

October 1997  
Mailed to: E/29-100A

Time/Current Characteristic Curves for  
Westinghouse Series C® L-Frame Circuit  
Breakers

## Westinghouse AB DE-ION® Circuit Breakers

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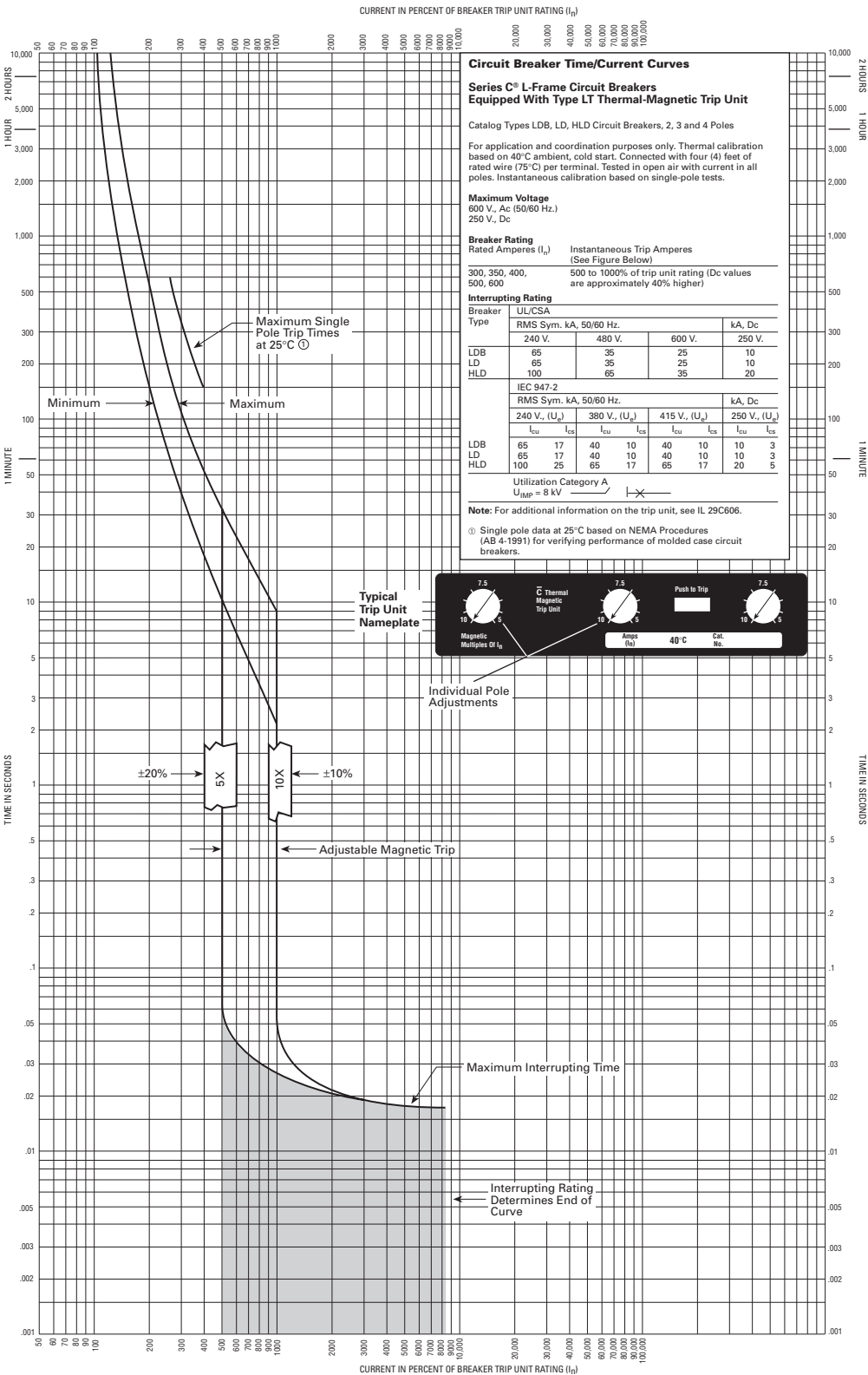
Individual oversize copies of curves listed above printed on onion-skin paper are available in limited quantity from:

Cutler-Hammer  
Westinghouse &  
Cutler-Hammer Products  
Five Parkway Center  
Pittsburgh, PA 15220

When ordering onion-skin curves, use number at bottom of page where curve appears, i.e., SC-4547-89B. **Requests for full sets of curves will not be honored.**

