

# Series C MDL-Frame

## 400-800A, 240-600V

### Contents

Description	Page
Catalog Number Selection . . . . .	3
 <b>Digitrip RMS 310+ Electronic Trip Units</b>	
MDL, HMDL, CMDL, CHMDL, MDLB, HMLDB; 800A; 3- and 4-pole; LS and LSG . . . . . TD012051EN . . . . .	6
MDL, HMDL, CMDL, CHMDL, MDLB, HMLDB; 800A; 3- and 4-pole; LSI, LSIG, ALSI, ALSIG . . . . . TD012052EN . . . . .	7
Ground Fault Protection . . . . . TD012053EN . . . . .	8
Maintenance Mode Setting; ALSI and ALSIG . . . . . TD012054EN . . . . .	9
 <b>Digitrip RMS 310 Electronic Trip Units</b>	
MDL, HMDL, CMDL, CHMD; 800A; 3- and 4-pole; LS and LSG . . . . . SC-7204-99 . . . . .	10
MDL, HMDL, CMDL, and CHMD; 800A 3- and 4-pole; LSI, LSIG, ALSI, ALSIG. . . . . SC-6913-98 . . . . .	11
Ground Fault Protection . . . . . SC-6914-98 . . . . .	12
 <b>MT Thermal/Magnetic Trip Unit</b>	
MDL, HMDL, MDLB, and HMDLB, 300-600A . . . . . SC-6911-98 . . . . .	13
MDL, HMDL, MDLB, and HMDLB, 700-800A . . . . . SC-6912-98 . . . . .	14

**Note:**  
Time/Current characteristic curves for Series C M-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.

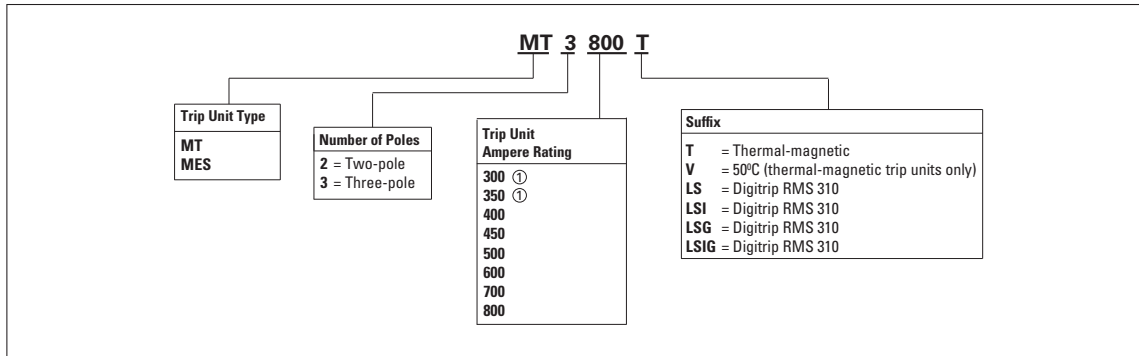
**Time Current Curves are engineering reference documents for application and coordination purposes only. For field testing molded case circuit breakers, refer to NEMA AB 4 guidelines.**



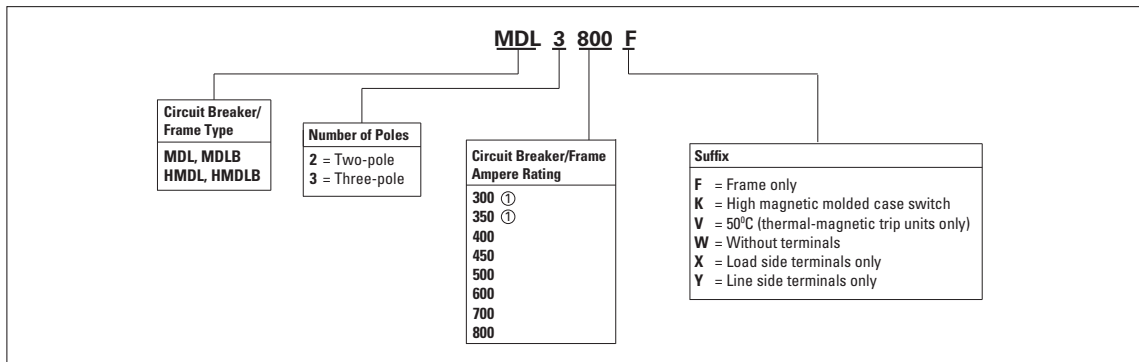
### Catalog Number Selection

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. Thermal-Magnetic Trip Unit**



