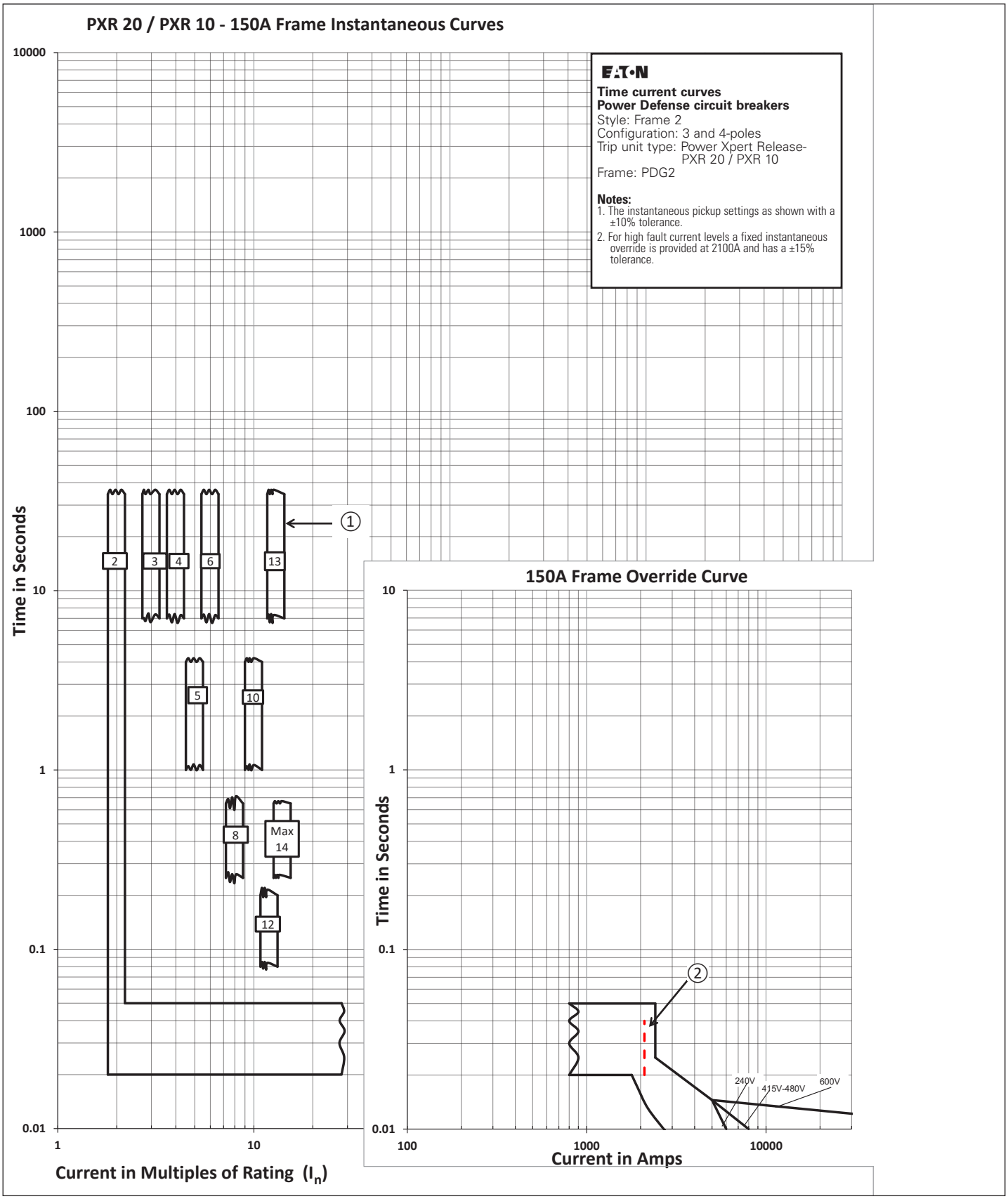


Figure 25. PXR 20 / PXR 10 - instantaneous and override for 150A frame.

April 2022

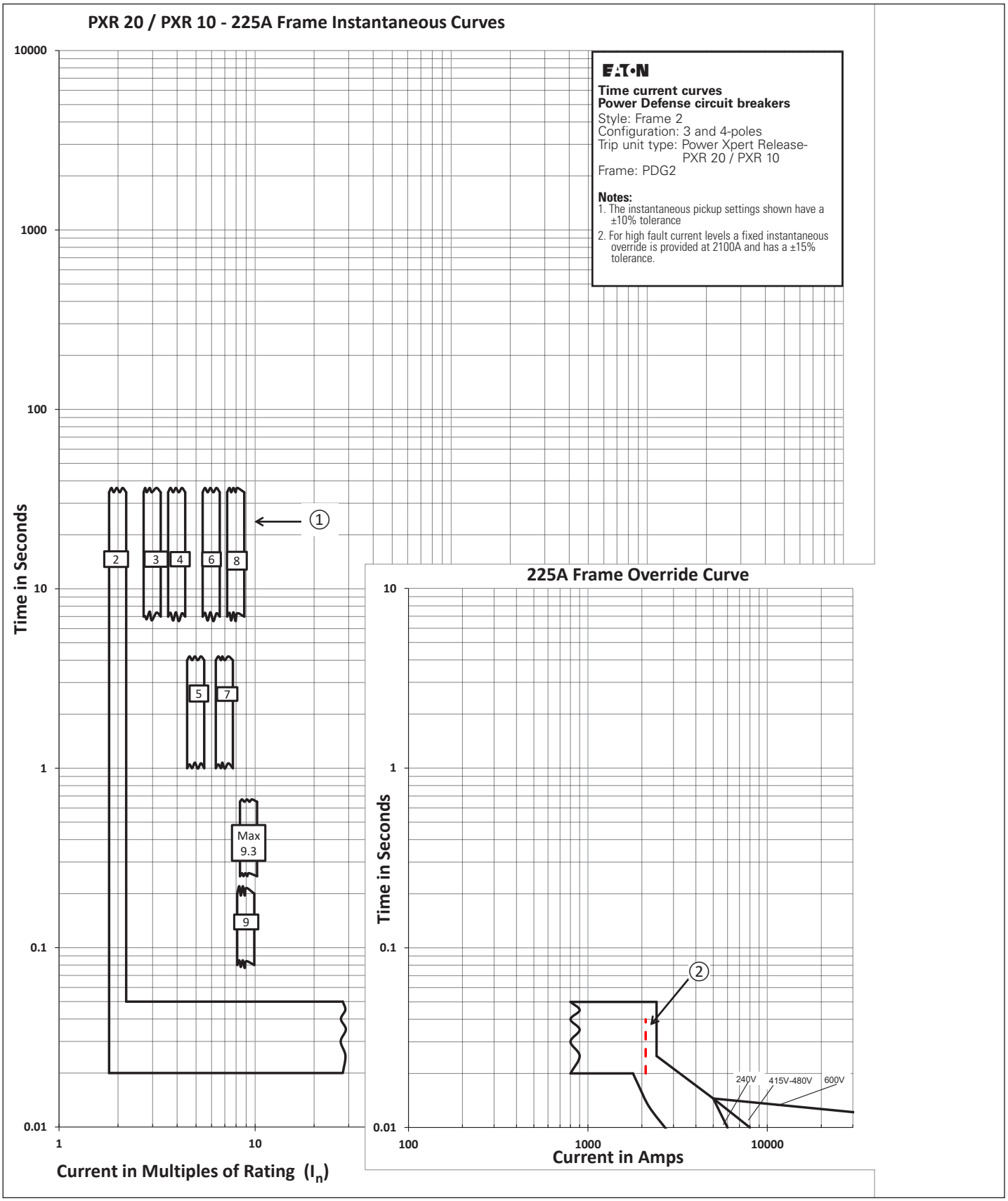


Figure 26. PXR 20 / PXR 10 - instantaneous and override for 225A frame.

April 2022

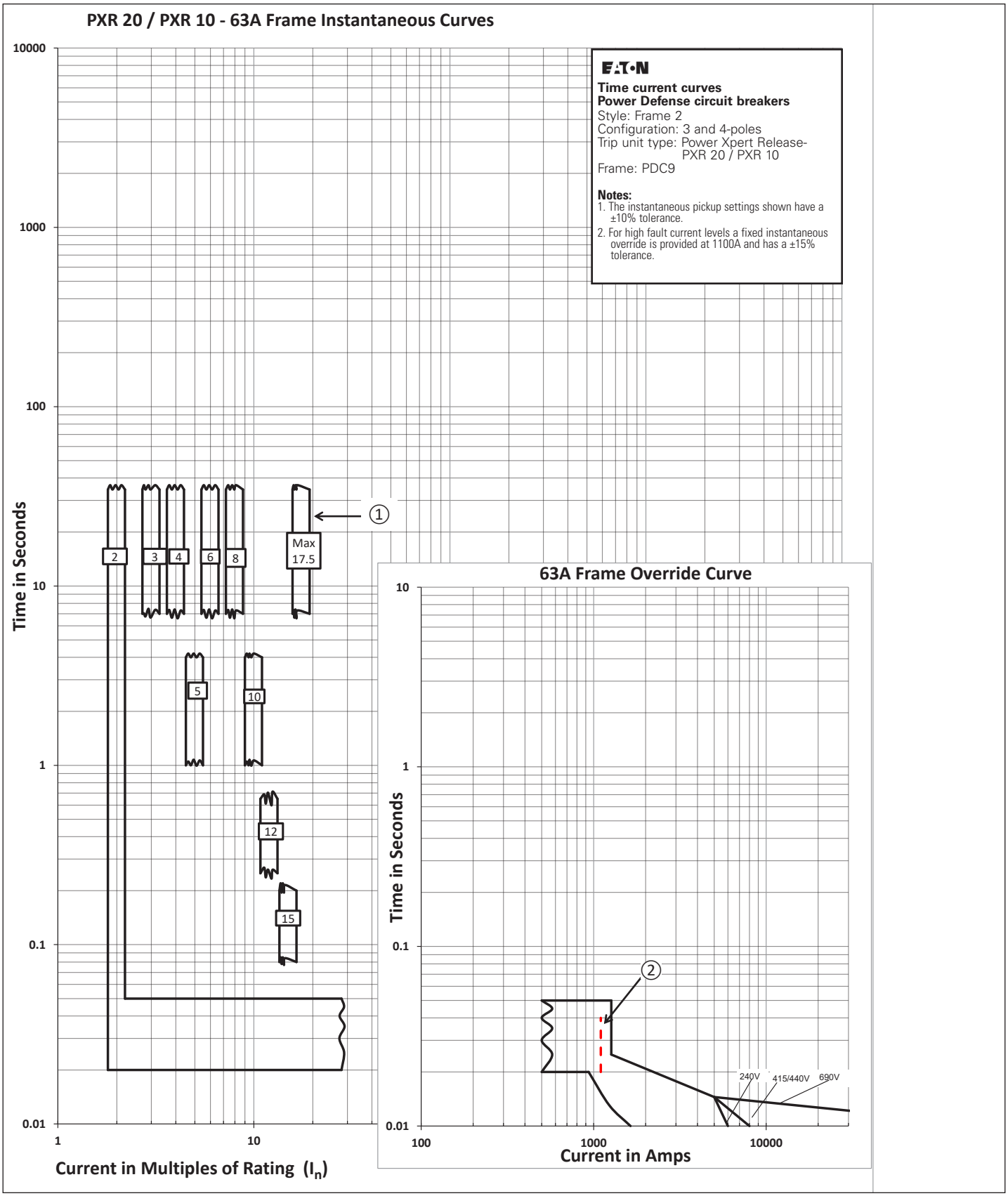


Figure 27. PXR 20 / PXR 10 - instantaneous and override for 63A frame.

April 2022

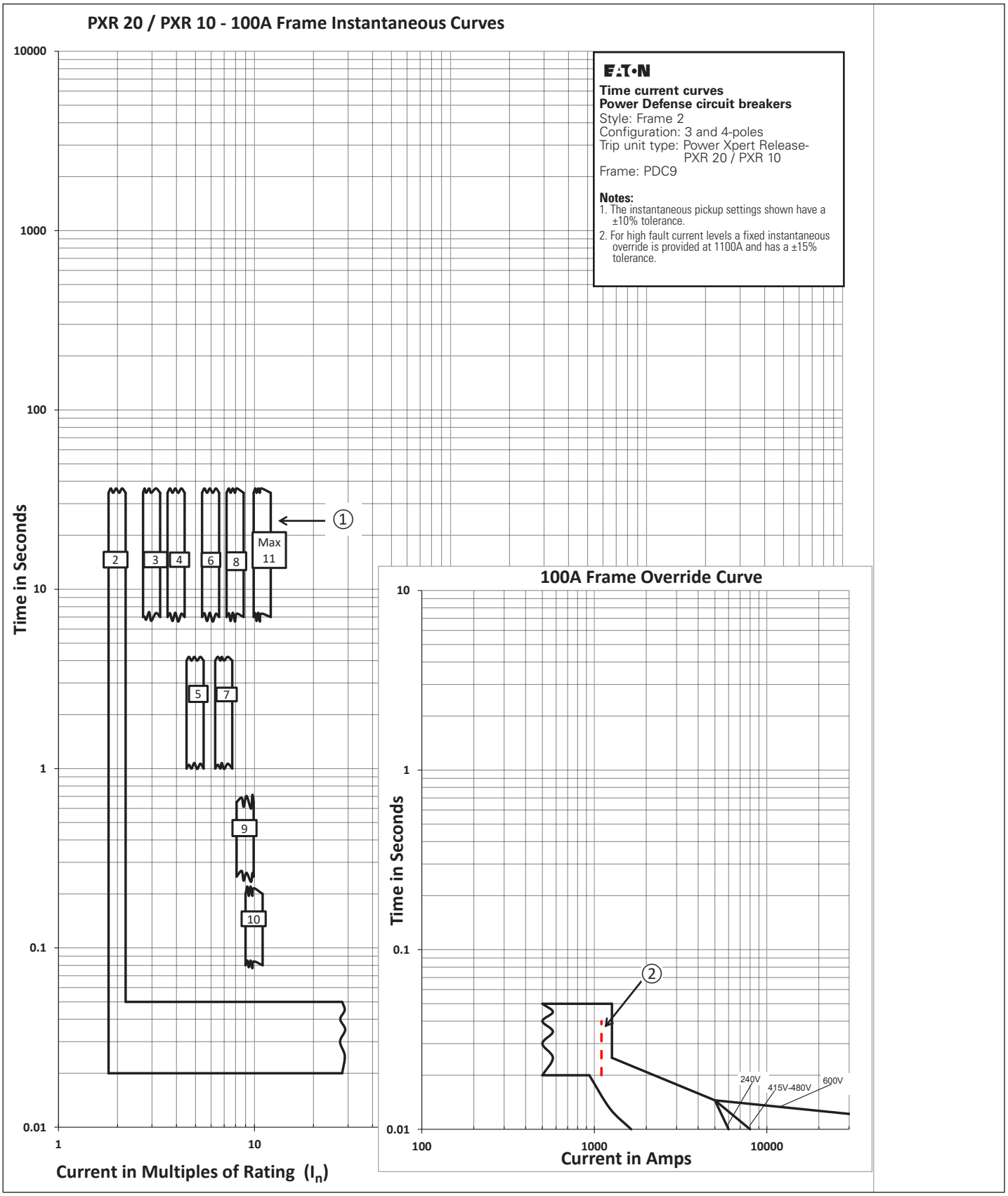


Figure 28. PXR 20 / PXR 10 - instantaneous and override for 100A frame.

April 2022

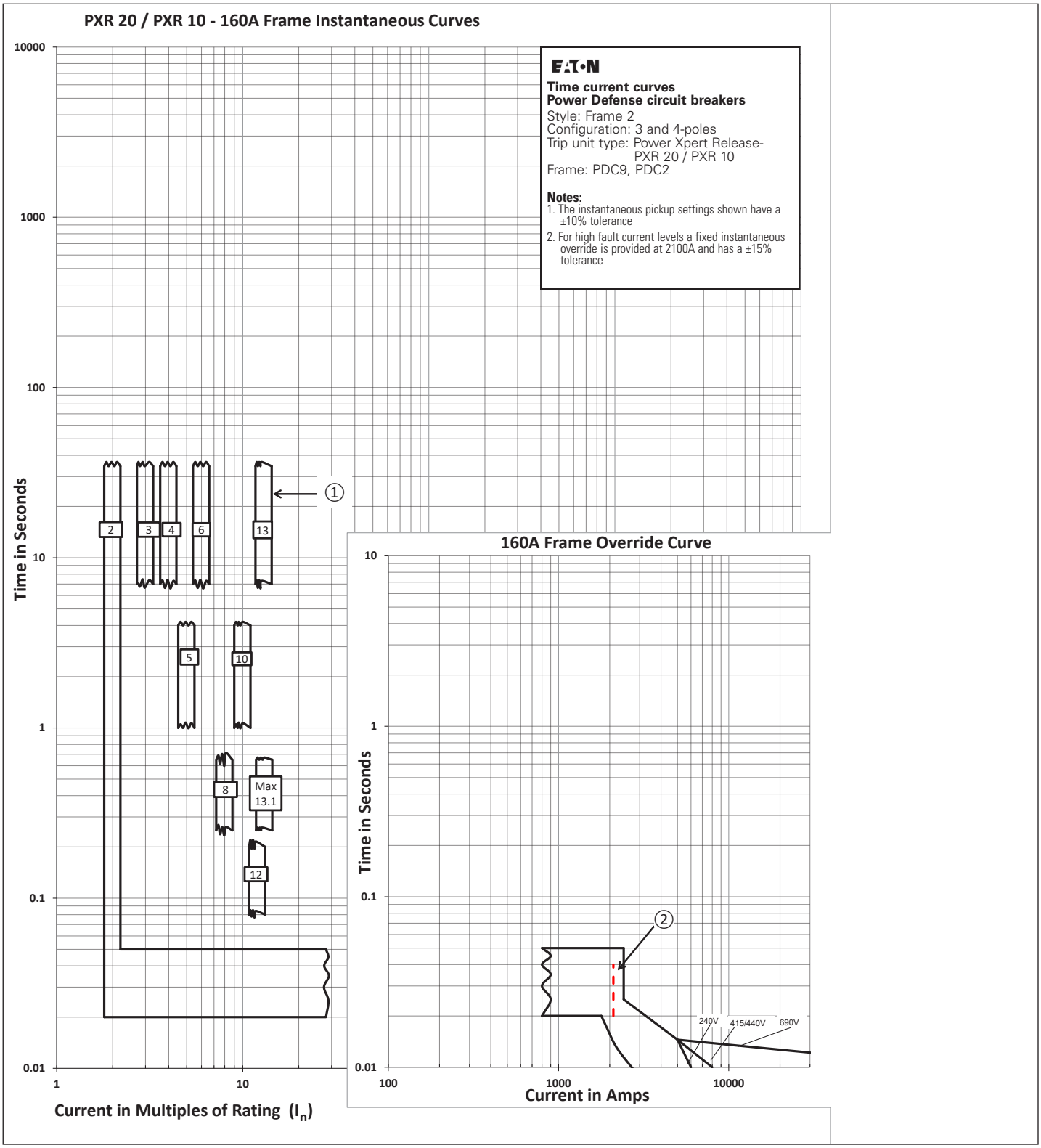


Figure 29. PXR 20 / PXR 10 - instantaneous and override for 160A frame.

April 2022

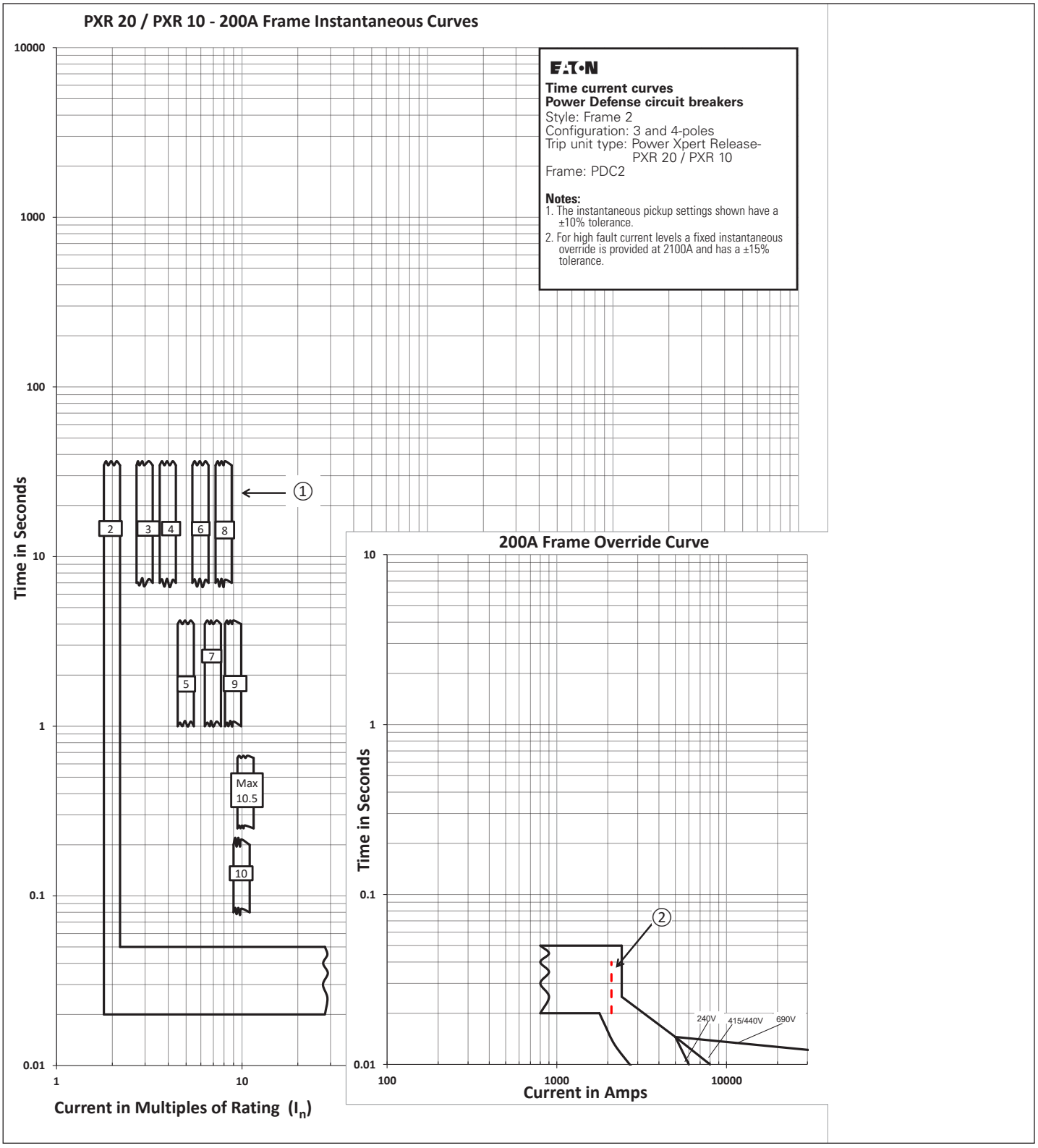


Figure 30. PXR 20 / PXR 10 - instantaneous and override for 200A frame.

April 2022

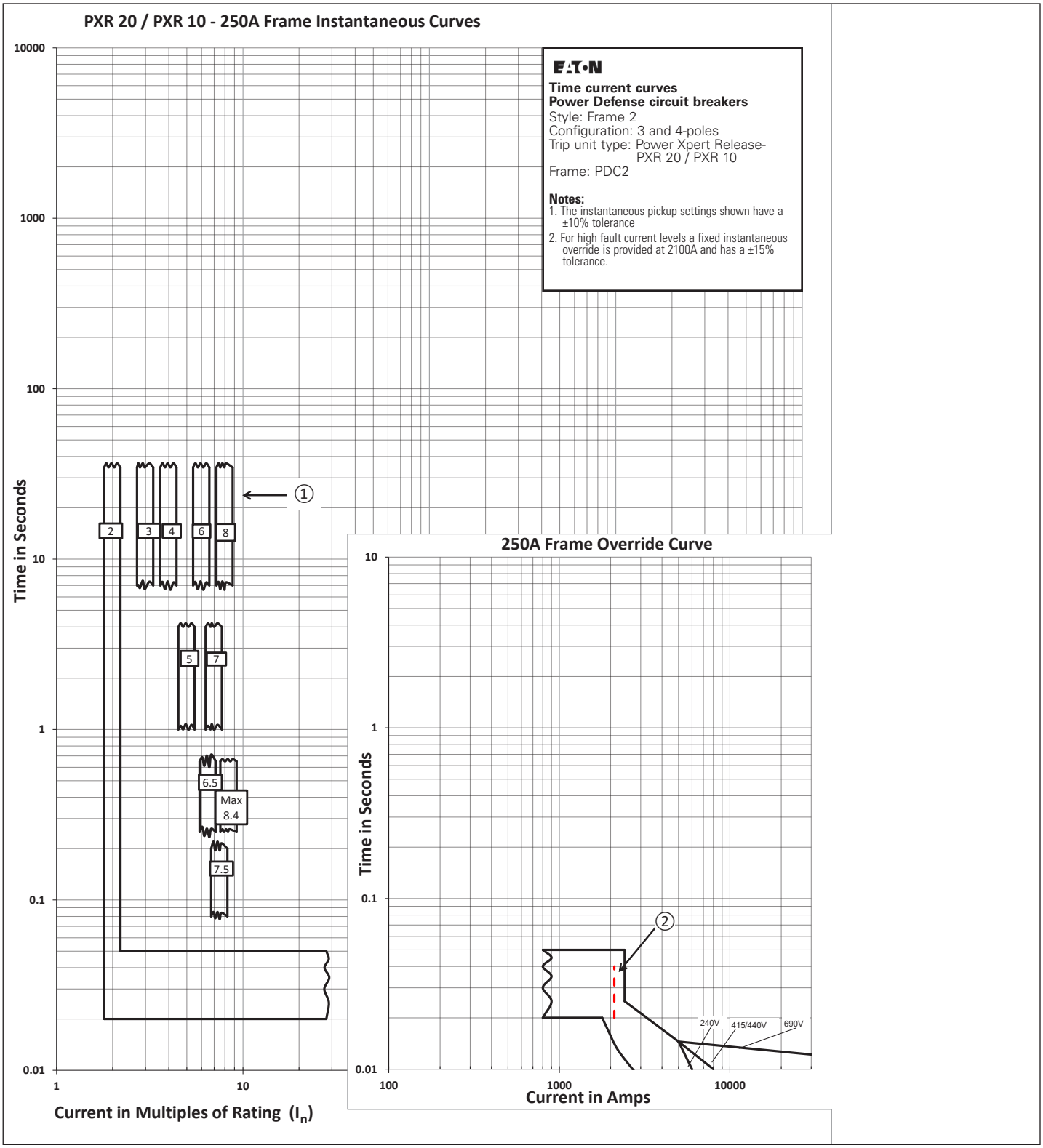


Figure 31. PXR 20 / PXR 10 - instantaneous and override for 250A frame.

April 2022

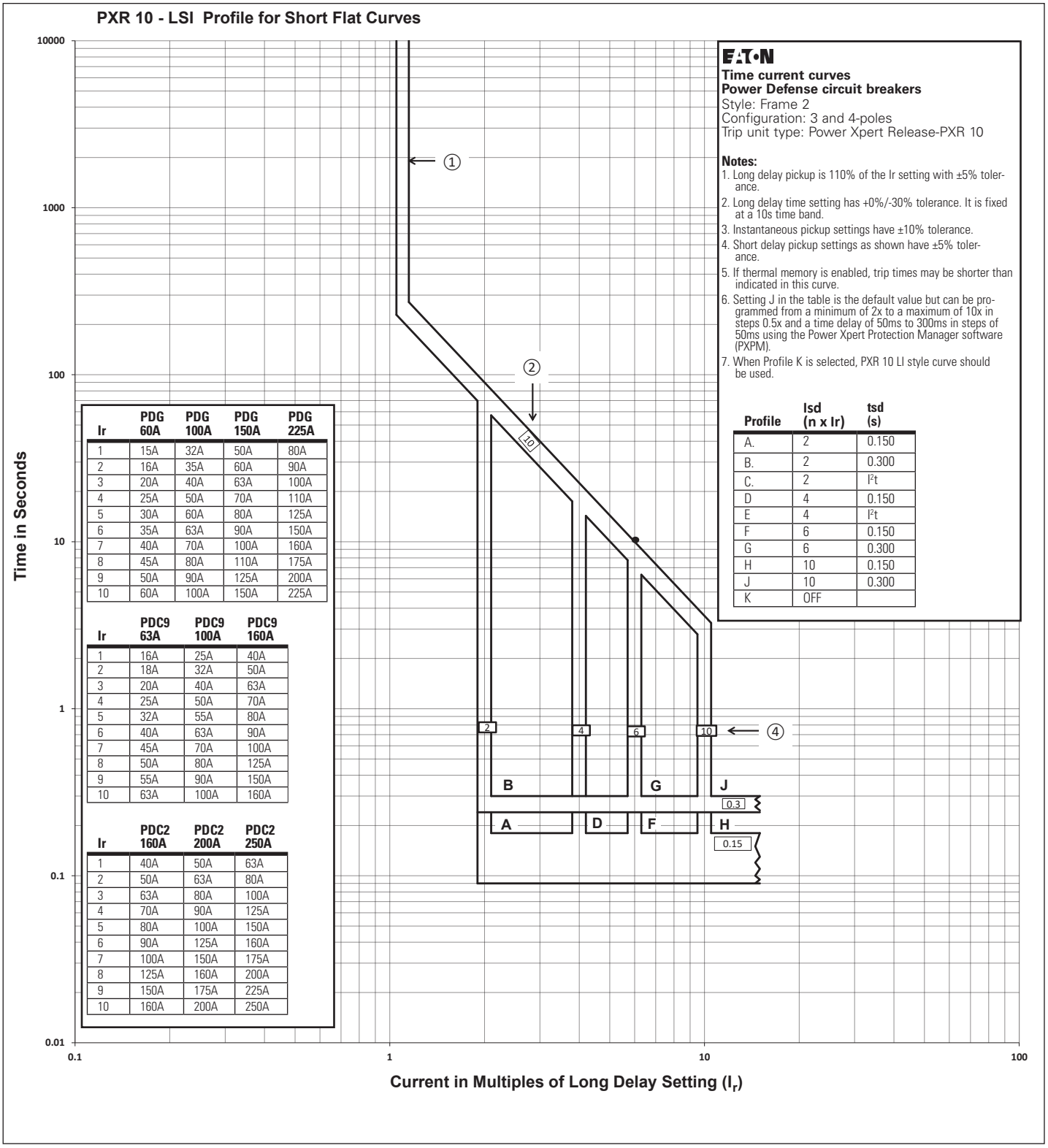


Figure 32. PXR 10 LSI profile for short flat curves.