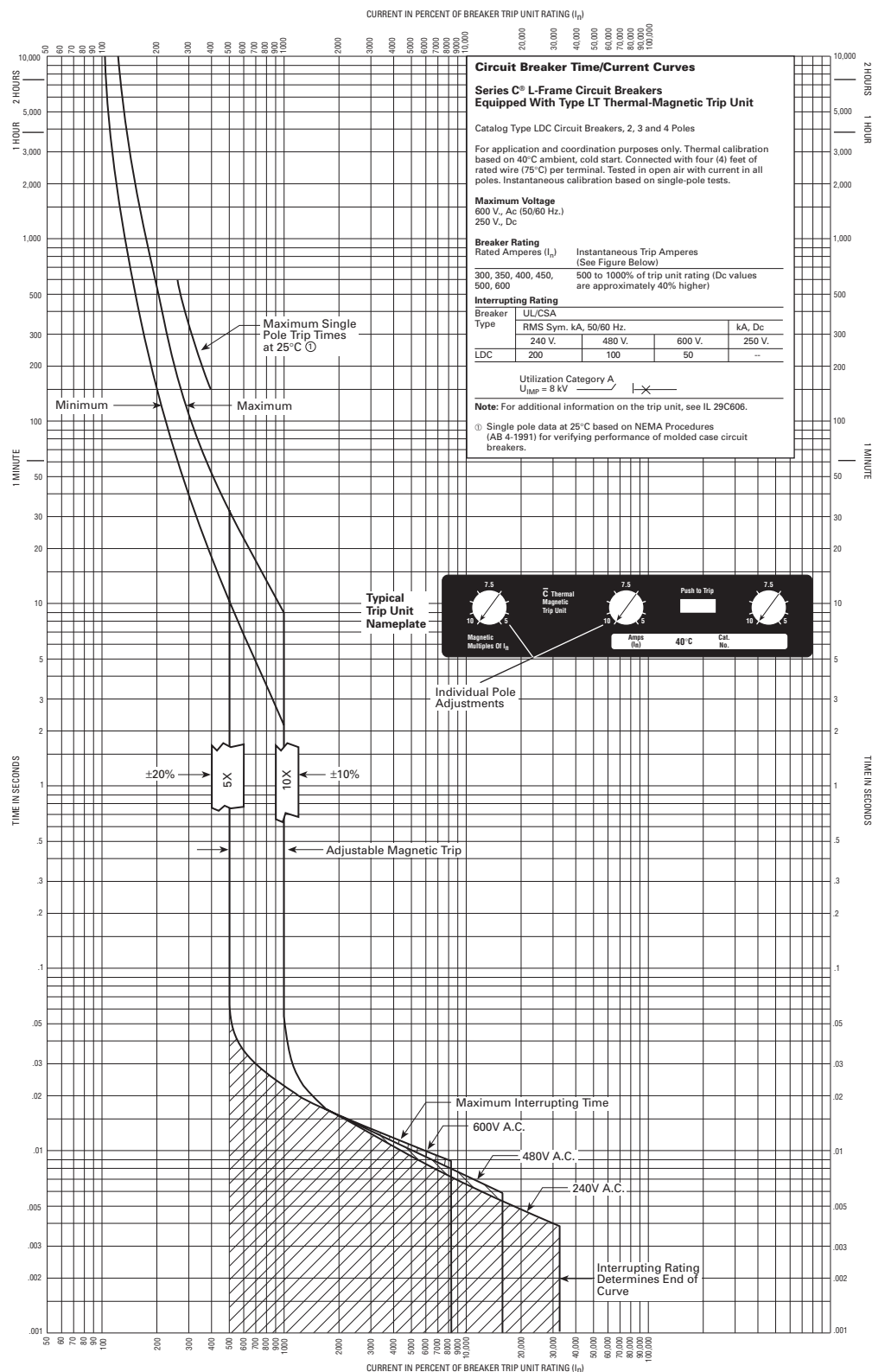


AB DE-ION Circuit Breakers  
Types LDB, LD, HLD Equipped With Type LT Thermal-Magnetic Trip Unit



