

# Series C RD-Frame

## 800-2500A, 240-600V

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**Note:**  
Time/Current characteristic curves for Series C R-frame circuit breakers—voltages shown in curve headings are maximum at which the breaker may be applied. Interrupting capacity of individual breaker is tabulated on each curve.

**Note:**  
The following curves are UL489 Listed for use in North America.  
The following circuit breakers are derived from Eaton, Westinghouse, or Cutler-Hammer history.

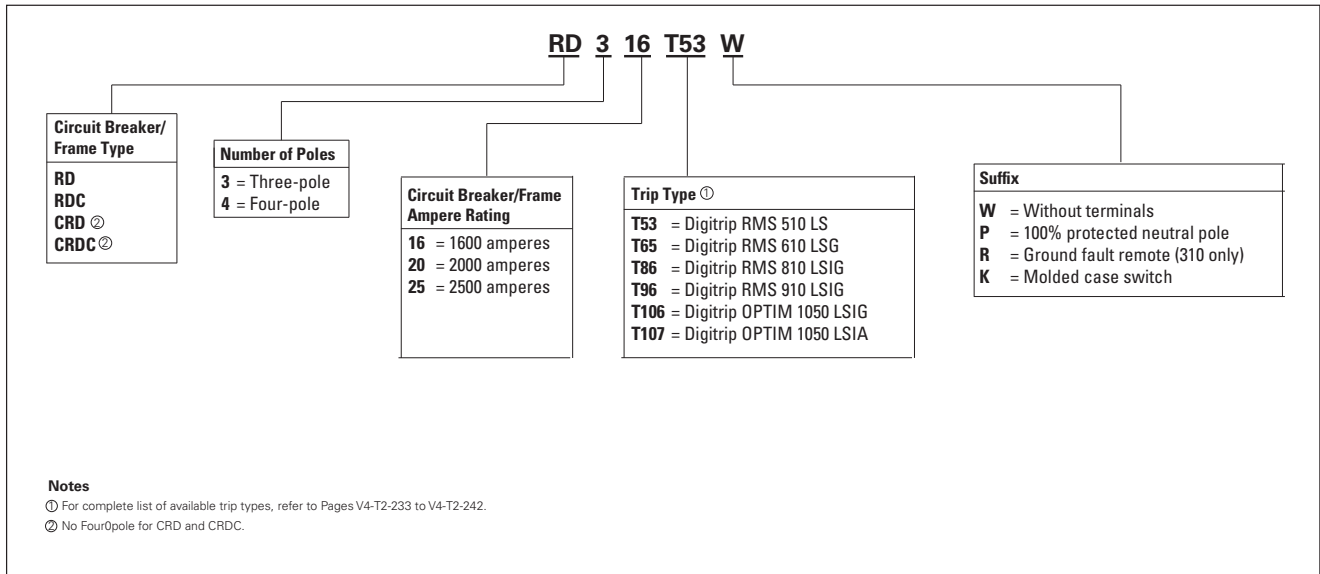
**Time Current Curves are engineering reference documents for application and coordination purposes only. For field testing molded case circuit breakers, refer to NEMA AB 4 guidelines.**



## Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

**Table 1. Circuit Breaker/Frame**



Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 510/610/810 Trip Units. Typical Instantaneous Time-Phase Current Characteristic Curve Based on  $I_n$

**IMPORTANT**

TRIP UNITS ARE NOT AVAILABLE WITH ONLY INSTANTANEOUS PROTECTION. THIS CURVE MUST BE USED in conjunction WITH Curve No. SC-5627-93 for LONG DELAY (and if applicable SHORT DELAY) PROTECTION to obtain the complete time-current characteristic.



**Series C R-Frame Circuit Breakers with DIGITRIP RMS 510/610/810 Trip Units**

**Typical Instantaneous Time-Phase Current Characteristic Curve (I)**

**Available Rating Plugs Marked 50/60 Hz**

Maximum Ampere Rating	Ampere Rating ( $I_n$ )	Frequency ⑤	Catalog Number
1600	1600	50/60	RP6R16A160
1600	1250 ⑥	50	RP6R16A125
1600	1200	50/60	RP6R16A120
1600	1000	50/60	RP6R16A100
1600	800	50/60	RP6R16A080
2000	2000	50/60	RP6R20A200
2000	1600	50/60	RP6R20A160
2000	1250 ⑥	50	RP6R20A125
2000	1200	50/60	RP6R20A120
2000	1000	50/60	RP6R20A100
2500 ⑦	2500	50/60	RP6R25A250
2500 ⑦	2000	50/60	RP6R25A200
2500 ⑦	1600	50/60	RP6R25A160

**Interrupting Rating**

Breaker Type	UL/CSA rms Sym. kA, 50/60 Hz		
	240V	480V	600V
RD, CRD	125	65	50
RDC, CRDC	200	100	65

Breaker Type	IEC 60947-2 rms Sym. kA, 50/60 Hz		
	220-240V	380-415V	500V
RD, CRD	125	65	50
RDC, CRDC	200	100	65

Utilization Category A  
 $I_{cs} = 0.5 I_{cu}$   
 $U_{imp} = 8kV$



**Tolerances ⑧**

INST Range = 90% to 110% of setting

**Notes:**

- ① For 2000A Rating Plug.
- ② For 2500A Rating Plug.
- ③ For 800-1600A Rating Plugs.
- ④ The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.
- ⑤ The Rating Plug is for 50 and 60 Hz applications.
- ⑥ Not UL/CSA listed.
- ⑦ For Types RD and RDC only.
- ⑧ Curves apply from -20°C to +55°C ambient. Temperatures above 95°C cause automatic trip. For possible ampere derating for ambient above 40°C, refer to Eaton.

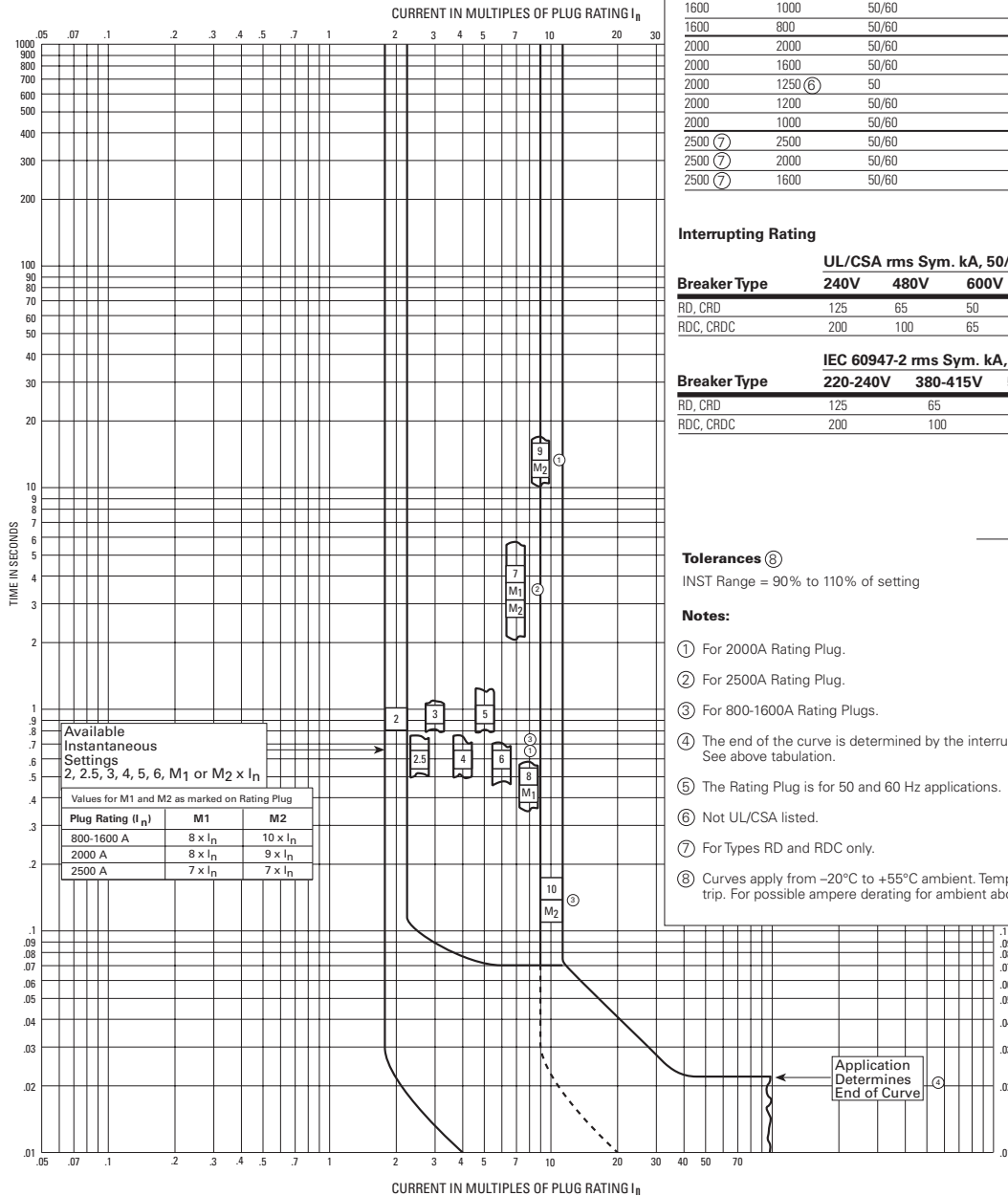


Figure 1. Typical Instantaneous Time-Phase Current Characteristic Curve Based on  $I_n$  - Curve Number SC-5626-93, October 1997

Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 510/610/810 Trip Units. Typical Long Delay/Short Delay Time-Phase Current Characteristic Curve Based on  $I_r$

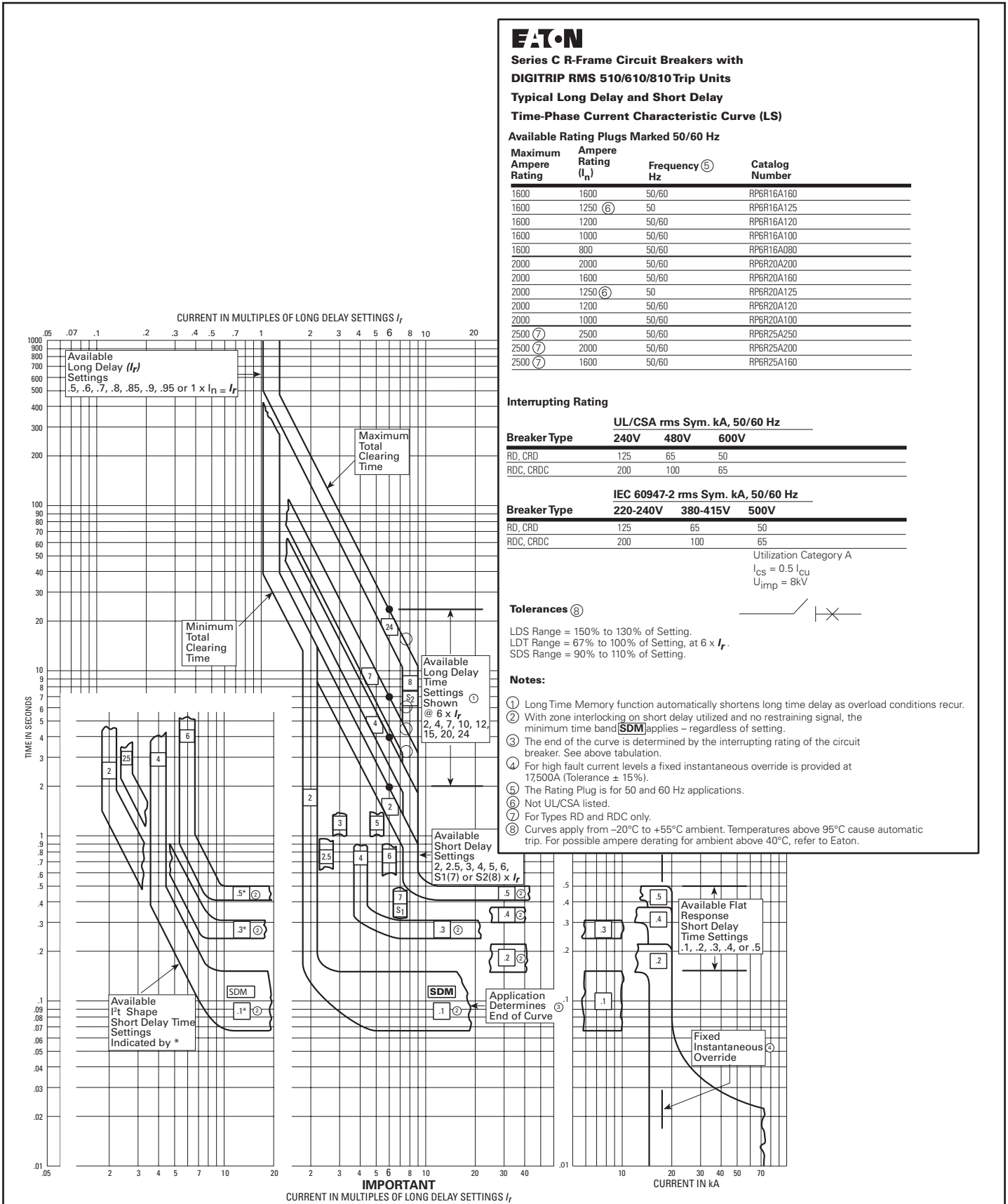


Figure 2. Typical Long Delay/Short Delay Time-Phase Current Characteristic Curve Based on  $I_n$  - Curve Number SC-5627-93, October 1997

Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 510/610/810 Trip Units. Typical Ground Fault/Protection Time/Current Characteristic Curve Based on  $I_n$

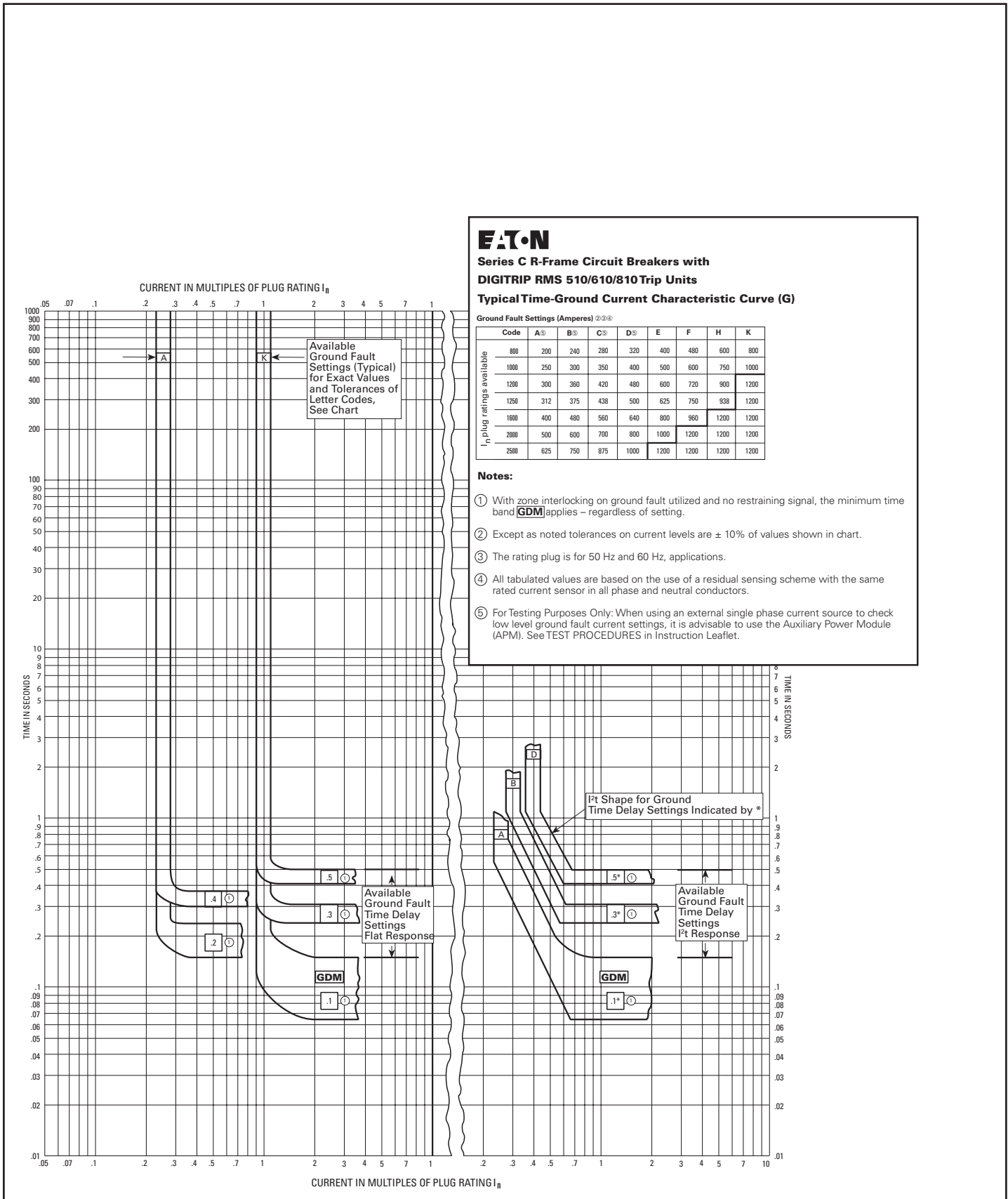


Figure 3. Typical Ground Fault/Protection Time/Current Characteristic Curve Based on  $I_n$  - Curve Number SC-5628-93, October 1997

