Cutler-Hammer

Series C ®
Molded Case Circuit Breakers M-Frame 300-800 Amperes

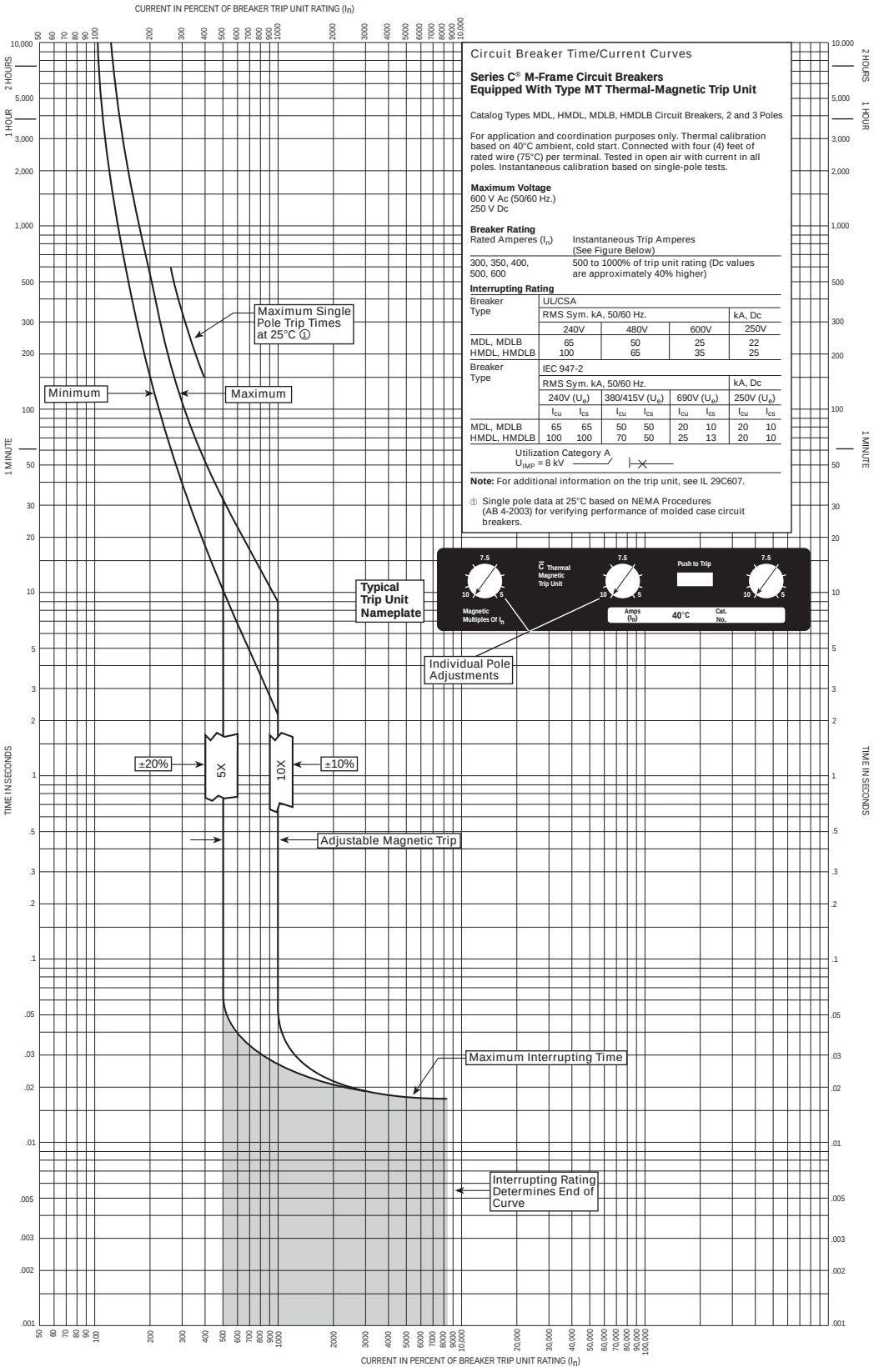
Breaker Description	Curve No.	Page
Types MDL, HMDL, MDLB, and HMDLB Equipped with Type MT Thermal-Magnetic Trip Unit, 300 to 600 Amperes	SC-6911-98	2
Types MDL, HMDL, MDLB, and HMDLB Equipped with Type MT Thermal-Magnetic Trip Unit, 700 and 800 Amperes	SC-6912-98	3
Types MDL, HMDL, CMDL, and CHMDL Equipped with Type MES Digitrip RMS 310 Trip Units, Types MES3800LS and MES3800LSG	SC-7204-99	4
Types MDL, HMDL, CMDL, and CHMDL Equipped with Type MES Digitrip RMS 310 Trip Units, Types MES3800LSI and MES3800LSIG	SC-6913-98	5
Types MDL, HMDL, CMDL, and CHMDL Equipped with Type MES Digitrip RMS 310 Trip Units, Ground Fault Protection	SC-6914-98	6