## AB DE-ION Circuit Breakers

### Type LDC Equipped With Type LT Thermal-Magnetic Trip Unit



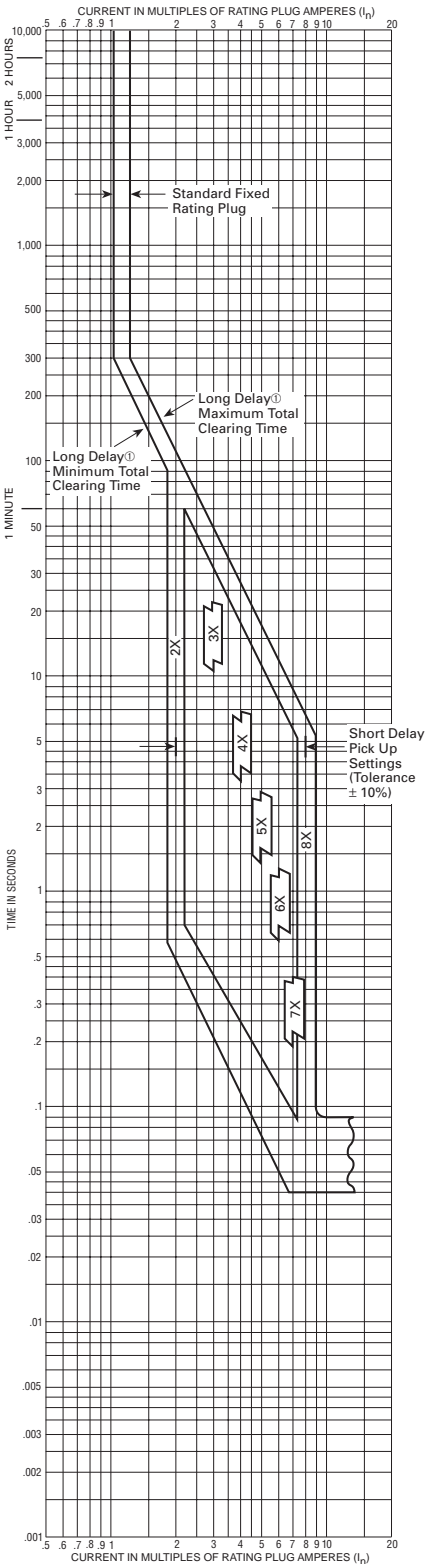
Curve No. SC-5760-94





AB DE-ION Circuit Breakers

Types LD, HLD, CLD, and CHLD Equipped With Type LES Digitrip RMS 310 Trip Units,  
Types LES3600LS, LES3600LSG, LES4600LS, LES4600LSE, LES4600LSP



**Circuit Breaker Time/Current Curves (Phase Current) ④**

**Series C® L-Frame Circuit Breakers**  
Equipped With Type LES Digitrip RMS 310 Trip Units

Catalog Types LES3600LS, LES3600LSG, LES4600LS, LES4600LSE, and LES4600LSP Digitrip RMS 310 Trip Units for use with Circuit Breaker Types LD, HLD, CLD, and CHLD 3 and 4 Poles

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

**Available Rating Plugs**

Amperes Rating (In)	Type	Rating Plug Catalog Number	Short Delay Pickup Range Amperes
600	Fixed	6LES600T	1200-4800
500	Fixed	6LES500T	1000-4000
400	Fixed	6LES400T	800-3200
350	Fixed	6LES350T	700-2800
300	Fixed	6LES300T	600-2400
300, 400, 500, 600	Adjustable	A6LES600T1	600-4800

**Interrupting Ratings @ 50/60 Hz RMS Sym. Amperes (kA)**

Breaker Type	UL/CSA Volts	240		380		415	
		Icu	Ics	Icu	Ics	Icu	Ics
LD, CLD	kA	65	33	40	20	40	20
HLD, CHLD		100	50	65	33	65	33

Utilization Category A  
Uimp = 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 AB4-1991 publications.

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

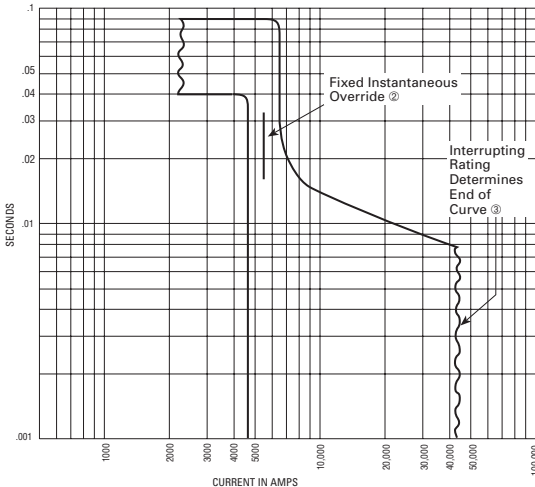
There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pick-up value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker 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 5500A. (Tolerance ±15%).