April 2022

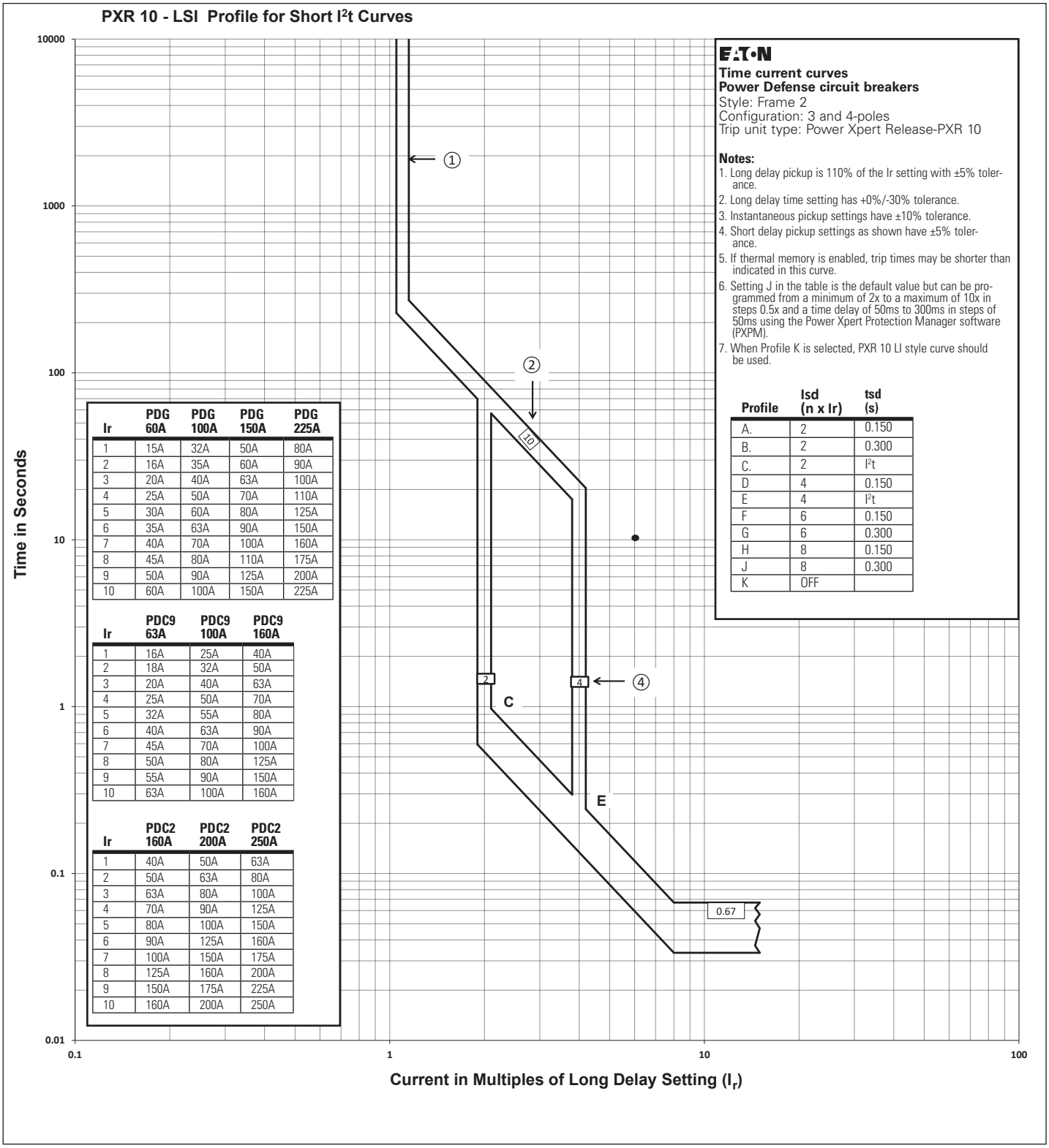


Figure 33. PXR 10 LSI profile for I²t short curves.

April 2022

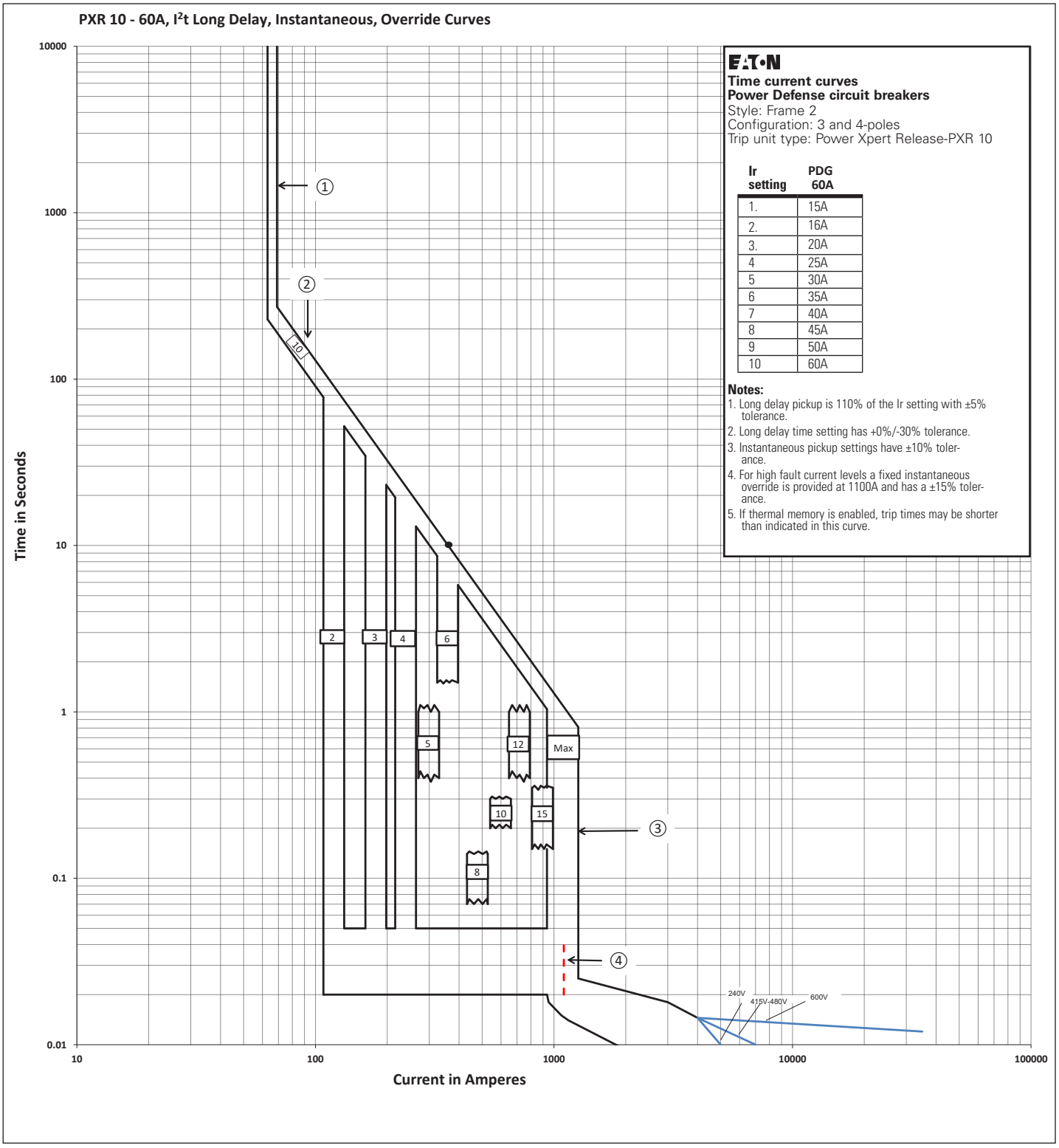


Figure 34. PXR 10 LI style 60A frame.

April 2022

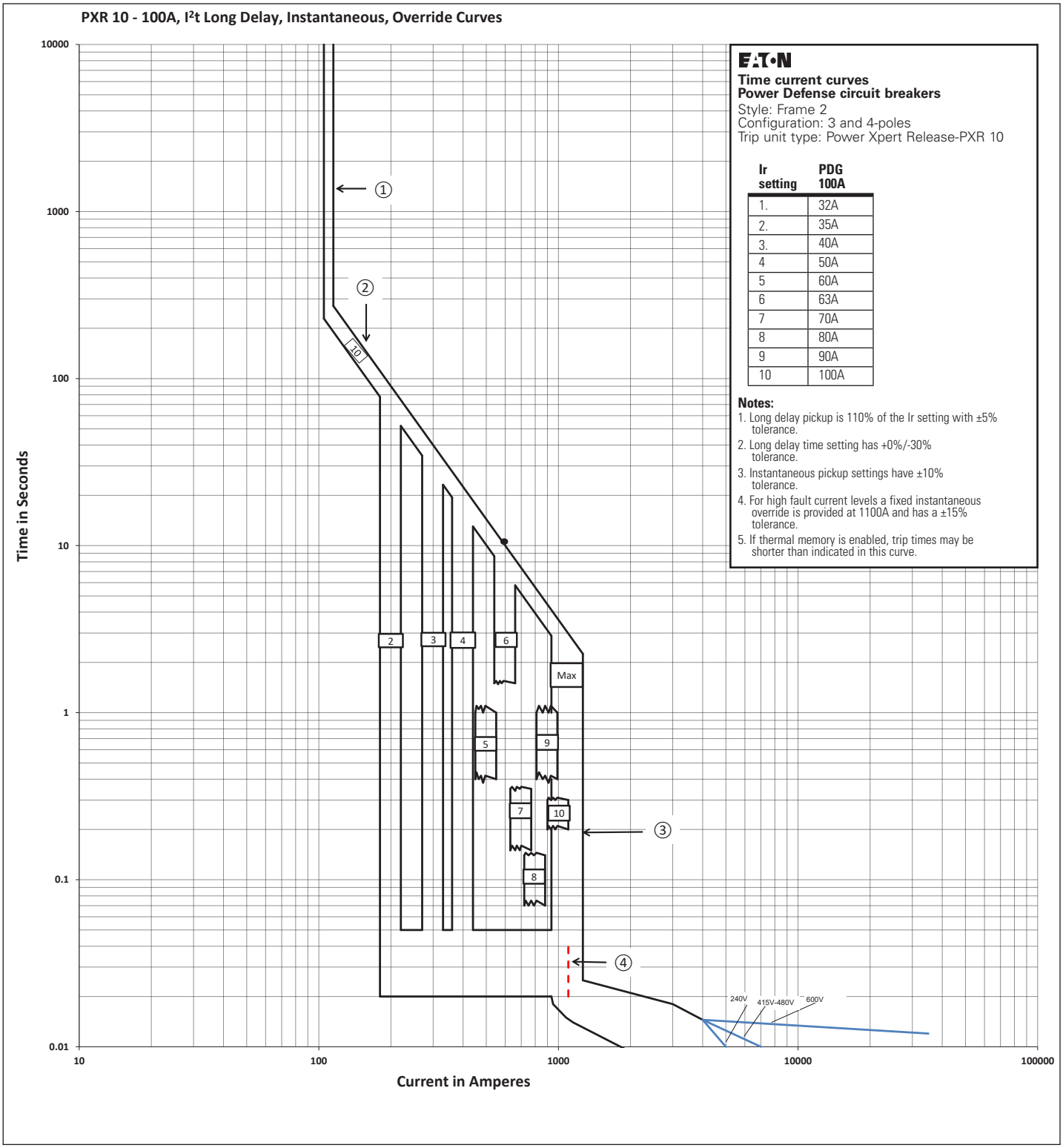


Figure 35. PXR 10 LI style 100A frame.

April 2022

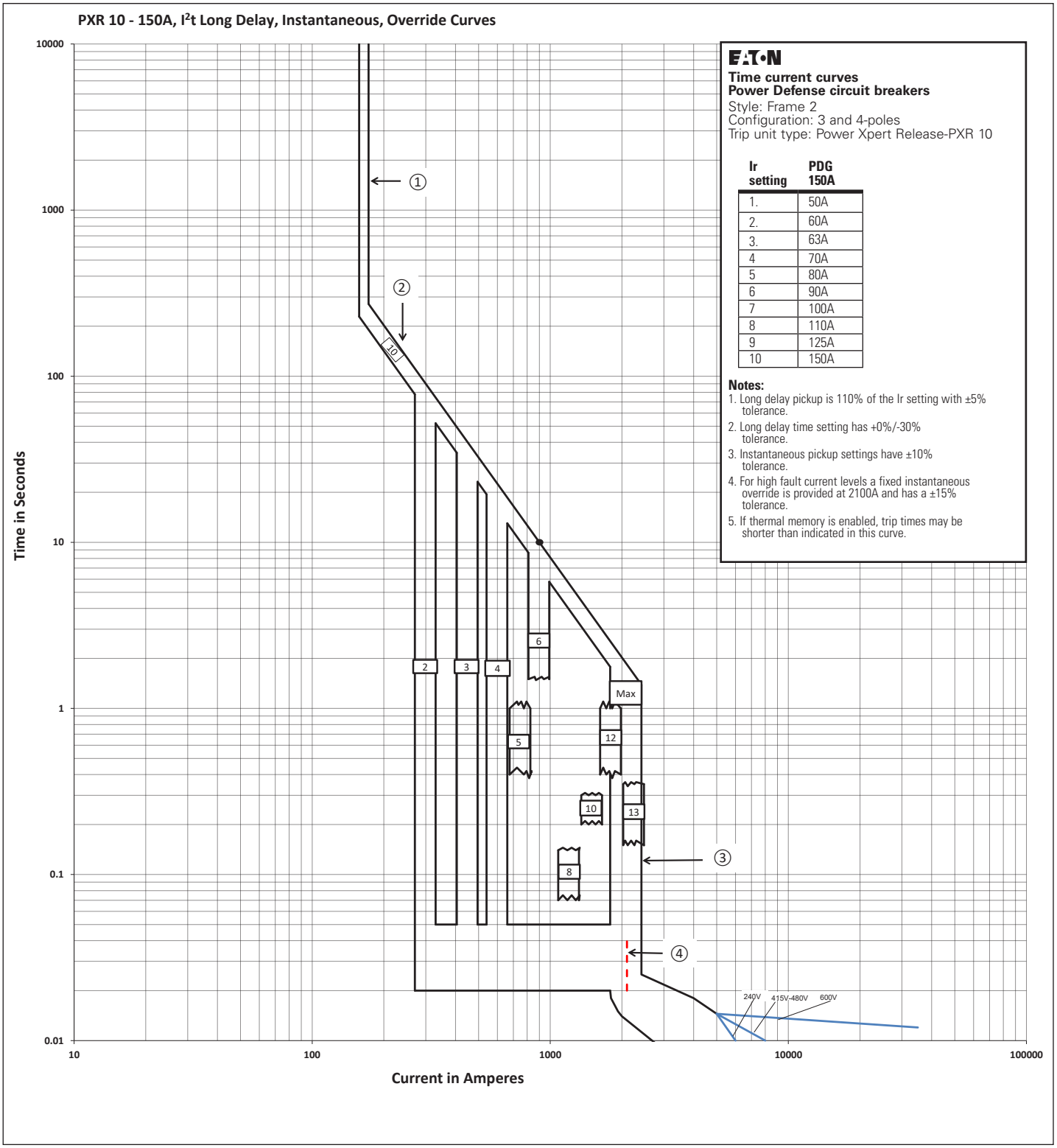


Figure 36. PXR 10 LI style 150A frame.

April 2022

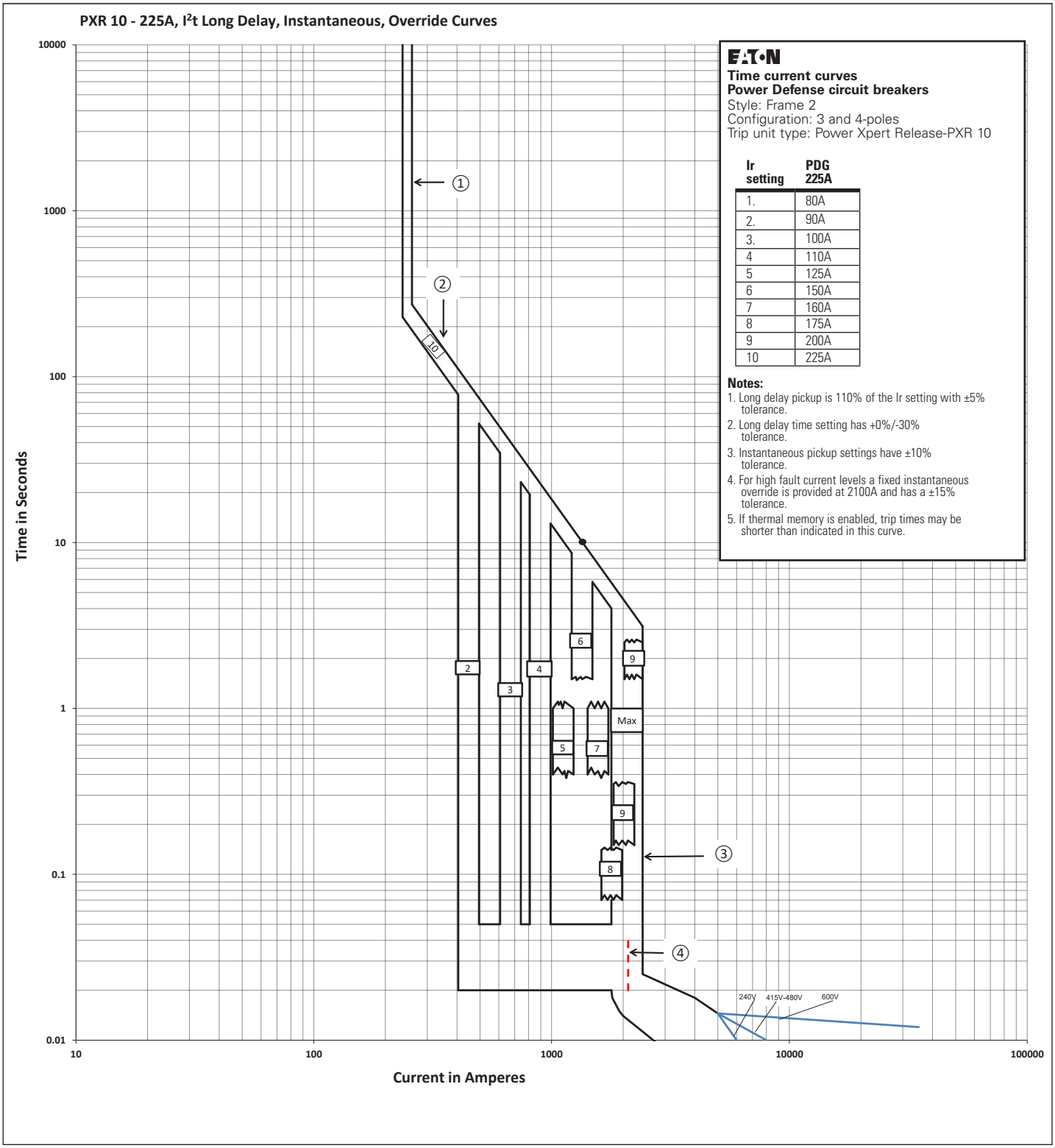


Figure 37. PXR 10 LI style 225A frame.

April 2022

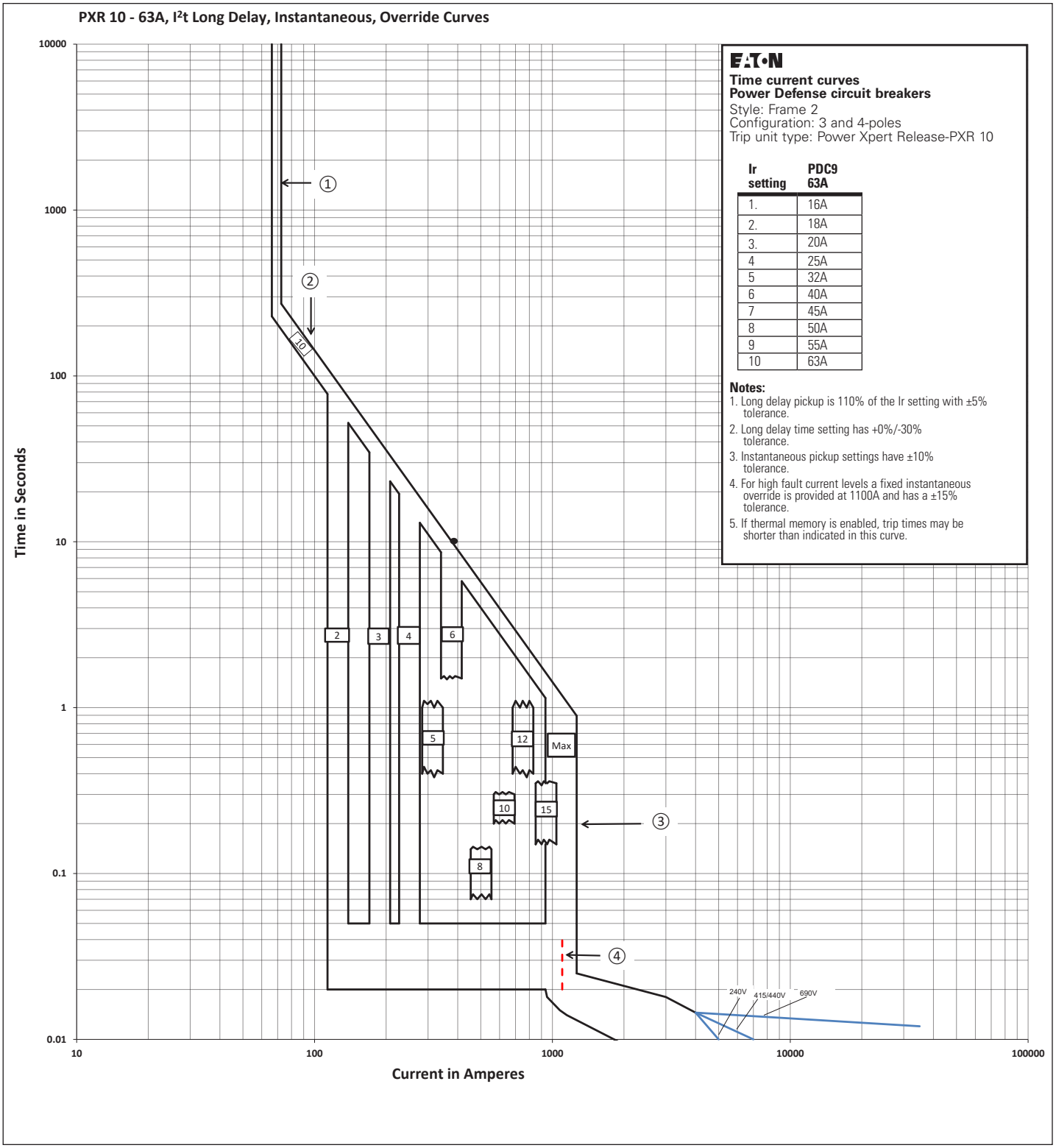


Figure 38. PXR 10 LI style 63A frame.

April 2022

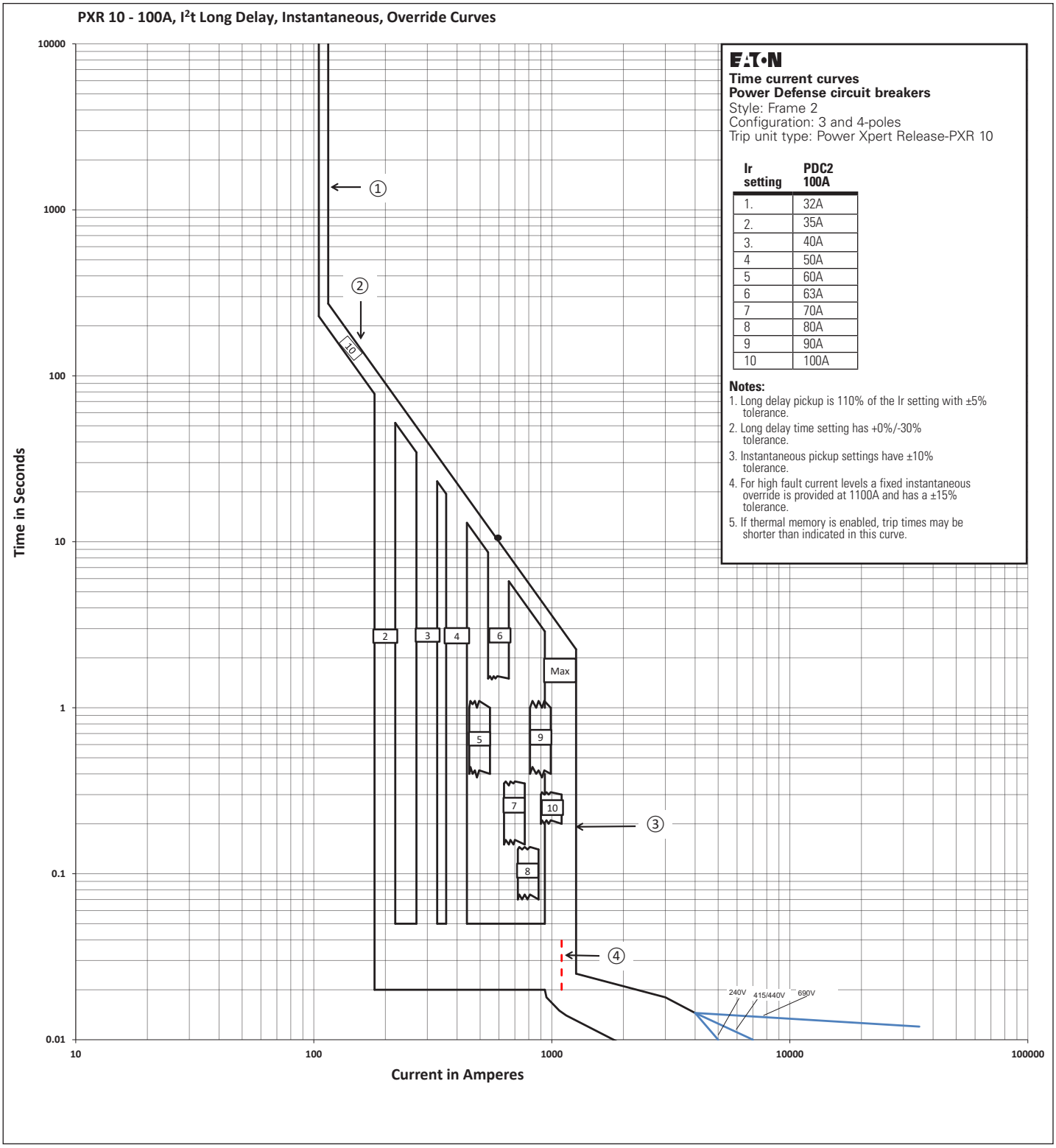


Figure 39. PXR 10 LI style 100A frame.

April 2022

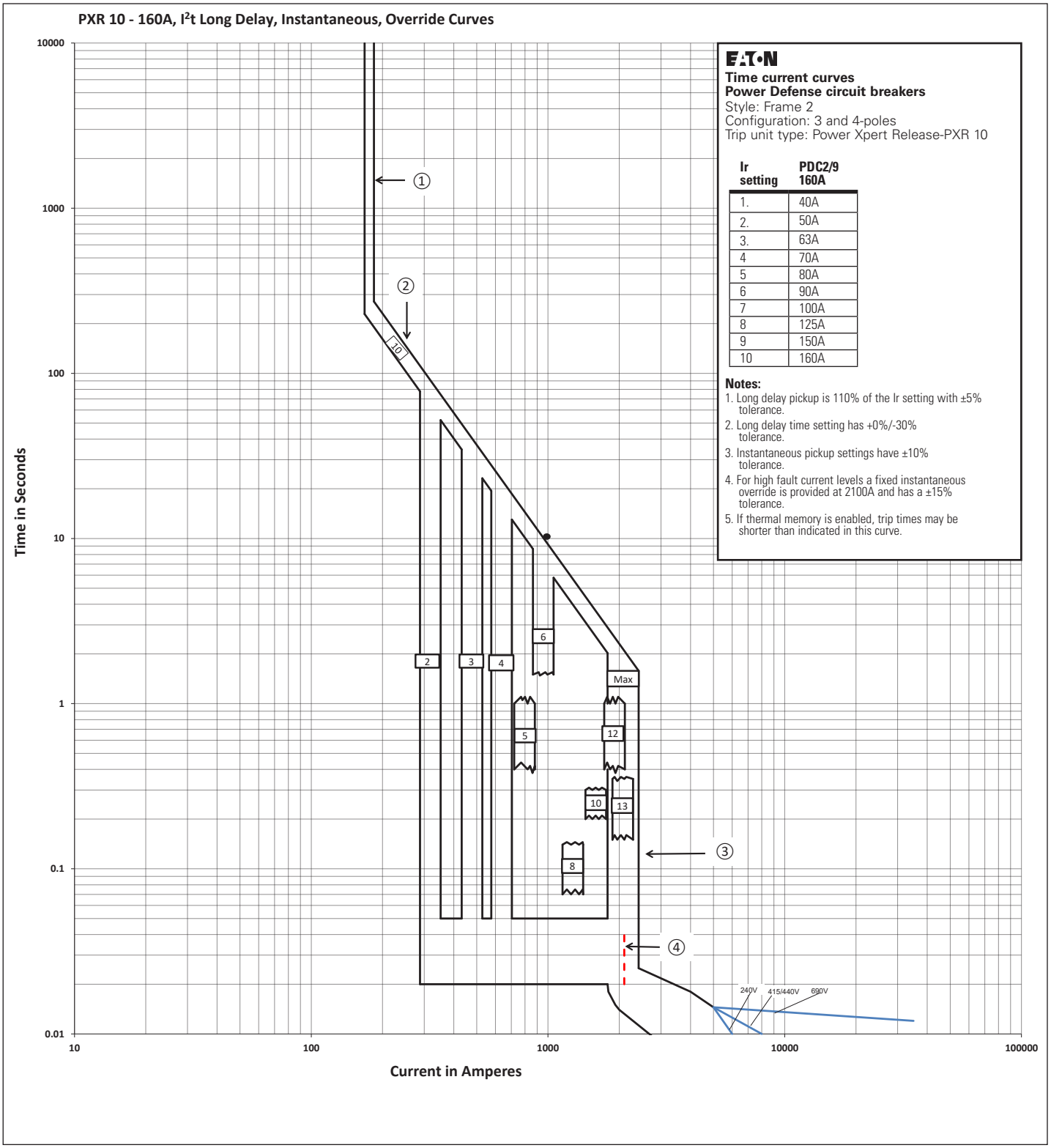


Figure 40. PXR 10 LI style 160A frame.