Further information may be obtained from:

Eaton Corporation
1000 Cherrington Parkway
Moon Township, Pennsylvania 15108-4312
United States of America
Telephone: 1-800-525-2000
http://www.eaton.com

The latest Time Current Curves may be found at:
http://www.cutler-hammer.eaton.com/NASApp/cs/ContentServer?pagename=C-H/DocumentSupport/DSCProdMainT

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



Circuit Breaker Time/Current Curves

Series C® M-Frame Circuit Breakers Equipped With Type MT Thermal-Magnetic Trip Unit

Catalog Types MDL, HMDL, MDLB, HMDLB Circuit Breakers, 2 and 3 Poles

For application and coordination purposes only. Thermal calibration based on 40°C ambient, cold start. Connected with four (4) feet of rated wire (75°C) per terminal. Tested in open air with current in all poles. Instantaneous calibration based on single-pole tests.

Maximum Voltage
600 V Ac (50/60 Hz.)
250 V Dc

Breaker Rating

Rated Amperes (I_n)	Instantaneous Trip Amperes (See Figure Below)
300, 350, 400, 500, 600	500 to 1000% of trip unit rating (Dc values are approximately 40% higher)

Interrupting Rating

Breaker Type	UL/CSA			
	RMS Sym. kA, 50/60 Hz.			kA, Dc
	240V	480V	600V	250V
MDL, MDLB	65	50	25	22
HMDL, HMDLB	100	65	35	25

Breaker Type	IEC 947-2							
	RMS Sym. kA, 50/60 Hz.						kA, Dc	
	240V (U_e)		380/415V (U_e)		690V (U_e)		250V (U_e)	
	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
MDL, MDLB	65	65	50	50	20	10	20	10
HMDL, HMDLB	100	100	70	50	25	13	20	10