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

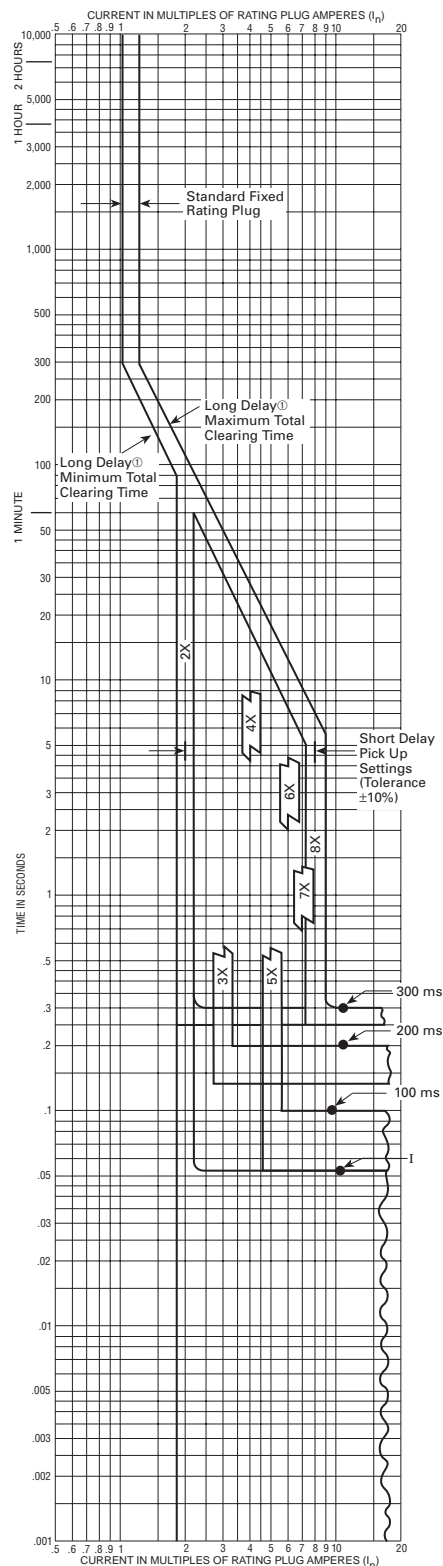
④ For ground fault time/current curves see SC-5661-93.





## AB DE-ION Circuit Breakers

Types LD, HLD, CLD, and CHLD Equipped With Type LES Digitrip RMS 310 Trip Units,  
Types LES3600LSI, LES3600LSIG, LES4600LSI, LES4600LSIP



### Circuit Breaker Time/Current Curves (Phase Current) ④

#### Series C® L-Frame Circuit Breakers Equipped With Type LES Digitrip RMS 310 Trip Units

Catalog Types LES3600LSI, LES3600LSIG, LES4600LSI, and LES4600LSIP  
Digitrip RMS 310 Trip Units for use with Circuit Breaker Types LD, HLD, CLD, and CHLD  
3 and 4 Poles

#### Adjustable Short Delay Time

#### Typical Trip Unit Nameplate



#### Available Rating Plugs

Ampere Rating (I <sub>n</sub> )	Type	Rating Plug Catalog Number	Short Delay Pickup Range Amperes
600	Fixed	6LES600T	1200-4800
500	Fixed	6LES500T	1000-4000
400	Fixed	6LES400T	800-3200
350	Fixed	6LES350T	700-2800
300	Fixed	6LES300T	600-2400
300, 400, 500, 600	Adjustable	A6LES600T1	600-4800

#### Interrupting Ratings @ 50/60 Hz RMS Sym. Amperes (kA)

Breaker Type	UL/CSA Volts	240	480	600
LD, CLD	kA	65	35	25
HLD, CHLD		100	65	35

Rating	240 Volts (U <sub>g</sub> )		380		415	
	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>
LD, CLD	65	33	40	20	40	20
HLD, CHLD	100	50	65	33	65	33

Utilization Category A  
U<sub>imp</sub> = 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 AB4-1991 publications.

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

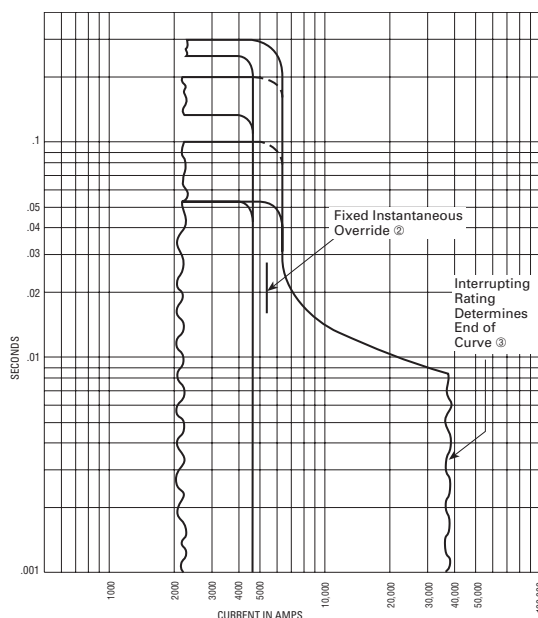
There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pick-up value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker 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 5500A. (Tolerance ±15%).

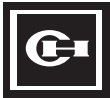
③ The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.

④ For ground fault time/current curves see SC-5661-93.