April 2022

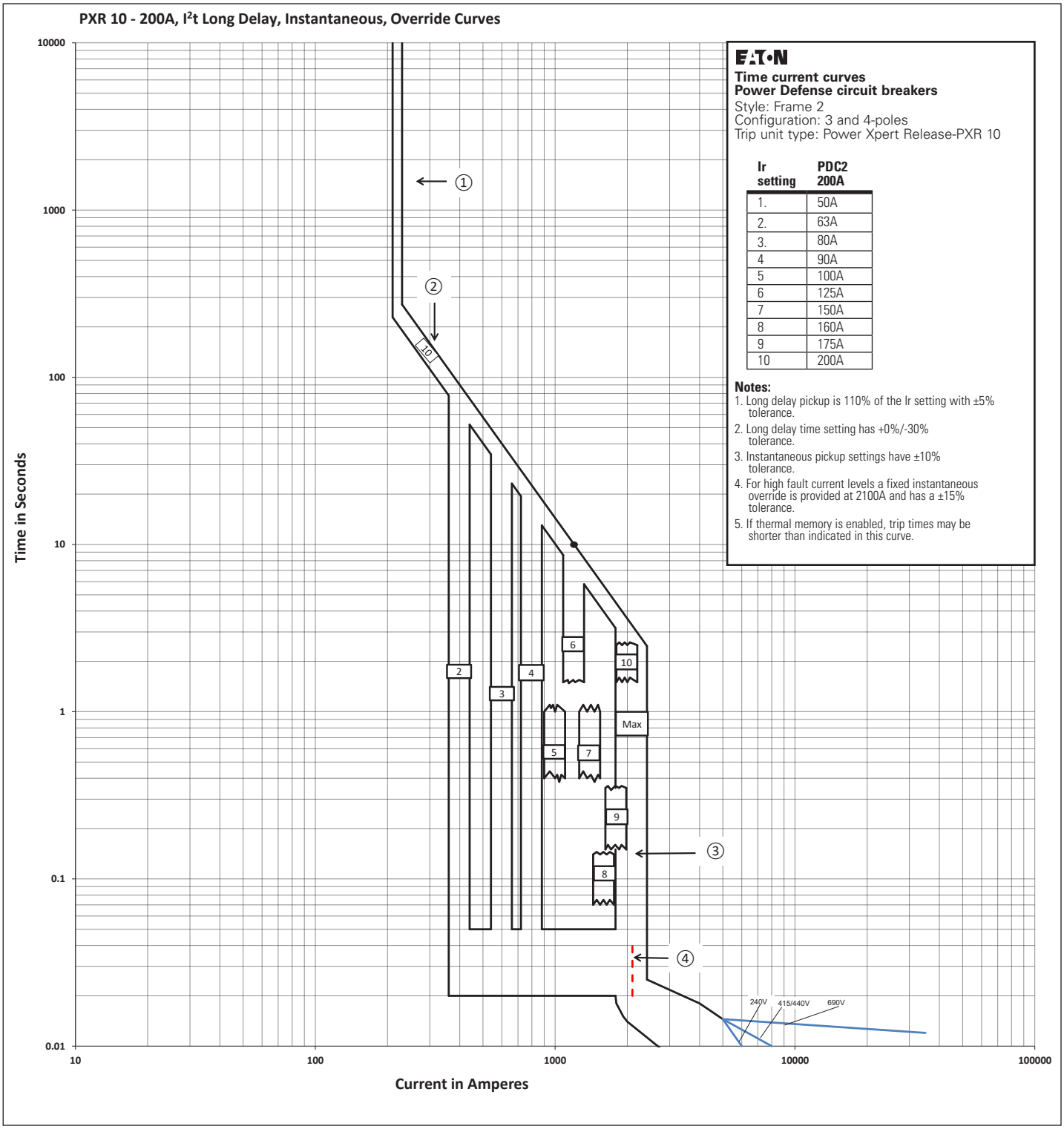


Figure 41. PXR 10 LI style 200A frame.

April 2022

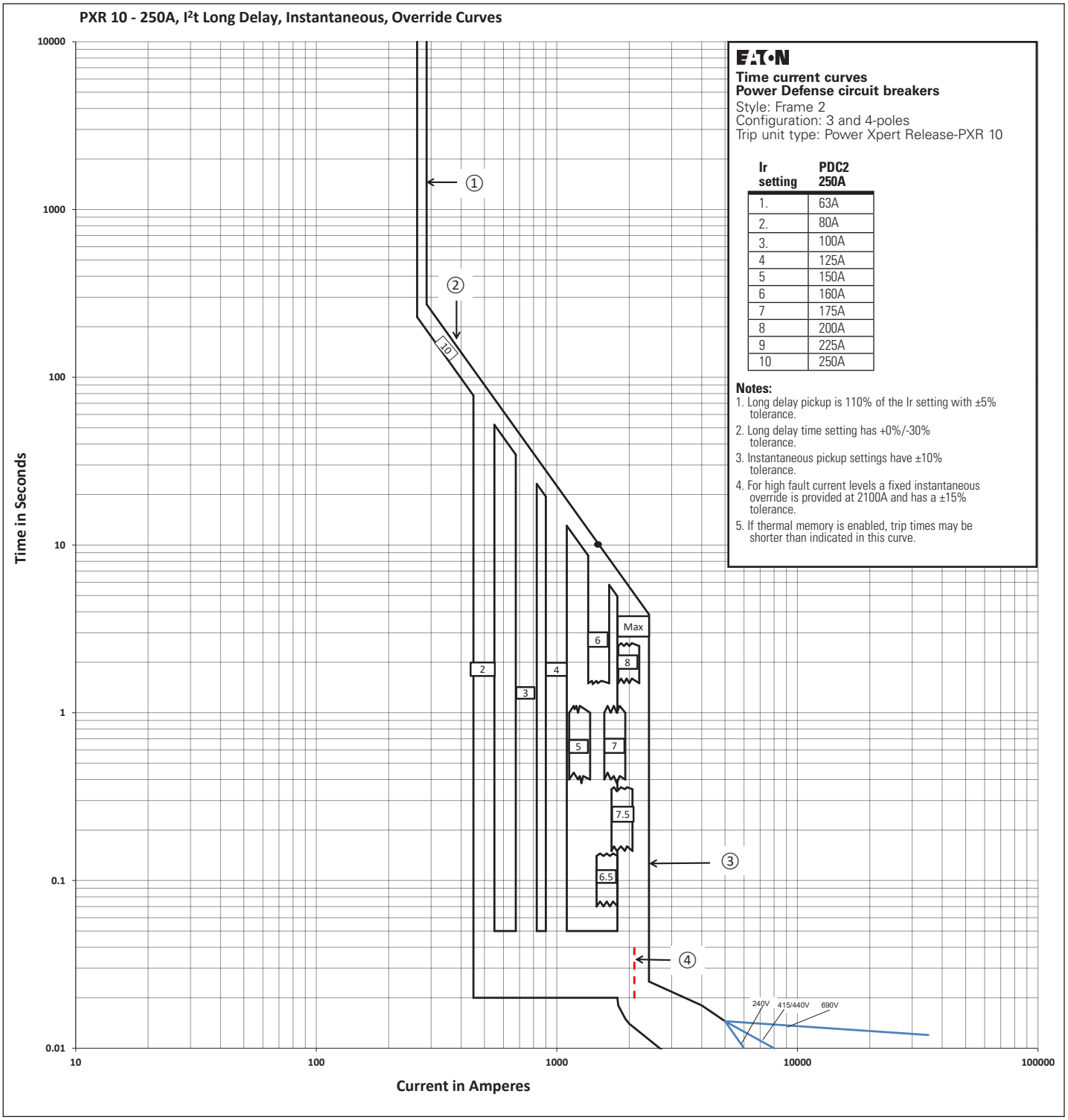


Figure 42. PXR 10 LI style 250A frame.

April 2022

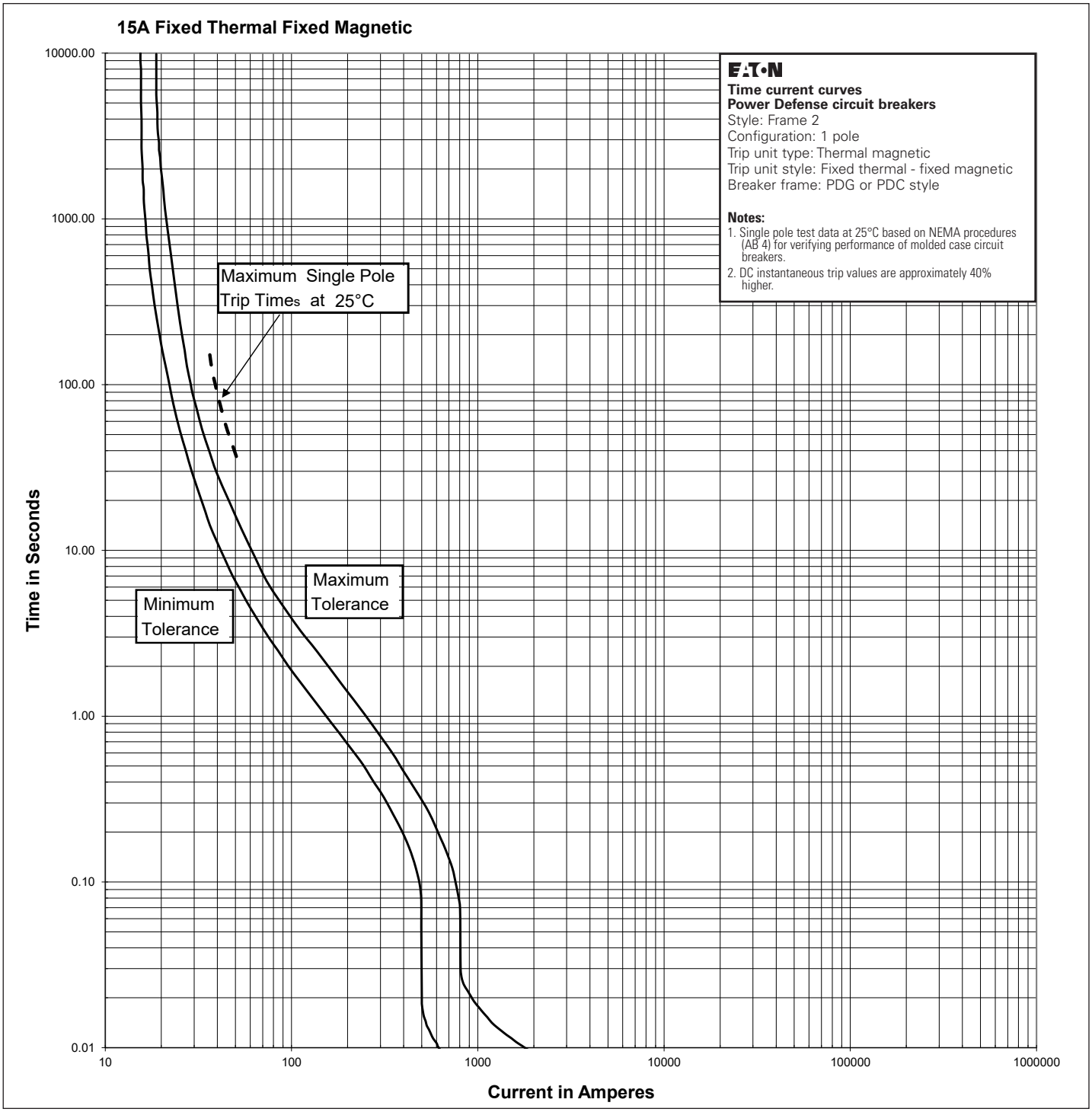


Figure 43. 15A fixed thermal fixed magnetic.

April 2022

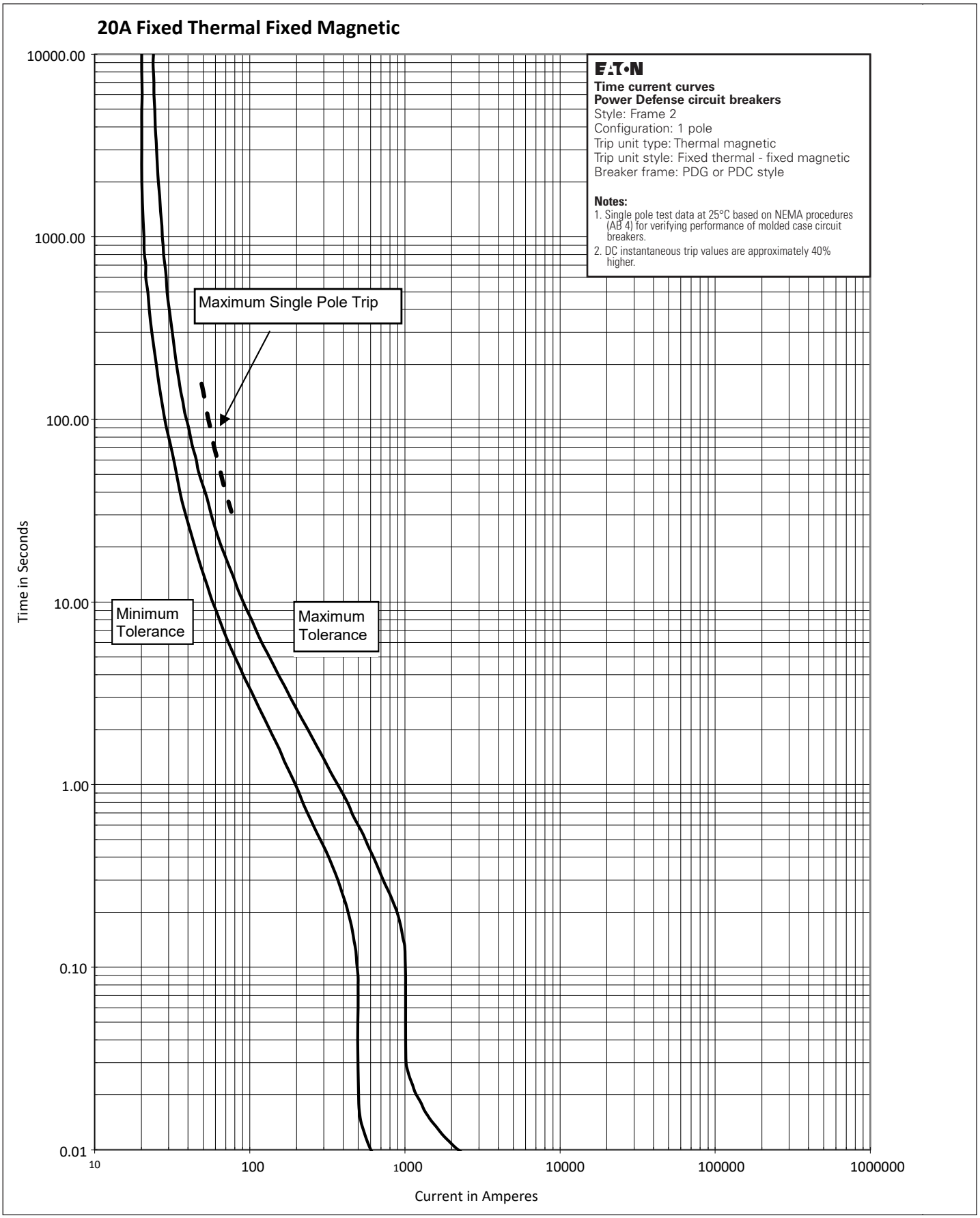


Figure 44. 20A fixed thermal fixed magnetic.

April 2022

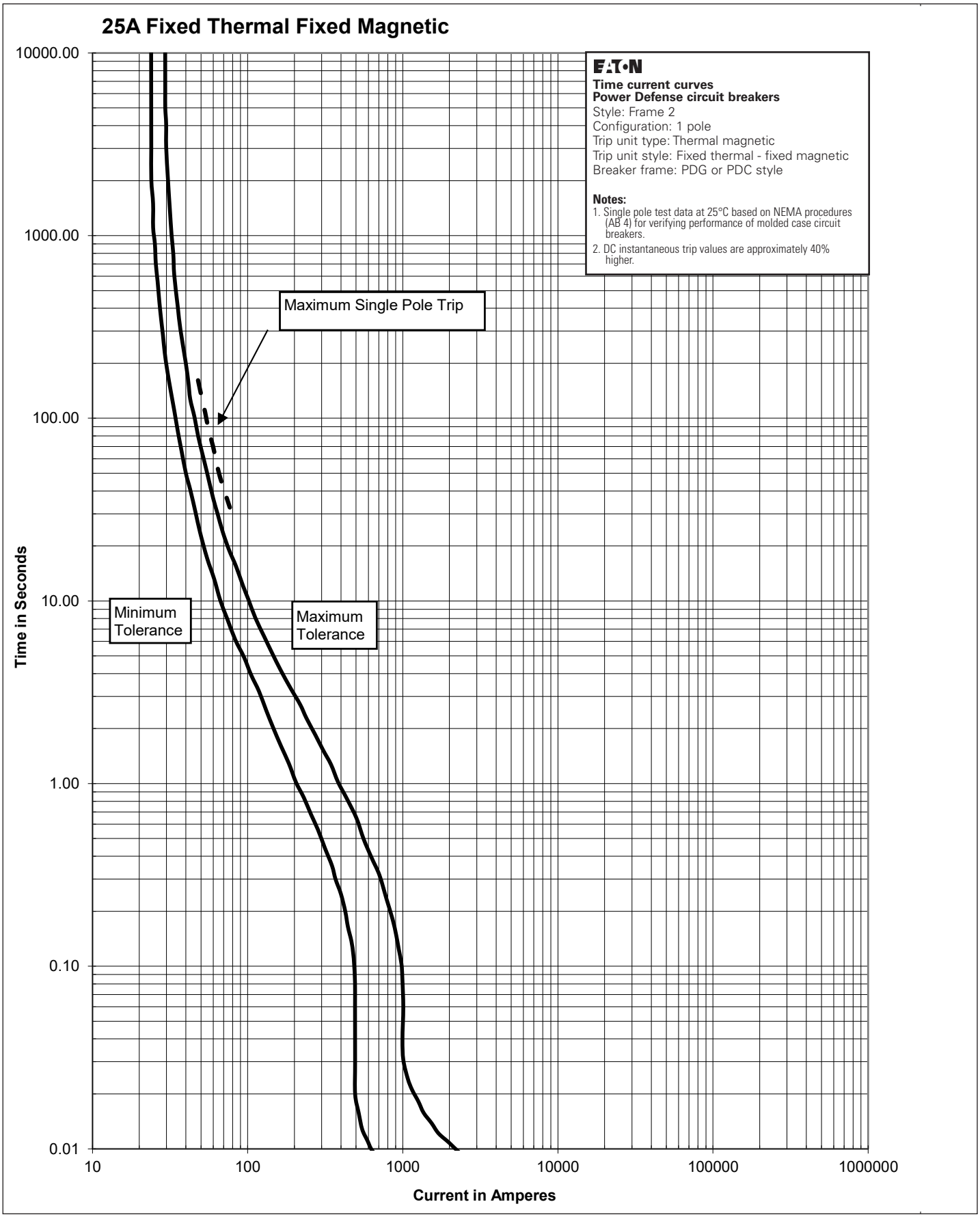


Figure 45. 25A fixed thermal fixed magnetic.

April 2022

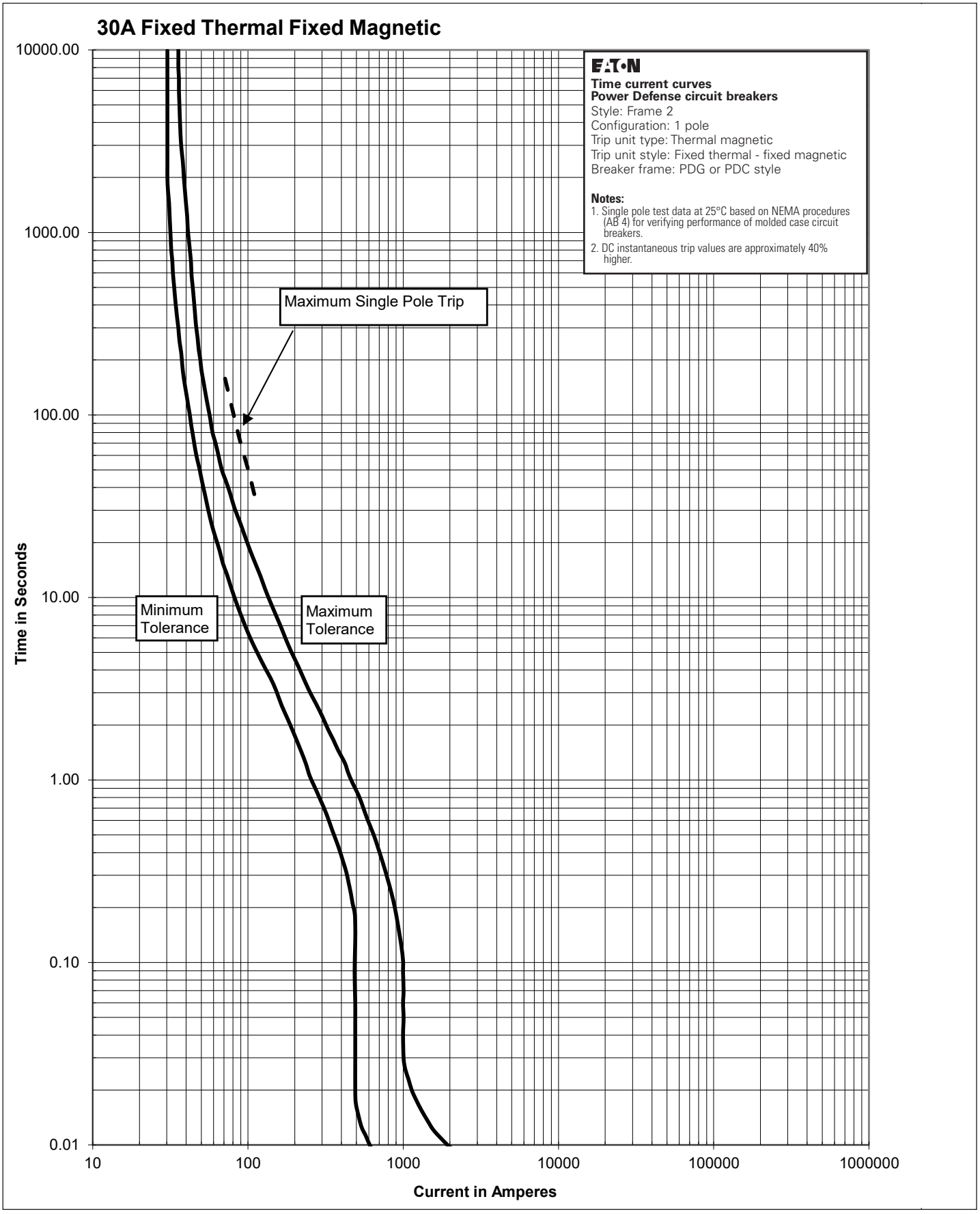


Figure 46. 30A fixed thermal fixed magnetic.

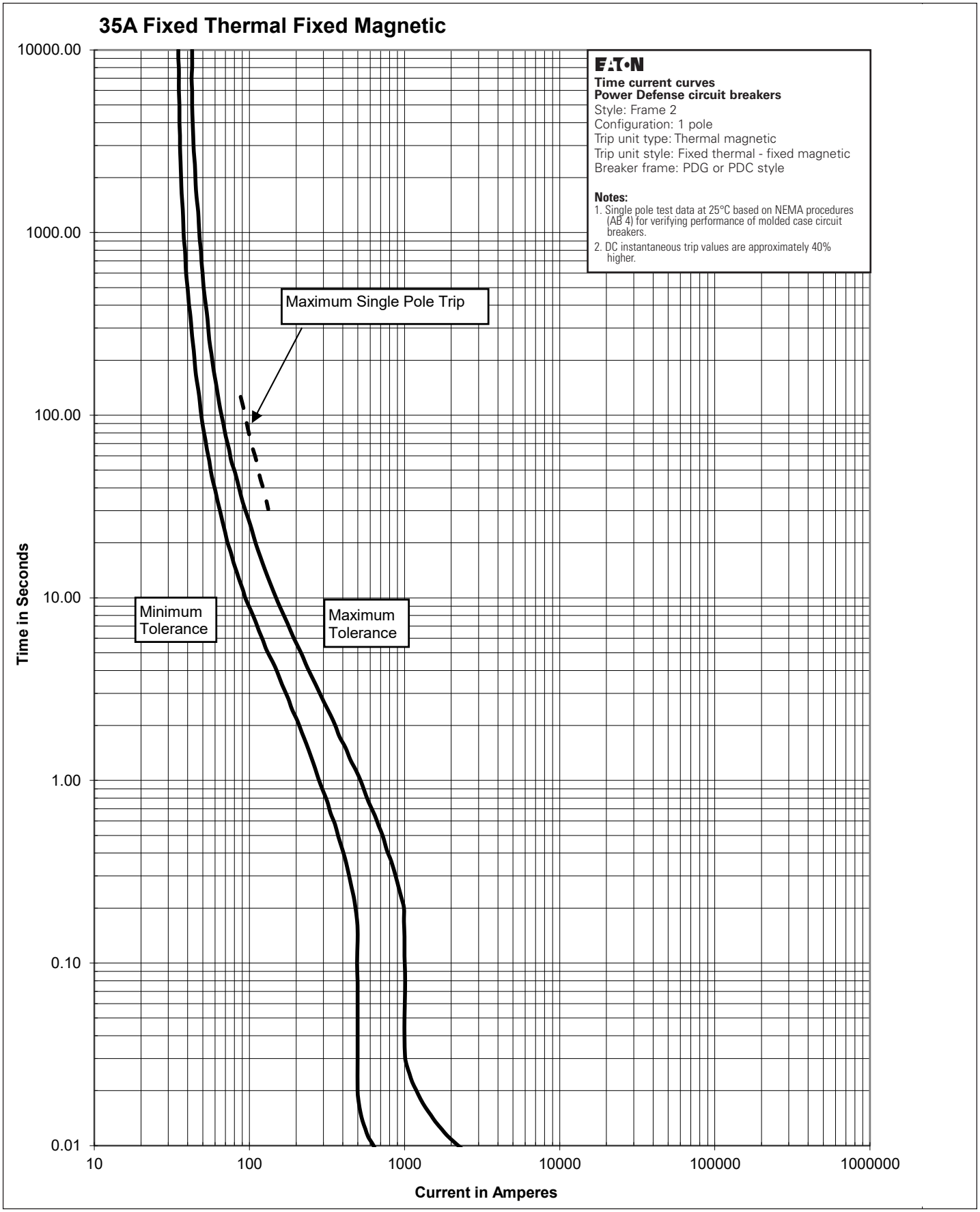


Figure 47. 35A fixed thermal fixed magnetic.

April 2022

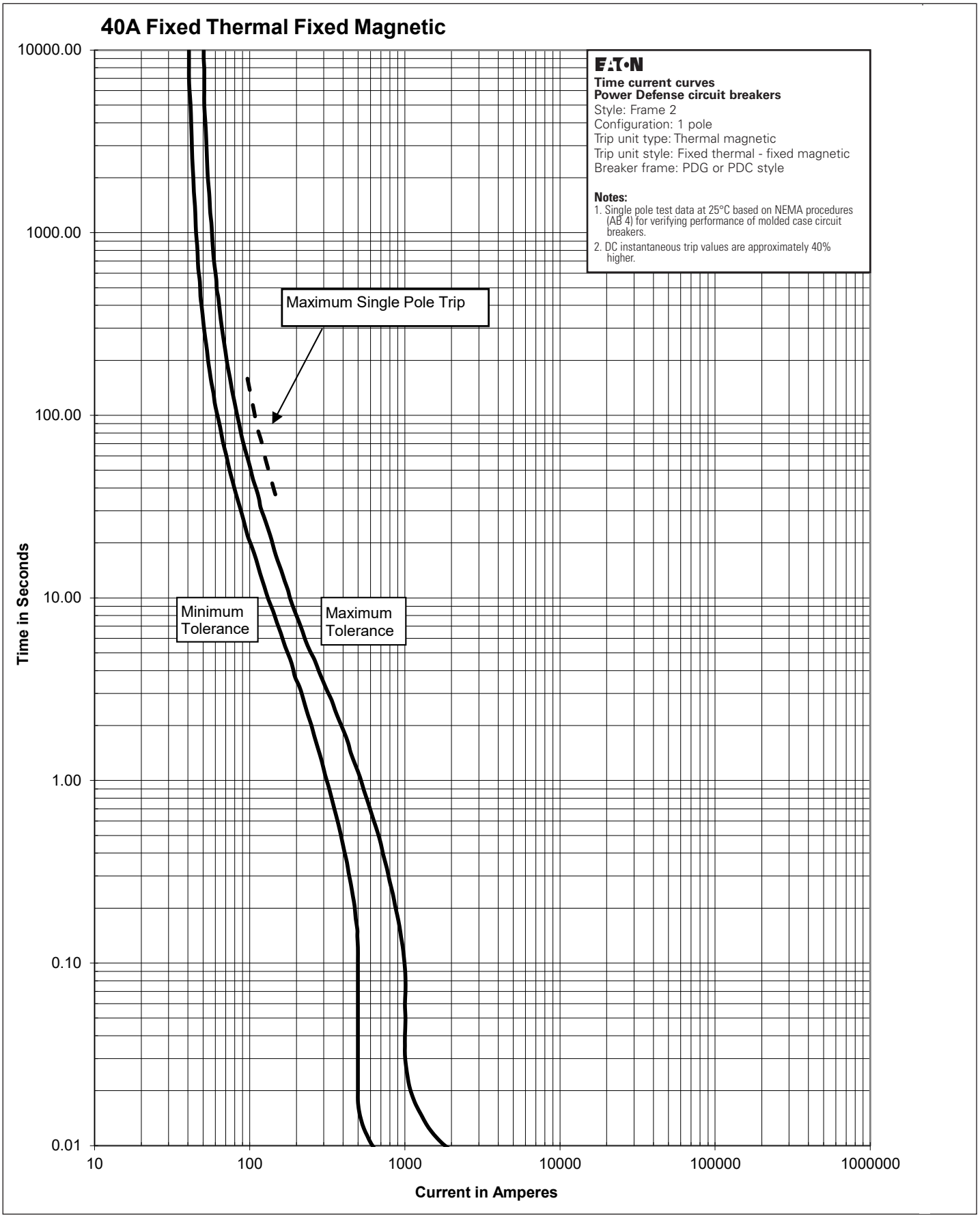


Figure 48. 40A fixed thermal fixed magnetic.

April 2022

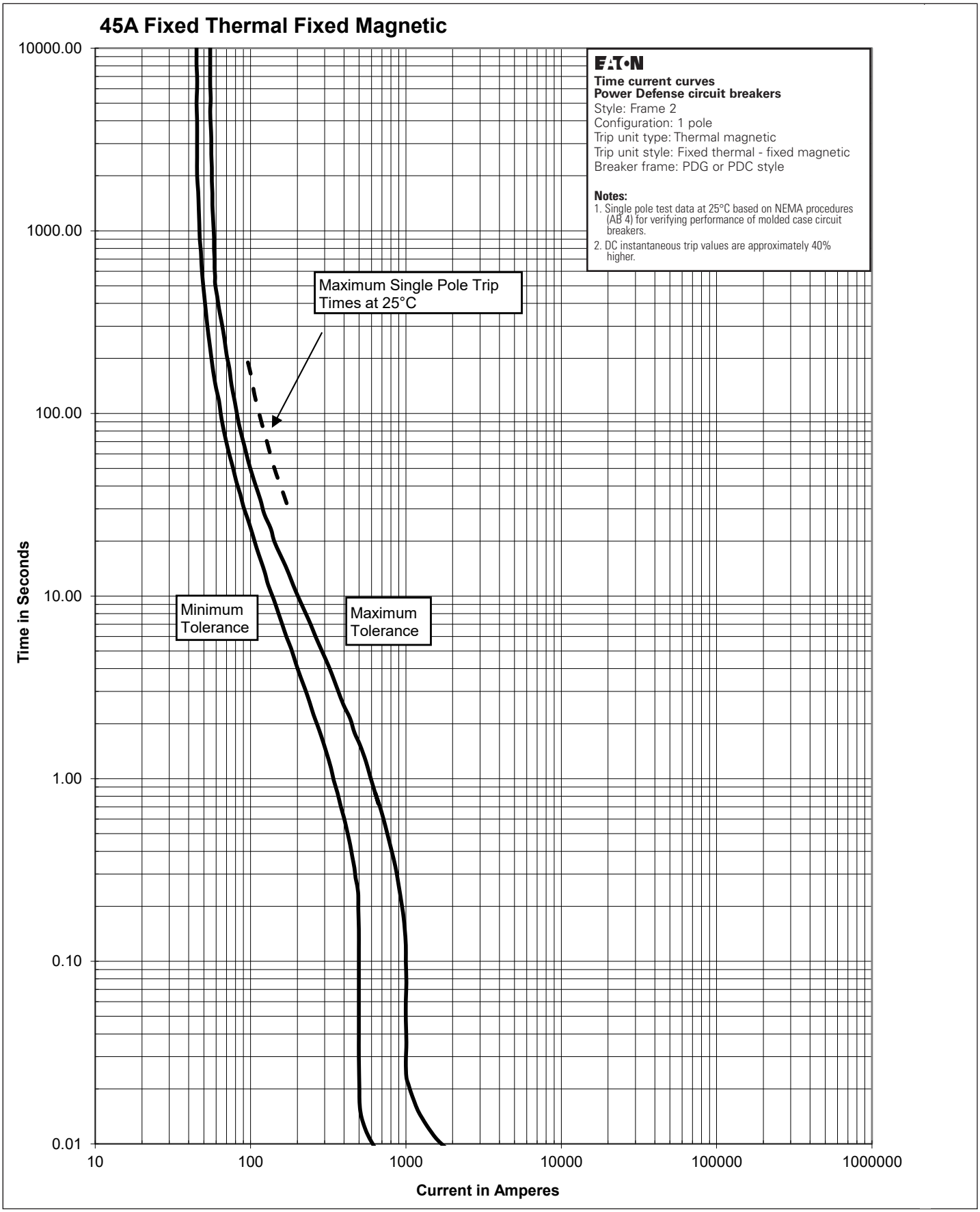


Figure 49. 45A fixed thermal fixed magnetic.