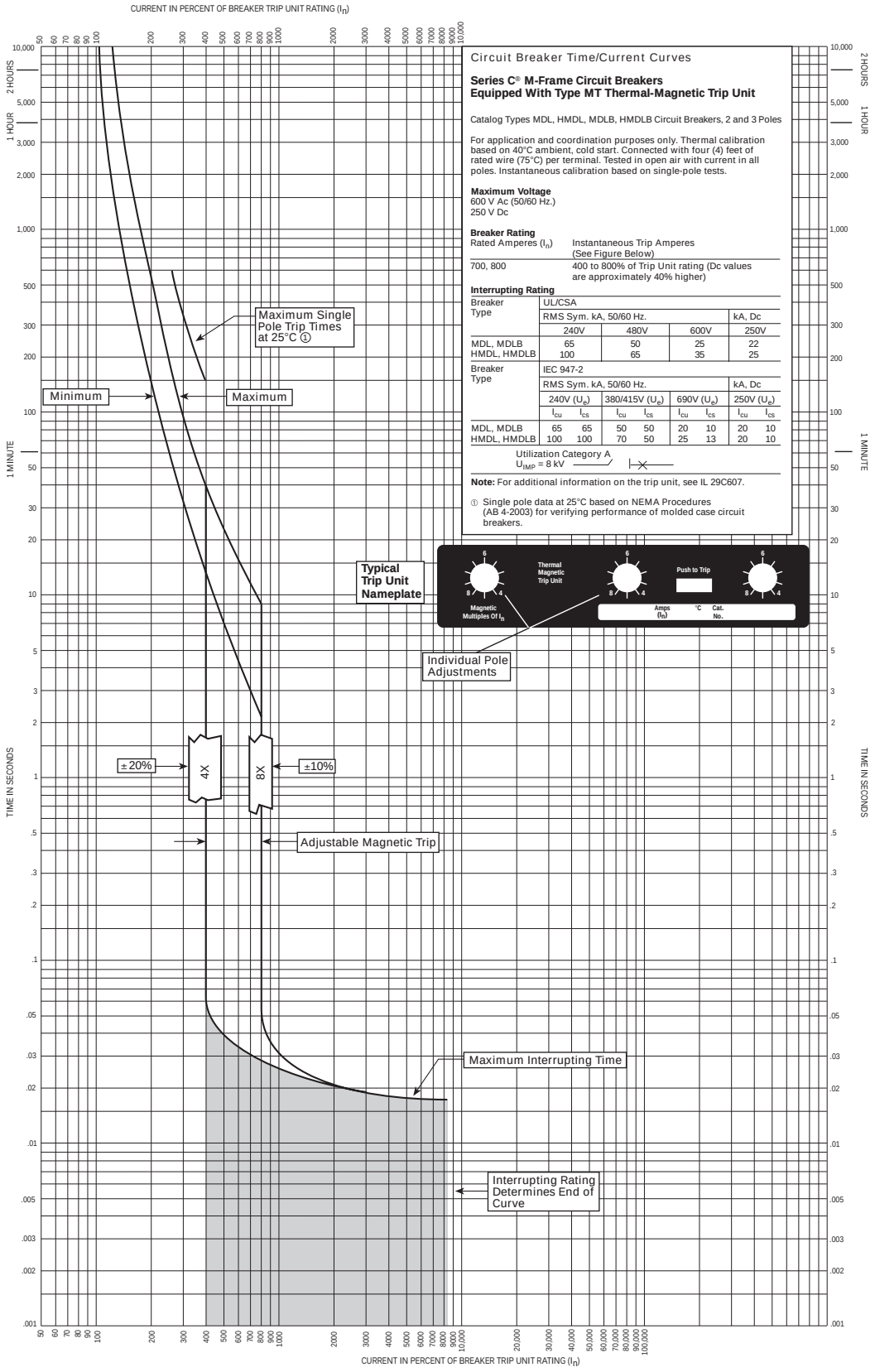
Utilization Category A
U_{IMP} = 8 kV

Note: For additional information on the trip unit, see IL 29C607.

① Single pole data at 25°C based on NEMA Procedures (AB 4-2003) for verifying performance of molded case circuit breakers.

Curve No. SC-6911-98

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



Circuit Breaker Time/Current Curves

Series C® M-Frame Circuit Breakers Equipped With Type MT Thermal-Magnetic Trip Unit

Catalog Types MDL, HMDL, MDLB, HMDLB Circuit Breakers, 2 and 3 Poles

For application and coordination purposes only. Thermal calibration based on 40°C ambient, cold start. Connected with four (4) feet of rated wire (75°C) per terminal. Tested in open air with current in all poles. Instantaneous calibration based on single-pole tests.

Maximum Voltage
600 V Ac (50/60 Hz.)
250 V Dc

Breaker Rating

Rated Amperes (I_n)	Instantaneous Trip Amperes (See Figure Below)
700, 800	400 to 800% of Trip Unit rating (Dc values are approximately 40% higher)

Interrupting Rating

Breaker Type	UL/CSA							
	RMS Sym. kA, 50/60 Hz.						kA, Dc	
	240V		480V		600V		250V	
MDL, MDLB	65		50		25		22	
HMDL, HMDLB	100		65		35		25	
Breaker Type	IEC 947-2							
	RMS Sym. kA, 50/60 Hz.						kA, Dc	
	240V (U_e)		380/415V (U_e)		690V (U_e)		250V (U_e)	
	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
MDL, MDLB	65	65	50	50	20	10	20	10
HMDL, HMDLB	100	100	70	50	25	13	20	10