R-Frame Circuit Breakers Equipped with 1600/2000A Digitrip OPTIM Trip Units; Long Delay  $I^2t$ , Short Delay  $I^2t$

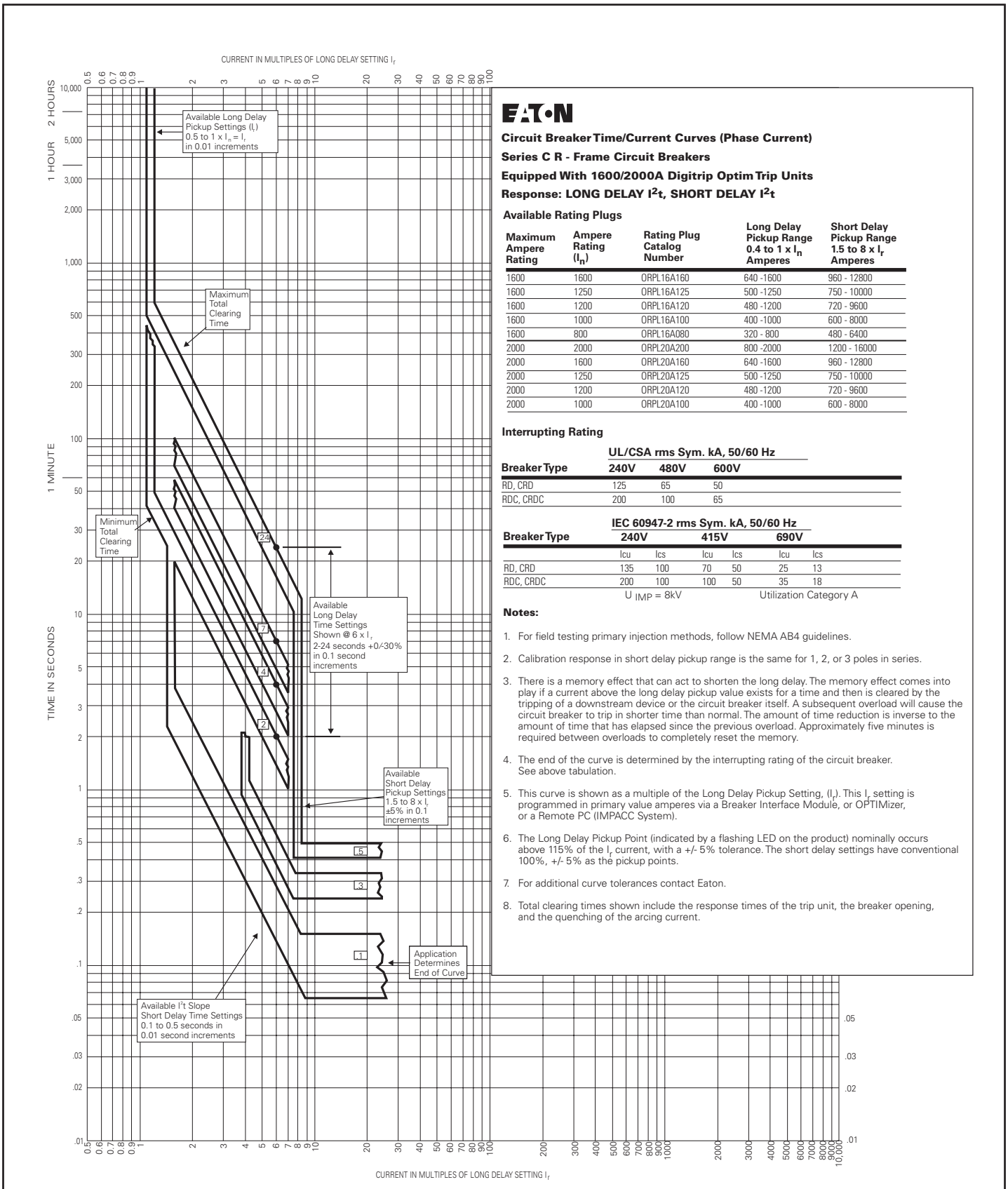


Figure 4. Long Delay  $I^2t$ , Short Delay  $I^2t$  - Curve Number SC-6336-96, October 1997

R-Frame Circuit Breakers Equipped with 1600/2000A Digitrip OPTIM Trip Units; Long Delay I<sup>2</sup>t, Short Delay Flat

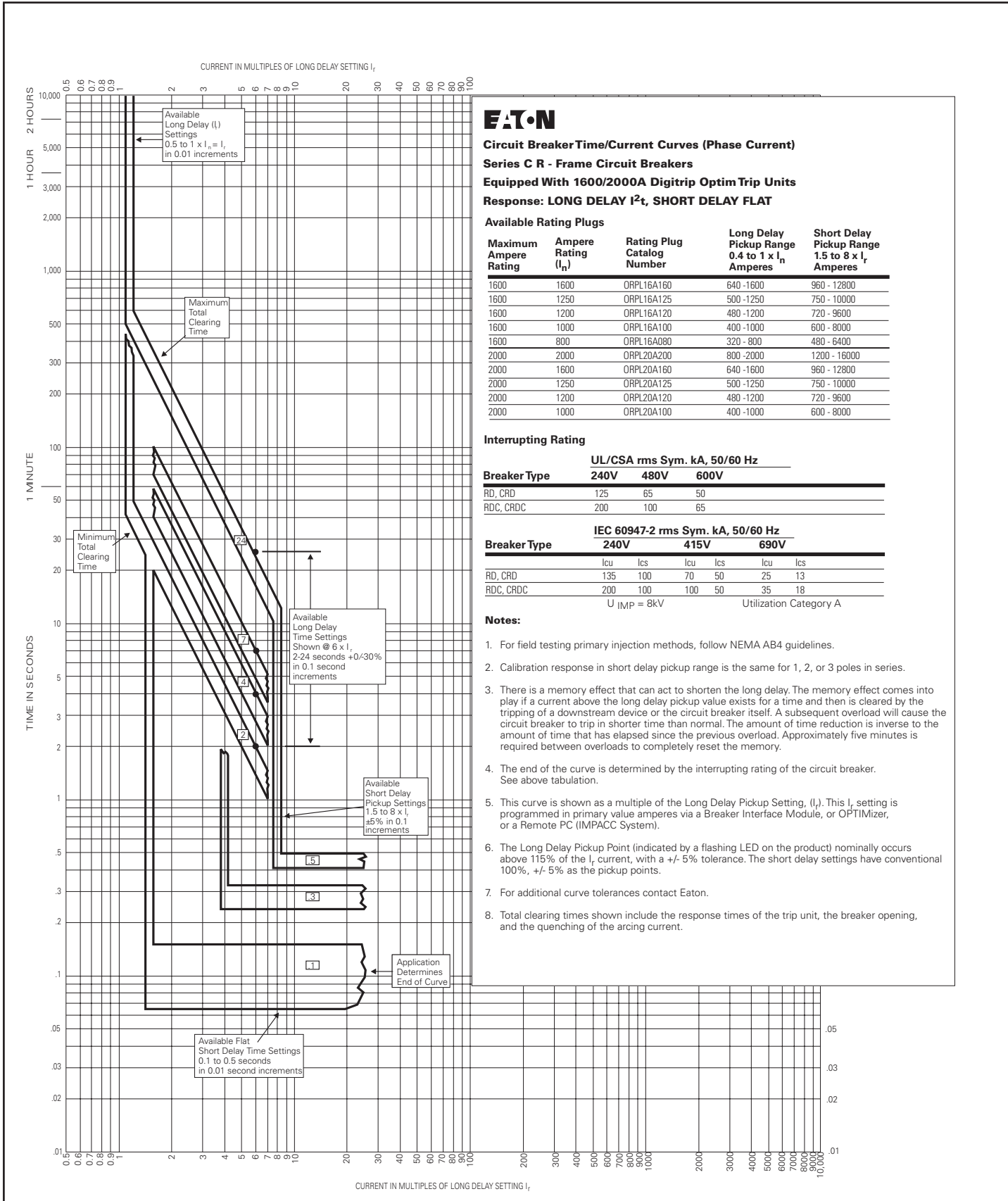


Figure 5. Long Delay I<sup>2</sup>T, Short Delay Flat - Curve Number SC-6337-96, October 1997