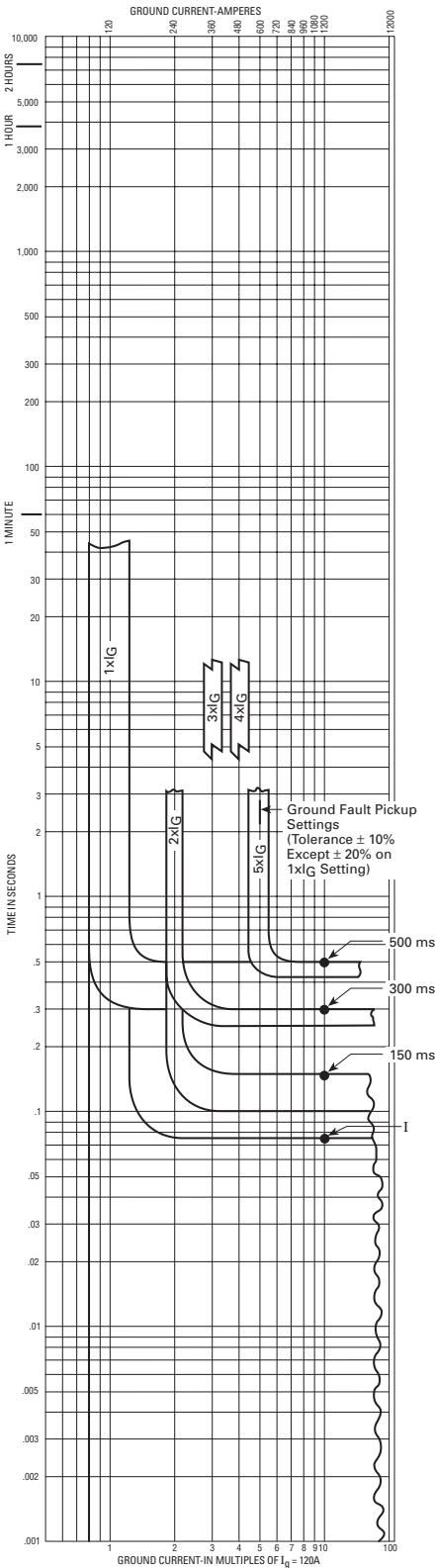
Curve No. SC-5654-93





AB DE-ION Circuit Breakers

Types LD, LCD, HLD, CLD, CHLD, and CLDC Equipped With Type LES Digitrip RMS 310 Trip Units, Ground Fault Protection



**Circuit Breaker Time/Current Curves (Ground Current) ①**

**Series C® L-Frame Circuit Breakers**  
Equipped With Type LES Digitrip RMS 310 Trip Units  
for Ground Fault Protection

Catalog Types LES3600LSG and LES3600LSIG Digitrip RMS 310 Trip Units for use with  
Circuit Breaker Types LD, HLD, LDC, CLD, CHLD, and CLDC

**Fixed Short Delay Time**

Digitrip RMS 310 Rating Plug

Short Delay Pickup =  $I_g$

Time: 200, 100, 50, 25, 10, 5, 2, 1, 0.5, 0.25, 0.1, 0.05, 0.025, 0.01, 0.005, 0.0025, 0.001

Ground Fault Pickup =  $I_g$

Time: 200, 100, 50, 25, 10, 5, 2, 1, 0.5, 0.25, 0.1, 0.05, 0.025, 0.01, 0.005, 0.0025, 0.001

Typical Trip Unit Nameplate

Digitrip RMS 310  
310 Amps  
40°C Ambient

**Adjustable Short Delay Time**

Digitrip RMS 310 Rating Plug

Short Delay Pickup =  $I_g$

Time: 200, 100, 50, 25, 10, 5, 2, 1, 0.5, 0.25, 0.1, 0.05, 0.025, 0.01, 0.005, 0.0025, 0.001

Ground Fault Pickup =  $I_g$

Time: 200, 100, 50, 25, 10, 5, 2, 1, 0.5, 0.25, 0.1, 0.05, 0.025, 0.01, 0.005, 0.0025, 0.001