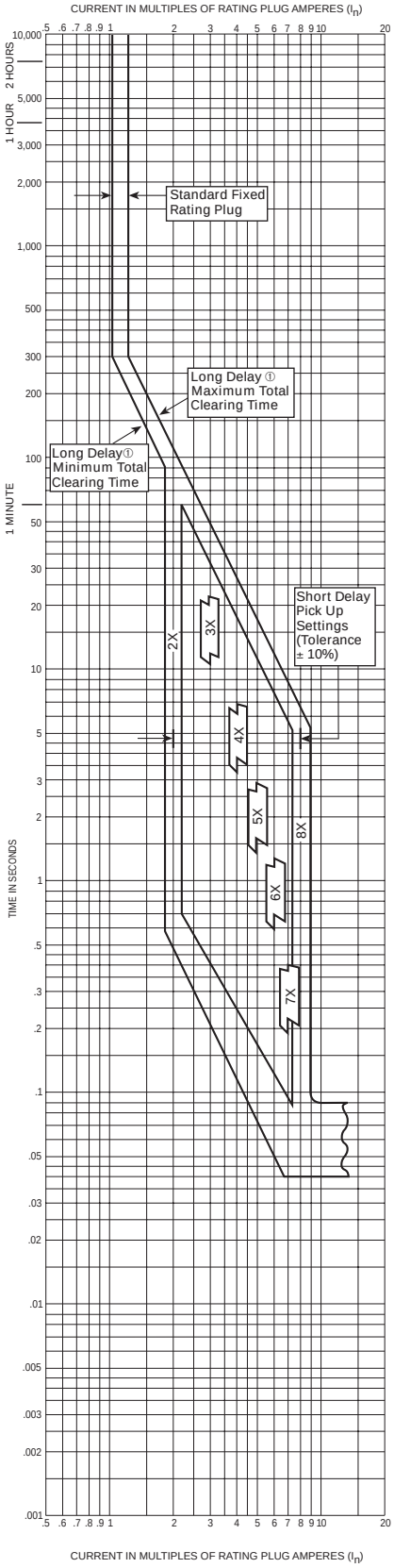
Utilization Category A
U_{IMP} = 8 kV

Note: For additional information on the trip unit, see IL 29C607.

① Single pole data at 25°C based on NEMA Procedures (AB 4-2003) for verifying performance of molded case circuit breakers.

Curve No. SC-6912-98

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

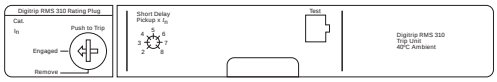


Circuit Breaker Time/Current Curves (Phase Current) ④

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

Fixed Short Delay Time **Typical Trip Unit Nameplate**



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, CHMDL	100	65	35

Breaker Type	IEC 947-2 RMS Sym. kA, 50/60 Hz					
	240V (U_e)		380/415V (U_e)		690V (U_e)	
	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
MDL, MDLB, CMDL, CMDLB	65	65	50	50	20	10
HMDL, HMDLB, CHMDL, CHMDL	100	100	70	50	25	13

Utilization Category A
U_{imp} = 8kV

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 AB4-2003 publications.

Calibration response in short delay pick-up range is same for 1, 2 or 3 poles in series.

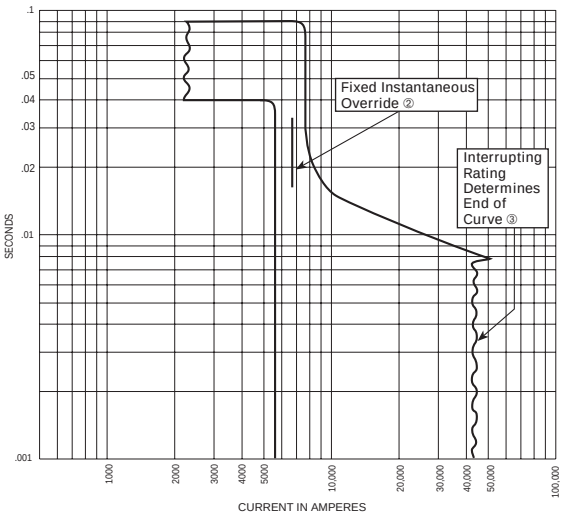
There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pick-up value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker 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.

① Curve accuracy applies from –20°C to +55°C ambient. For possible continuous ampere derating for ambient above 40°C, refer to Cutler-Hammer.

② For high fault current levels a fixed instantaneous override is provided at 6800A. (Tolerance ±15%).