April 2022

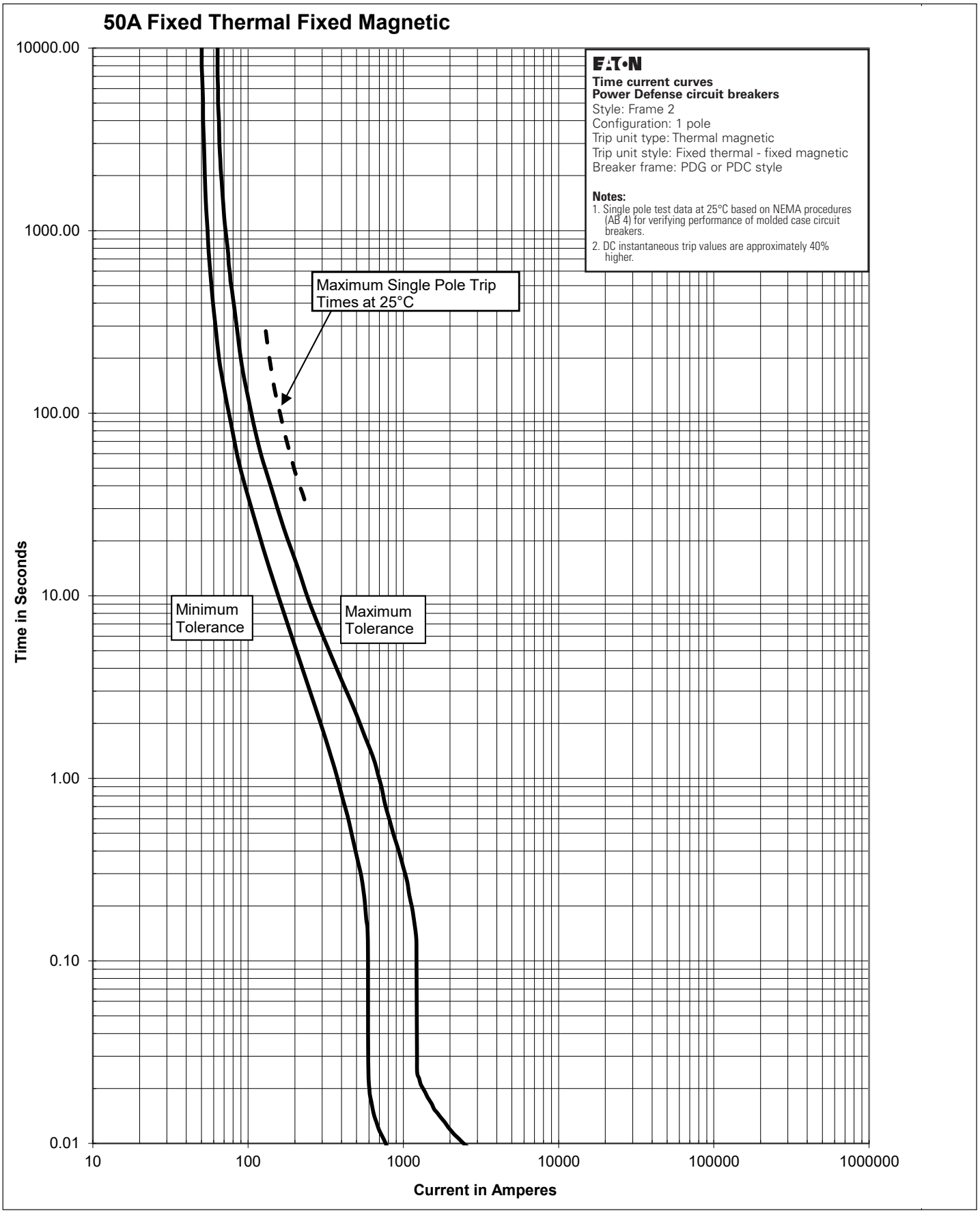


Figure 50. 50A fixed thermal fixed magnetic.

April 2022

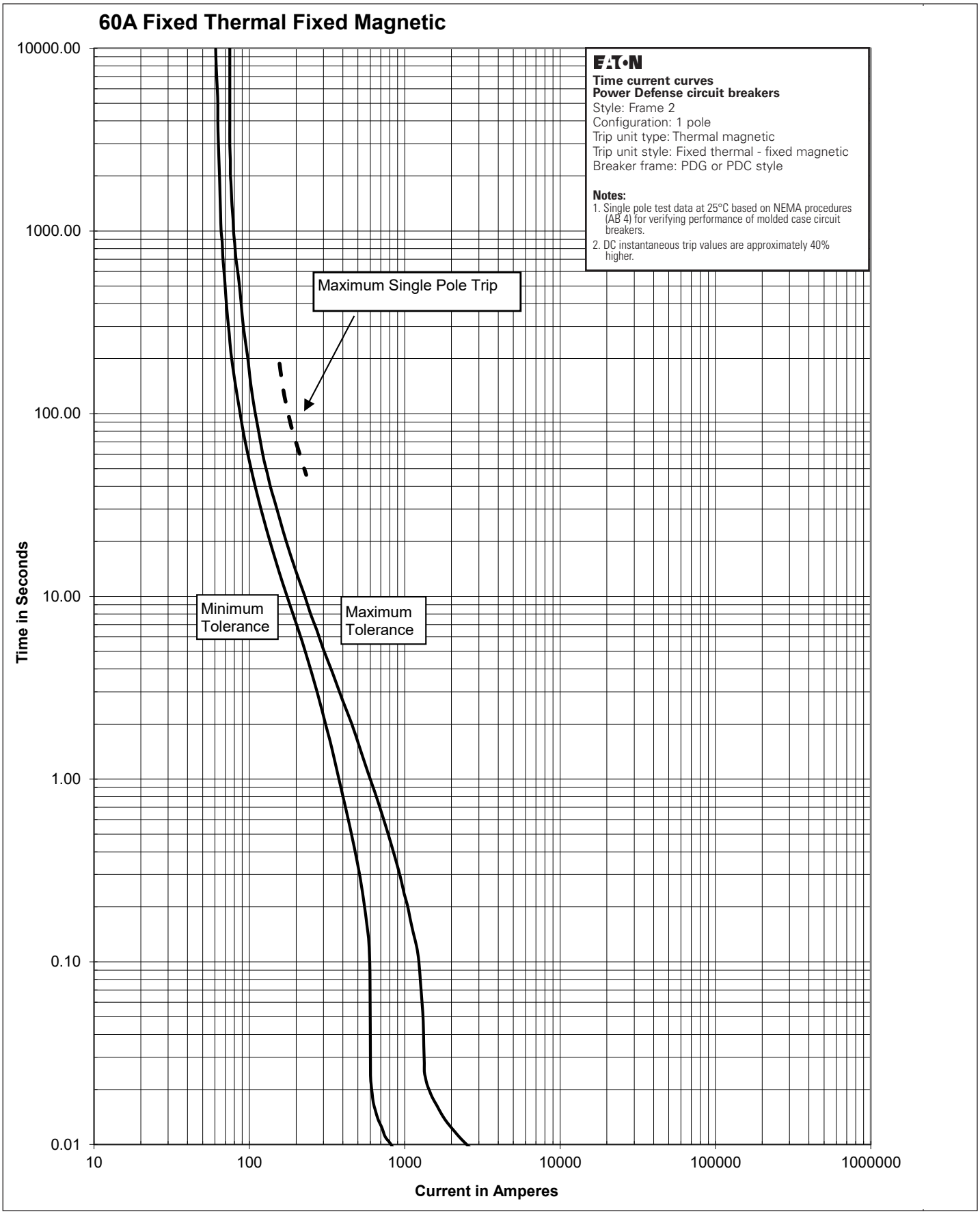


Figure 51. 60A fixed thermal fixed magnetic.

April 2022

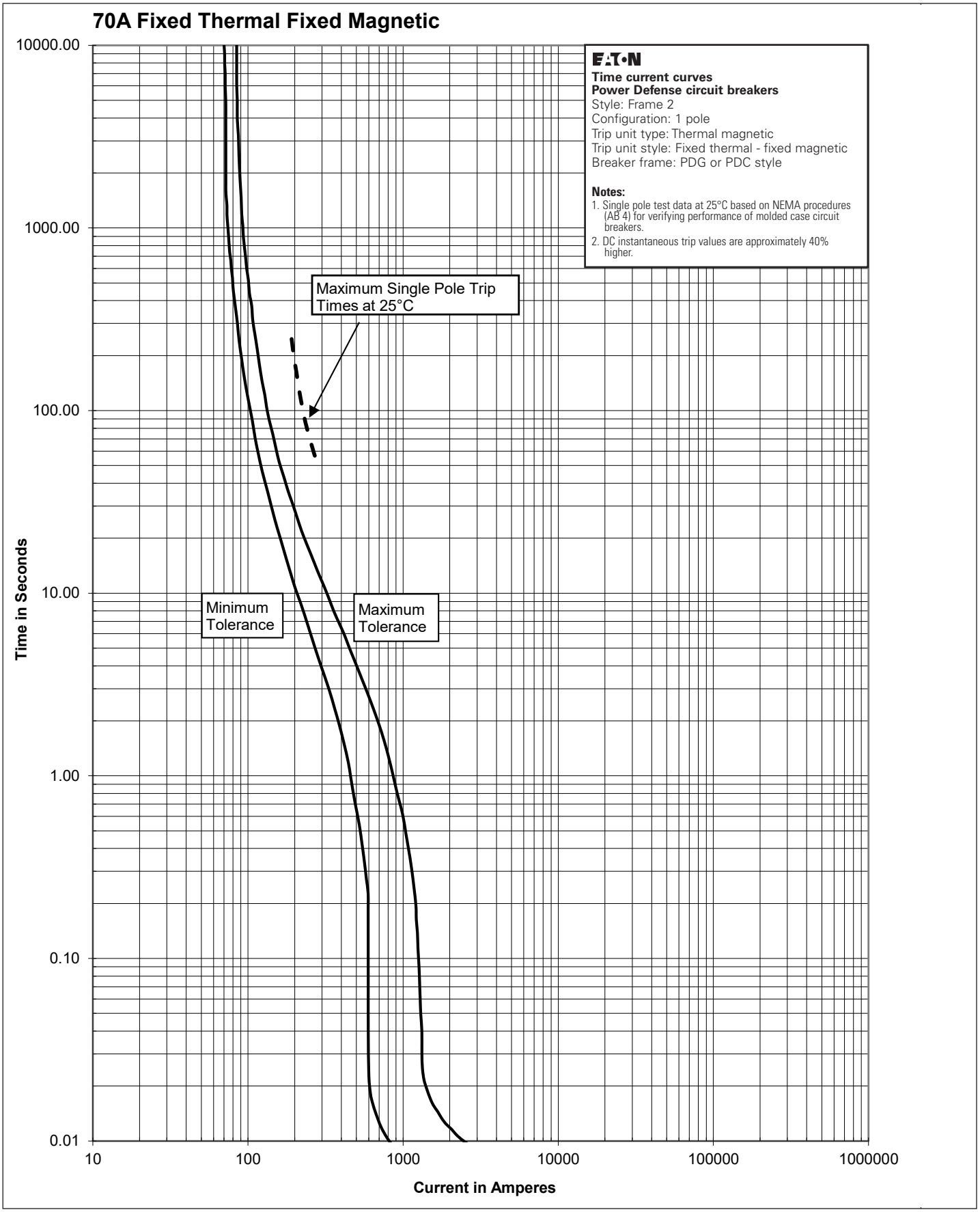


Figure 52. 70A fixed thermal fixed magnetic.

April 2022

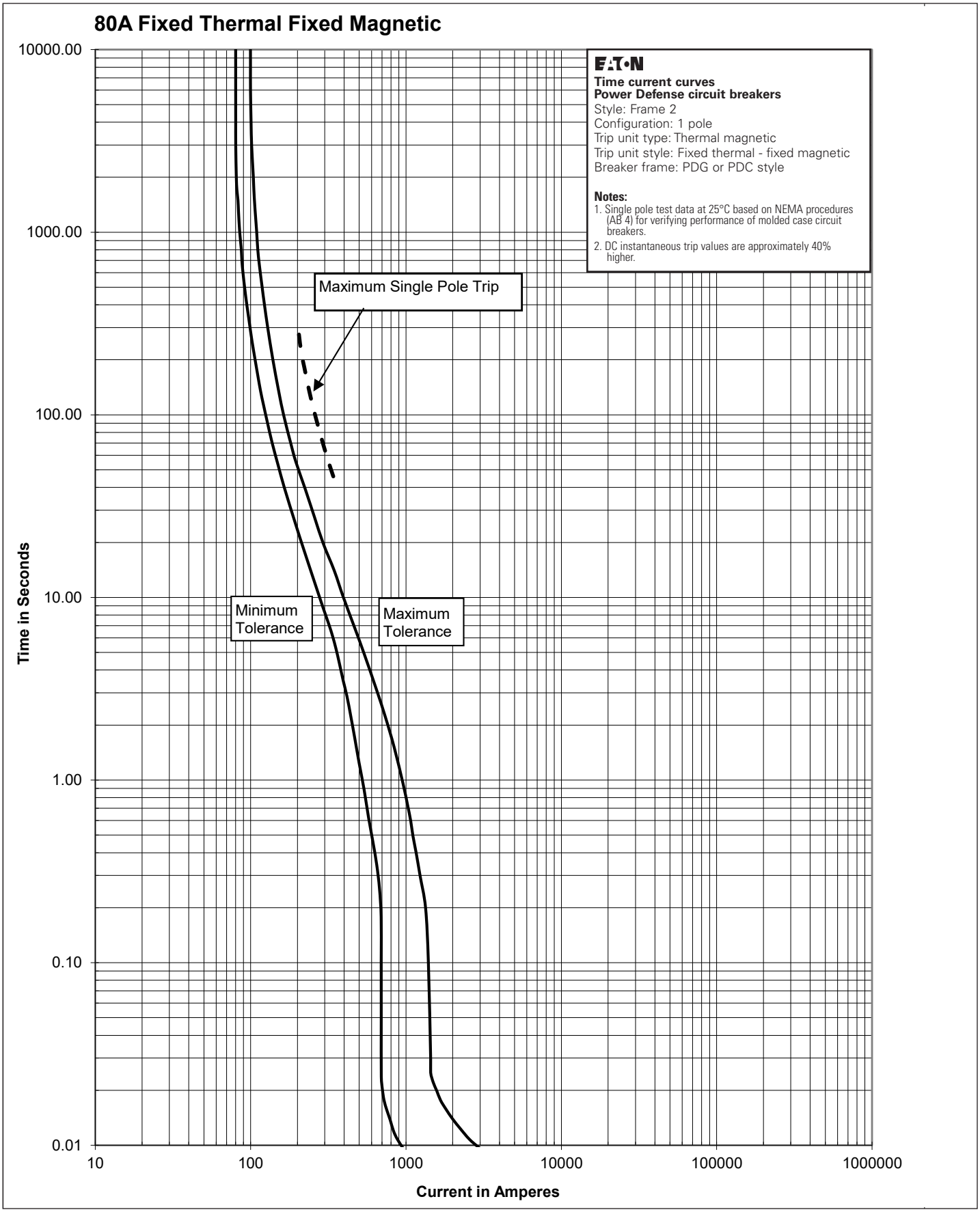


Figure 53. 80A fixed thermal fixed magnetic.

April 2022

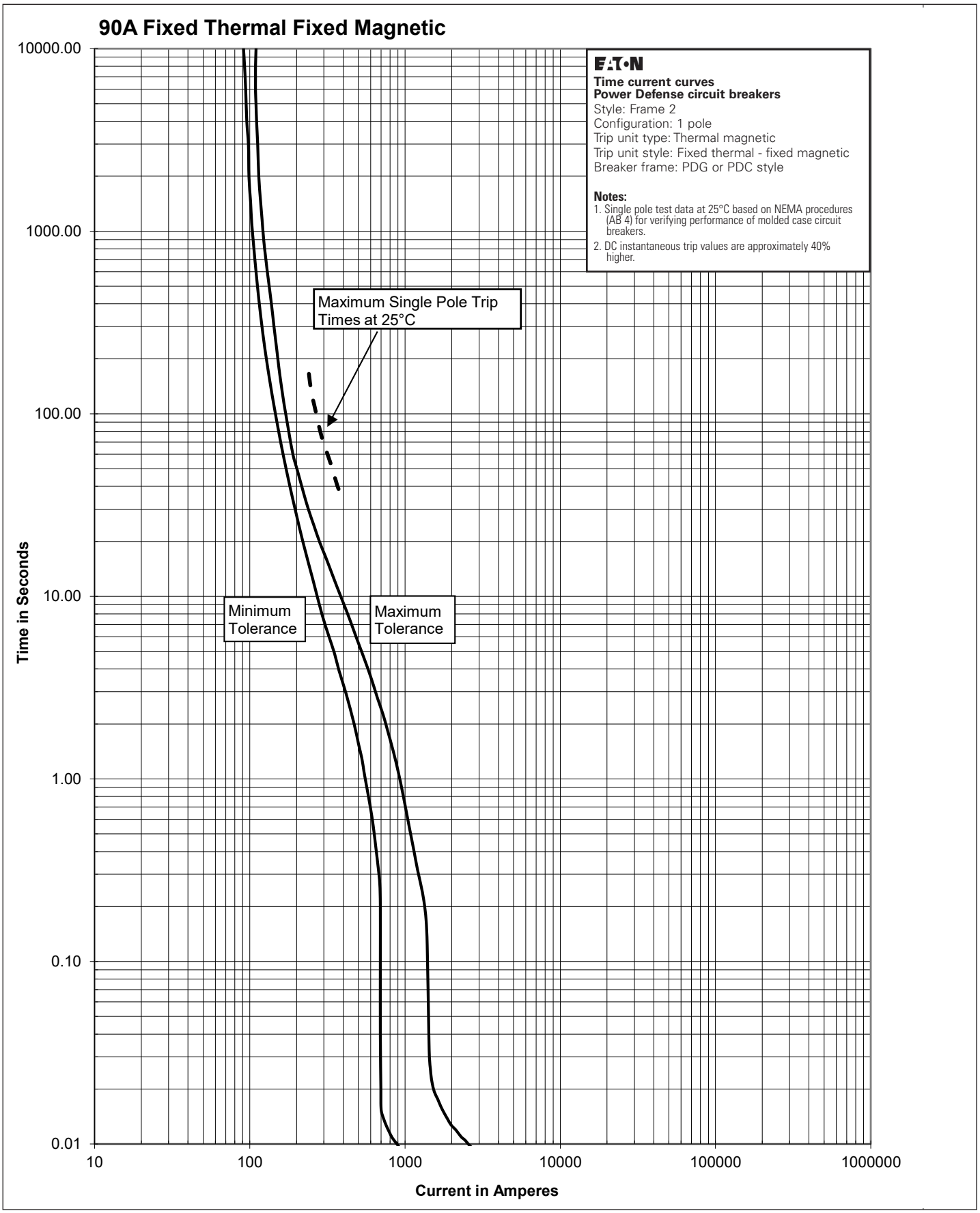


Figure 54. 90A fixed thermal fixed magnetic.

April 2022

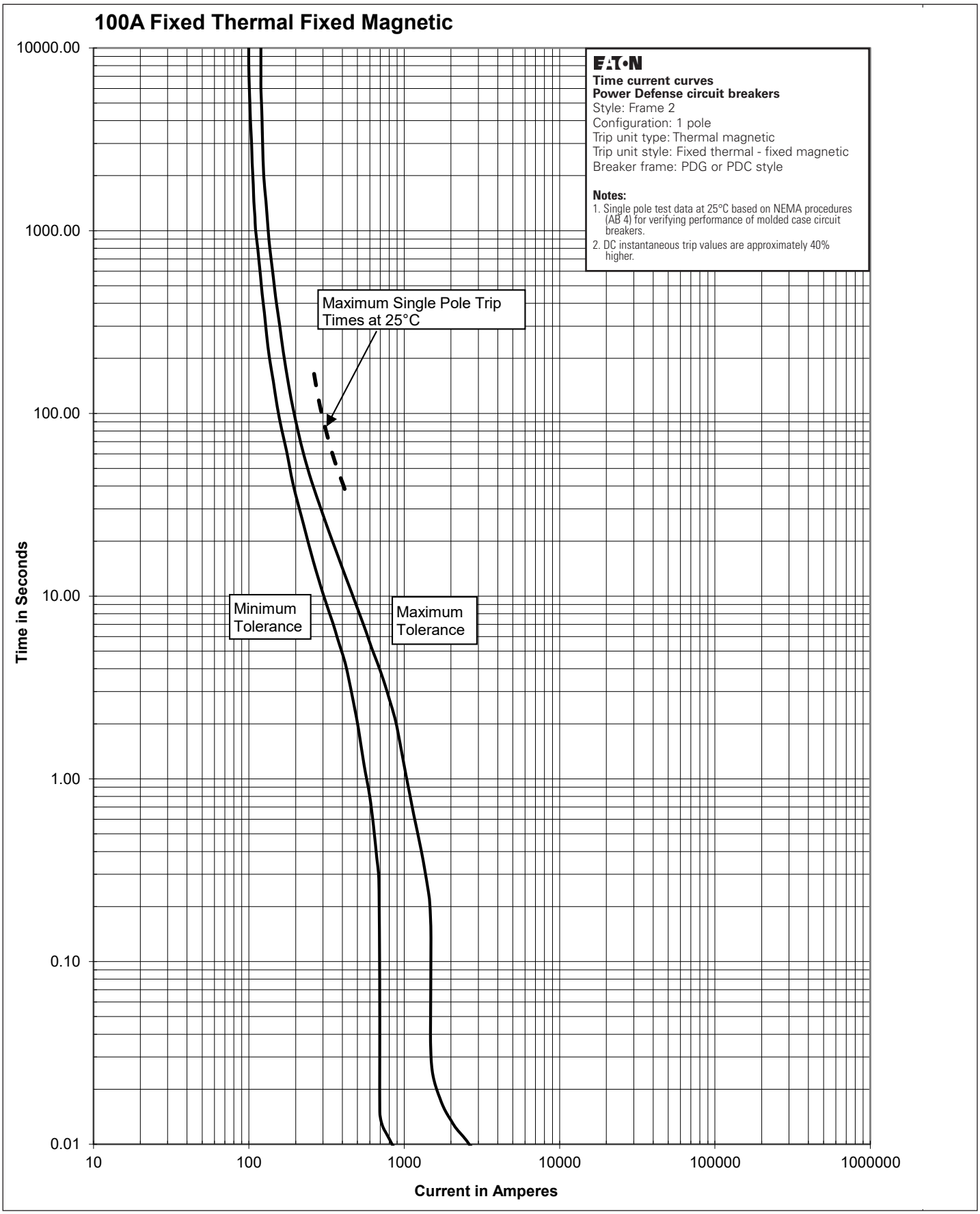


Figure 55. 100A fixed thermal fixed magnetic.

April 2022

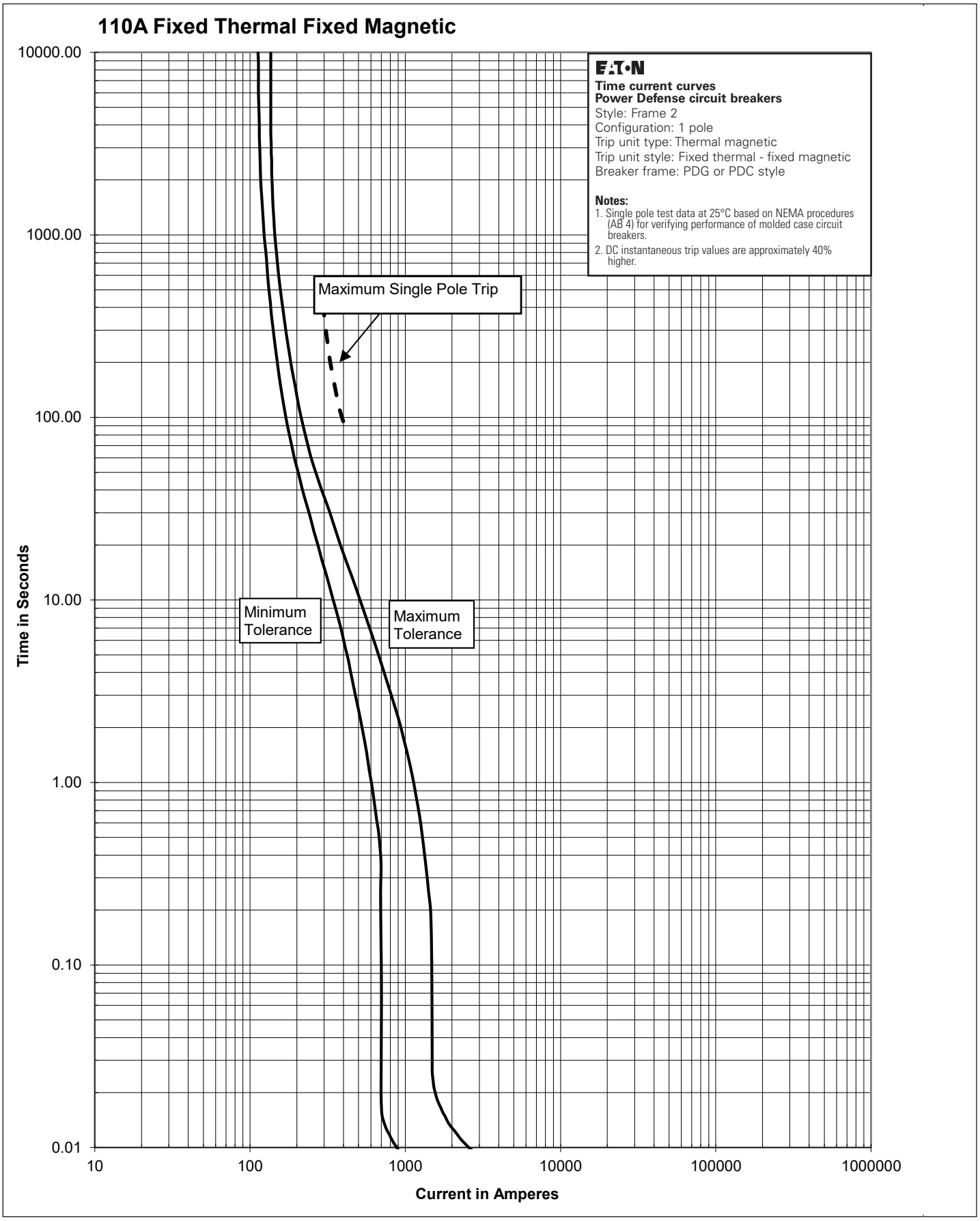


Figure 56. 110A fixed thermal fixed magnetic.

April 2022

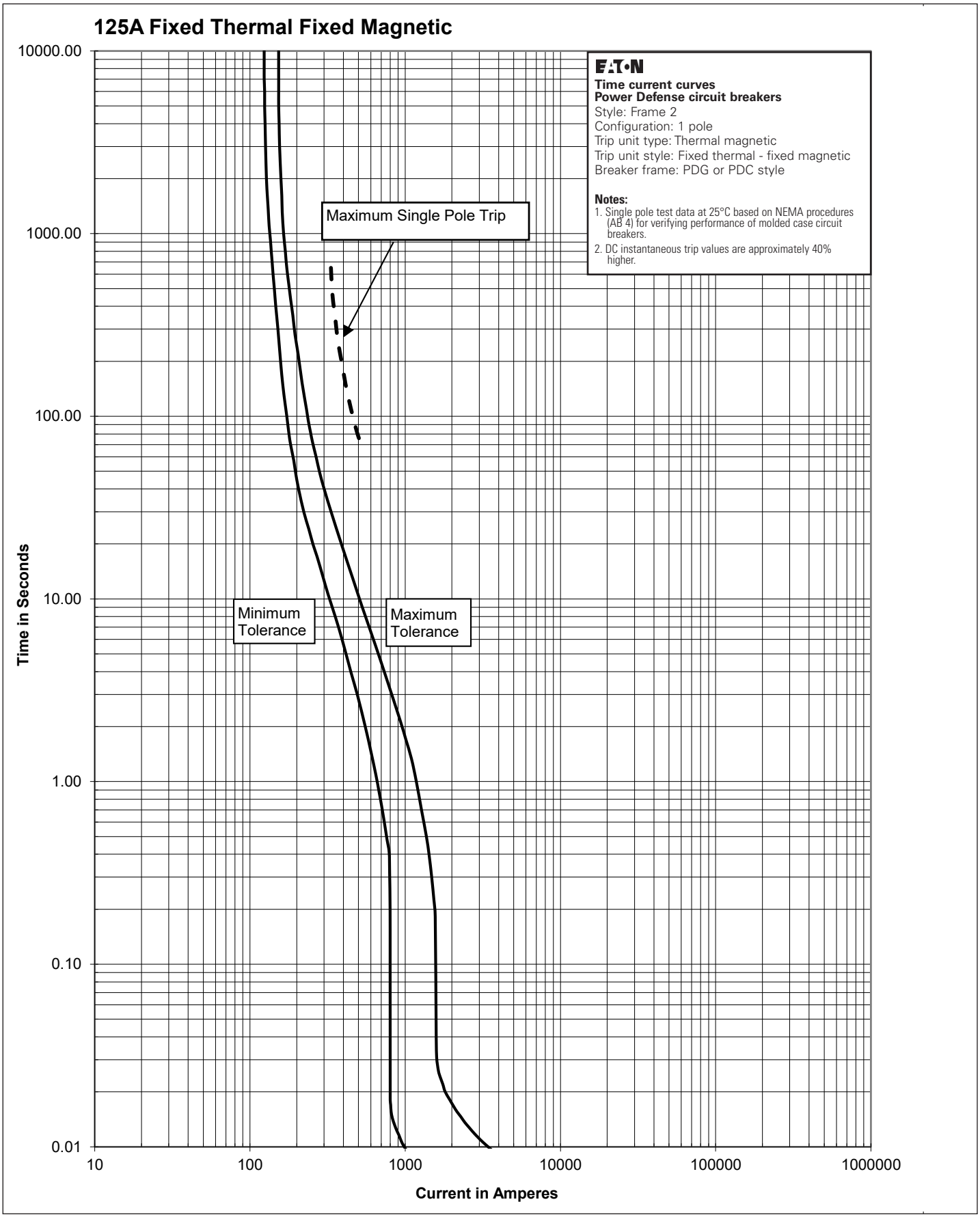


Figure 57. 125A fixed thermal fixed magnetic.