Typical Trip Unit Nameplate

Digitrip RMS 310  
310 Amps  
40°C Ambient

**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.

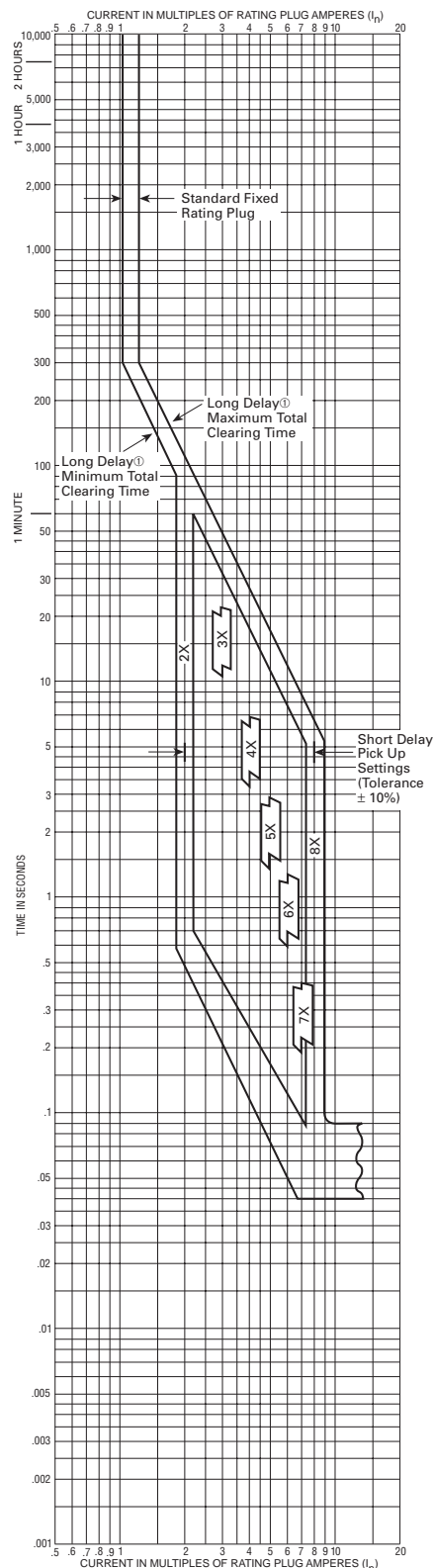
Digitrip RMS 310 trip units are suitable for functional field testing with test kit Cat. No. STK2. For field testing using primary injection methods, follow NEMA publication (AB4-1991).

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



## AB DE-ION Circuit Breakers

**Types LDC and CLDC Equipped With Type LES Digitrip RMS 310 Trip Units, Types LES3600LS, LES3600LSG, LES4600LS, LES4600LSE, LES4600LSP**



**Circuit Breaker Time/Current Curves (Phase Current) ④**

**Series C® L-Frame Circuit Breakers**  
**Equipped With Type LES Digitrip RMS 310 Trip Units**

Catalog Types LES3600LS, LES3600LSG, LES4600LS, LES4600LSE, and LES4600LSP  
Digitrip RMS 310 Trip Units for use with Circuit Breaker Types LDC and CLDC  
3 and 4 Poles

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

Digitrip RMS 310 Rating Plug      Short Delay Pickup  $\times I_n$

Cat.      Push-to-Test      Test      Digitrip RMS 310  
In      Engaged      40°C Ambient

**Available Rating Plugs**

Ampere Rating ( $I_n$ )	Type	Rating Plug Catalog Number	Short Delay Pickup Range Amperes
600	Fixed	6LES600T	1200-4800
500	Fixed	6LES500T	1000-4000
400	Fixed	6LES400T	800-3200
350	Fixed	6LES350T	700-2800
300	Fixed	6LES300T	600-2400
300, 400, 500, 600	Adjustable	A6LES600T1	600-4800

**Interrupting Ratings @ 50/60 Hz RMS Sym. Amperes (kA)**

Breaker Type	UL/CSA Volts	240	480	600
LDC, CLDC	kA	200	100	50

IEC 947-2

Volts ( $U_n$ )	240	380	415
Rating	$I_{cu}$ $I_{cs}$	$I_{cu}$ $I_{cs}$	$I_{cu}$ $I_{cs}$
kA	200   100	100   50	100   50

LDC, CLDC

Utilization Category A  
 $U_{imp} = 8kV$        $I-X$

**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 AB4-1991 publications.

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

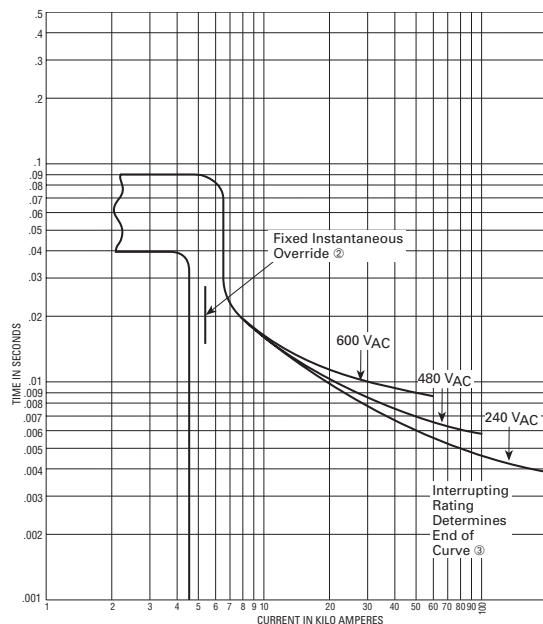
There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above the long delay pick-up value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker 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 5500A. (Tolerance  $\pm 15\%$ ).