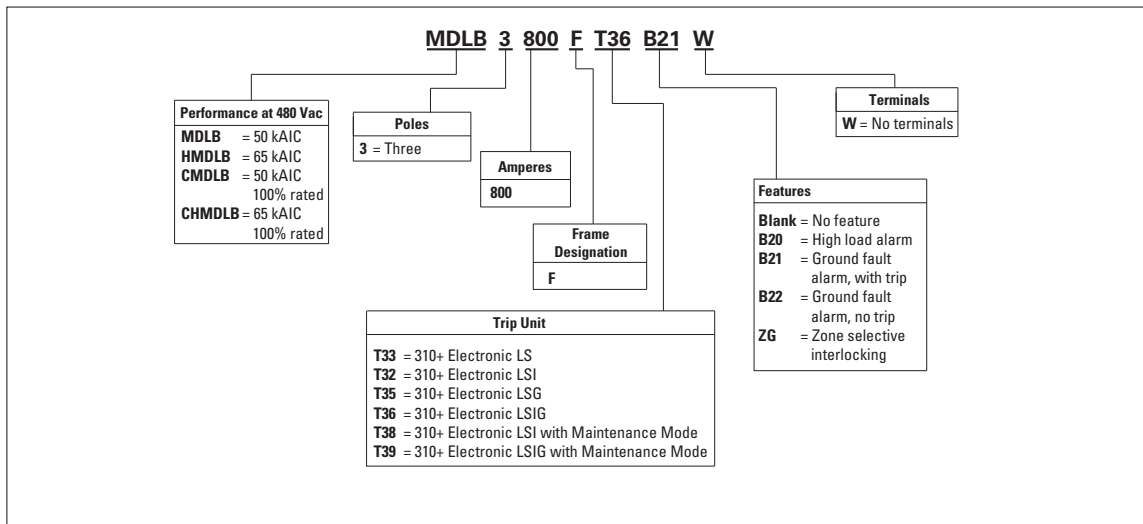
**Table 2. Circuit Breaker/Frame**



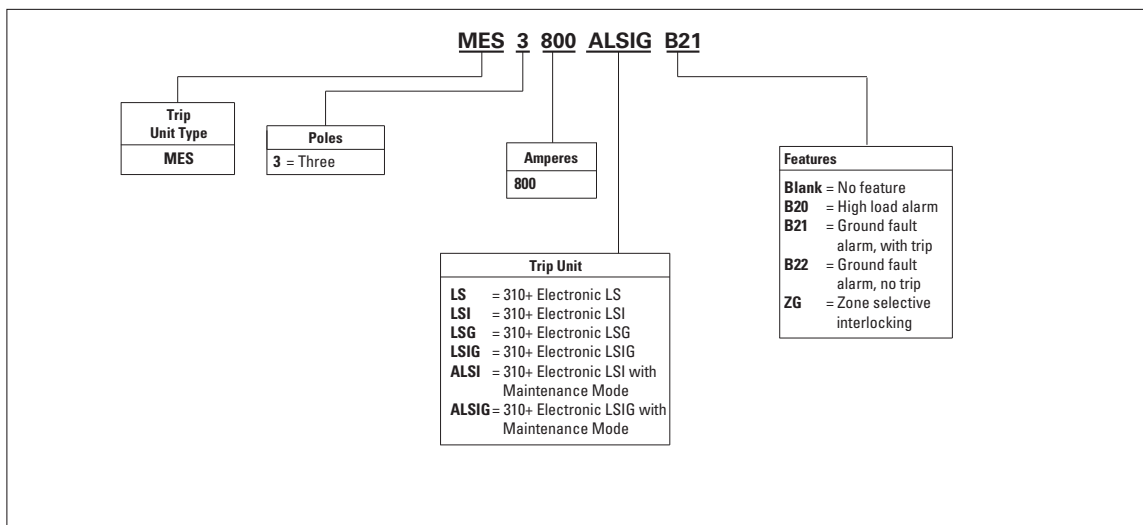
**Note**

① Thermal-magnetic only.

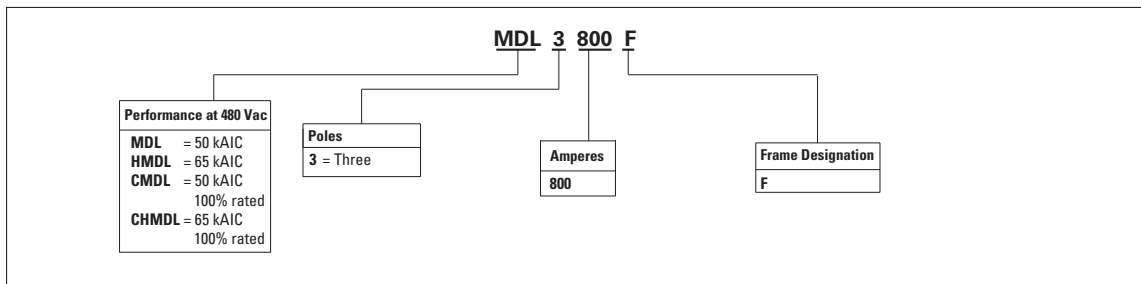
**Table 3. MDL Breaker Assembly**



**Table 4. MDL Electronic Trip Unit**



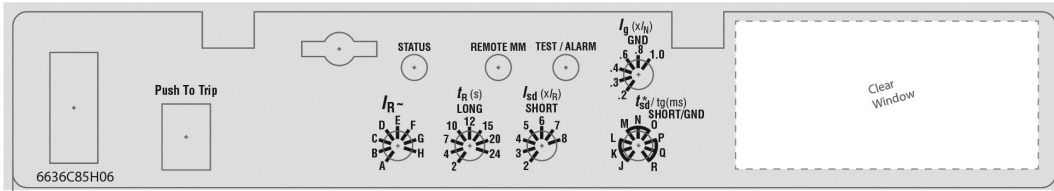
**Table 5. MDL Frame Only**



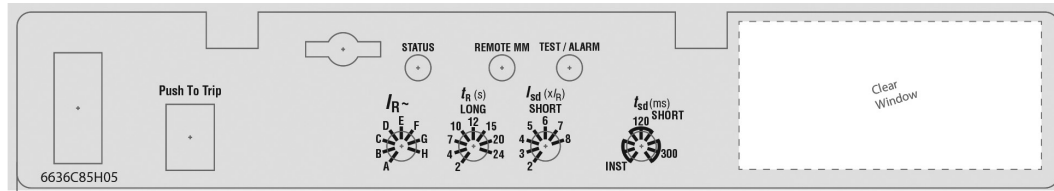
**Note**

- ① Maintenance Mode and ZSI are only available with LSI and LSIG trip units.
- ② B21 and B22 features available only with LSG, LSIG and ALSIG trip units.
- ③ B2x suffixes cannot be combined with other B2x suffixes.