R-Frame Circuit Breakers Equipped with 1600A Digitrip OPTIM Trip Units; Instantaneous and Override

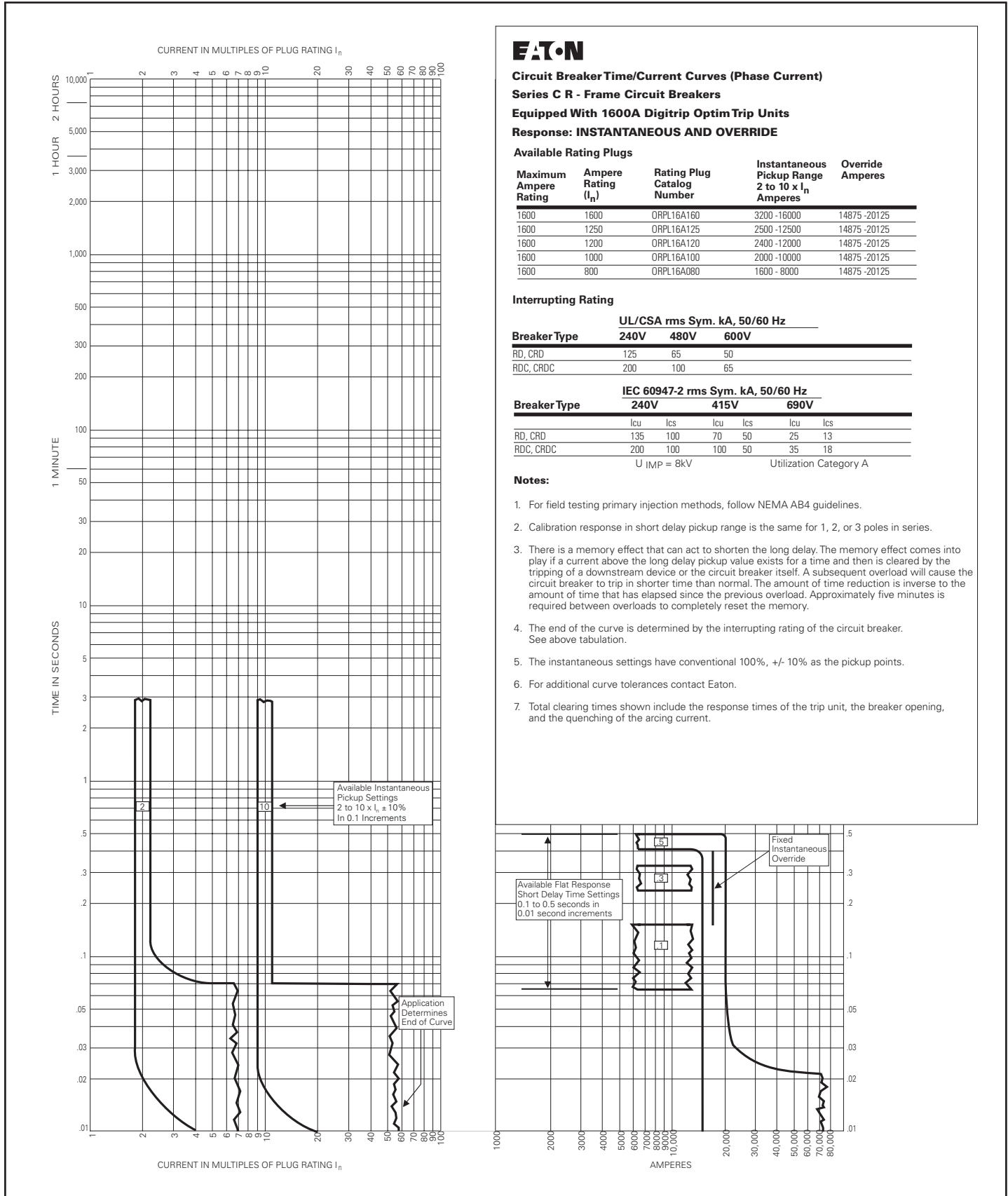


Figure 7. Instantaneous and Override, 1600 Amperes - Curve Number SC-6342-96, October 1997

R-Frame Circuit Breakers Equipped with 2000A Digitrip OPTIM Trip Units; Instantaneous and Override

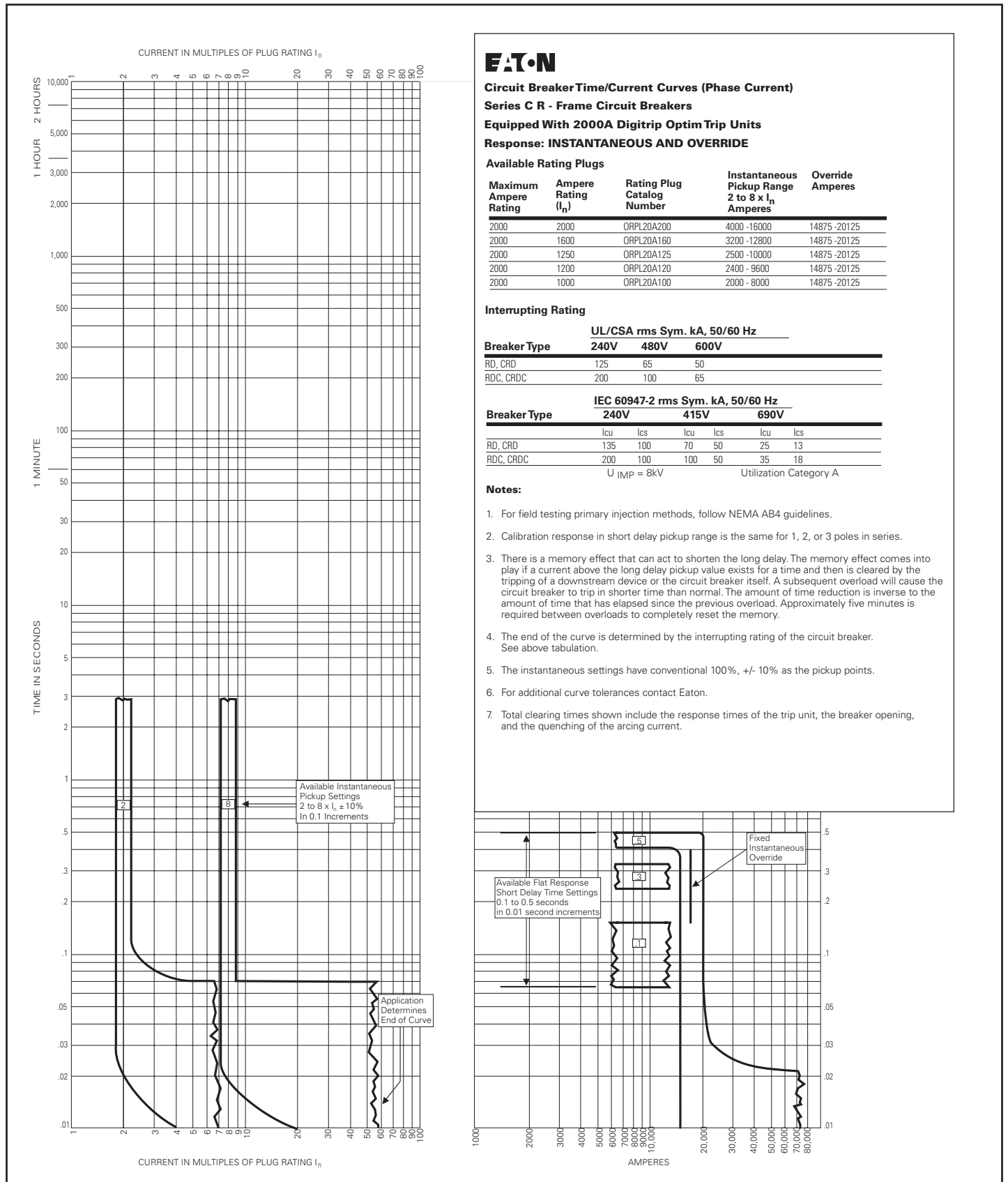


Figure 8. Instantaneous and Override, 2000 Amperes - Curve Number SC-6343-96, October 1997