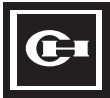
③ The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.

④ For ground fault time/current curves see SC-5661-93.



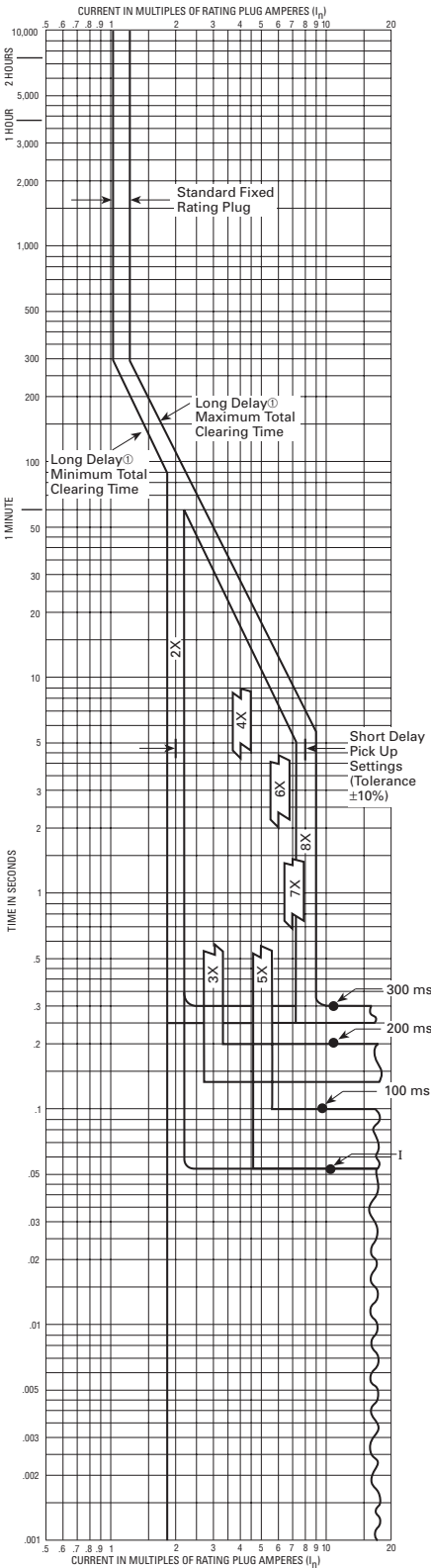
Curve No. SC-5657-93





AB DE-ION Circuit Breakers

Types LDC and CLDC Equipped With Type LES Digitrip RMS 310 Trip Units, Types LES3600LSI, LES3600LSIG, LES4600LSI, LES4600LSIP



**Circuit Breaker Time/Current Curves (Phase Current) ④**

**Series C® L-Frame Circuit Breakers**  
**Equipped With Type LES Digitrip RMS 310 Trip Units**

Catalog Types LES3600LSI, LES3600LSIG, LES4600LSI, and LES4600LSIP  
Digitrip RMS 310 Trip Units for use with Circuit Breaker Types LDC and CLDC  
3 and 4 Poles

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

Digitrip RMS 310 Rating Plug      Digitrip RMS 310 Trip Unit      40°C Ambient

Ampere Rating (I <sub>n</sub> )	Type	Rating Plug Catalog Number	Short Delay Pickup Range Amperes
600	Fixed	6LES600T	1200-4800
500	Fixed	6LES500T	1000-4000
400	Fixed	6LES400T	800-3200
350	Fixed	6LES350T	700-2800
300	Fixed	6LES300T	600-2400
300, 400, 500, 600	Adjustable	A6LES600T1	600-4800

**Interrupting Ratings @ 50/60 Hz RMS Sym. Amperes (kA)**

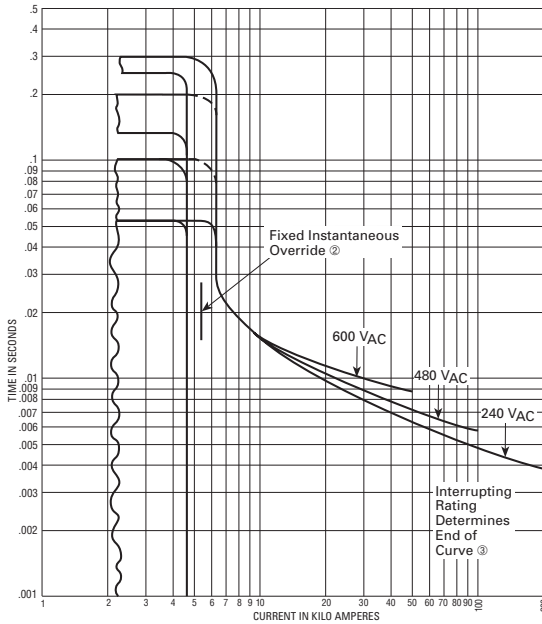
Breaker Type	UL/CSA Volts	240	480	600
LDC, CLDC	kA	200	100	50