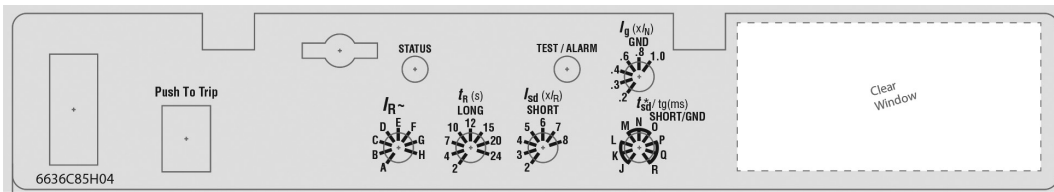
**ALSIG (With Maintenance Mode)**



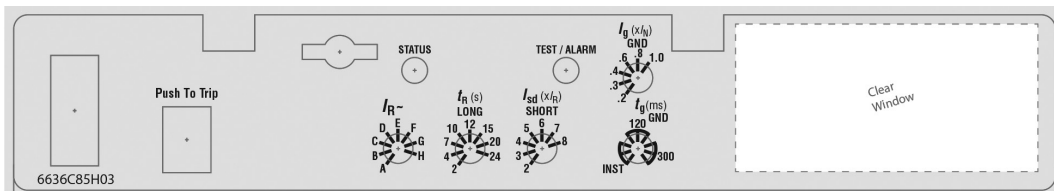
**ALSI (With Maintenance Mode)**



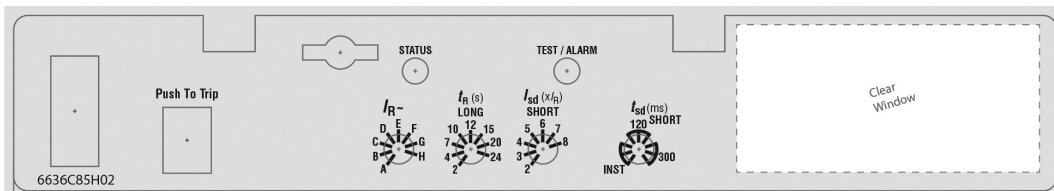
**LSIG**



**LSG**



**LSI**



**LS**

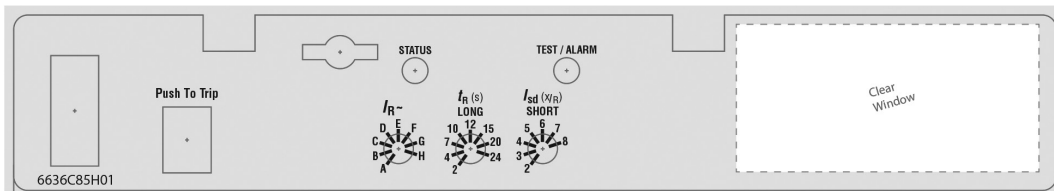


Figure 1. Digitrip 310+ Faceplates

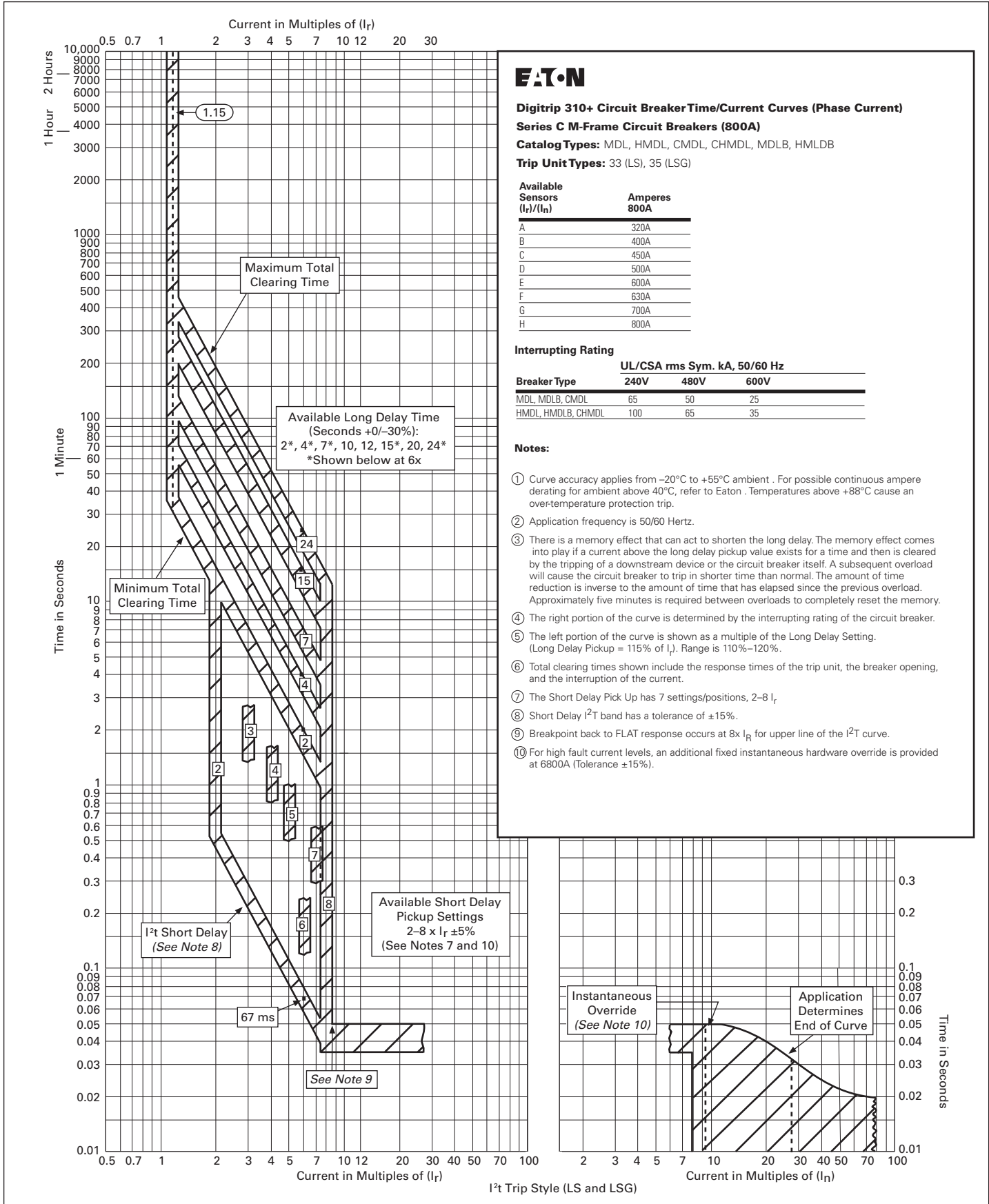


Figure 2. Digitrip 310+ Trip Units (800A), Long Delay Response and Short Delay with I<sup>2</sup>T Response Curve and Override (LS, LSG) - TD012051EN, October 2014