R-Frame Circuit Breakers Equipped with 1600A Digitrip OPTIM Trip Units; Ground Fault or Ground Fault Alarm Only



**Circuit Breaker Time/Current Curves (Ground Current)**

**Series C R - Frame Circuit Breakers**

**Equipped With 1600A Digitrip Optim Trip Units**

**Response: GROUND FAULT TRIP OR GROUND FAULT ALARM ONLY**

**Available Rating Plugs**

Maximum Ampere Rating	Ampere Rating (I <sub>n</sub> )	Rating Plug Catalog Number	Ground Fault Pickup Range Amperes
1600	1600	ORPL16A160	400 -1200
1600	1250	ORPL16A125	312.5 -1200
1600	1200	ORPL16A120	300 -1200
1600	1000	ORPL16A100	250 -1000
1600	800	ORPL16A080	200 - 800

**Interrupting Rating**

Breaker Type	UL/CSA rms Sym. kA, 50/60 Hz		
	240V	480V	600V
RD, CRD	125	65	50
RDC, CRDC	200	100	65

Breaker Type	IEC 60947-2 rms Sym. kA, 50/60 Hz					
	240V		415V		690V	
	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
RD, CRD	135	100	70	50	25	13
RDC, CRDC	200	100	100	50	35	18

**Notes:**

- For field testing primary injection methods, follow NEMA AB4 guidelines.
- Calibration response in short delay pickup range is the same for 1, 2, or 3 poles in series.
- There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in shorter time than normal. The amount of time reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately five minutes is required between overloads to completely reset the memory.
- The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.
- Ground fault level is electronically limited to a maximum of 1200 Amperes.
- The ground fault settings have conventional 100%, +/- 10% as the pickup points.
- For additional curve tolerances contact Eaton.
- Total clearing times shown include the response times of the trip unit, the breaker opening, and the quenching of the arcing current.

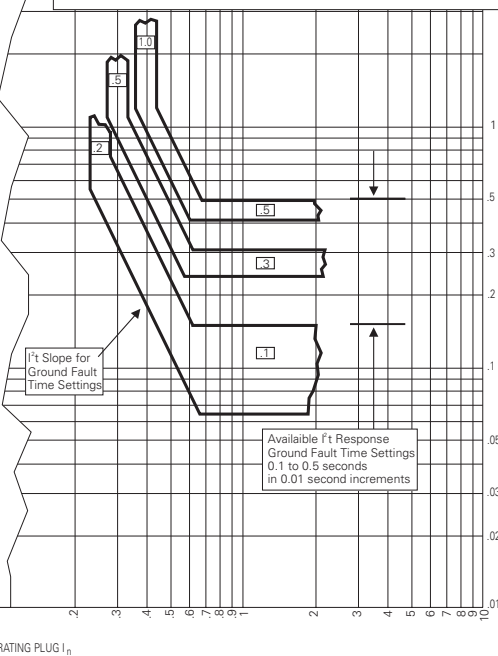
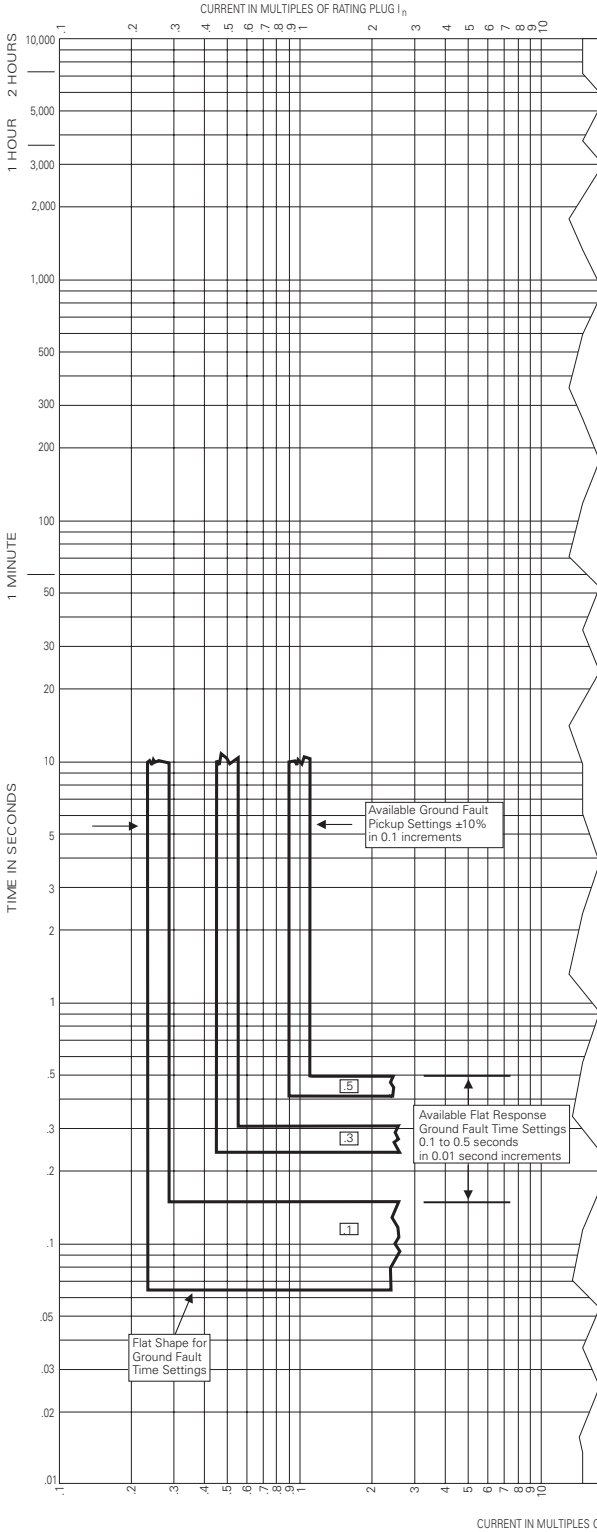


Figure 9. Ground Fault or Ground Fault Alarm Only, 1600 Amperes - Curve Number SC-6345-96, October 1997

R-Frame Circuit Breakers Equipped with 2000A Digitrip OPTIM Trip Units; Ground Fault or Ground Fault Alarm Only