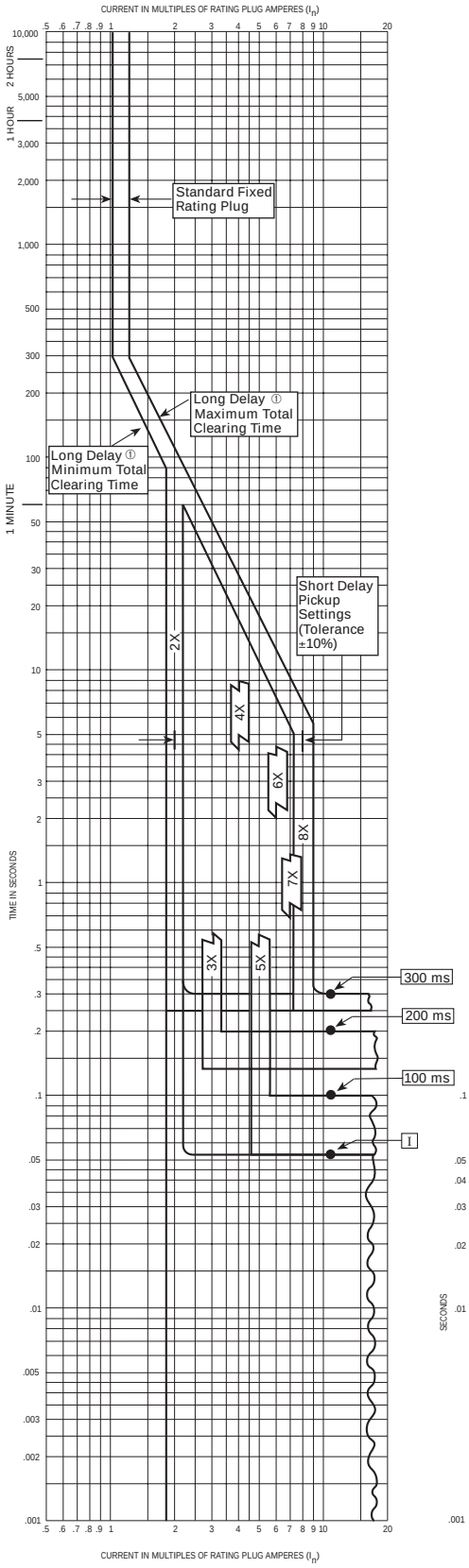
③ The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.

④ For ground fault time/current curves see SC-6914-98.



Curve No. SC-7204-99

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

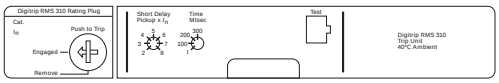


Circuit Breaker Time/Current Curves (Phase Current) ④

Series C® M-Frame Circuit Breakers
Equipped With Type MES Digitrip RMS 310 Trip Units

Catalog Types MES3800LSI and MES3800LSIG Digitrip RMS 310 Trip Units for use with Circuit Breaker Types MDL, HMDL, CMDL, CHMDL
3 Poles

Adjustable Short Delay Time **Typical Trip Unit Nameplate**



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, CHMDL	100	65	35

Breaker Type	IEC 947-2 RMS Sym. kA, 50/60 Hz					
	240V (U_e)		380/415V (U_e)		690V (U_e)	
	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
MDL, MDLB, CMDL, CMDLB	65	65	50	50	20	10
HMDL, HMDLB, CHMDL, CHMDL	100	100	70	50	25	13

Utilization Category A
U_{imp} = 8kV

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 AB4-2003 publications.

Calibration response in short delay pickup range is same for 1, 2 or 3 poles in series.

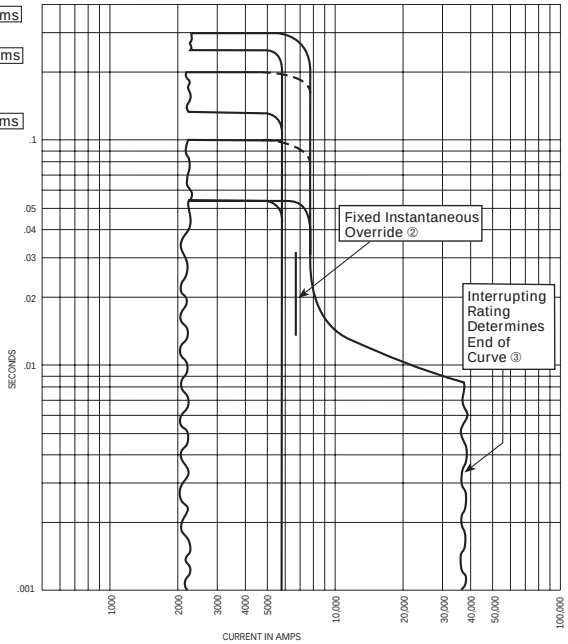
There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in shorter time than normal. The amount of time 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.