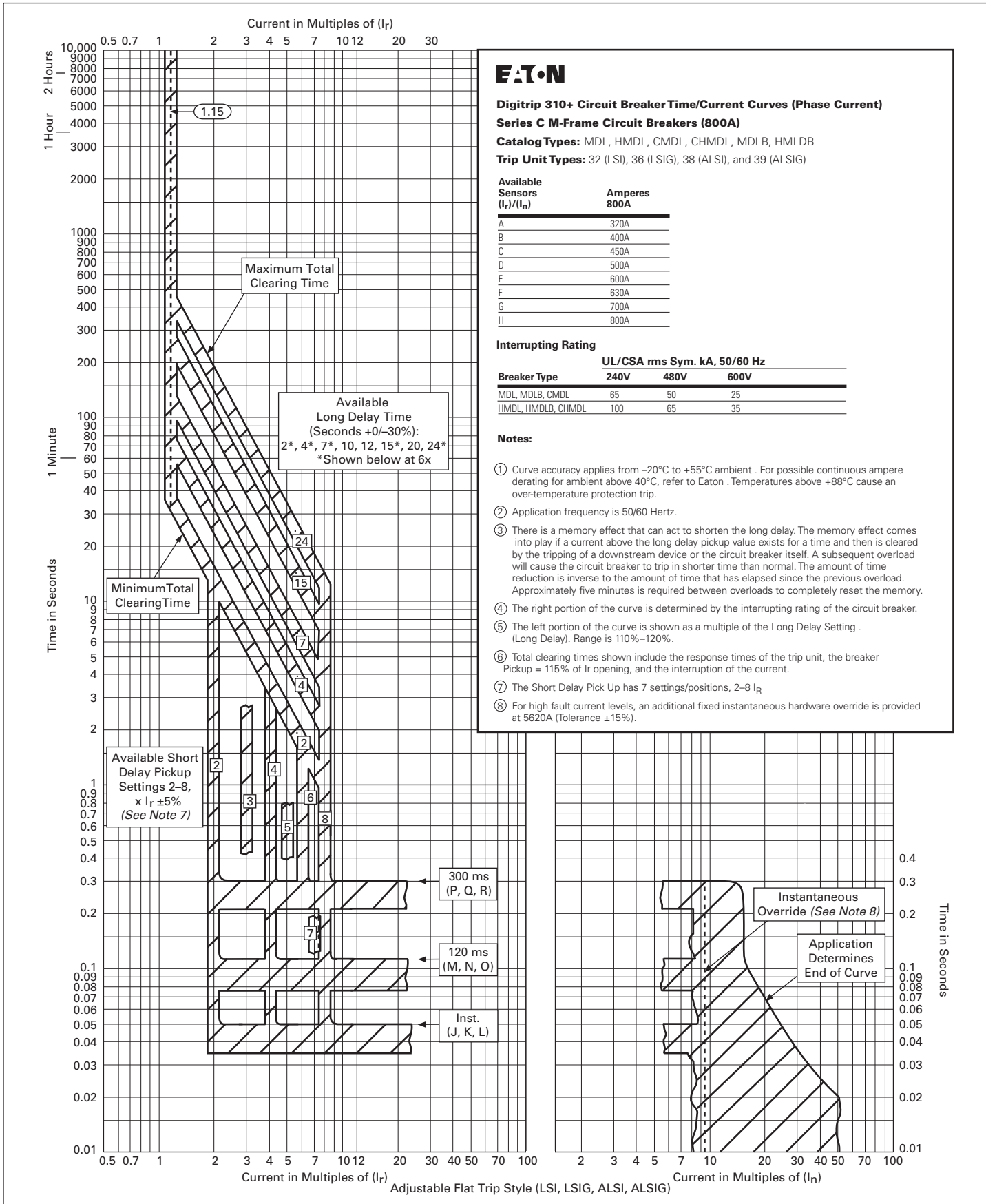


Figure 3. Digitrip 310+ Trip Units (800A), Long Delay Response and Short Delay with Flat Response Curve and Override (LSI, LSIG, ALSI, ALSIG) - TD012052EN, October 2014

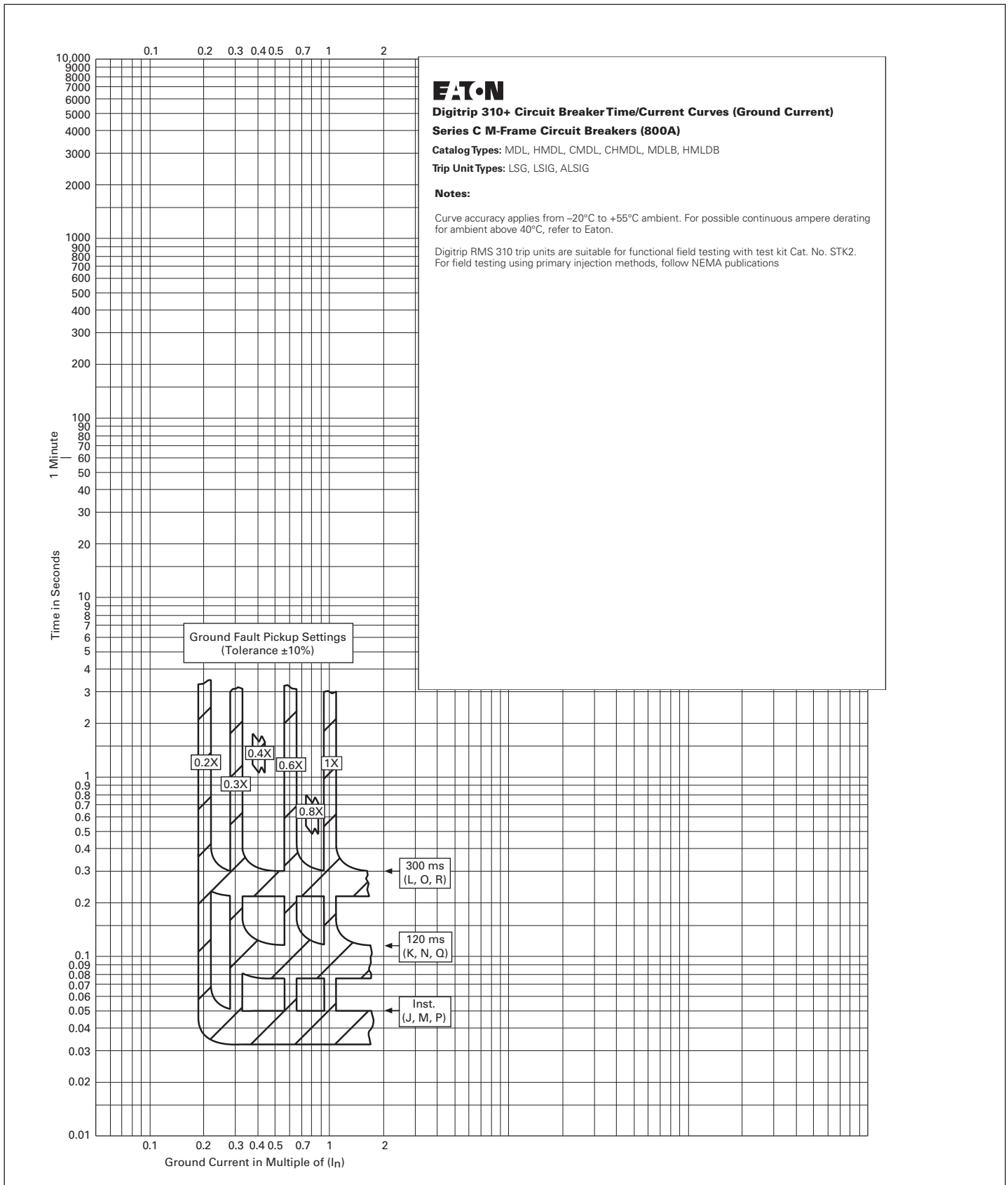


Figure 4. Ground Fault Delay Response Curve (LSG, LSIG, ALSIG) - Curve Number TD012053EN