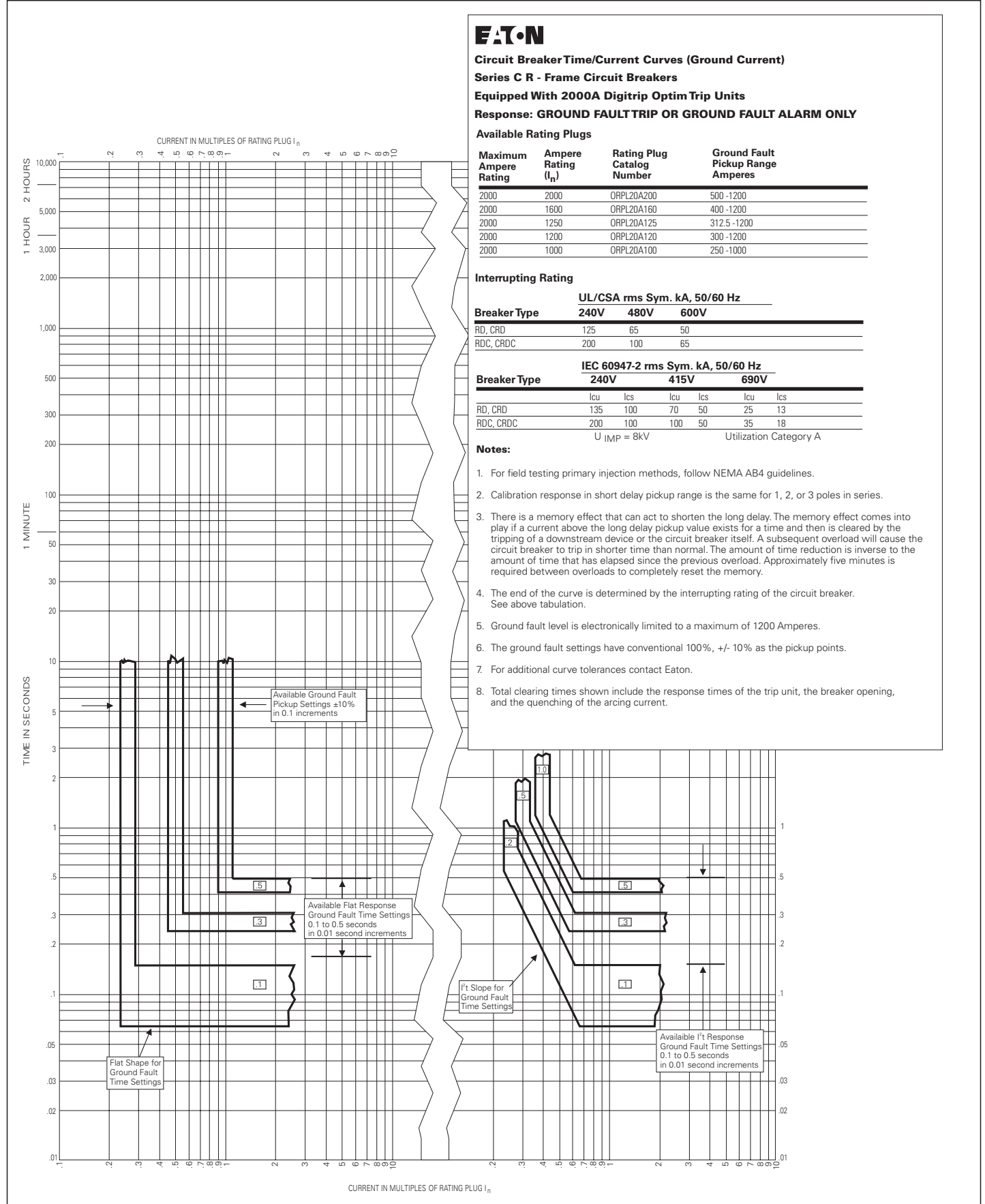


Figure 10. Ground Fault or Ground Fault Alarm Only, 2000 Amperes - Curve Number SC-6346-96, October 1997

R-Frame Circuit Breakers Equipped with 2500A Digitrip OPTIM Trip Units; Long Delay I<sup>2</sup>t, Short Delay I<sup>2</sup>t

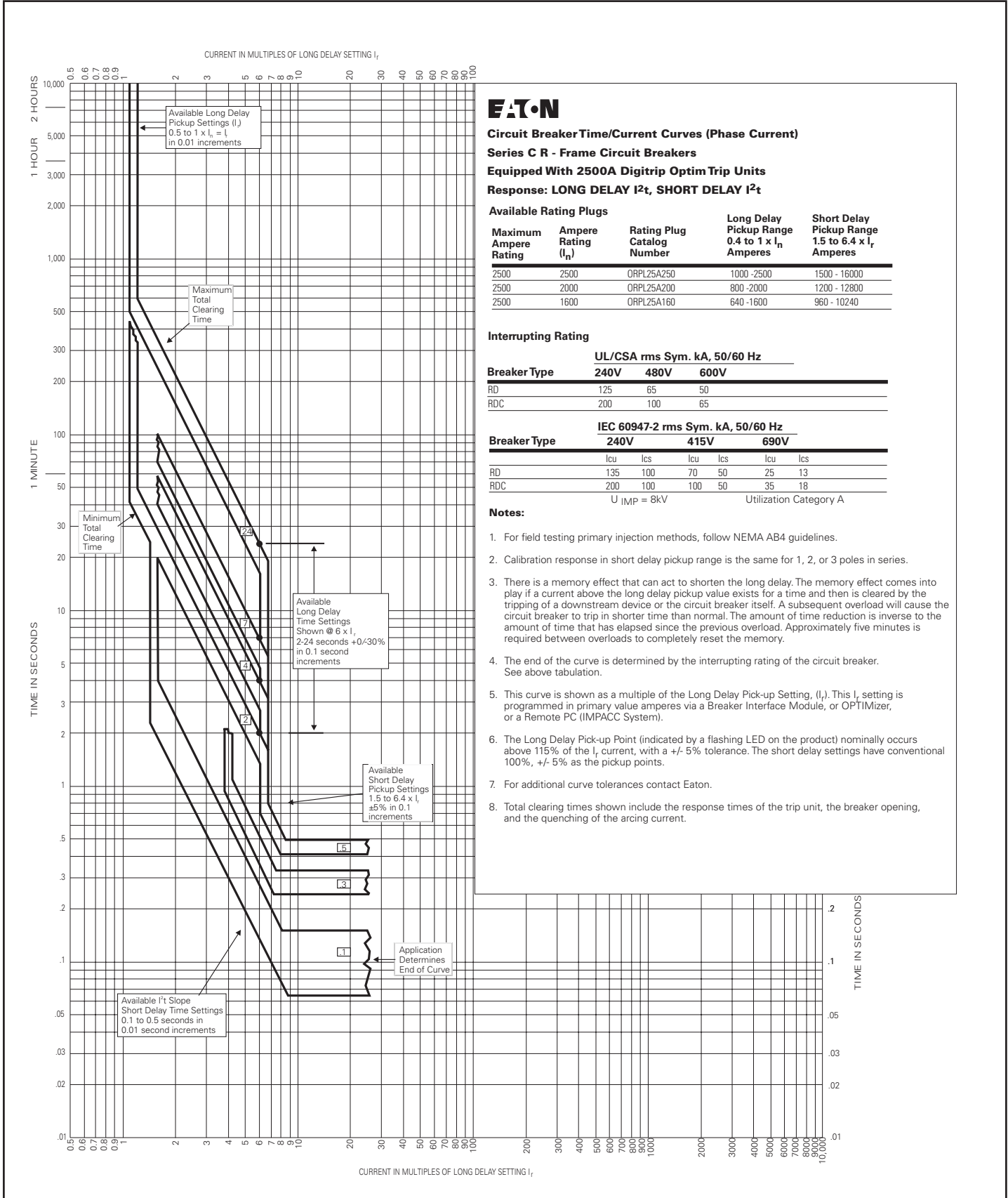


Figure 11. Long Delay I<sup>2</sup>T, Short Delay I<sup>2</sup>T - Curve Number SC-6339-96, October 1997

R-Frame Circuit Breakers Equipped with 2500A Digitrip OPTIM Trip Units; Long Delay I<sup>2</sup>t, Short Delay Flat