① Curve accuracy applies from –20°C to +55°C ambient. For possible continuous ampere derating for ambient above 40°C, refer to Cutler-Hammer.

② For high fault current levels a fixed instantaneous override is provided at 6800A. (Tolerance ±15%).

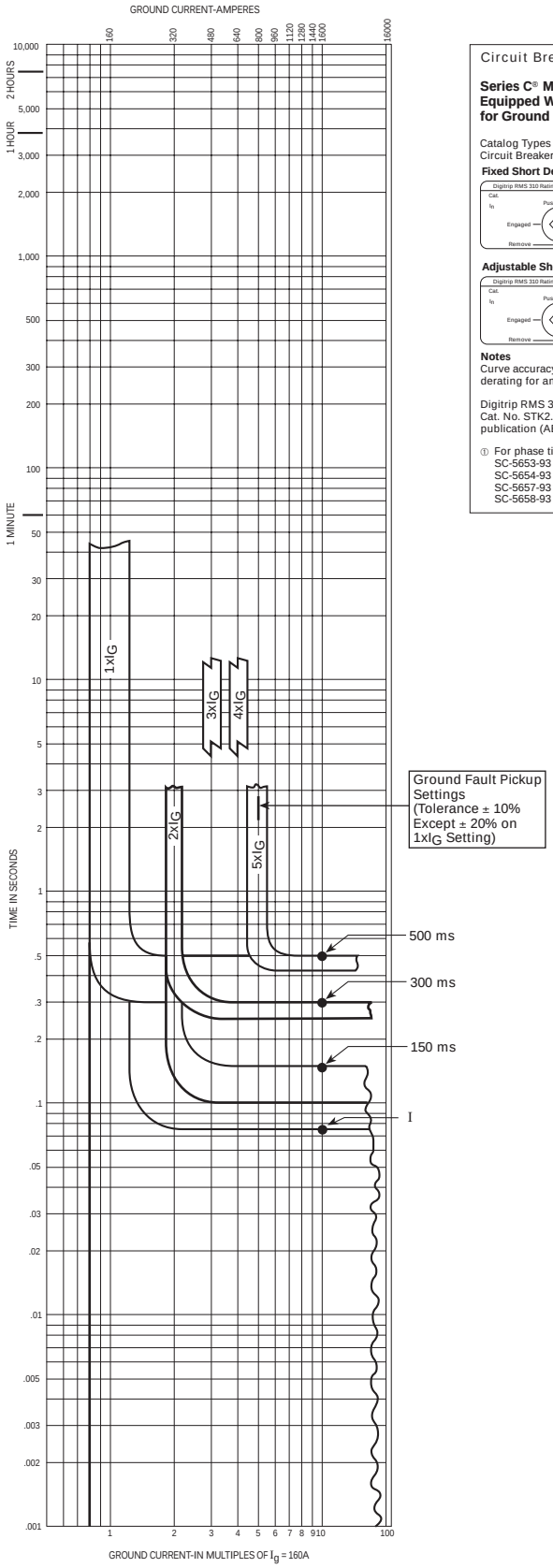
③ The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.

④ For ground fault time/current curves see SC-6914-98.



Curve No. SC-6913-98

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

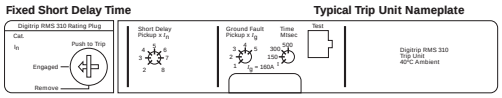


Circuit Breaker Time/Current Curves (Ground Current) ①

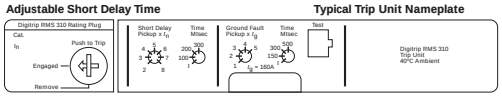
Series C® M-Frame Circuit Breakers
Equipped With Type MES Digitrip RMS 310 Trip Units
for Ground Fault Protection

Catalog Types MES3800LSG and MES3800LSIG Digitrip RMS 310 Trip Units for use with Circuit Breaker Types MDL, KMDL, CMDL, CHMDL

Fixed Short Delay Time **Typical Trip Unit Nameplate**



Adjustable Short Delay Time **Typical Trip Unit Nameplate**



Notes
Curve accuracy applies from –20°C to +55°C ambient. For possible continuous ampere derating for ambient above 40°C, refer to Cutler-Hammer.

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 publication (AB4-2003).

① For phase time/current curves see:
SC-5653-93
SC-5654-93
SC-5657-93
SC-5658-93

Curve No. SC-6914-98