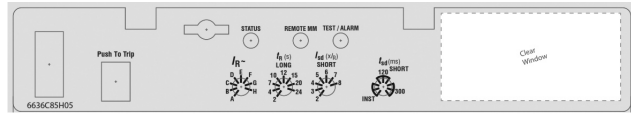


**Digitrip 310+ Circuit Breaker Time/Current Curves**

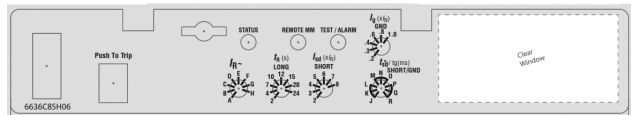
**Maintenance Mode Setting**

**Trip Unit Types:** 38 (ALSI) and 39 (ALSIG)

**Series C M-Frame Trip Unit Nameplates**



**ALSI**



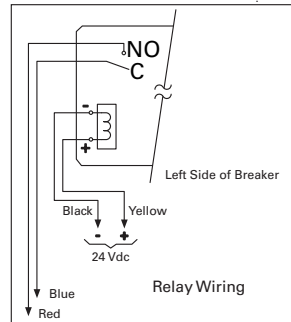
**ALSIG**

$I_r$  = Continuous Current Setting or Rating Plug Value,  $I_s$  = Current Sensor Frame Rating,  
 $I_n$  = Rating Plug Value,  $I_g$  = Ground Current Pickup Multiplier,  $I_i$  = Instantaneous Override Pickup.

**Notes:**

- 1 The Maintenance Mode feature must be ENABLED via application of 24 Vdc for these curves to apply. The blue LED is lit when in Maintenance Mode.
- 2 The end of the curve is determined by the interrupting rating of the circuit breaker.
- 3 Total clearing times shown include the response times of the trip unit, the breaker opening, and the interruption of the current.
- 4 Nominal Values (Pickup) (Tolerance is  $\pm 15\%$ )  $2.5 \times I_n$ .
- 5 The total clearing times shown are conservative and consider the maximum response time of the trip unit, the circuit breaker opening, and the interruption of the current in the worst case conditions such as: maximum rated voltages, single-phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions.

Contact Eaton for additional information.



Maintenance Mode Trip

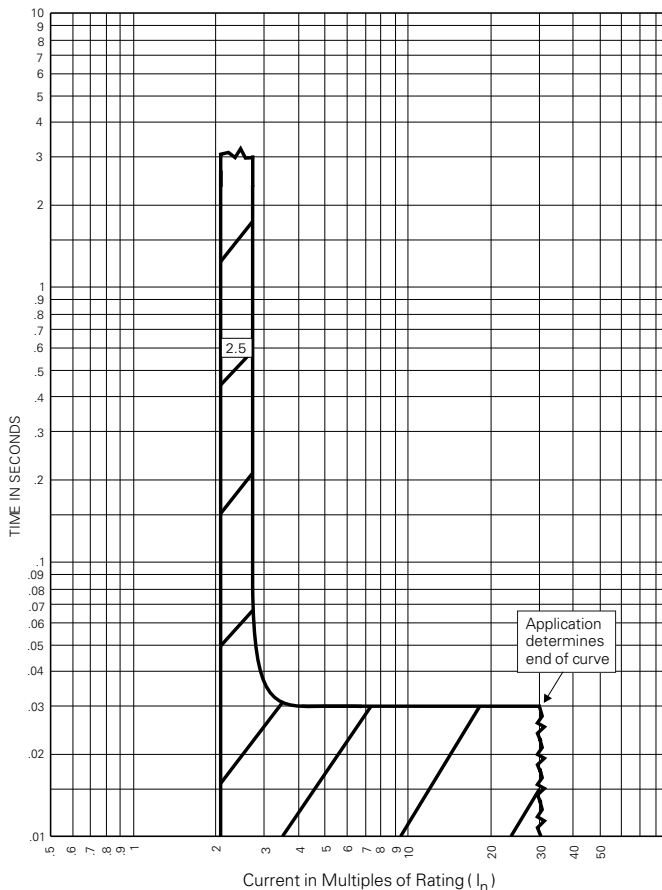
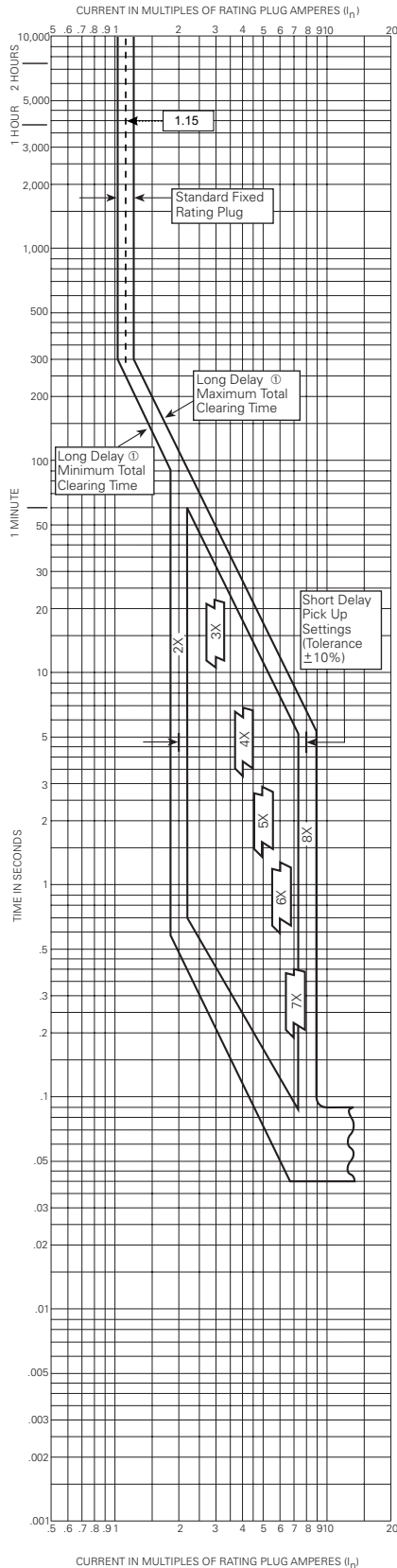


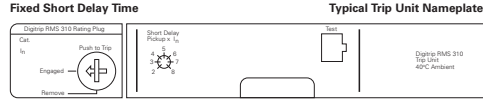
Figure 5. Maintenance Mode Setting (ALSI, ALSIG) - Curver Number - TD012054EN, October 2014

Types MDL, HMDL, CMDL, and CHMDL Equipped with Type MES Digitrip RMS 310 Trip Units, Types MES3800LS and MES3800LSG



**Circuit Breaker Time/Current Curves (Phase Current)**  
**Series C M-Frame Circuit Breakers**  
**Equipped With Type MES Digitrip RMS 310 Trip Units**

**Catalog Types:** MES3800LS and MES3800LSG Digitrip RMS 310 Trip Units for use with Circuit Breaker Types MDL, HMDL, CMDL and CHMDL 3 Poles.