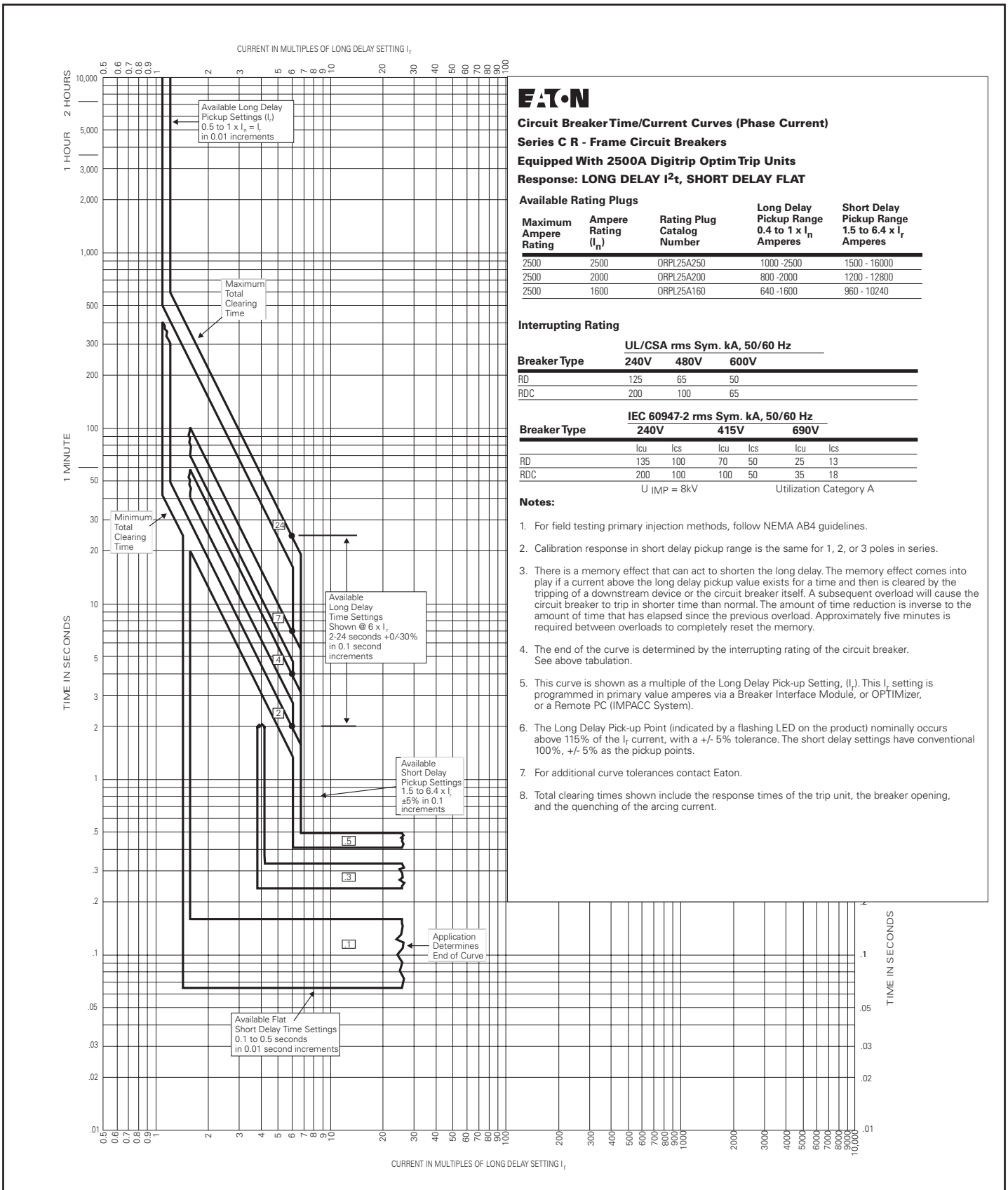


Figure 12. Long Delay I<sup>2</sup>t, Short Delay Flat - Curve Number SC-6340-96, October 1997

R-Frame Circuit Breakers Equipped with 2500A Digitrip OPTIM Trip Units; Long Delay I<sup>4</sup>t, Short Delay Flat

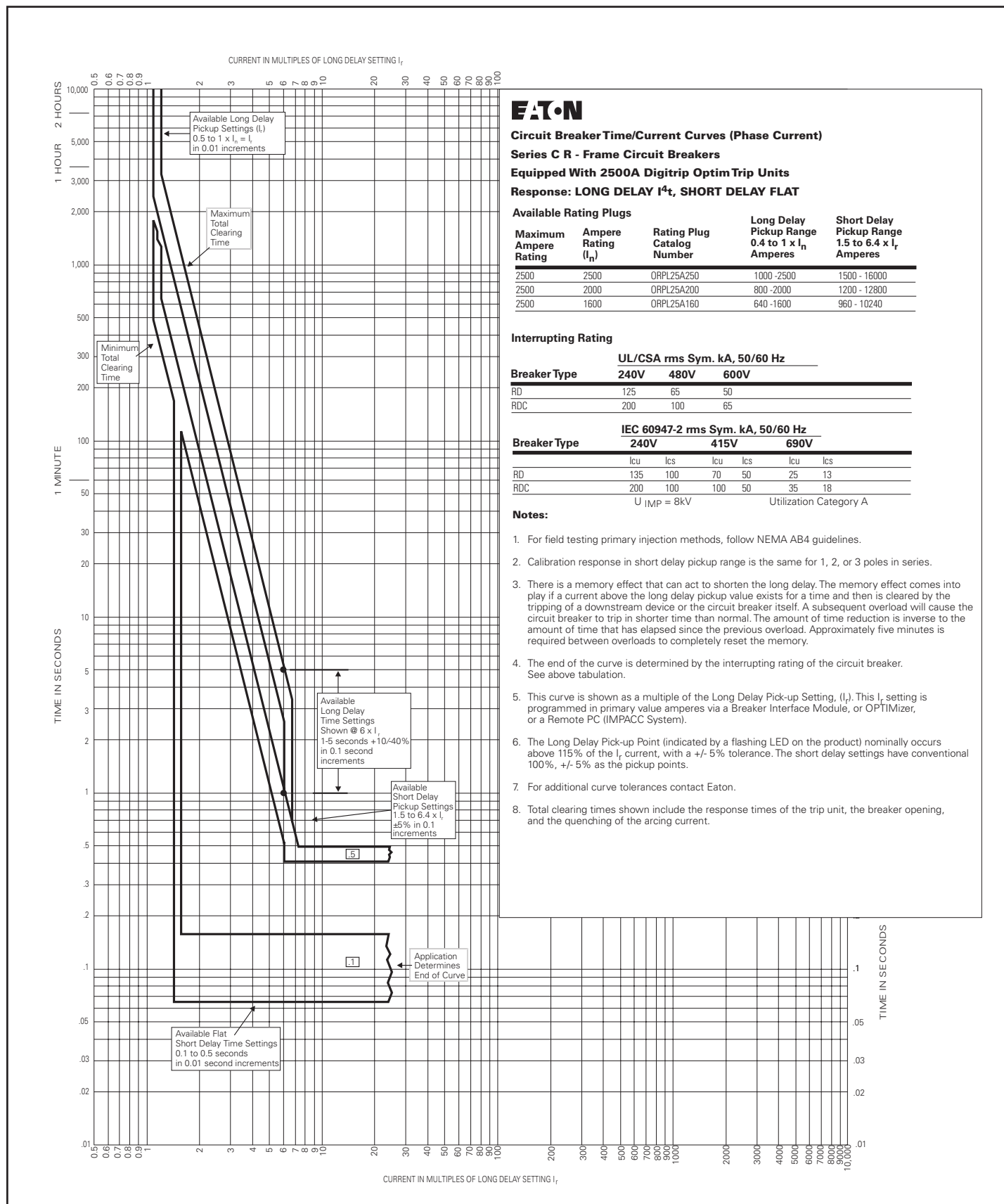


Figure 13. Long Delay I<sup>4</sup>t, Short Delay Flat - Curve Number SC-6341-96, October 1997



R-Frame Circuit Breakers Equipped with 2500A Digitrip OPTIM Trip Units; Instantaneous and Override