April 2022

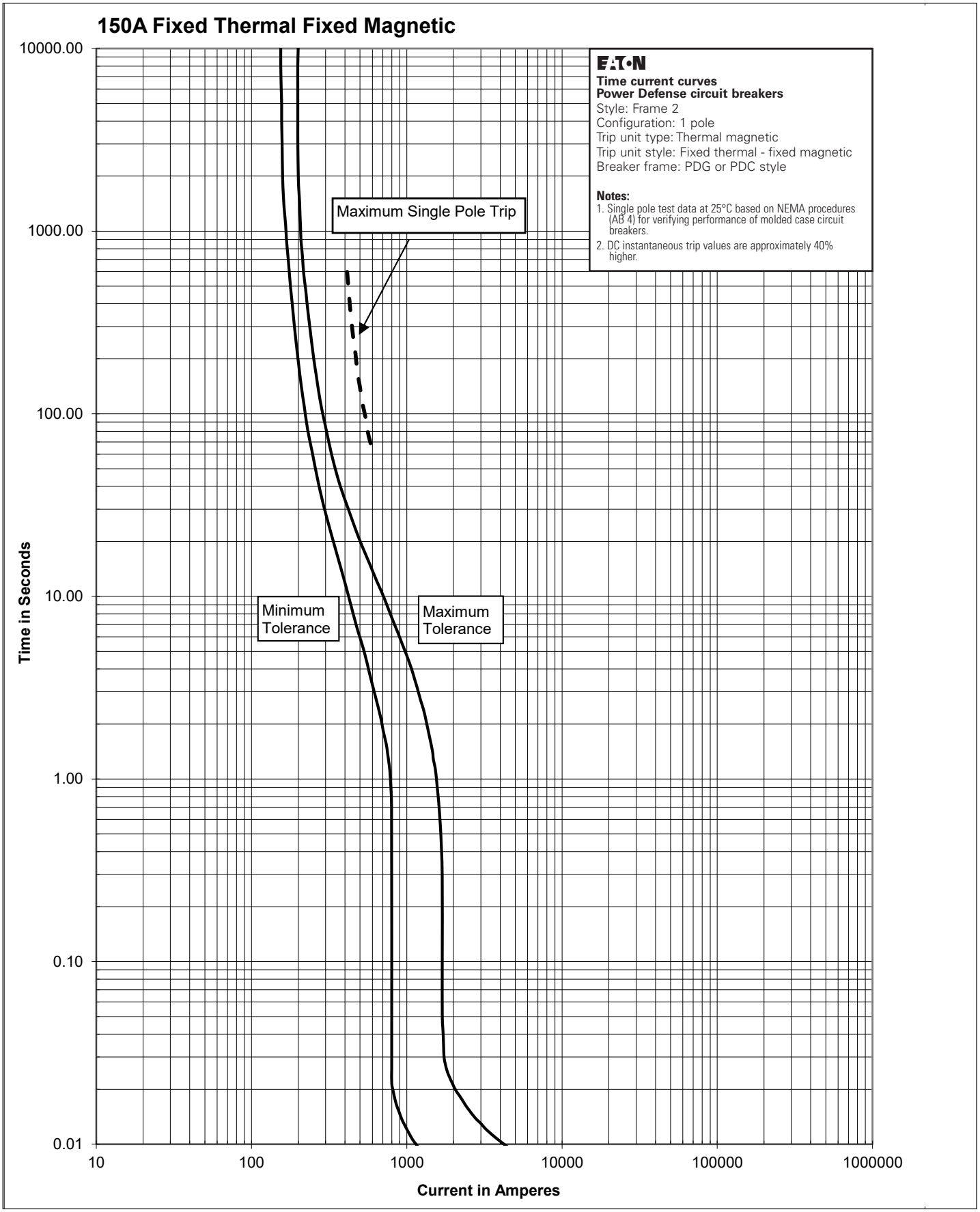


Figure 58. 150A fixed thermal fixed magnetic.

April 2022

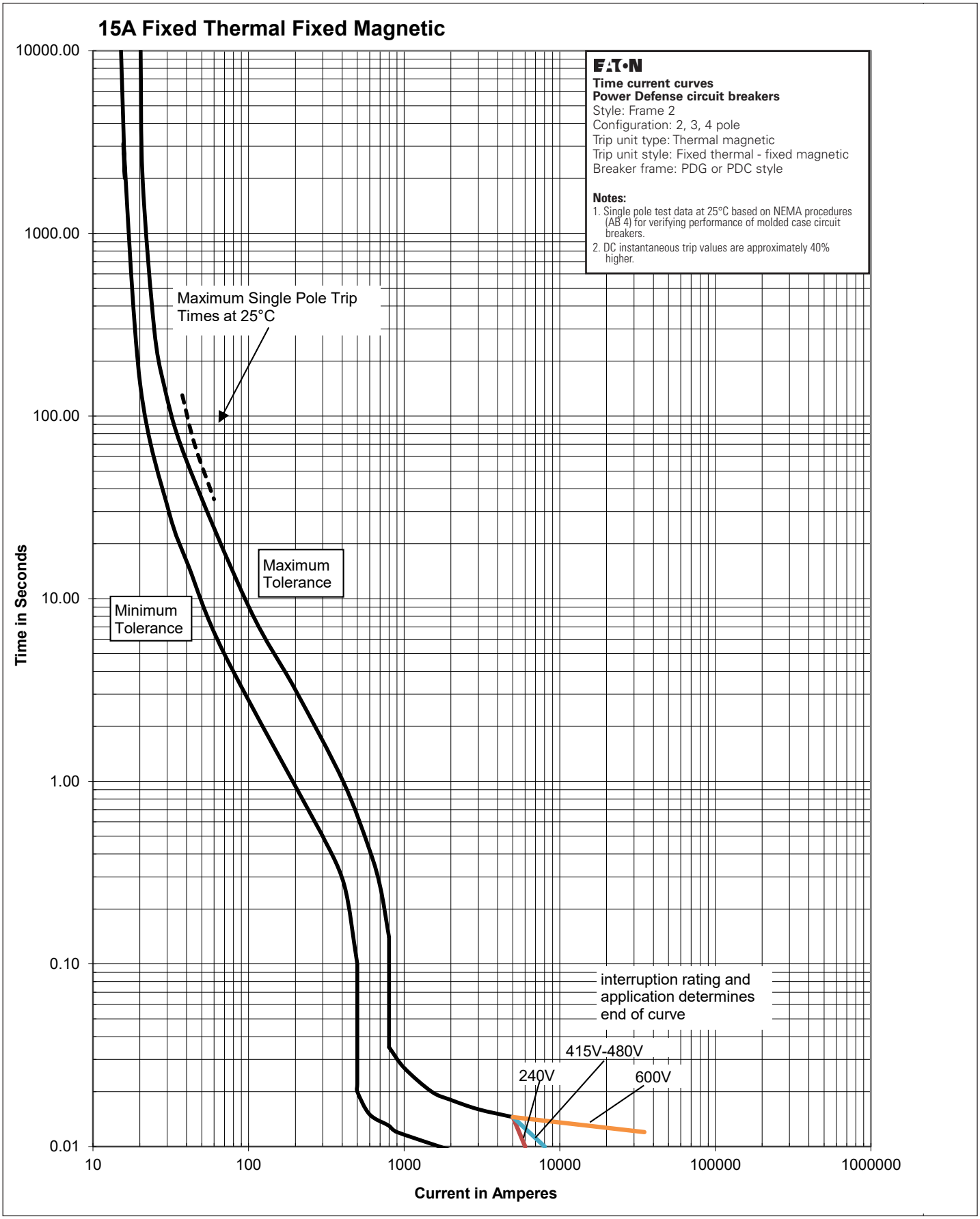


Figure 59. 15A fixed thermal fixed magnetic.

April 2022.

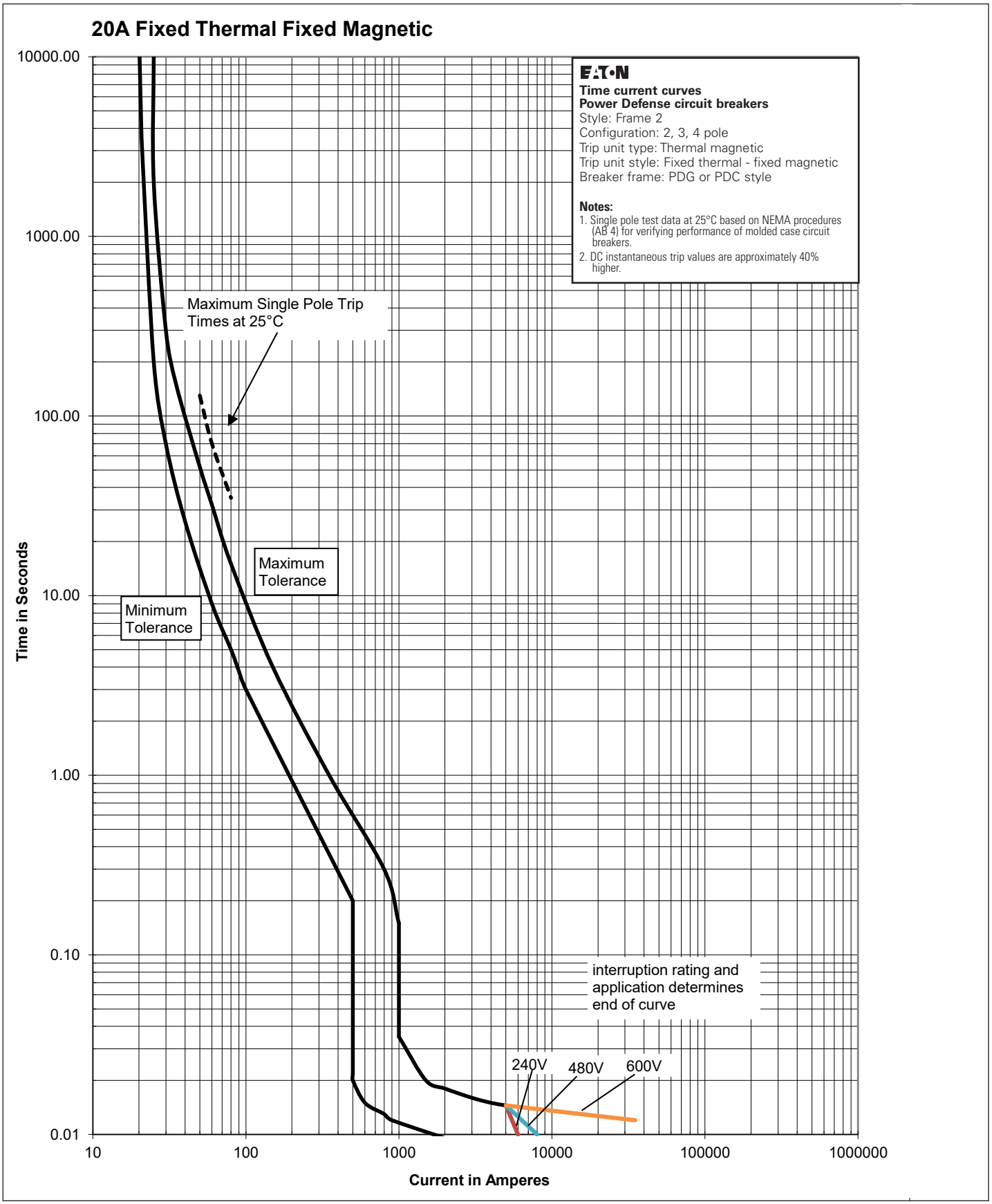


Figure 60. 20A fixed thermal fixed magnetic.

April 2022

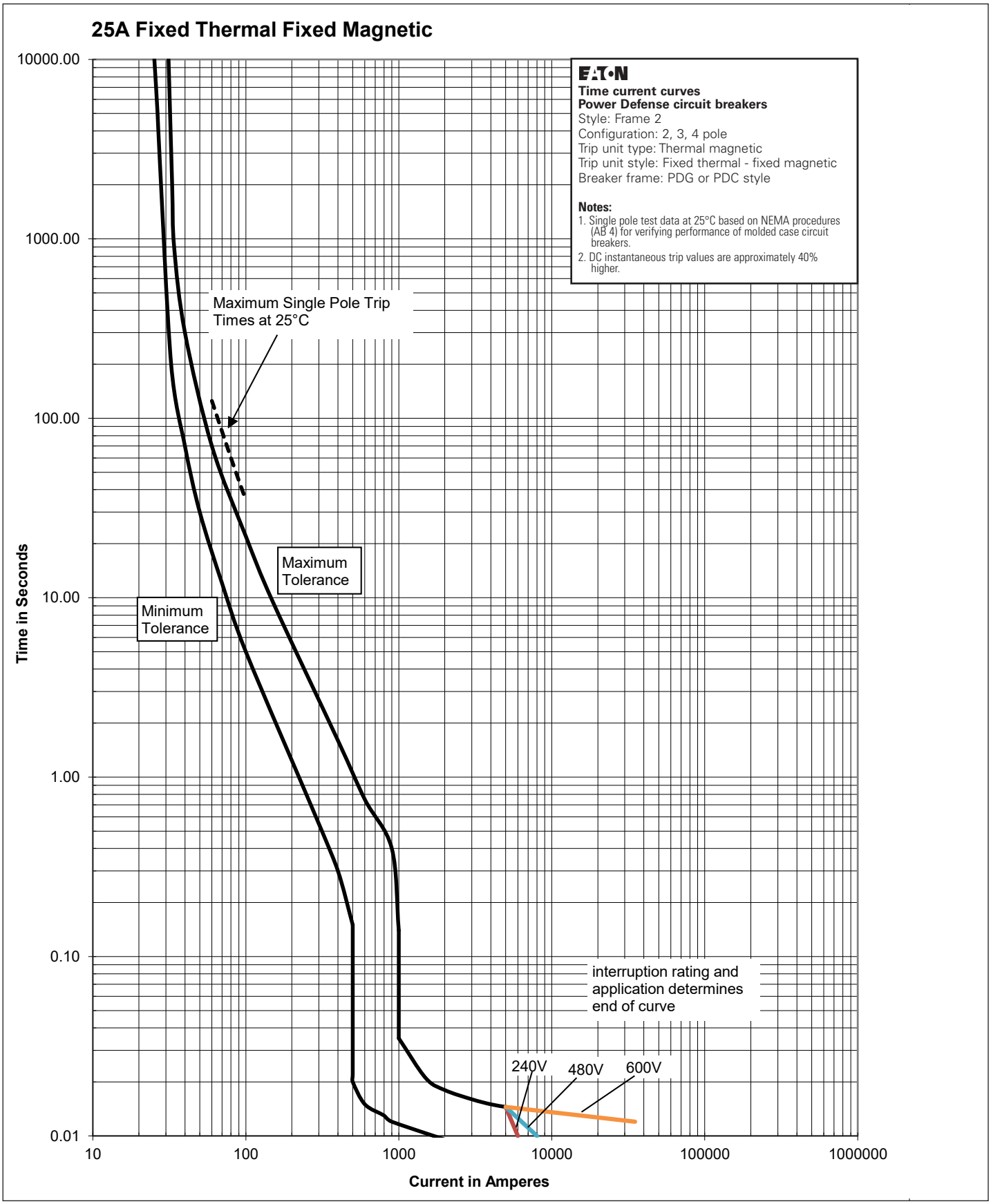


Figure 61. 25A fixed thermal fixed magnetic.

April 2022

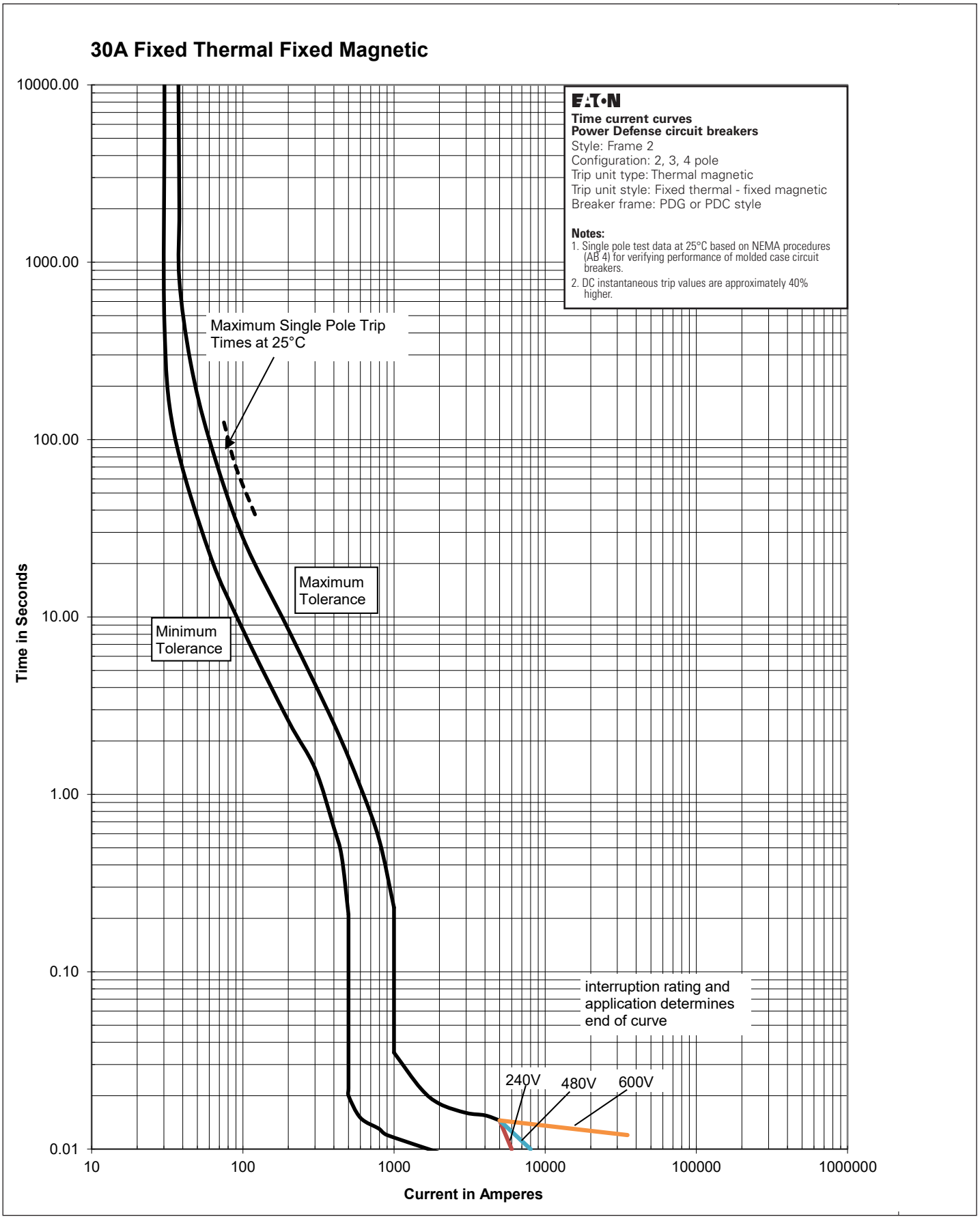


Figure 62. 30A fixed thermal fixed magnetic.

April 2022

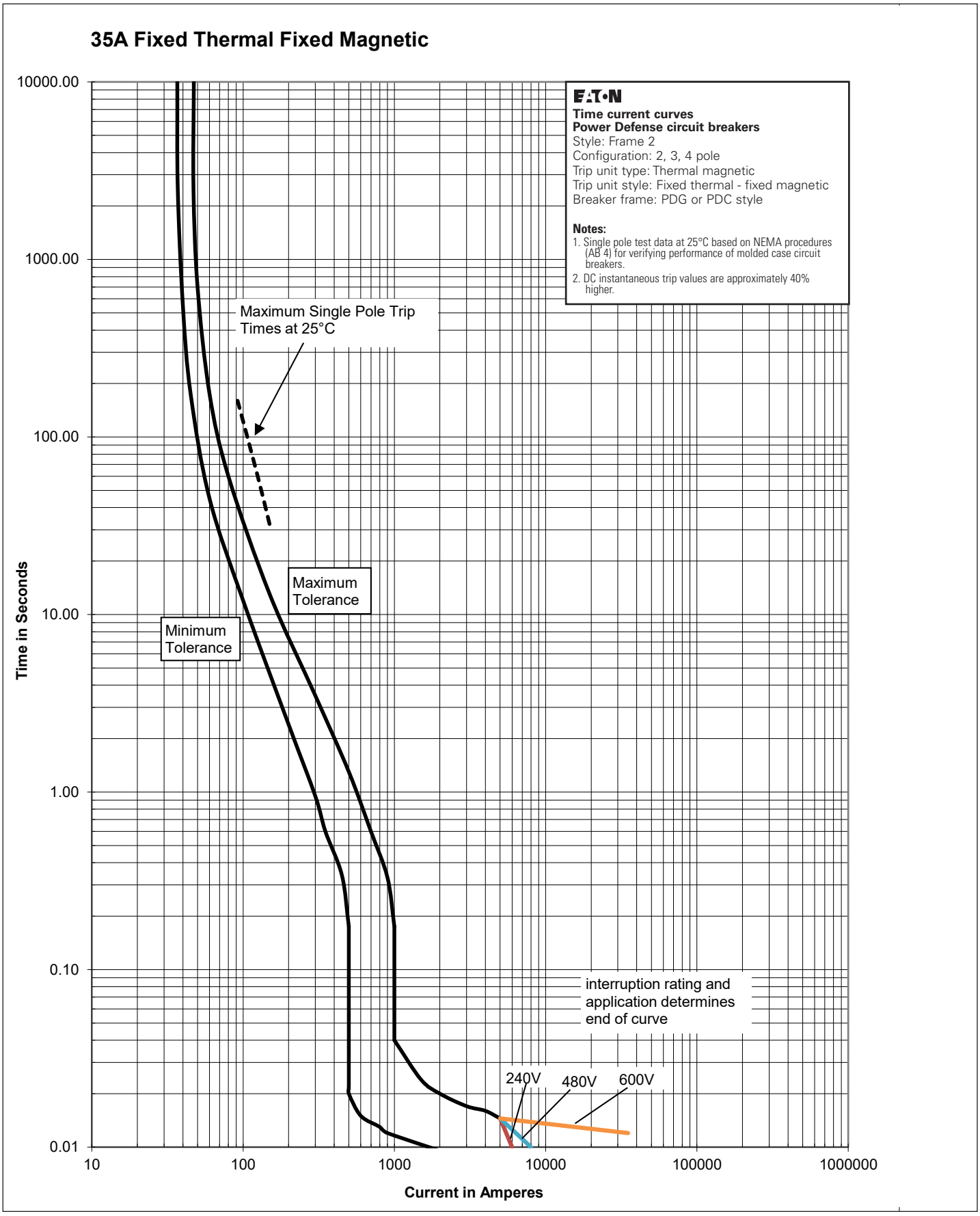


Figure 63. 35A fixed thermal fixed magnetic.

April 2022

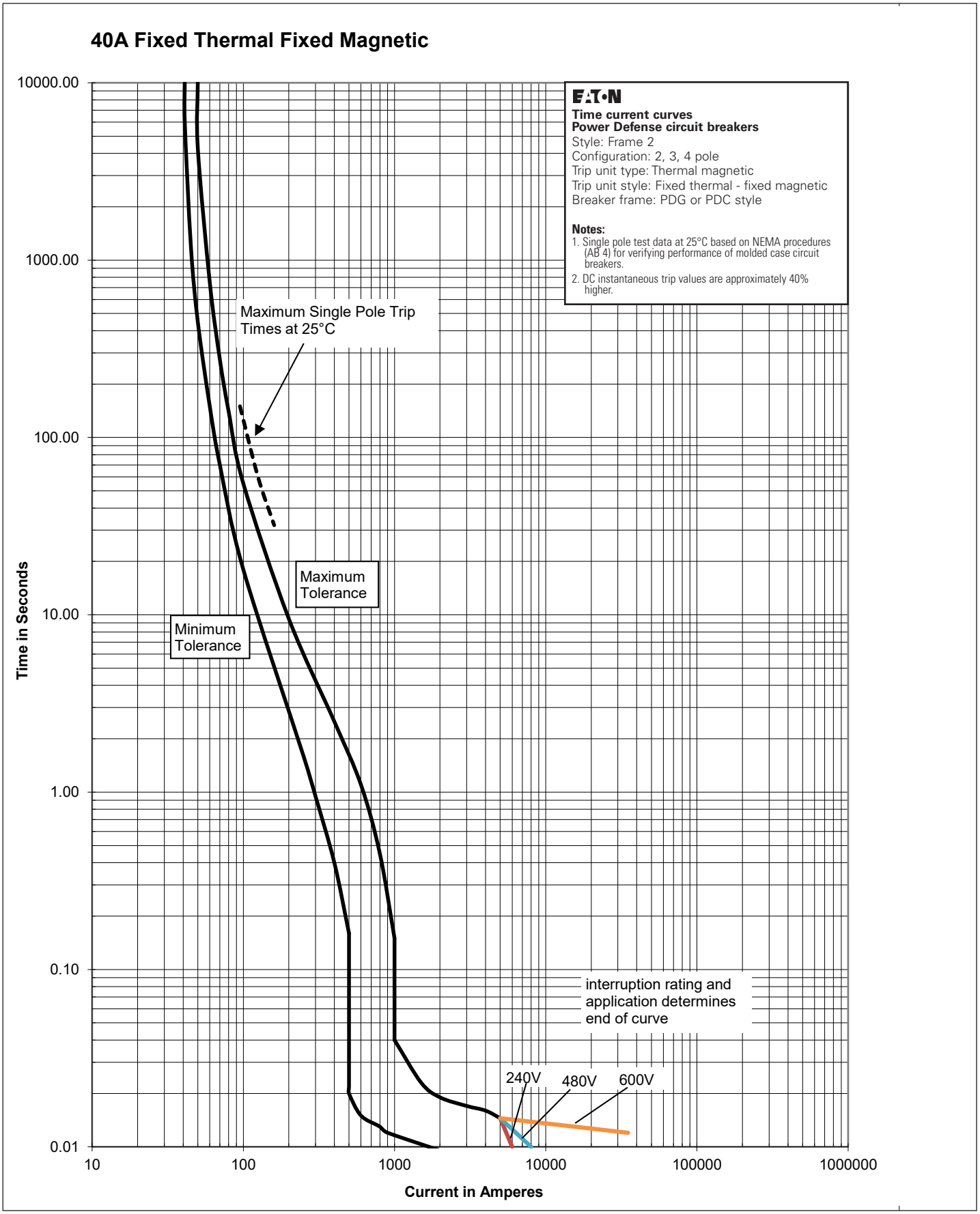


Figure 64. 40A fixed thermal fixed magnetic.

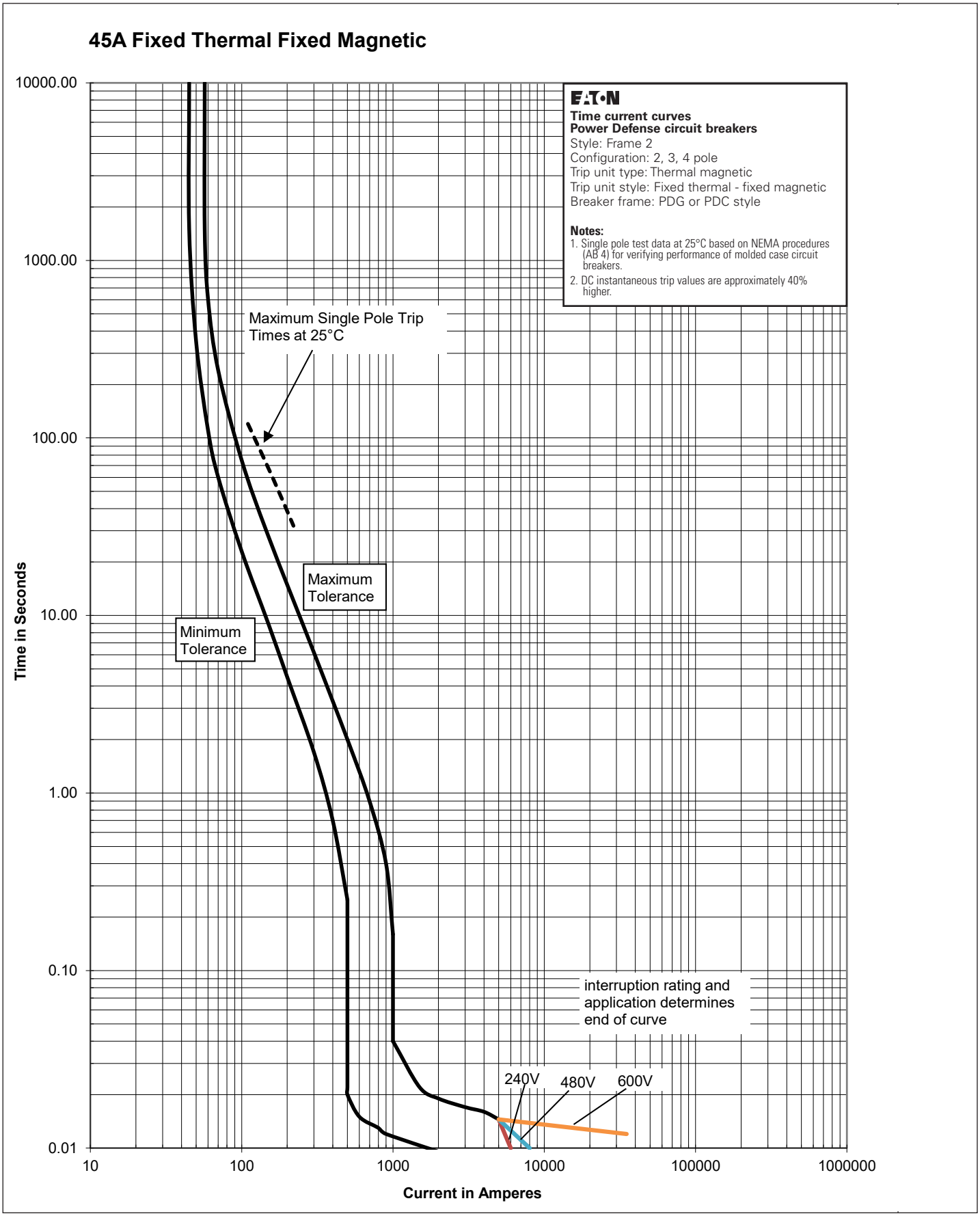


Figure 65. 45A fixed thermal fixed magnetic.

April 2022.