**Available Rating Plugs**

Ampere Rating ( $I_n$ )	Type	Rating Plug Catalog Number	Short Delay Pickup Range Amperes
800	Fixed	8MES800T	1600-6400
700	Fixed	8MES700T	1400-5600
600	Fixed	8MES600T	1200-4800
500	Fixed	8MES500T	1000-4000
400	Fixed	8MES400T	800-3200
400, 500, 600, 800	Adjustable	A8MES800T1	800-6400

**Interrupting Rating**

Breaker Type	UL/CSA rms Sym. kA, 50/60 Hz		
	240V	480V	600V
MDL, MDLB, CMDL, CMDLB	65	50	25
HMDL, HMDLB, CHMDL, CHMDLB	100	65	35

Breaker Type	IEC 60947-2 rms Sym. kA, 50/60 Hz					
	240V		380/415V		690V	
	Icu	Ics	Icu	Ics	Icu	Ics
MDL, MDLB, CMDL, CMDLB	65	65	50	50	20	10
HMDL, HMDLB, CHMDL, CHMDLB	100	100	70	50	25	13

Utilization Category A  
 $U_{IMP} = 8 \text{ kV}$



**Notes:** Digitrip RMS 310 trip units are suitable for functional field testing with test kit Cat. No. STK2. For field testing using primary injection methods, follow NEMA AB4 publications.

Calibration response in short delay pick-up range is 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 pick-up 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 delay 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.

- Curve accuracy applies from  $-20^\circ\text{C}$  to  $+55^\circ\text{C}$  ambient. For possible continuous ampere derating for ambient above  $40^\circ\text{C}$ , refer to Eaton.
- For high fault current levels a fixed instantaneous override is provided at 6800A. (Tolerance  $\pm 15\%$ ).
- The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.
- Long delay pickup is  $115\%$  of  $I_n$ ,  $\pm 15\%$ .

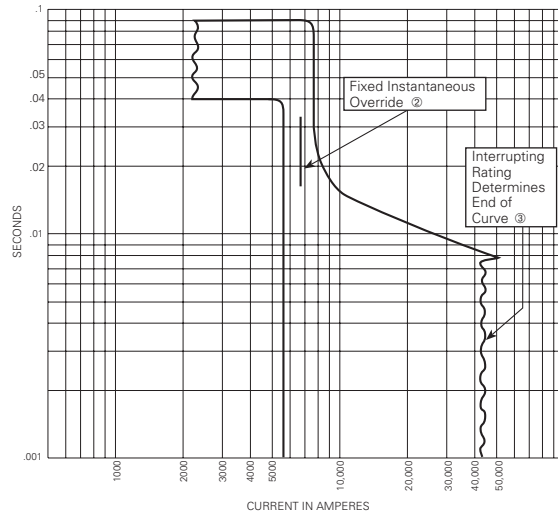


Figure 6. MDL, HMDL, CMDL, and CHMDL, types MES3800LS and MES3800LSG - Curve Number SC-7204-99, June 2007

Types MDL, HMDL, CMDL, and CHMDL Equipped with Type MES Digitrip RMS 310 Trip Units, Types MES3800LSI and MES3800LSIG

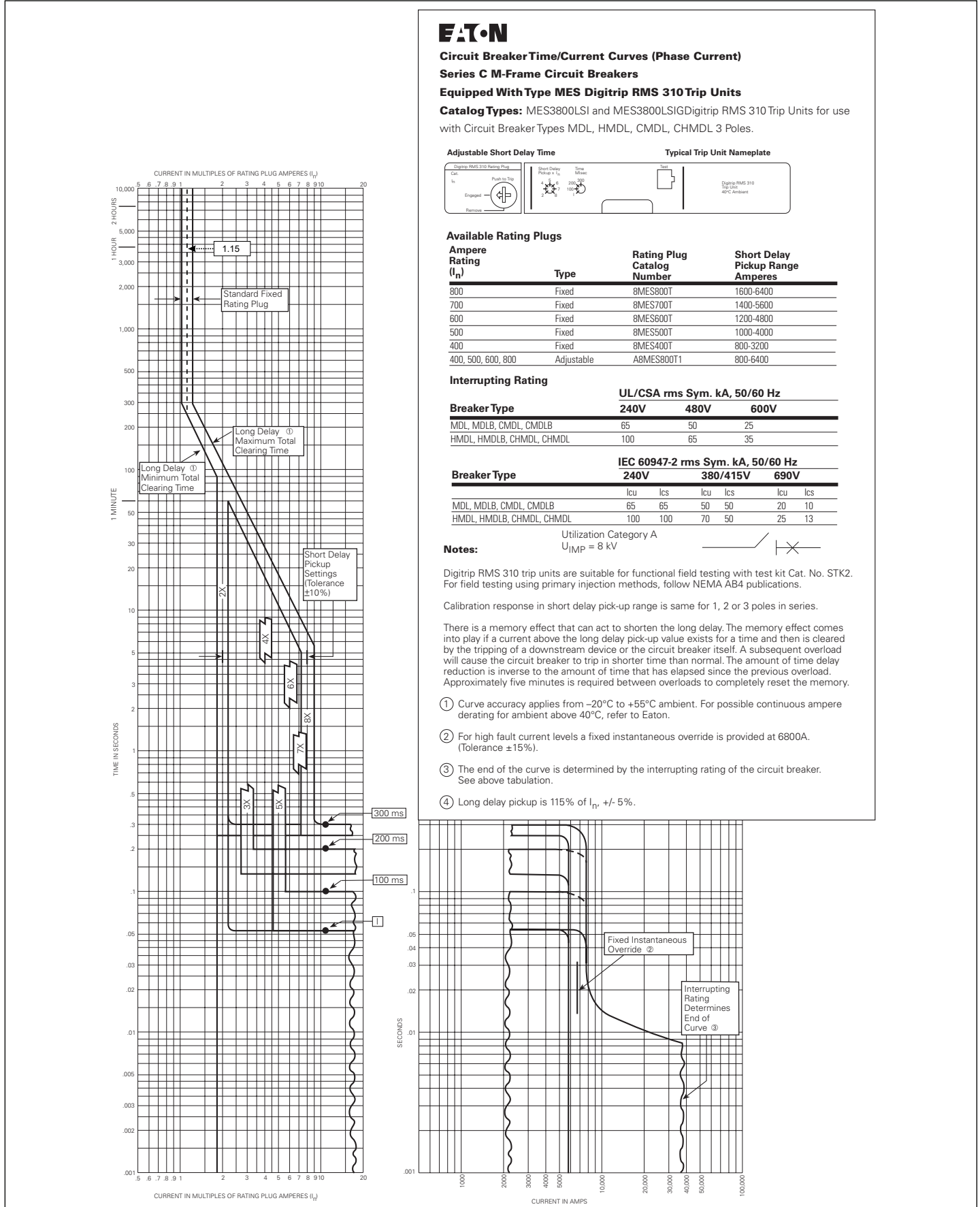


Figure 7. MDL, HMDL, CMDL, and CHMDL, types MES3800LSI and MES3800LSIG – Curve Number - SC-6913-98, June 2007