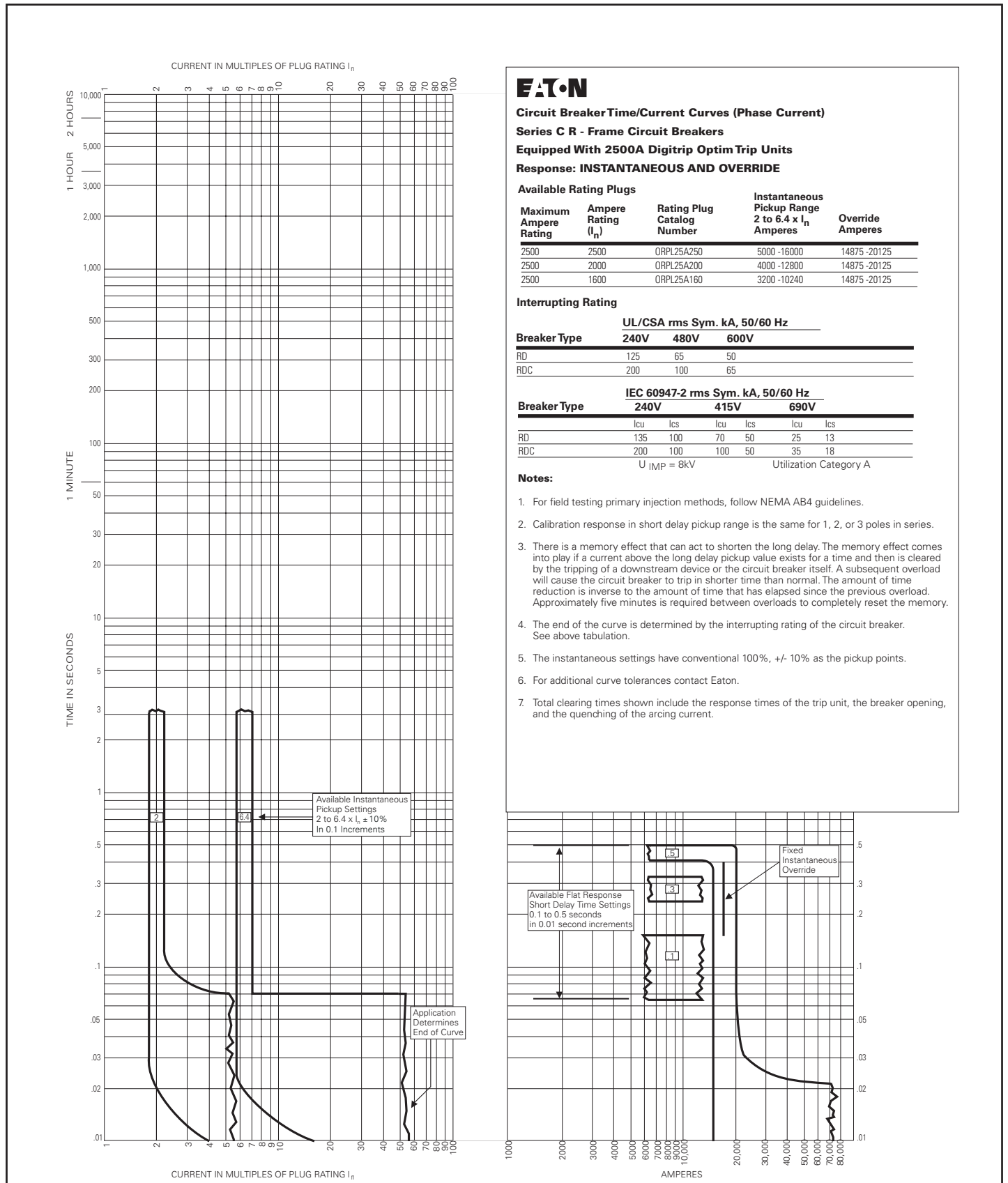


Figure 14. Instantaneous and Override - Curve Number SC-6344-96, October 1997

R-Frame Circuit Breakers Equipped with 2500A Digitrip OPTIM Trip Units; Ground Fault or Ground Fault Alarm Only



**Circuit Breaker Time/Current Curves (Phase Current)**

**Series C R - Frame Circuit Breakers**

**Equipped With 2500A Digitrip Optim Trip Units**

**Response: GROUND FAULT TRIP OR GROUND FAULT ALARM ONLY**

**Available Rating Plugs**

Maximum Ampere Rating	Ampere Rating (I <sub>n</sub> )	Rating Plug Catalog Number	Ground Fault Pickup Range Amperes
2500	2500	ORPL25A250	625 -1200
2500	2000	ORPL25A200	500 -1200
2500	1600	ORPL25A160	400 -1200

**Interrupting Rating**

Breaker Type	UL/CSA rms Sym. kA, 50/60 Hz		
	240V	480V	600V
RD	125	65	50
RDC	200	100	65

Breaker Type	IEC 60947-2 rms Sym. kA, 50/60 Hz					
	240V		415V		690V	
	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
RD	135	100	70	50	25	13
RDC	200	100	100	50	35	18

U<sub>IMP</sub> = 8KV Utilization Category A

**Notes:**

- For field testing primary injection methods, follow NEMA AB4 guidelines.
- Calibration response in short delay pickup range is the same for 1, 2, or 3 poles in series.
- There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in shorter time than normal. The amount of time reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately five minutes is required between overloads to completely reset the memory.
- The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.
- Ground fault level is electronically limited to a maximum of 1200 Amperes.
- The ground fault settings have conventional 100%, +/- 10% as the pickup points.
- For additional curve tolerances contact Eaton.
- Total clearing times shown include the response times of the trip unit, the breaker opening, and the quenching of the arcing current.

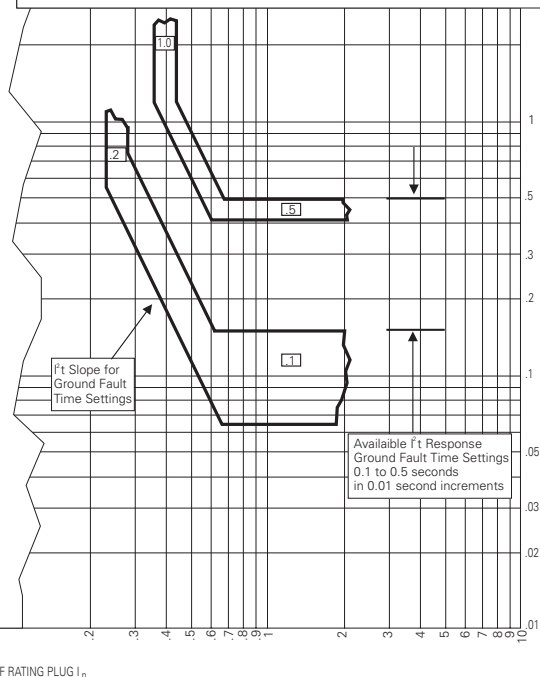
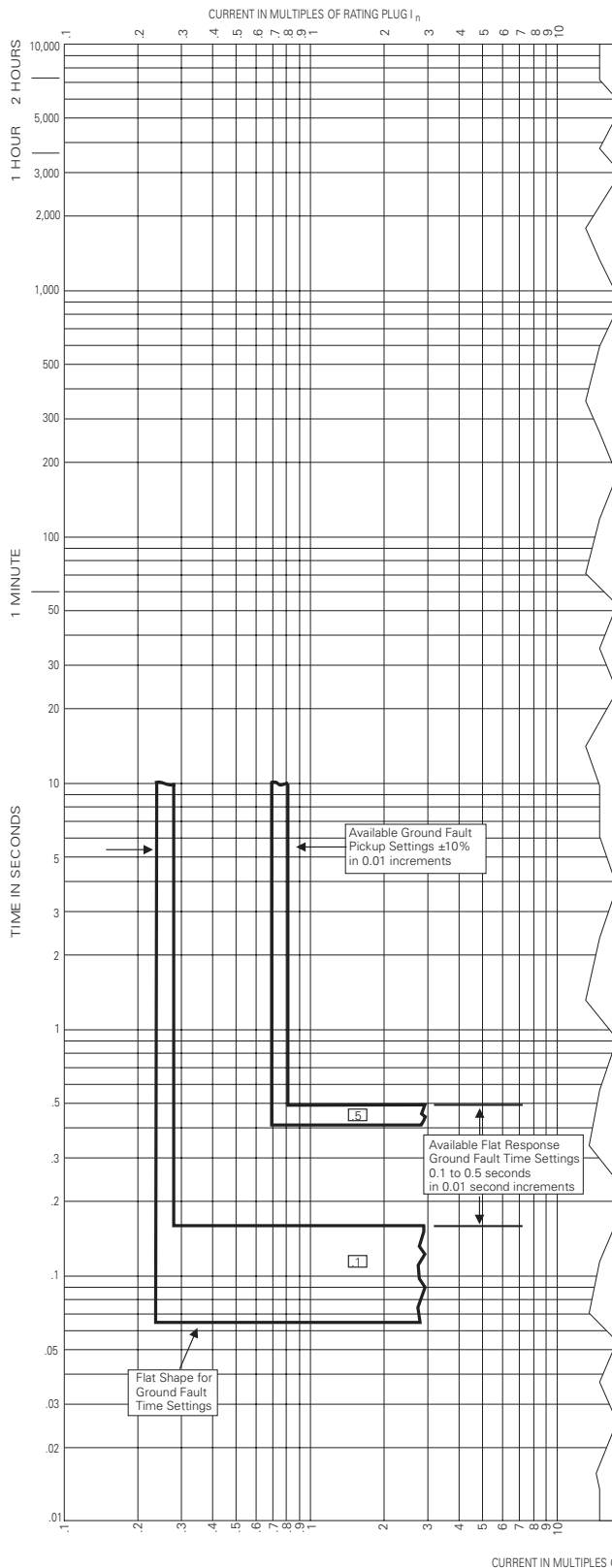


Figure 15. Ground Fault or Ground Fault Alarm Only - Curve Number SC-6347-96, October 1997



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