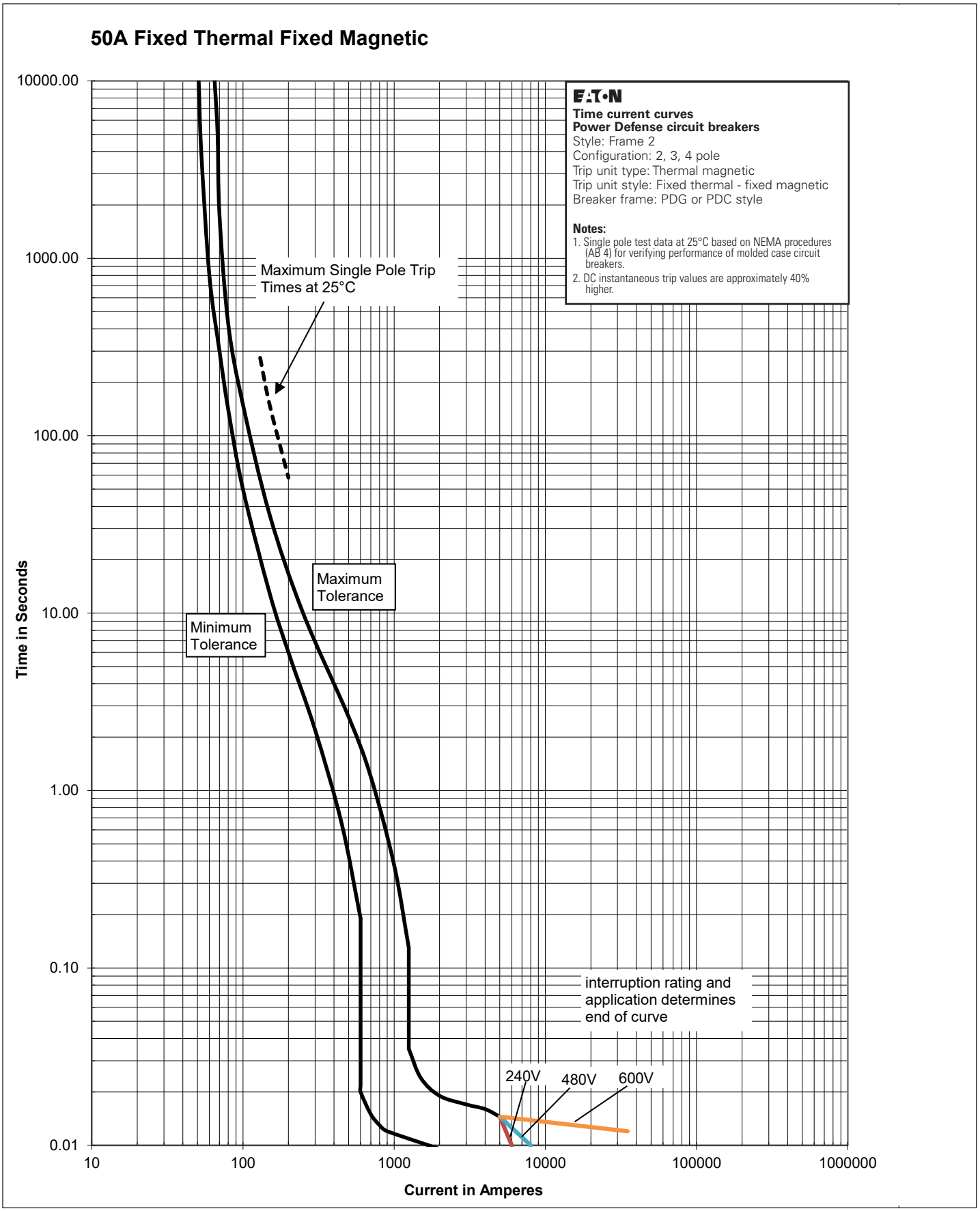


Figure 66. 50A fixed thermal fixed magnetic.

April 2022

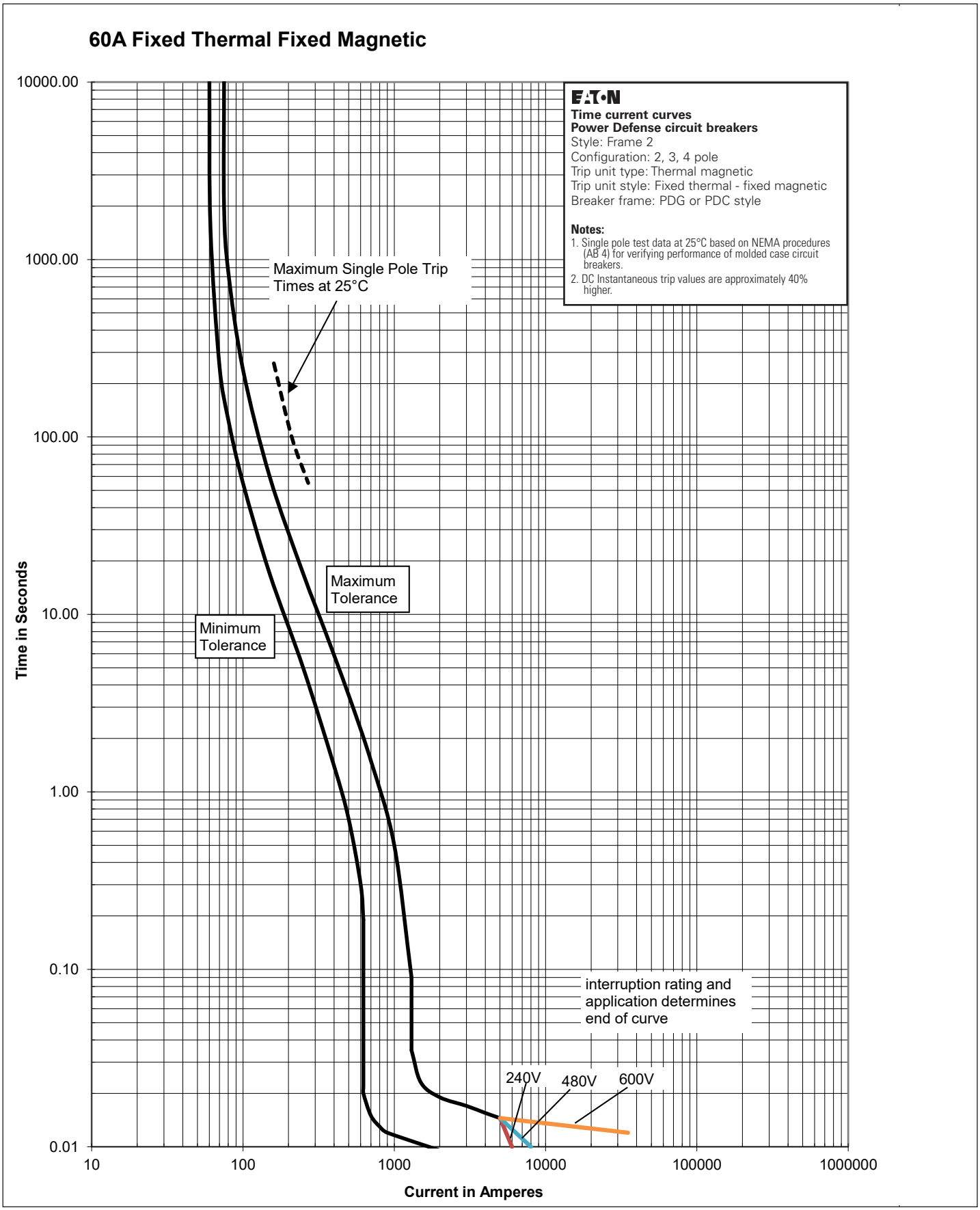


Figure 67. 60A fixed thermal fixed magnetic.

April 2022

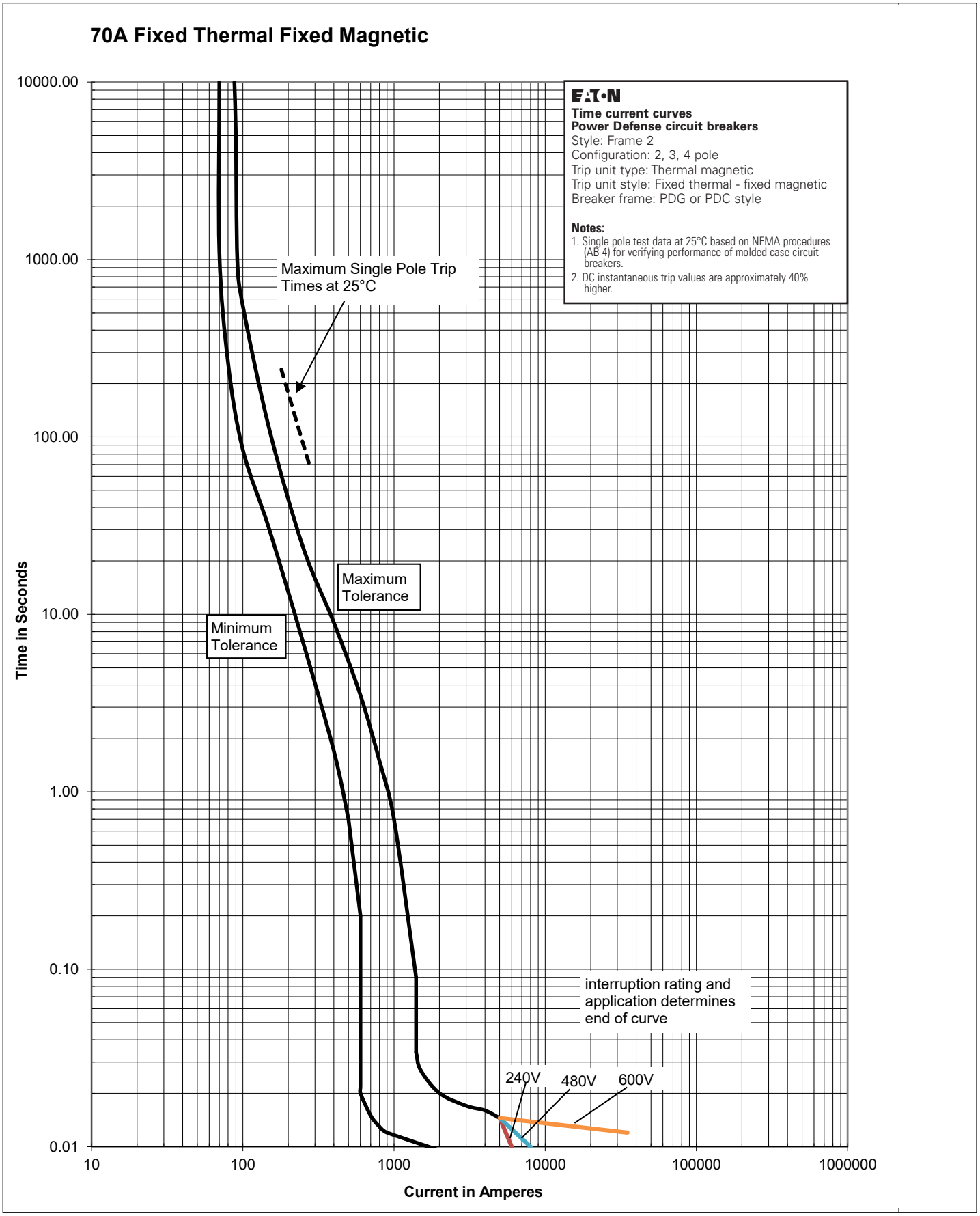


Figure 68. 70A fixed thermal fixed magnetic.

April 2022

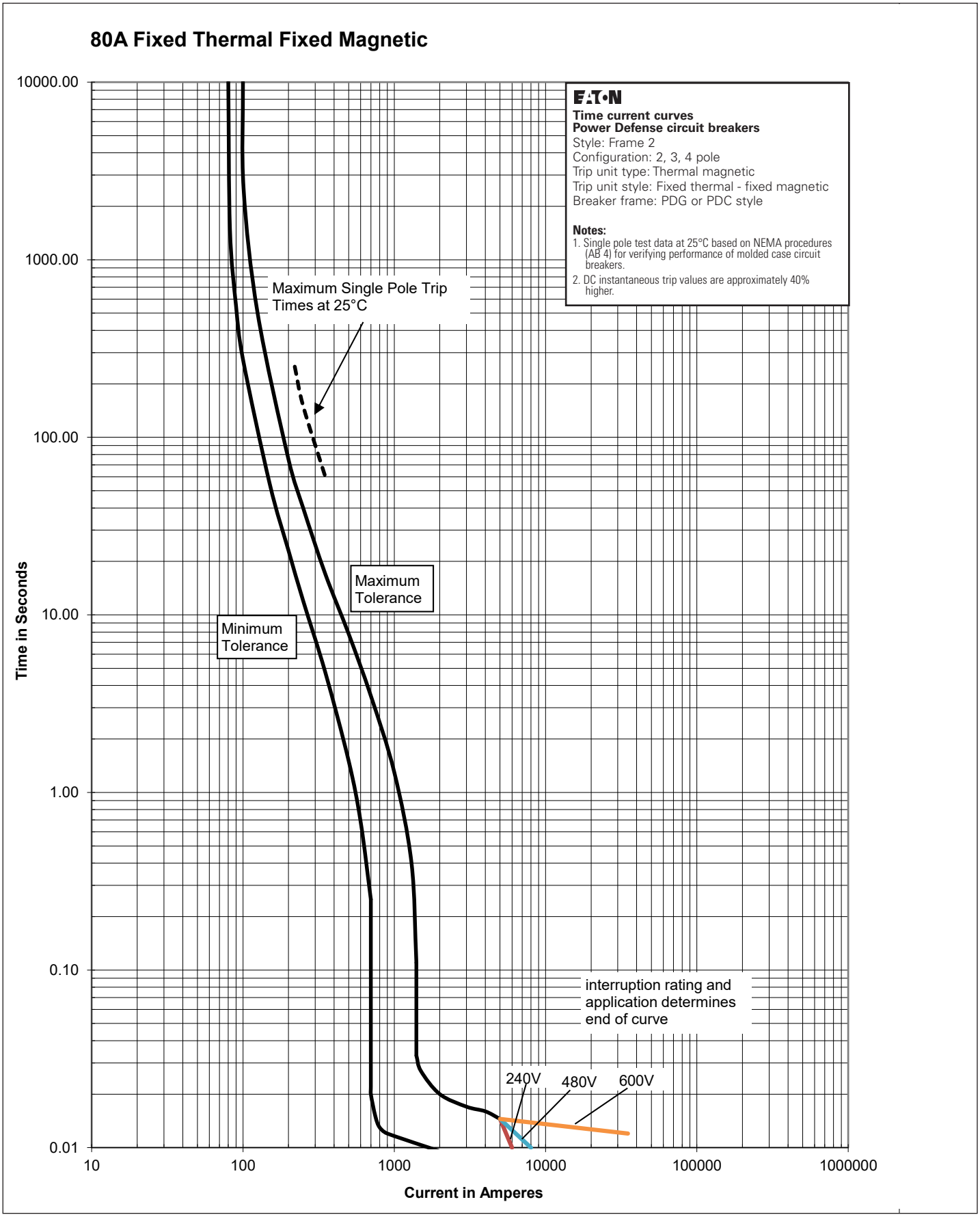


Figure 69. 80A fixed thermal fixed magnetic.

April 2022

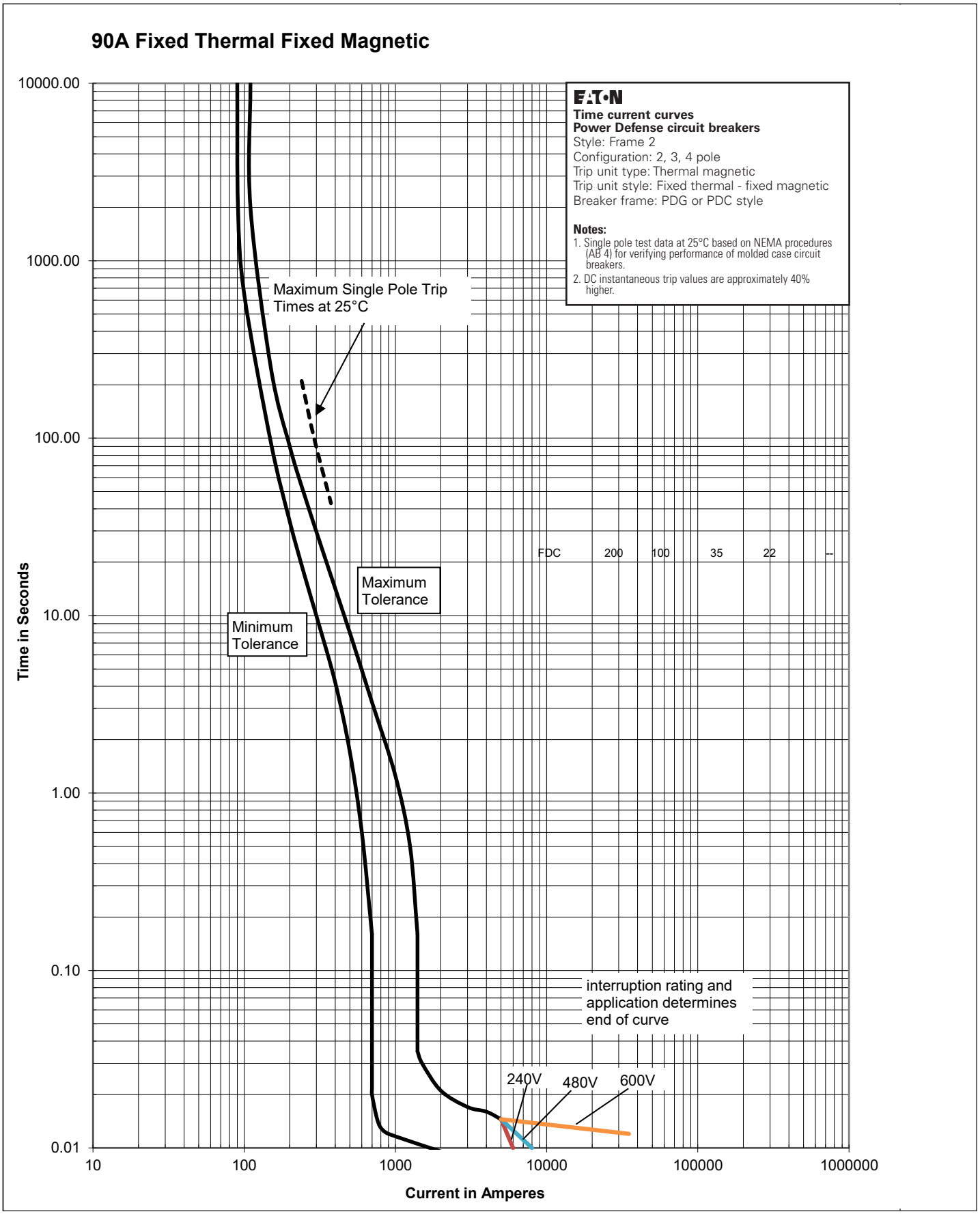


Figure 70. 90A fixed thermal fixed magnetic.

April 2022

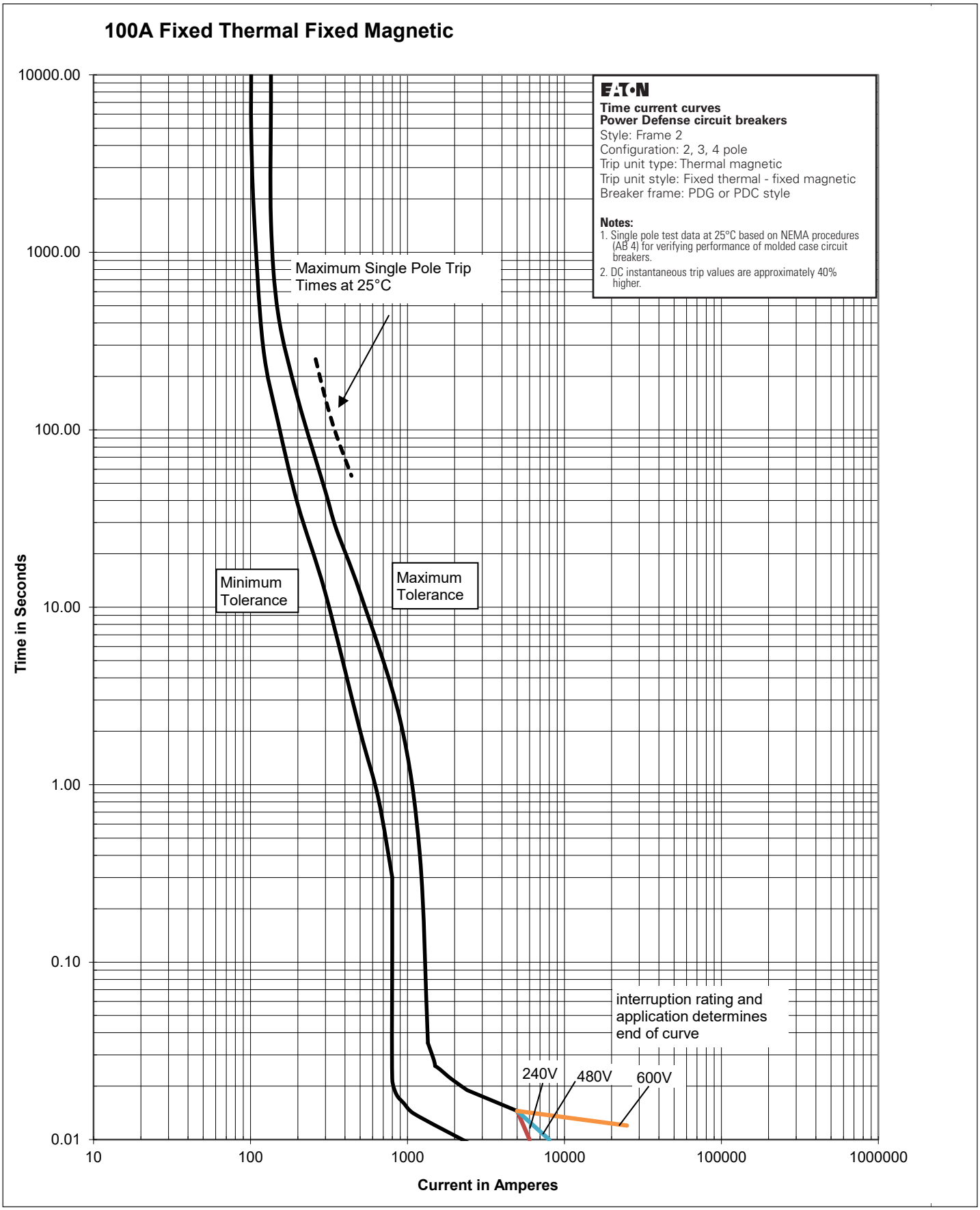


Figure 71. 100A fixed thermal fixed magnetic.

April 2022

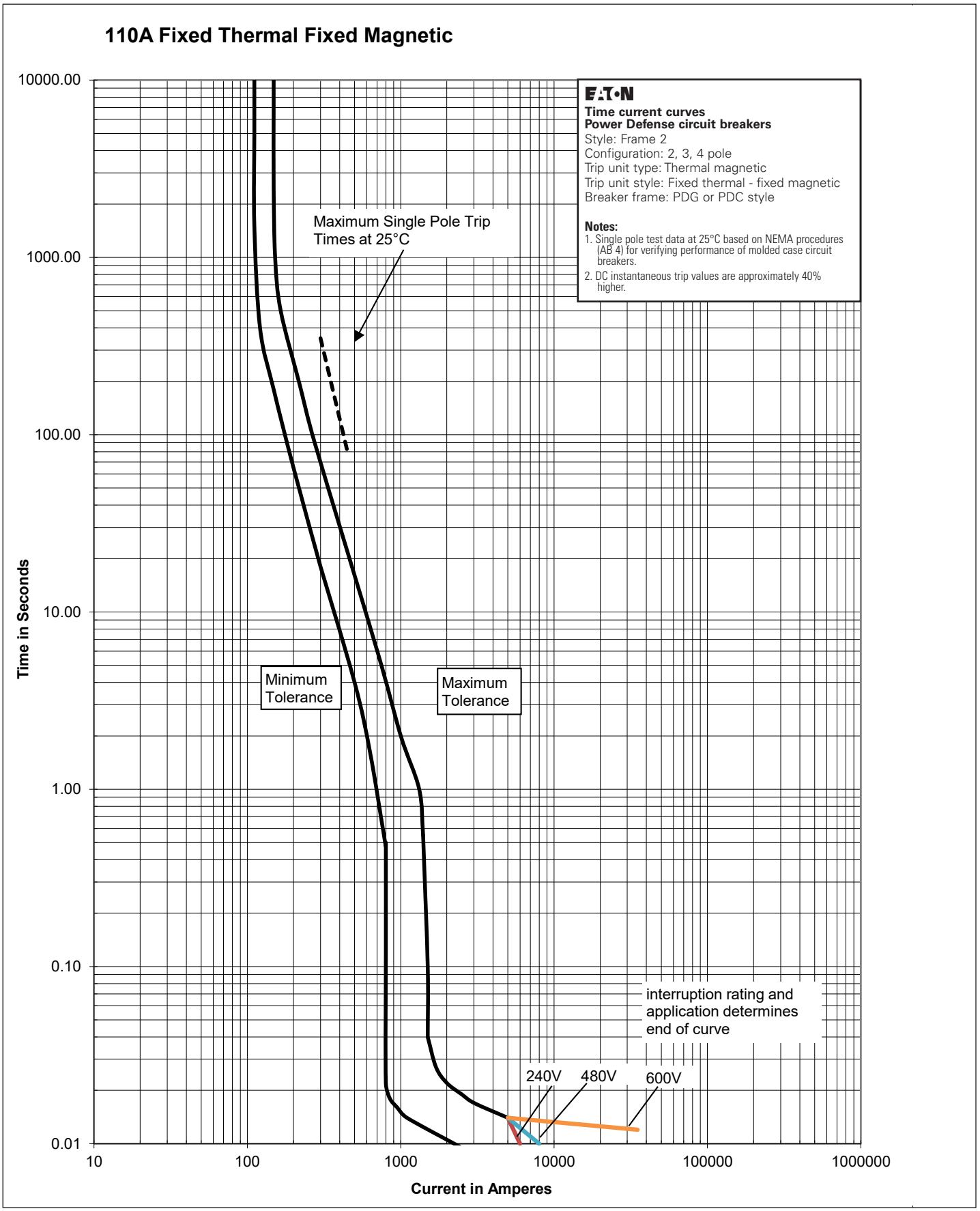


Figure 72. 110A fixed thermal fixed magnetic.

April 2022

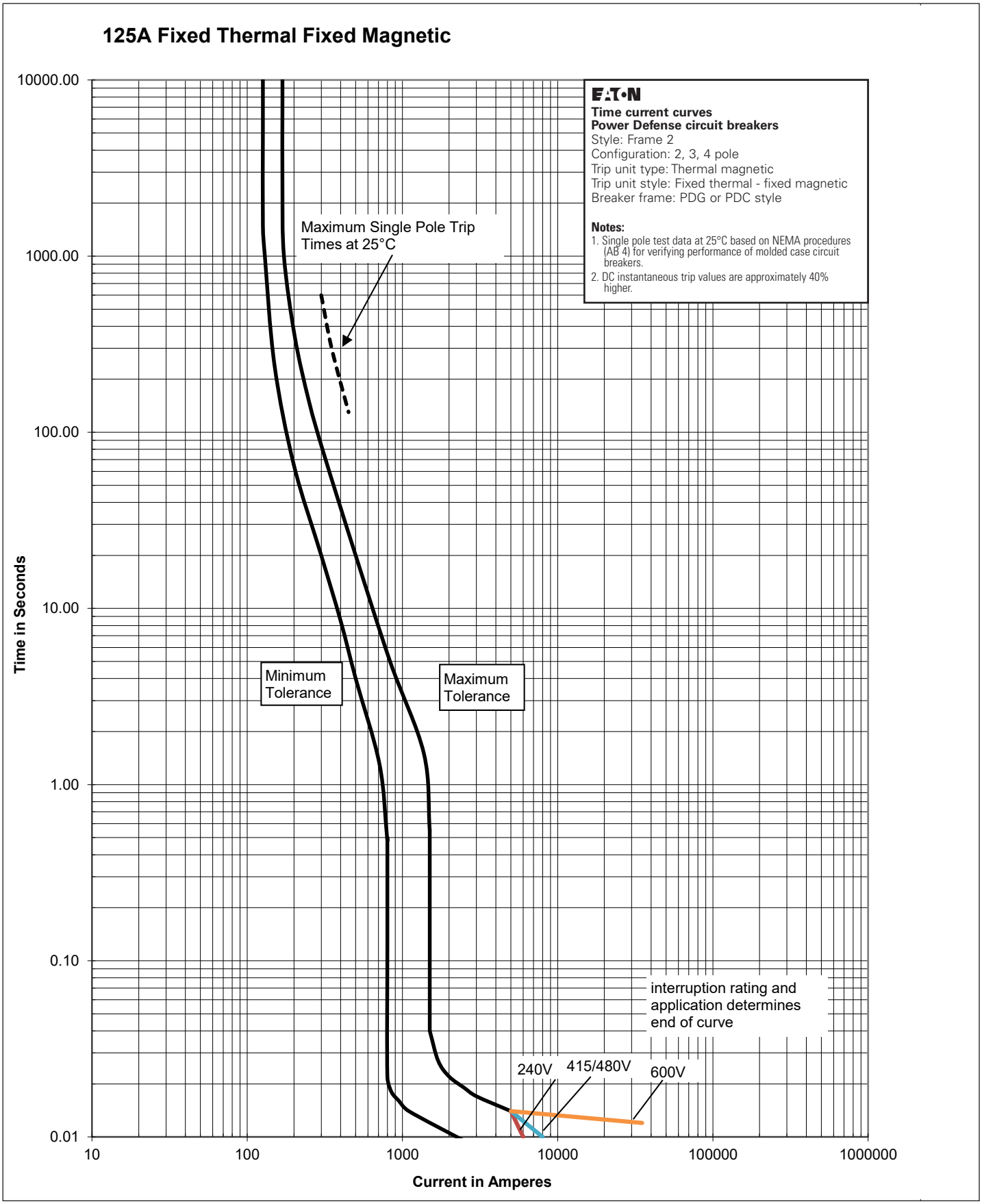


Figure 73. 125A fixed thermal fixed magnetic.

April 2022

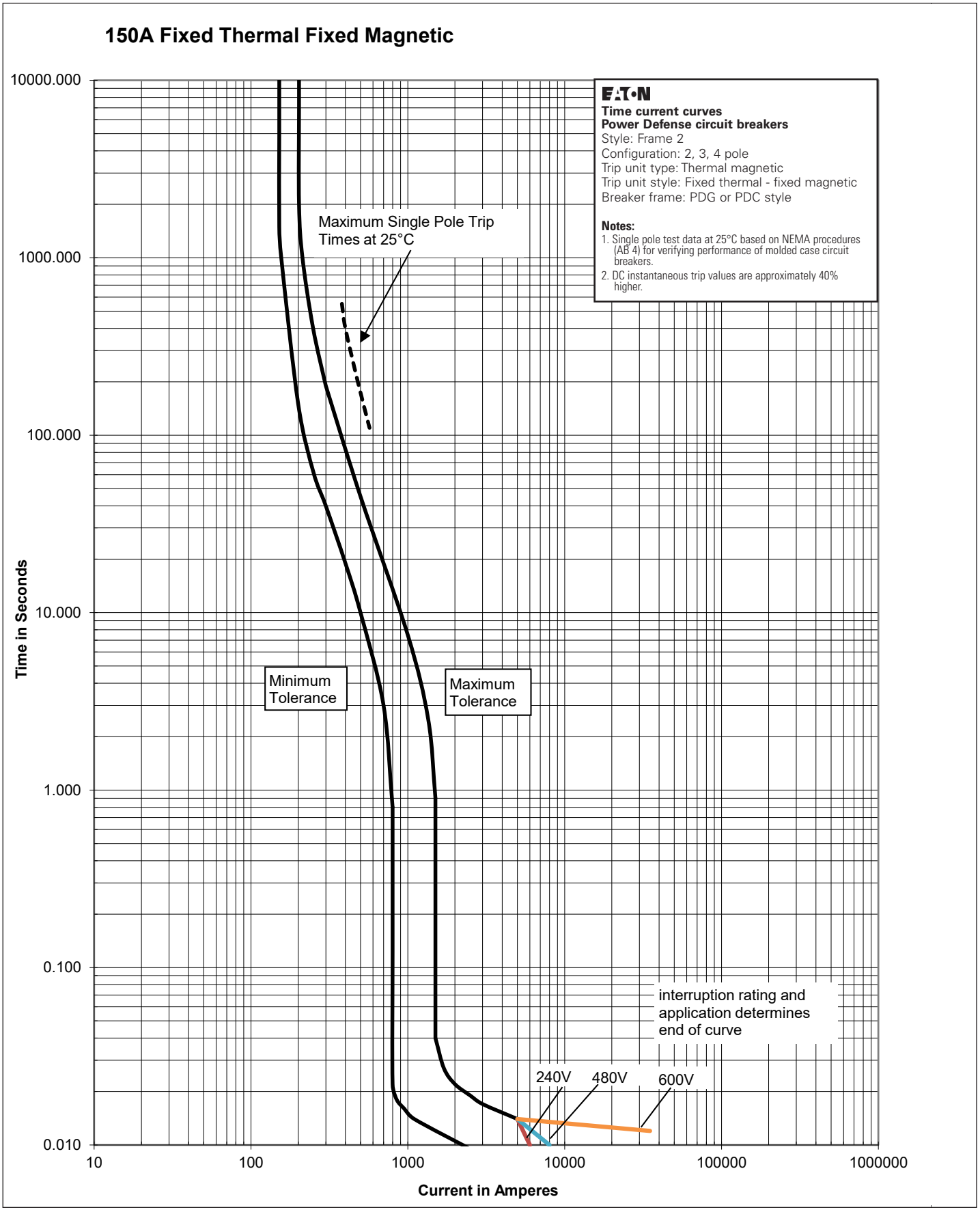


Figure 74. 150A fixed thermal fixed magnetic.

