

APPENDIX F

REPRESENTATIVE PROTECTIVE DEVICE OPERATING TIMES

ESTIMATED CLEARING TIMES OF PROTECTIVE DEVICES *

Table F-1. Relayed Circuit Breakers, 2.4-13.8kV

	Plunger, Instantaneous	Induction Instantaneous	Induction Inverse- Time
Relay times, cycles.....	0.25-1	0.5-2	6-6000
Circuit breaker interrupting time, cycles.....	3-8	3-8	3-8
Total time, cycles.....	3.25-9	3.5-10	9-6000

Table F-2. Power Air Circuit Breakers, Below 600V

	Frame Size	225-600A
		1600-4000A
Instantaneous, cycles.....	2-3	3
Short time, cycles.....	10-30	10-30
Long time, seconds.....	over 100
Ground fault, cycles.....	10-30	10-30

* Reprinted with permission from ANSI/IEEE Standard 242-1986, IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems, copyright 1986 by IEEE.

Table F-3. Molded-Case Circuit Breakers, Below 600V

	Frame Size	
	100A	225-1200A
Instantaneous, cycles	1.1	1.5
Long time, seconds.....	over 100	

Table F-4. Medium- and High-voltage Fuses

High current.....	0.25 cycles (for current-limiting fuses operating in their current-limiting range)
	1.0 cycle (for power fuses at maximum current)
Low current.....	600 s (for E-rated fuses operating at 2X nominal rating; other ratings are available with different times at 2X nominal rating)

Table F-5. Low-Voltage Fuses

High current.....	0.25 cycles (in current-limiting range)
Low current.....	1000 seconds (at 1.35 to 1.5 times nominal rating)