Types MDL, HMDL, CMDL, and CHMDL Equipped with Type MES Digitrip RMS 310 Trip Units, Ground Fault Protection

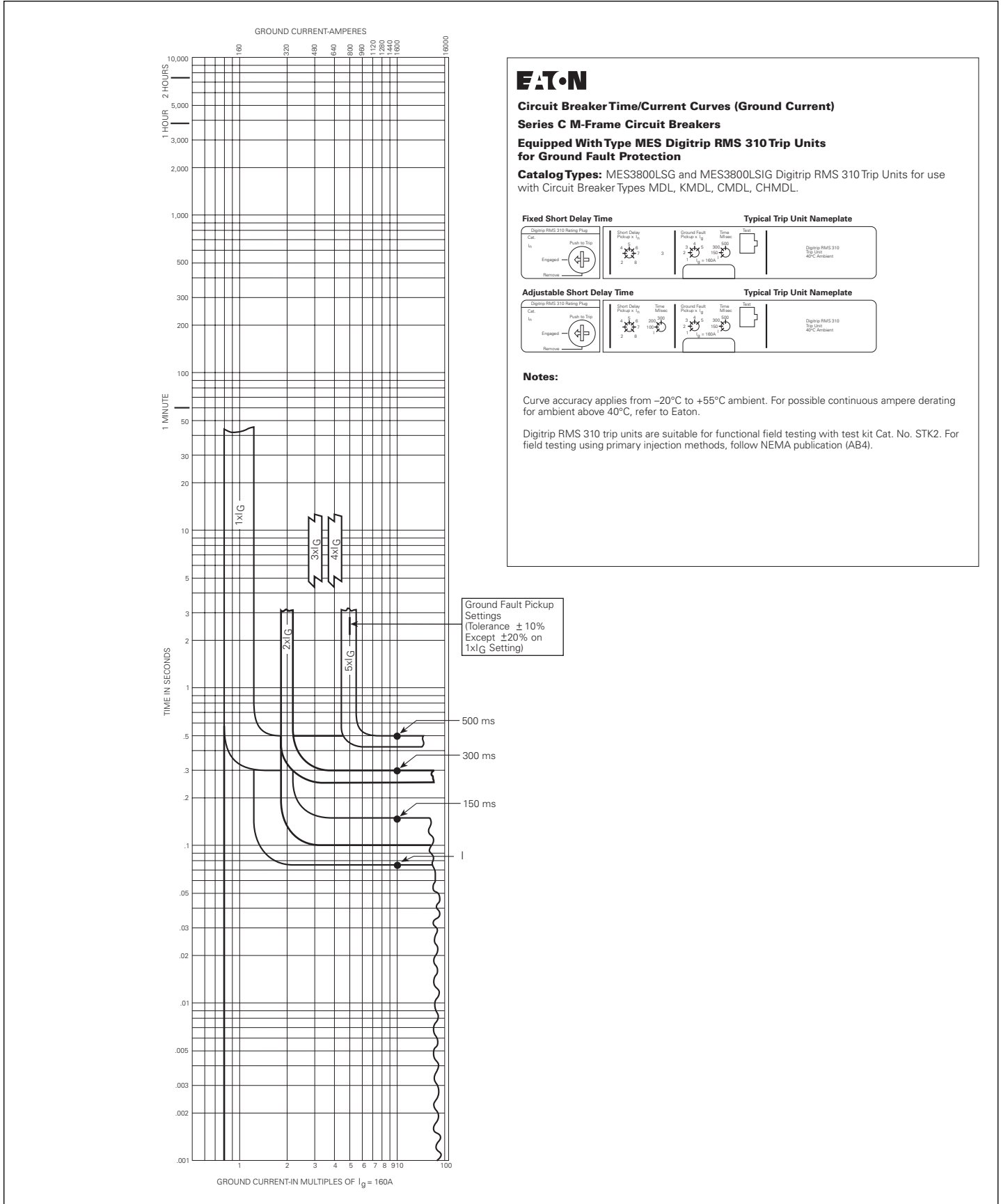


Figure 8. MDL, HMDL, CMDL, and CHMD Ground Fault Protection - Curve Number SC-6914-98, June 2007

Types MDL, HMDL, MDLB, and HMDLB Equipped with Type MT Thermal-Magnetic Trip Unit, 300 to 600 Amperes