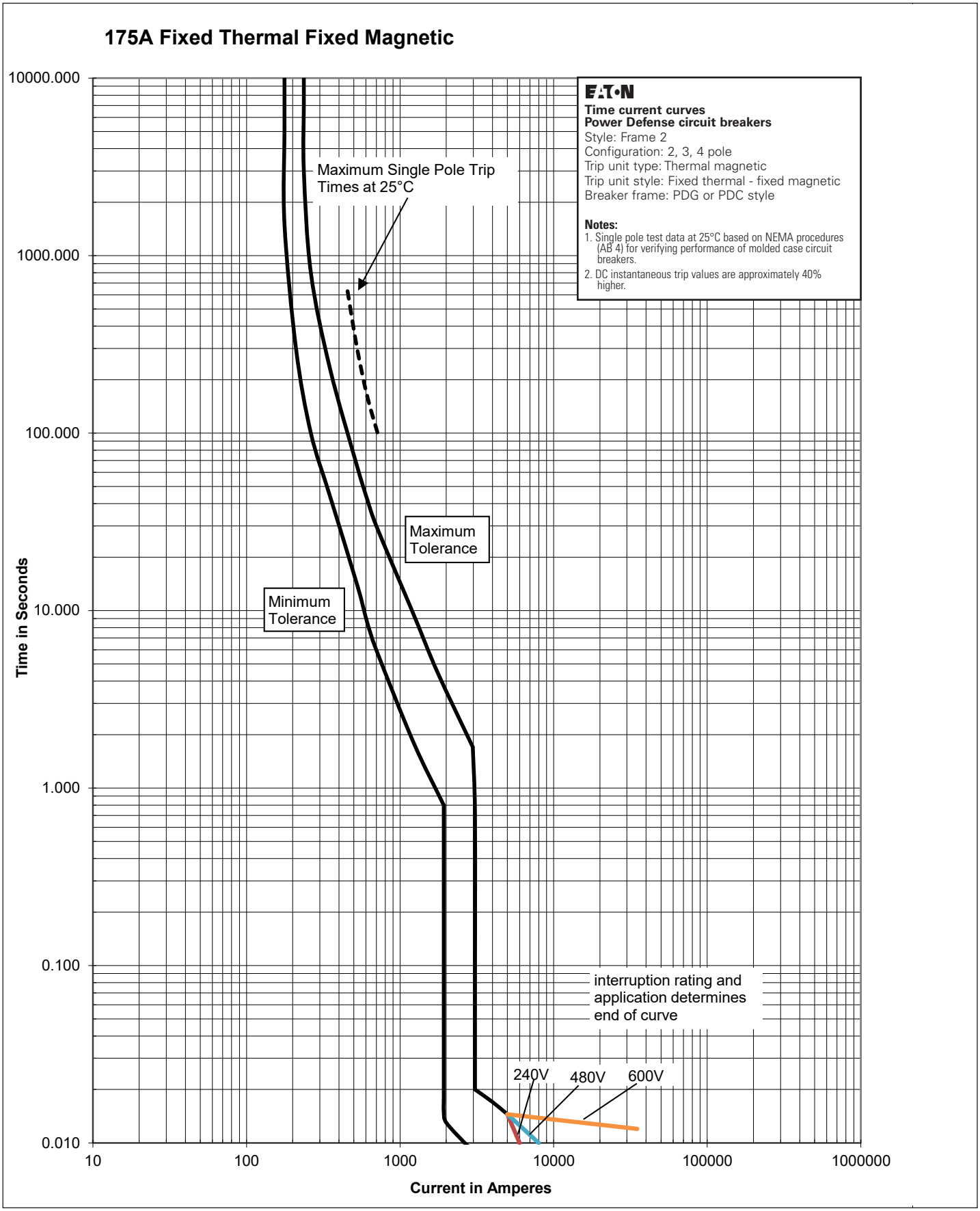


Figure 75. 175A fixed thermal fixed magnetic.

April 2022

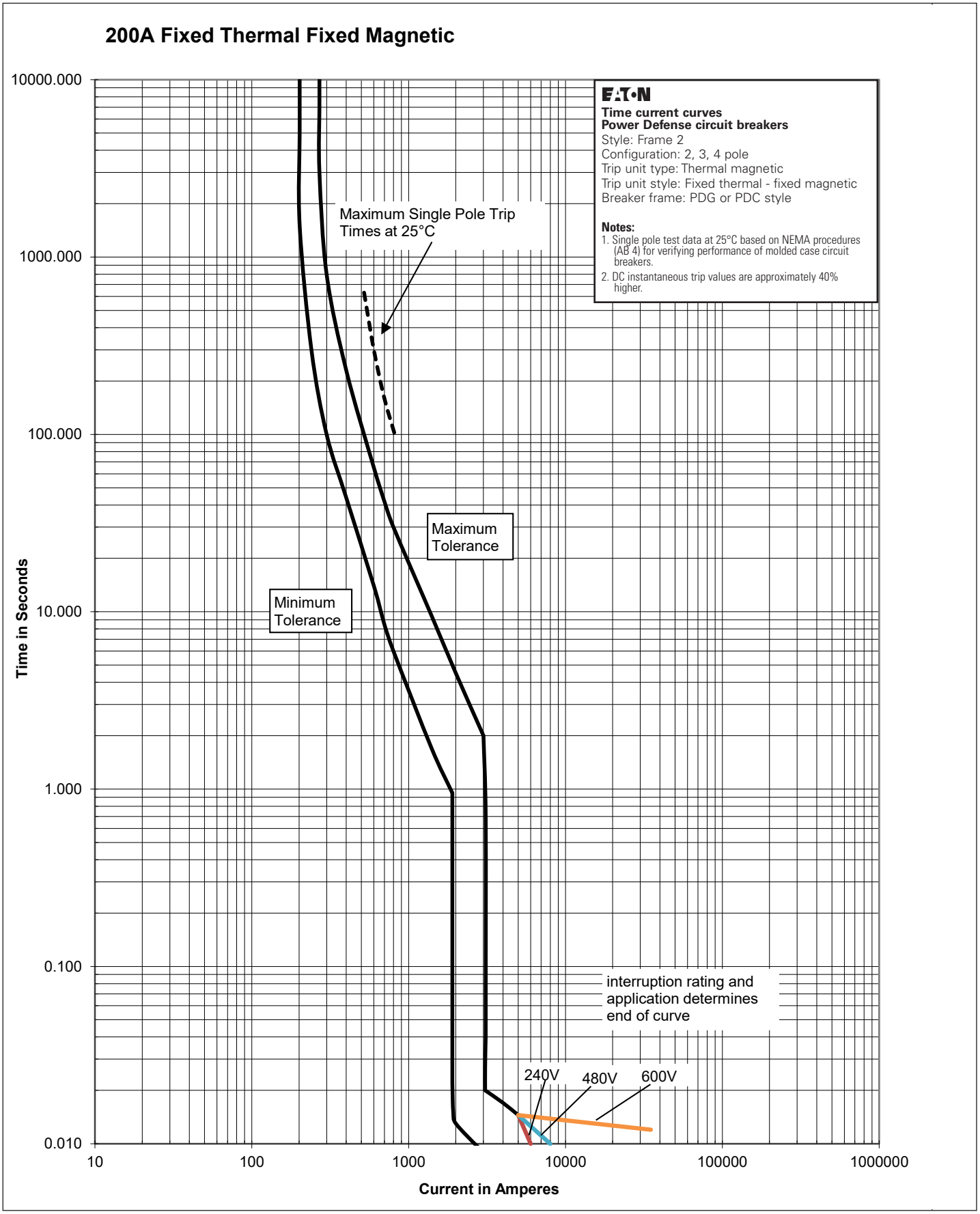


Figure 76. 200A fixed thermal fixed magnetic.

April 2022

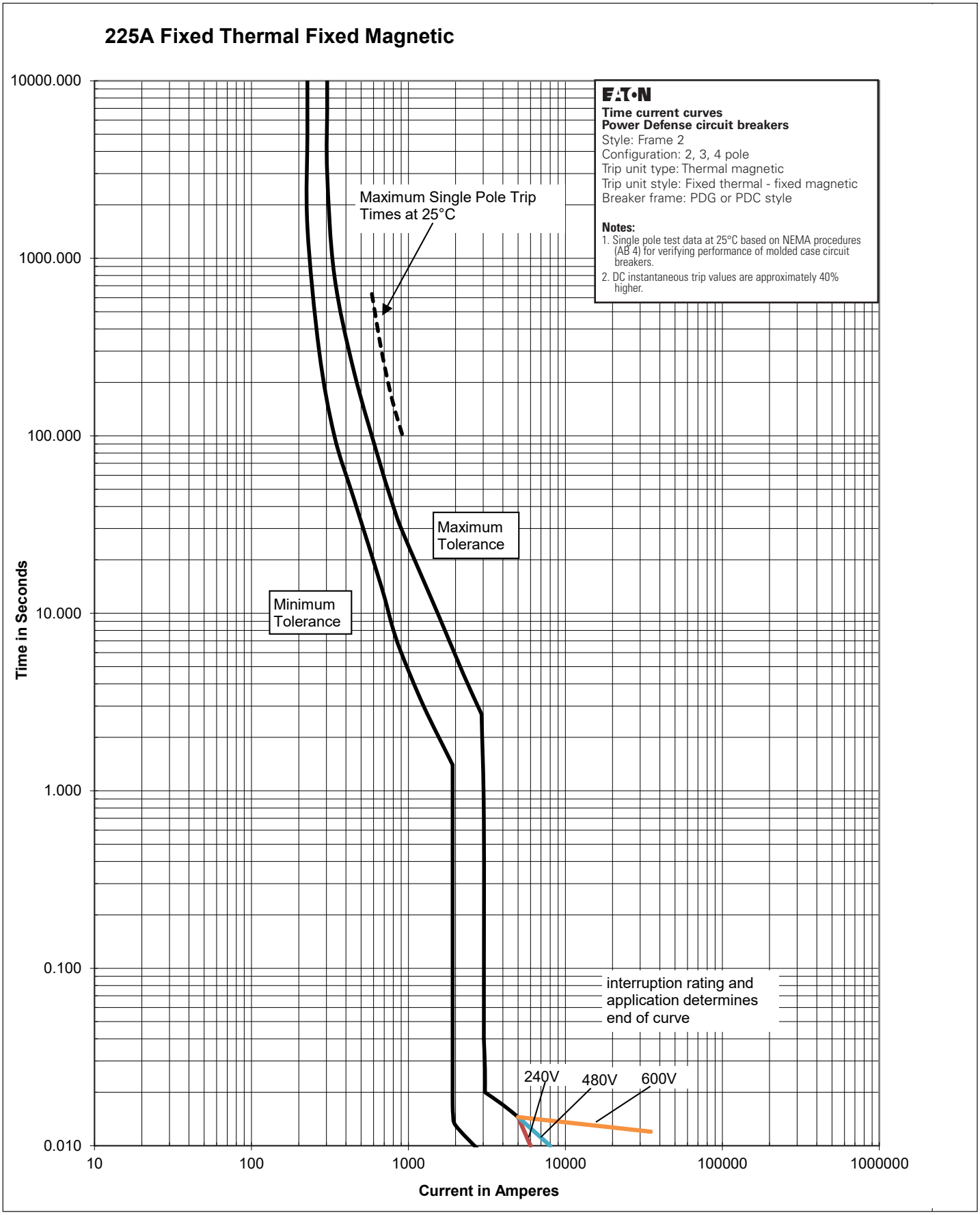


Figure 77. 225A fixed thermal fixed magnetic.

April 2022

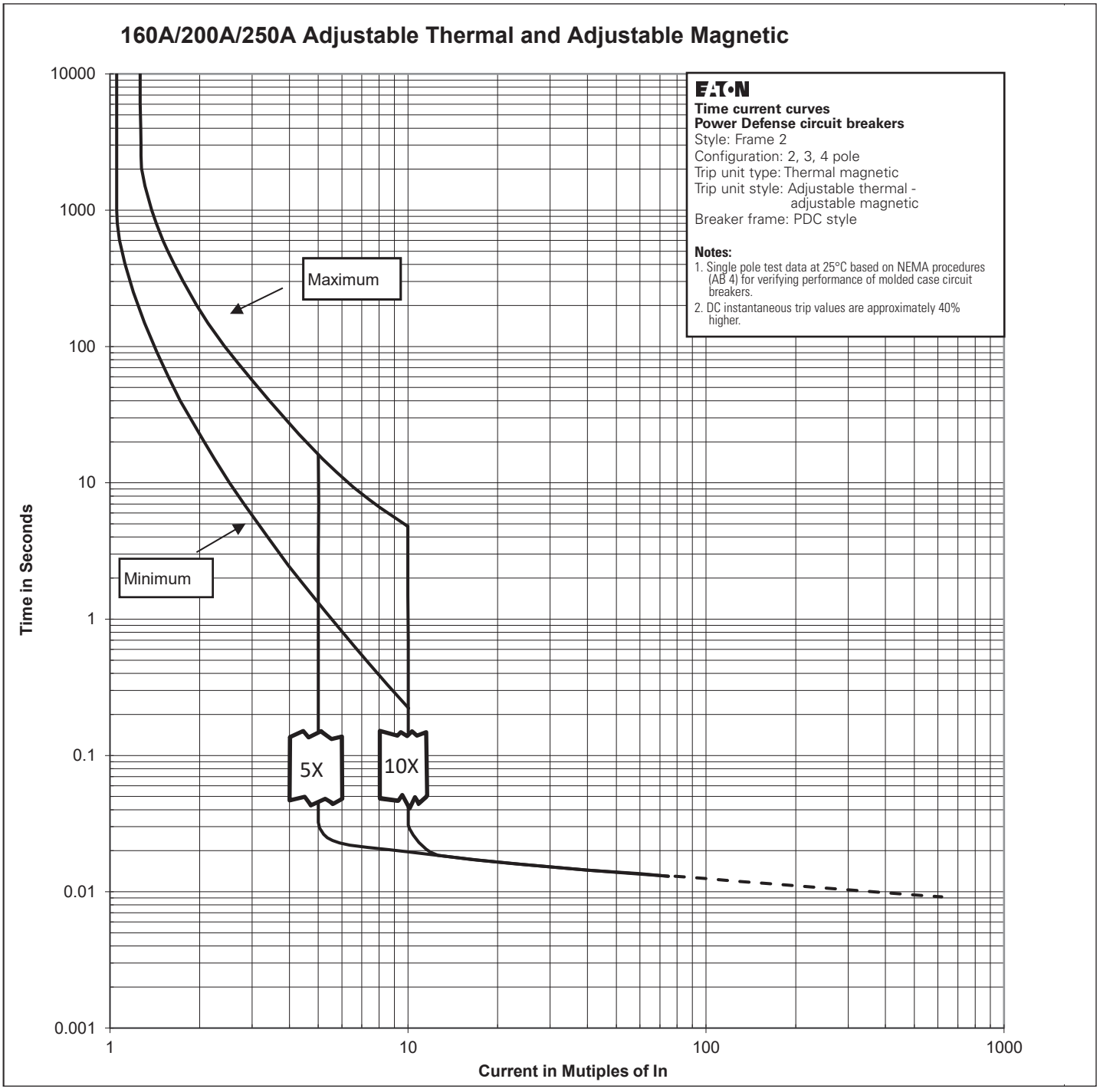


Figure 78. 160A/200A/250A adjustable thermal and adjustable magnetic. **April 2022**

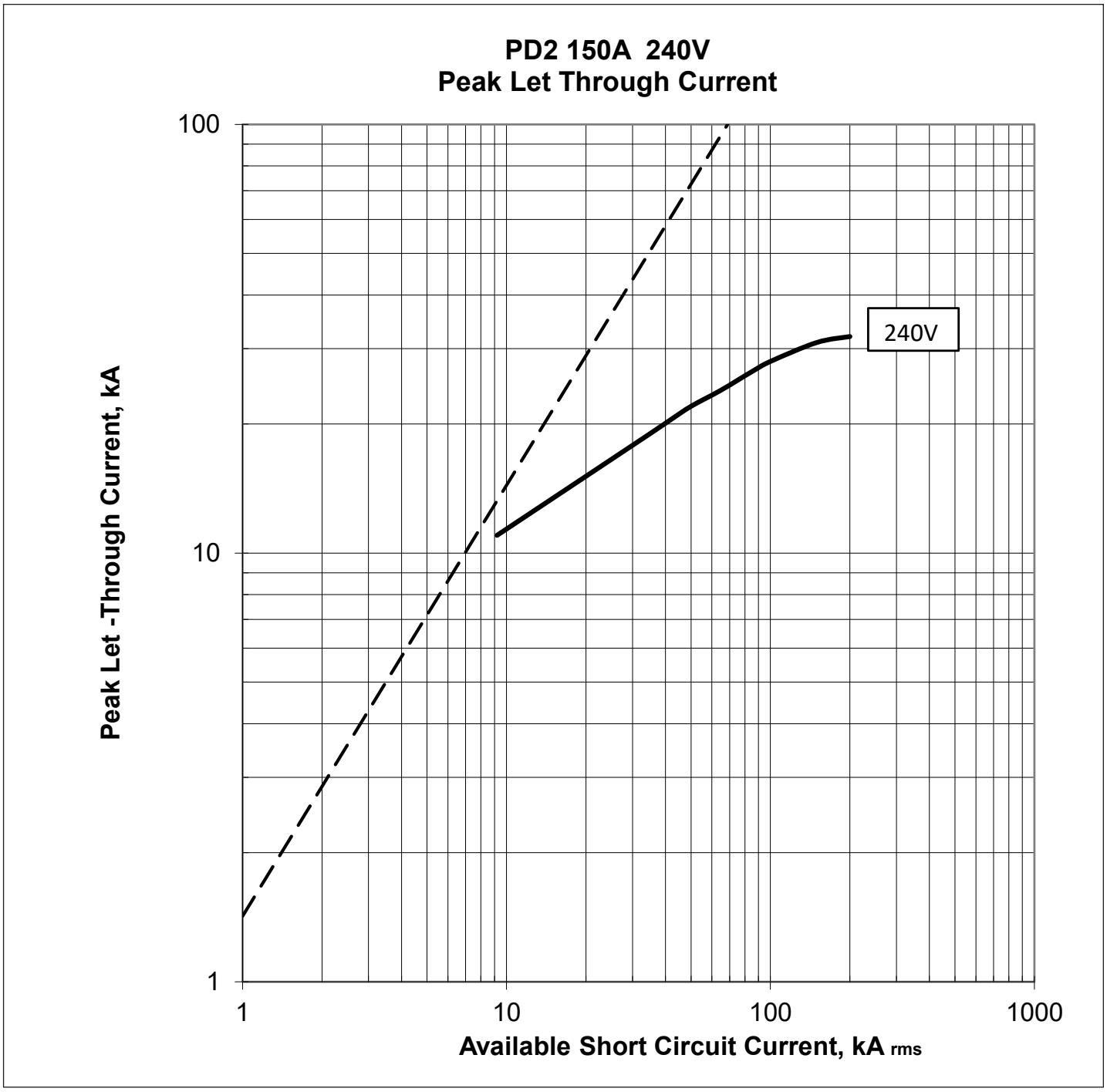


Figure 79. 240V let-through current 150A.

April 2022.

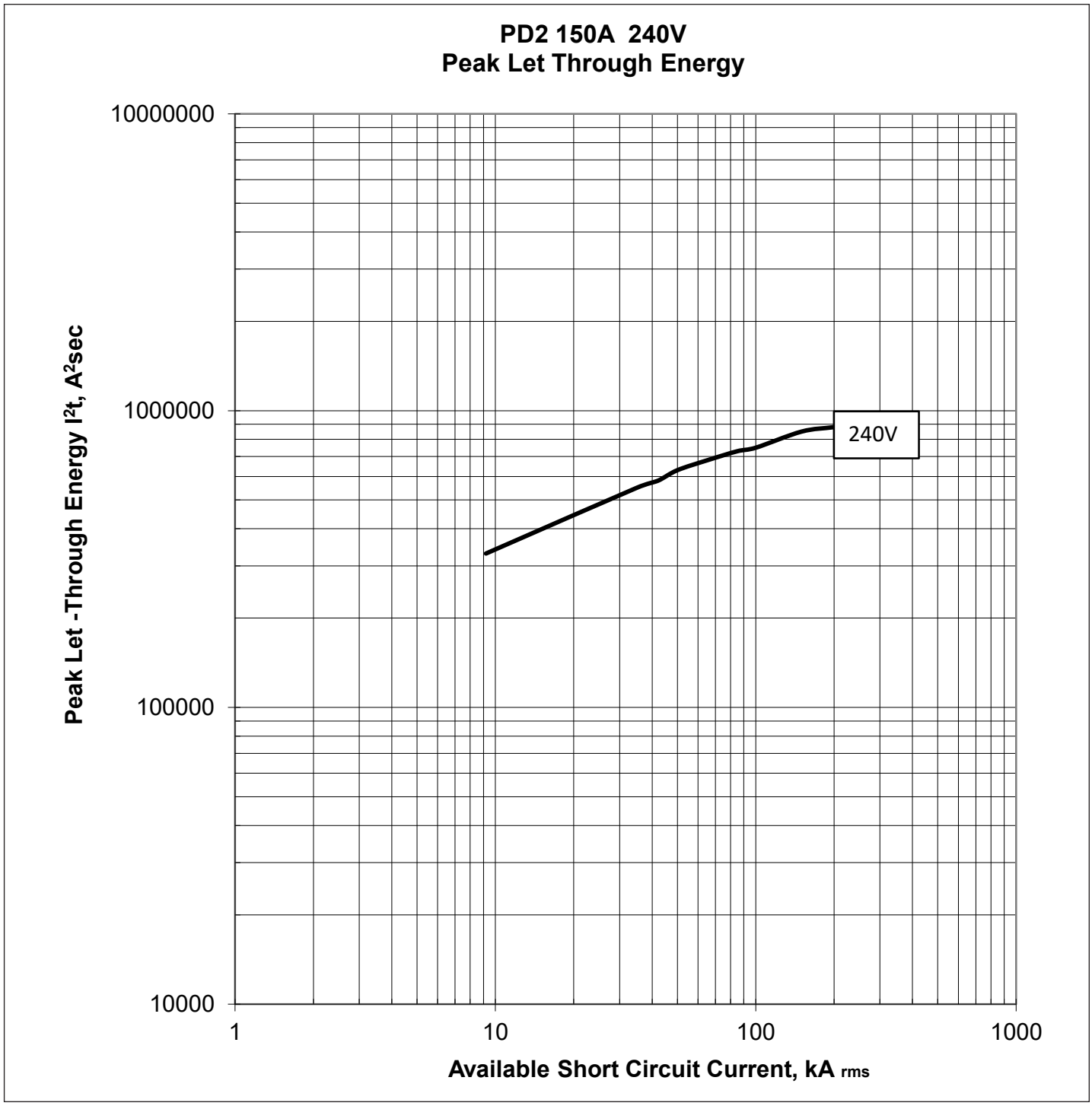


Figure 80. 240V let-through energy 150A. **April 2022.**

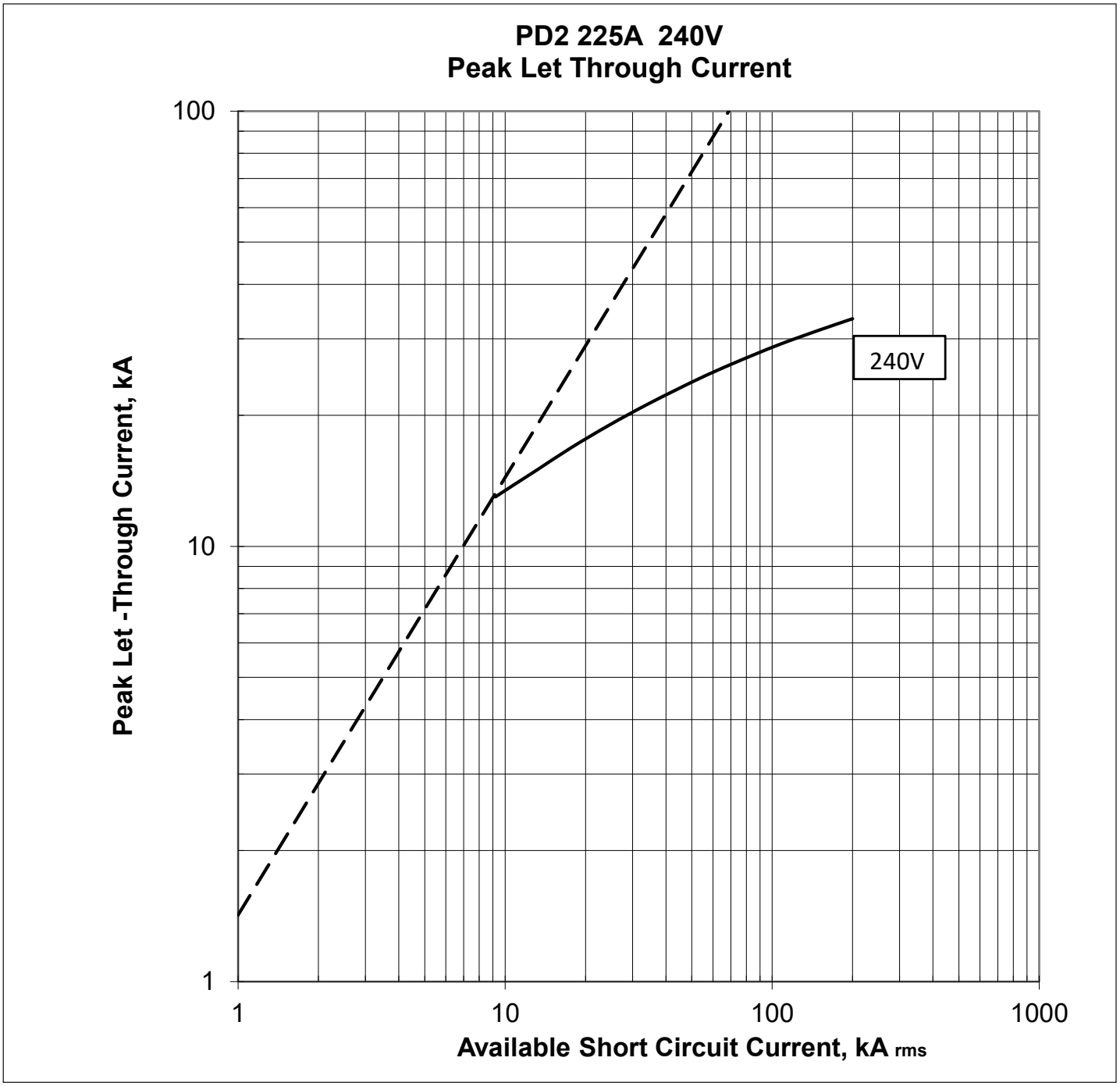


Figure 81. 240V let-through current 225A.

April 2022

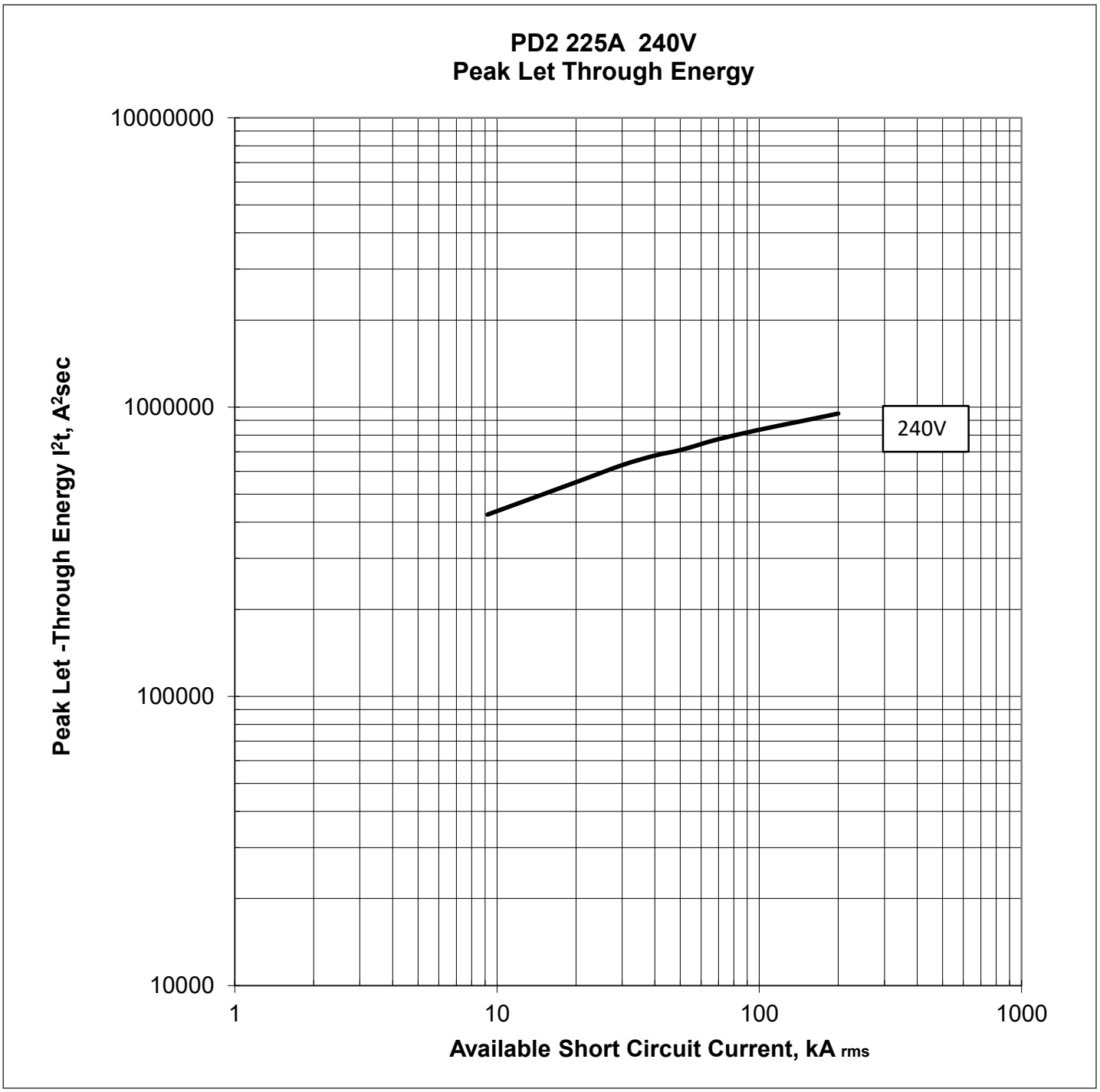


Figure 82. 240V let-through energy 225A.

April 2022

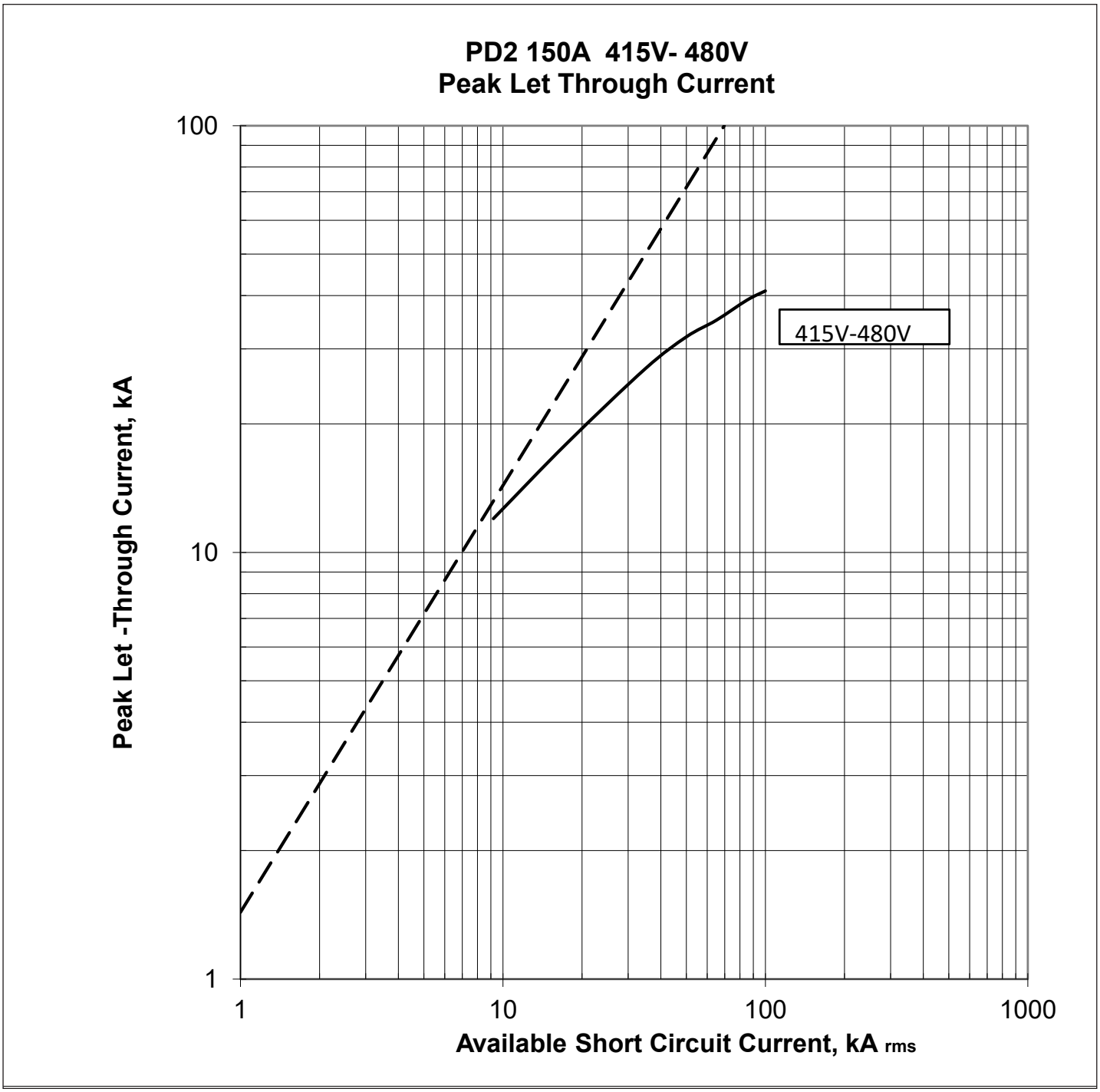


Figure 83. 415V-480V let through current 150A.

April 2022

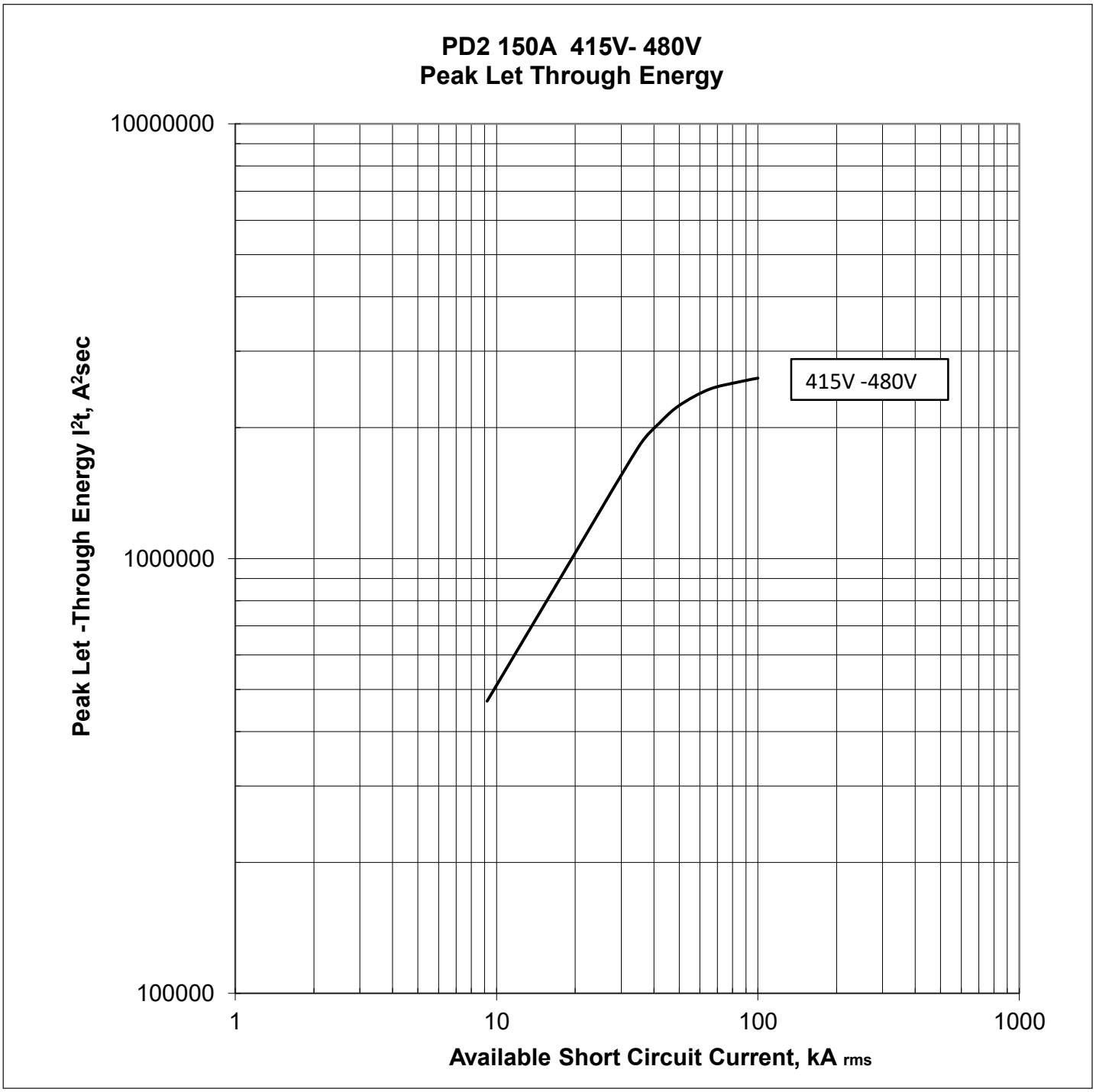


Figure 84. 415V-480V let through energy 150A.

April 2022

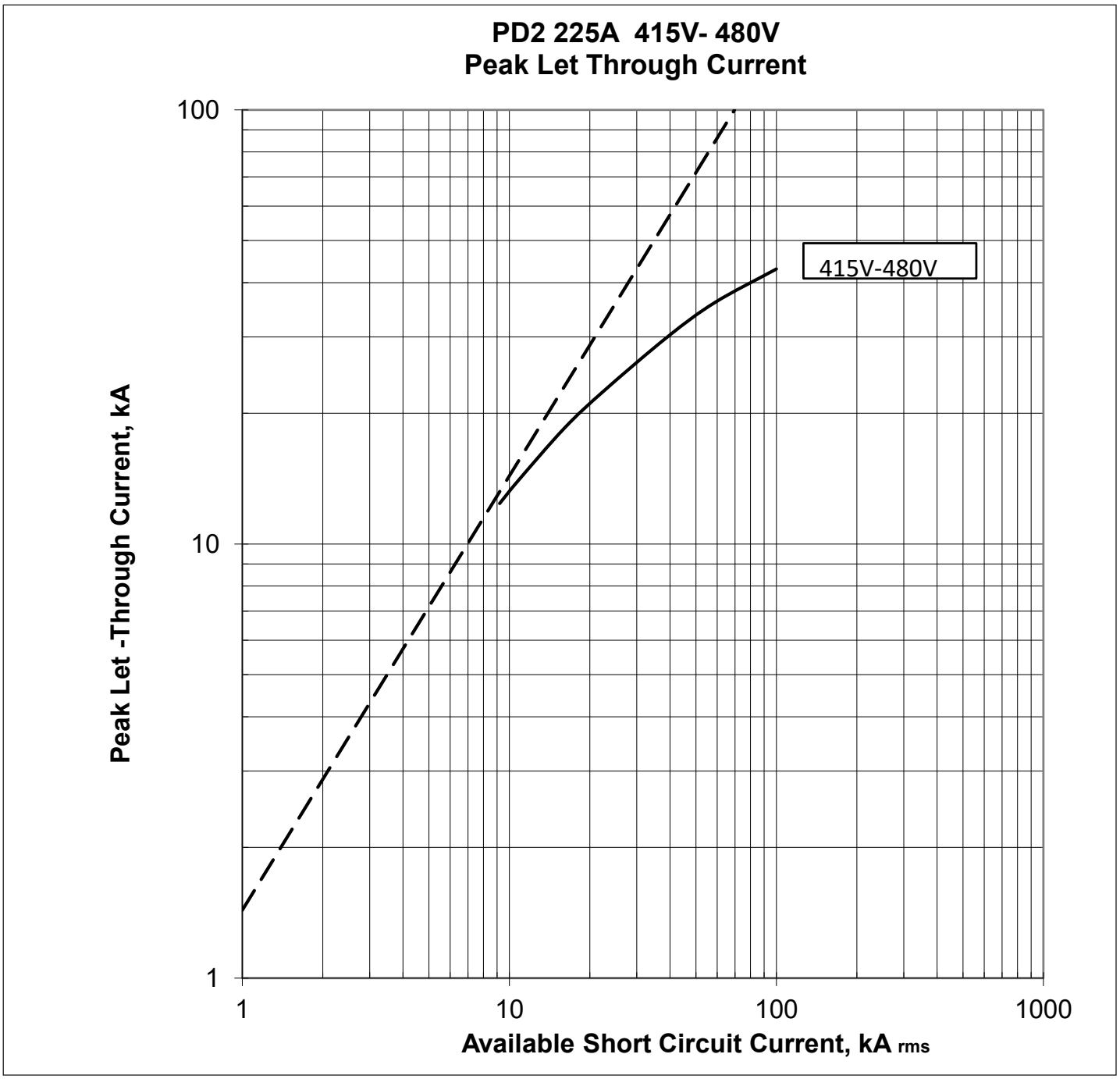


Figure 85. 415V-480V let-through current 225A.

April 2022

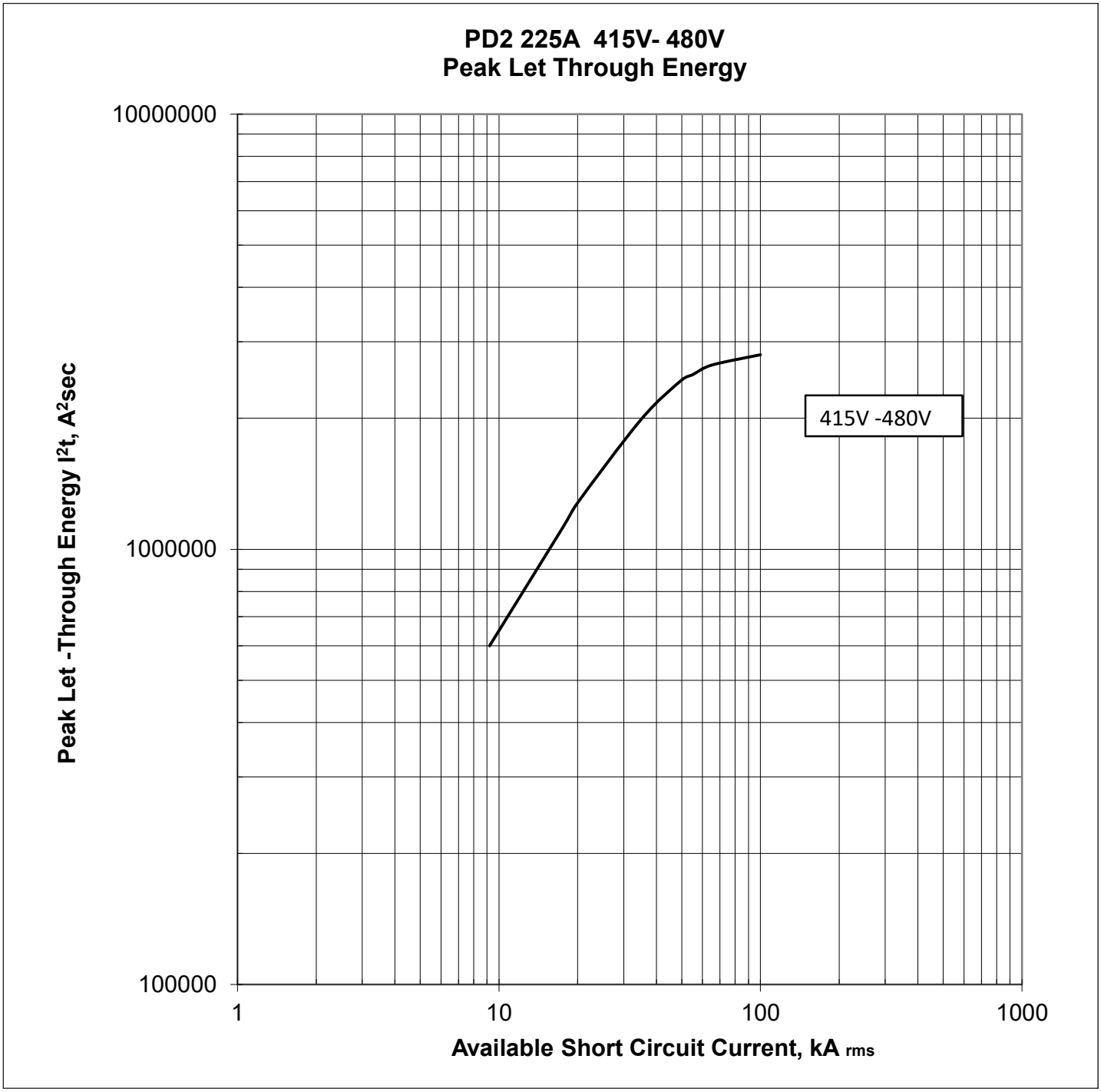


Figure 86. 415V-480V let through energy 225A.

April 2022

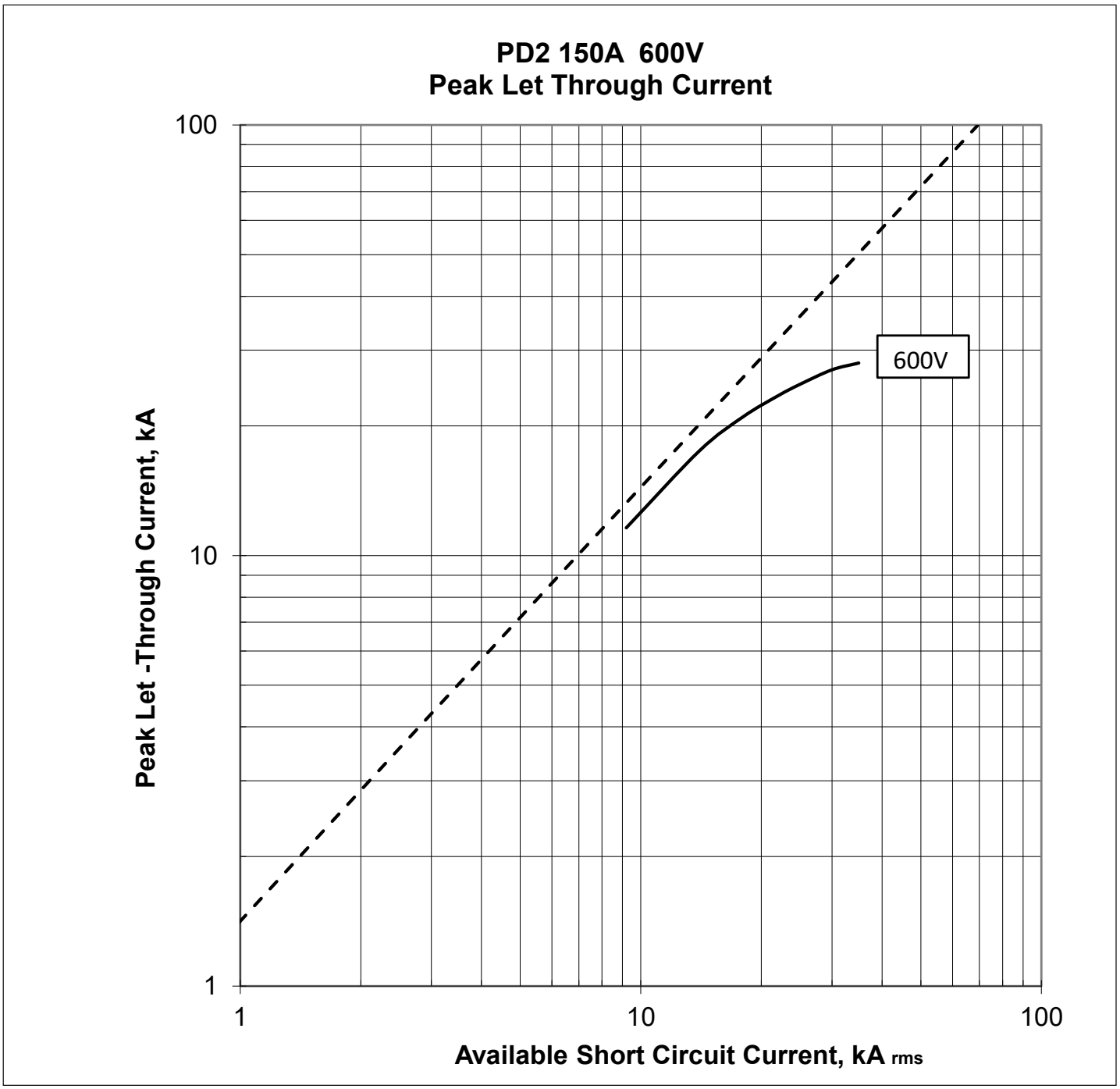


Figure 87. 600V let-through current 150A.

April 2022

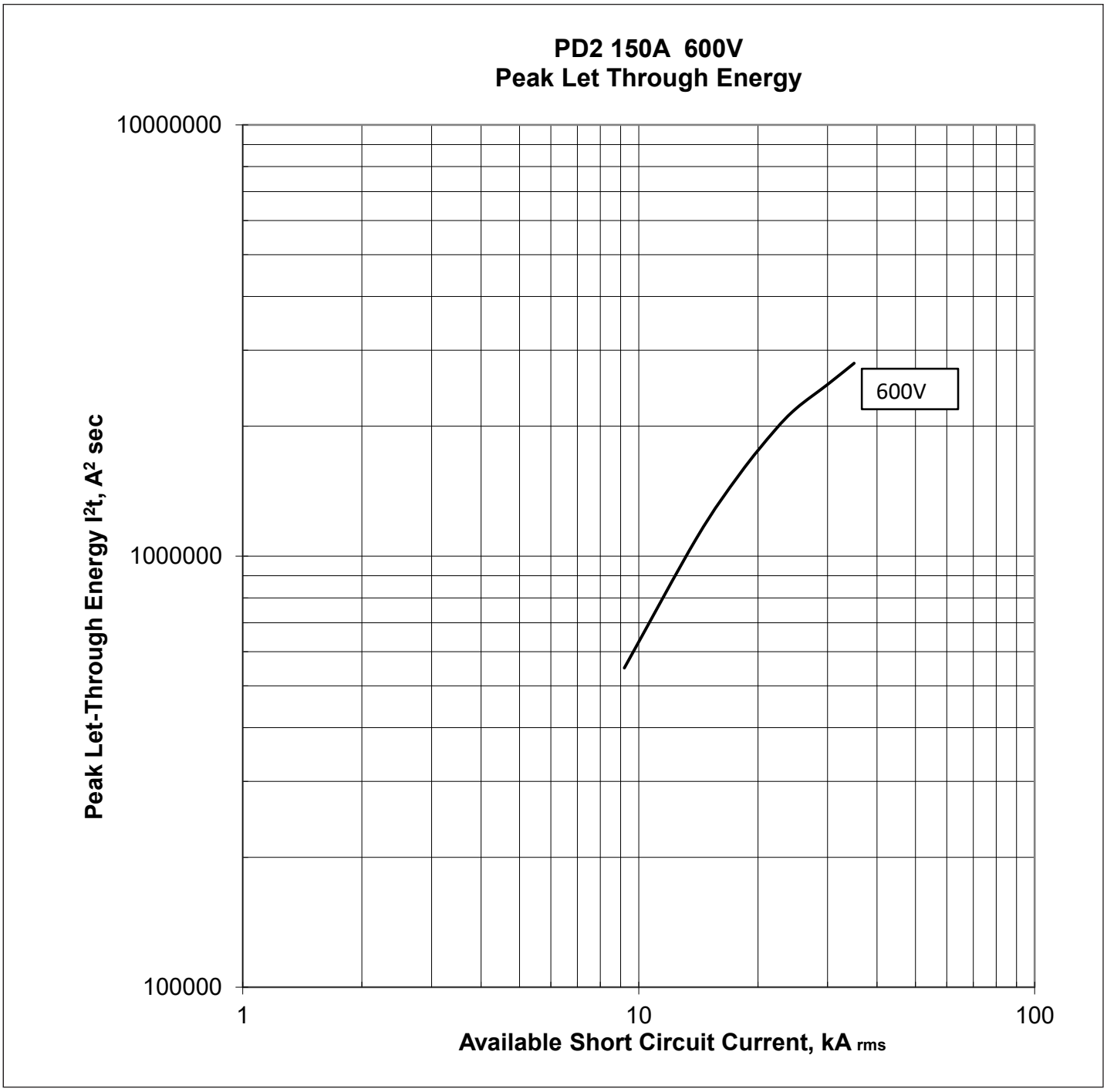


Figure 88. 600V let-through energy 150A.

April 2022

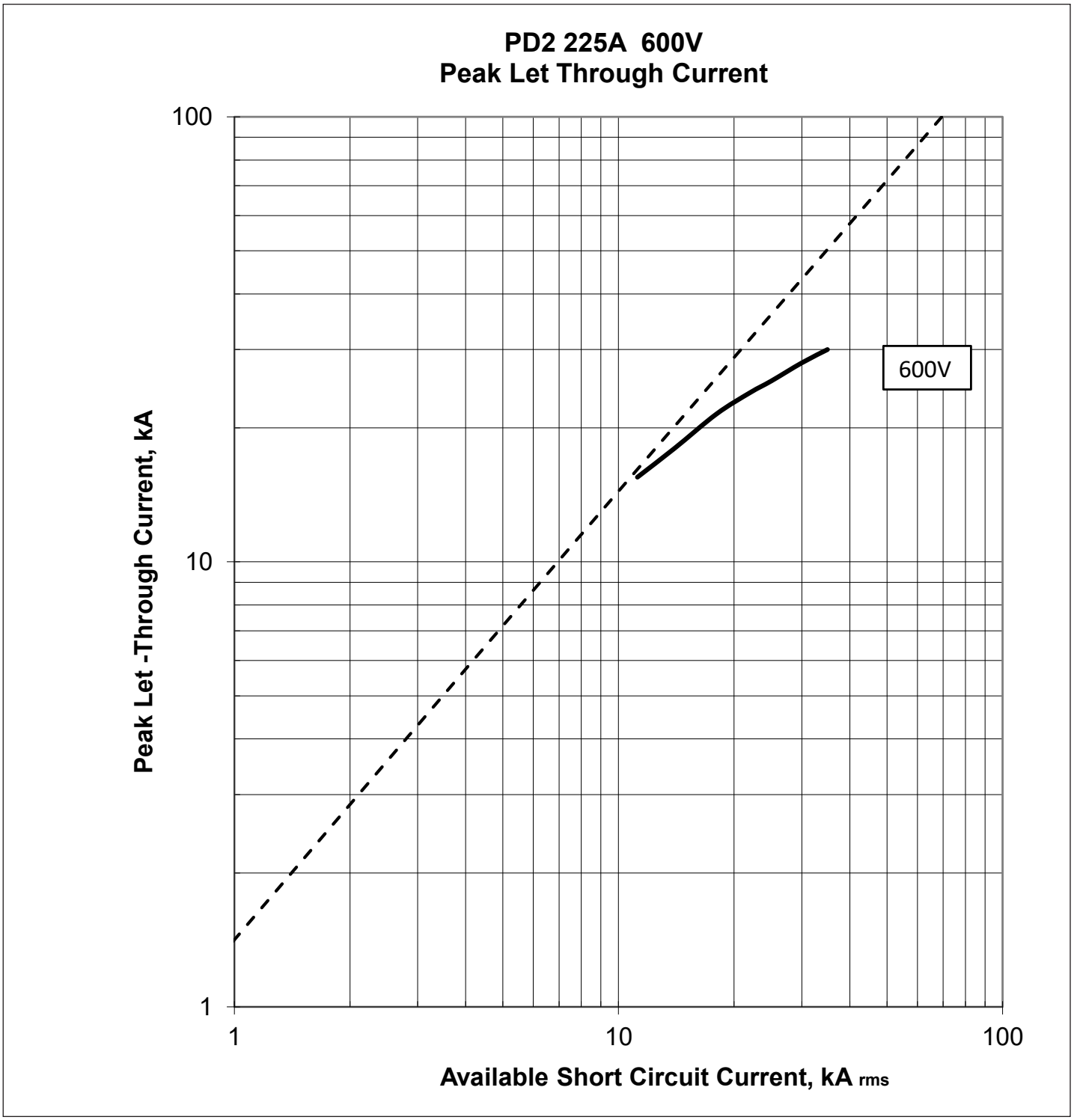


Figure 89. 600V let-through current 225A.

April 2022

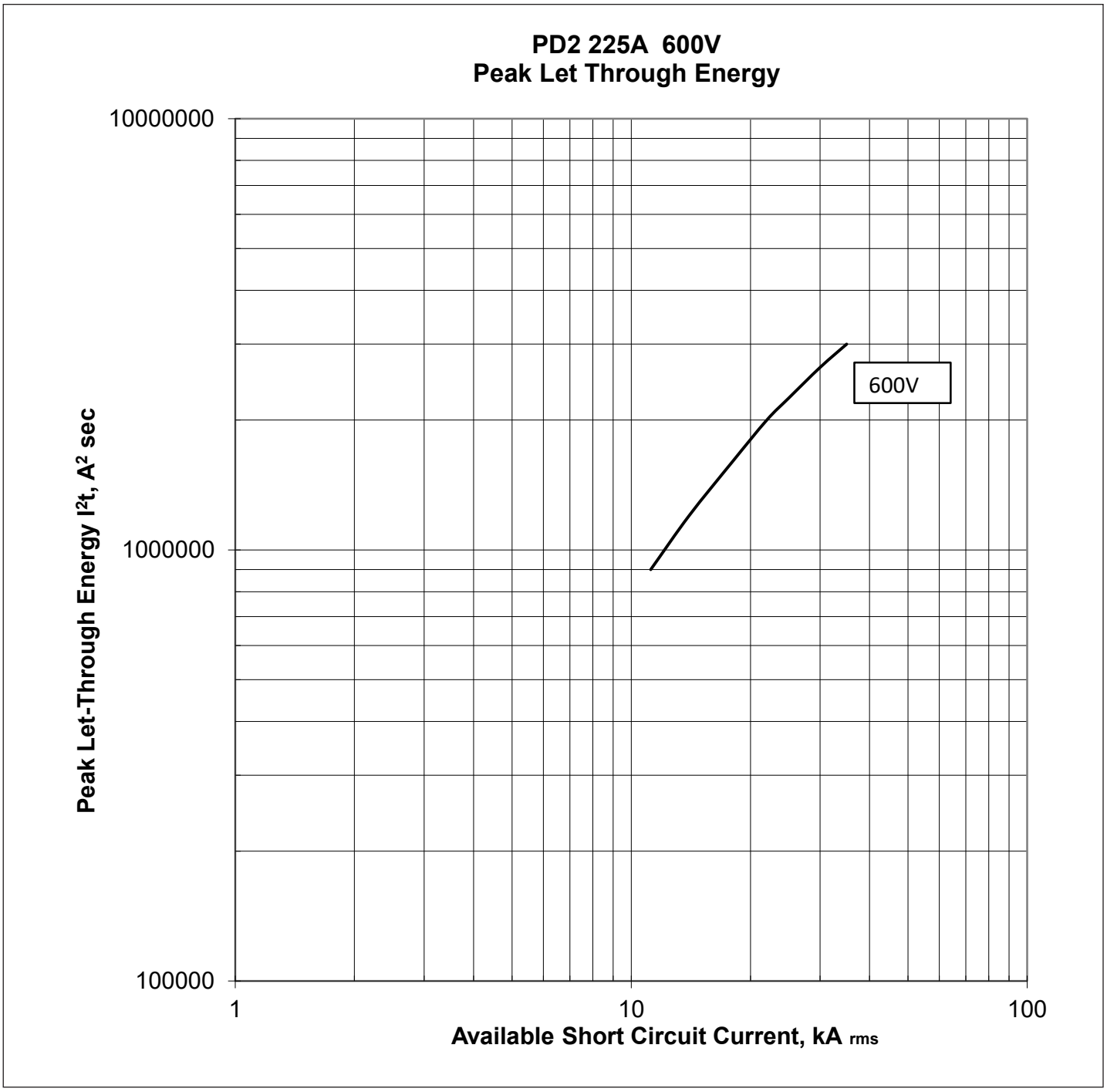


Figure 90. 600V let-through energy 225A.

April 2022

Time current curves Power Defense MCCB
Frame 2 thermal-magnetic and PXR electronic trip units
Standards: UL, CSA, IEC, CCC

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
877-ETN-CARE (877-386-2273)
Eaton.com

Printed in USA
Publication No. TD012064EN / TBG001440
April 2022

Powering Business Worldwide