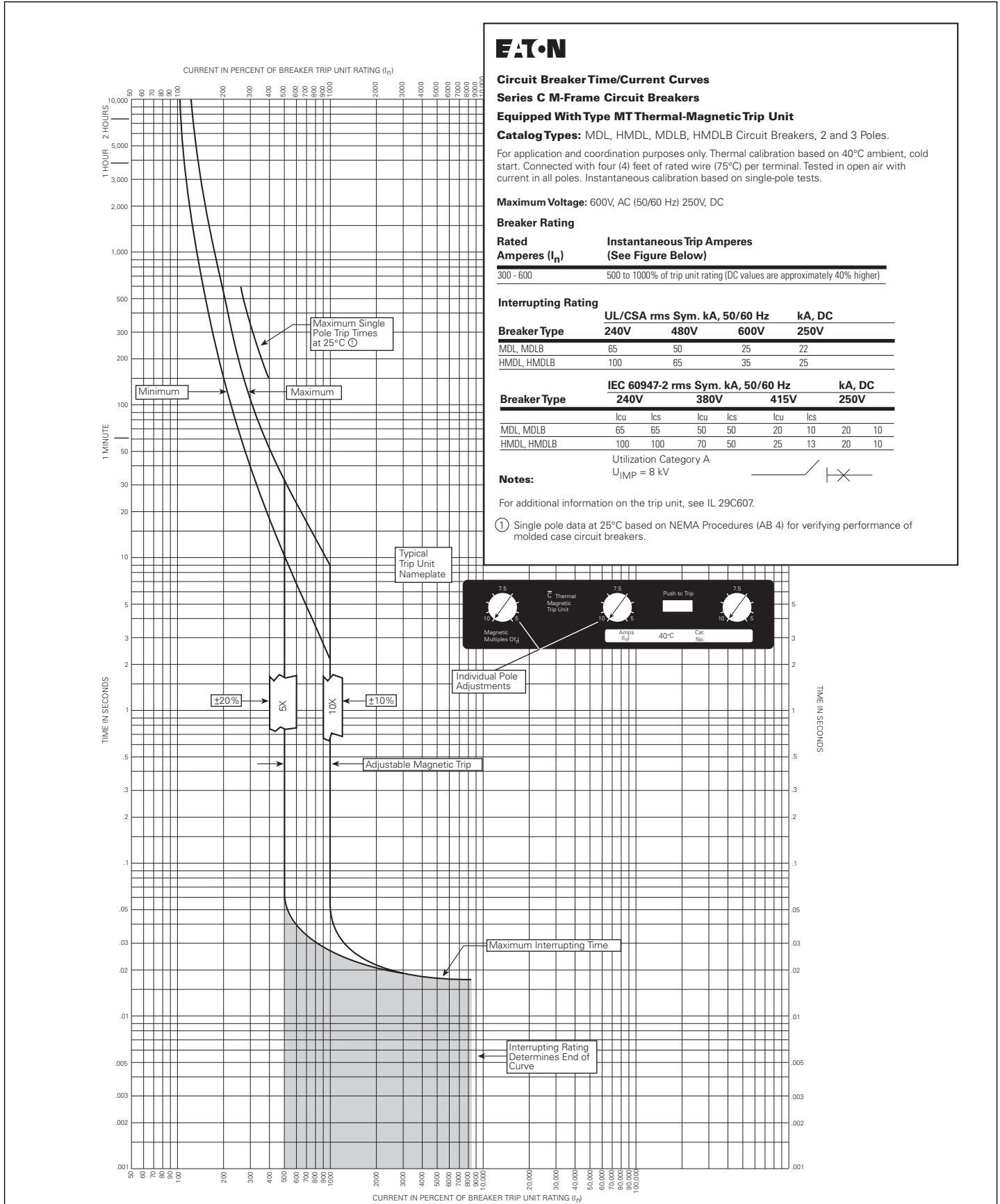


Figure 9. MDL, HMDL, MDLB, and HMDLB, 300-600A - Curve Number SC-6911-98, June 2007

Types MDL, HMDL, MDLB, and HMDLB Equipped with Type MT Thermal-Magnetic Trip Unit, 700 and 800 Amperes

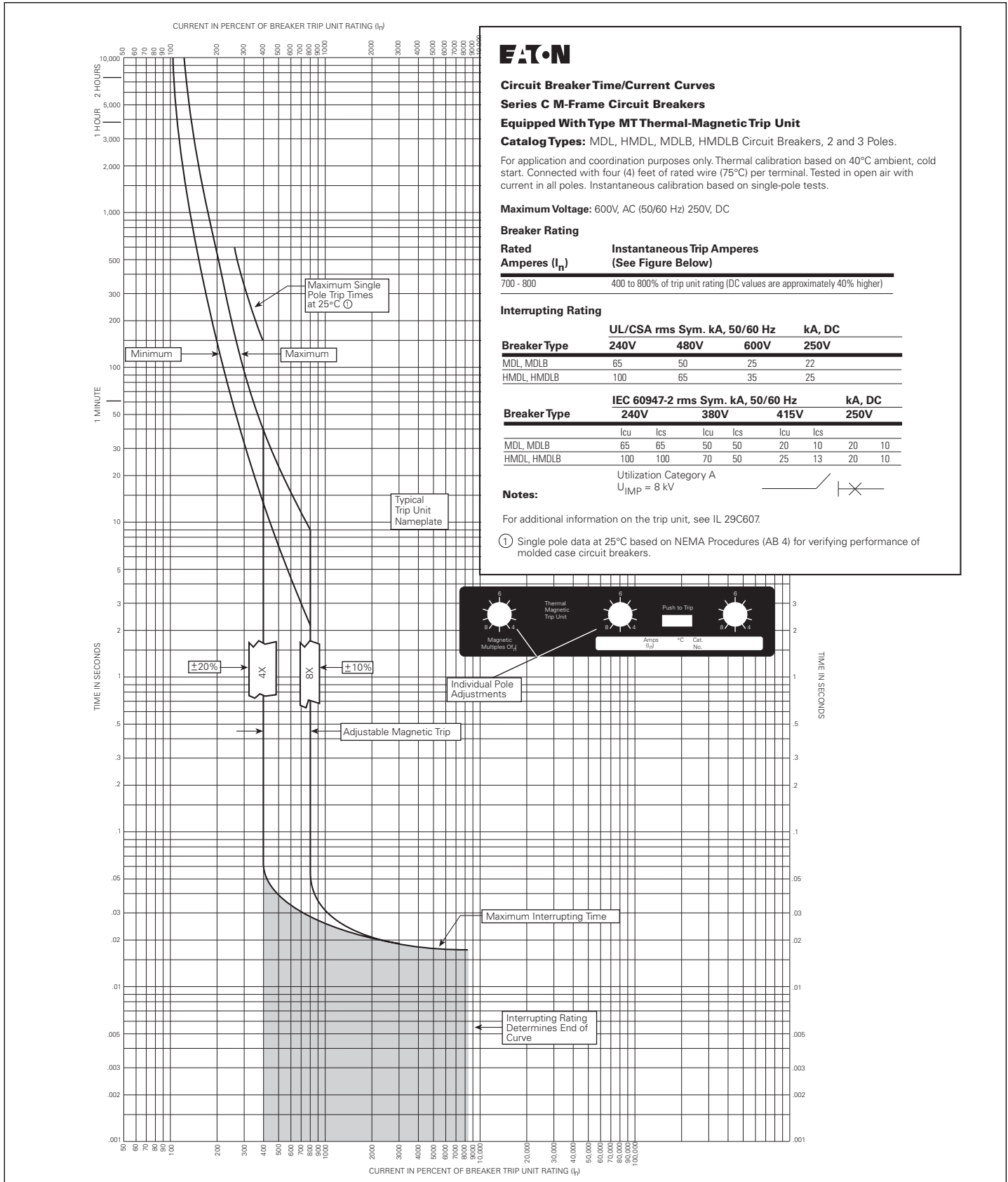


Figure 10. MDL, HMDL, MDLB, and HMDLB, 700-800A - Curve Number SC-6912-98, June 2007



**Eaton**  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
Eaton.com

© 2014 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. TD012036EN / KDC  
April 2014



Eaton is a registered trademark.

All other trademarks are property  
of their respective owners.