IEC 947-2

Volts (U <sub>n</sub> )	240	380	415
Rating	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cs</sub>
kA	200	100	50

Utilization Category A  
U<sub>imp</sub> = 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 AB4-1991 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 5500A. (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-5661-93.

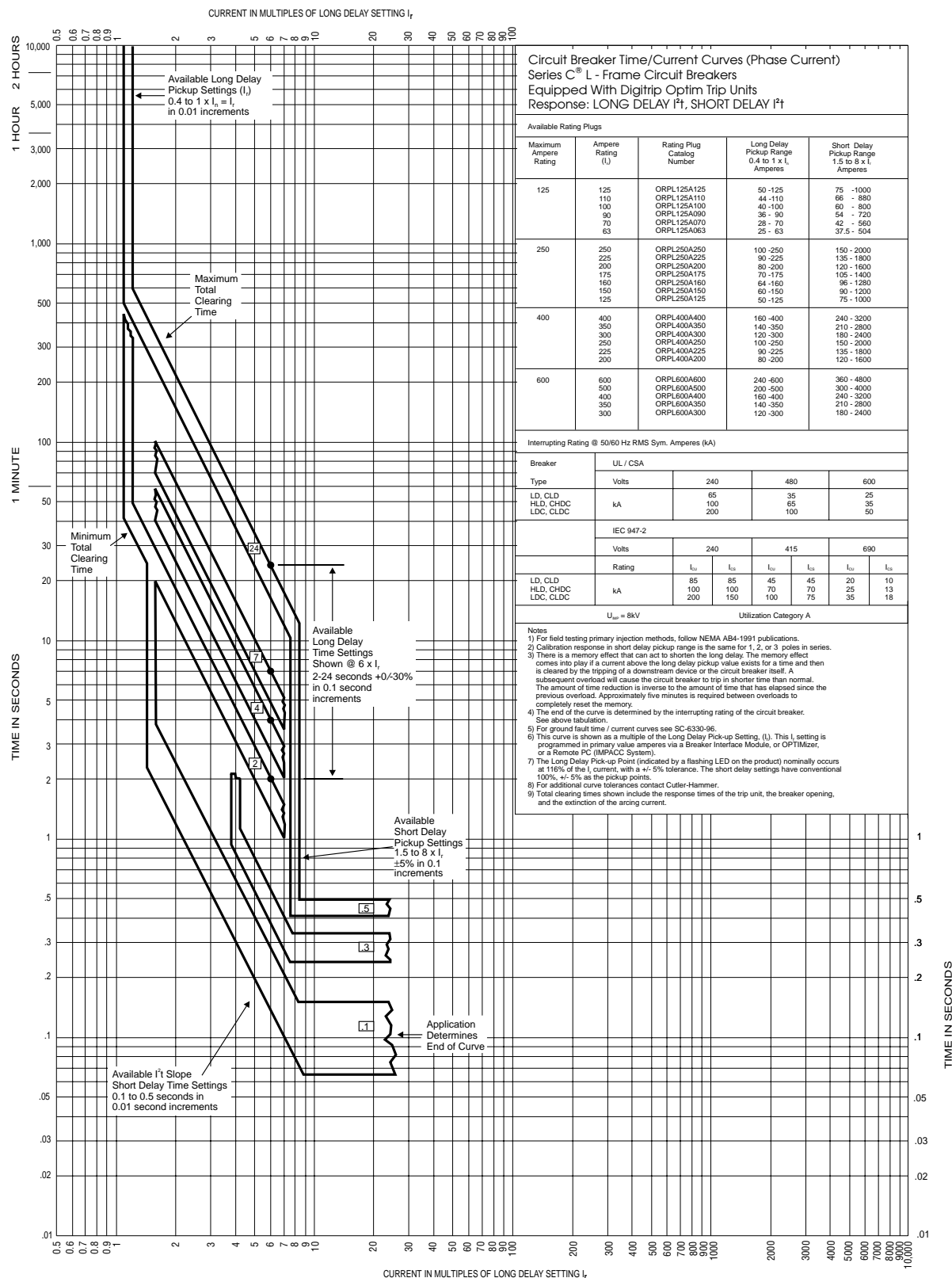






## AB DE-ION Circuit Breakers

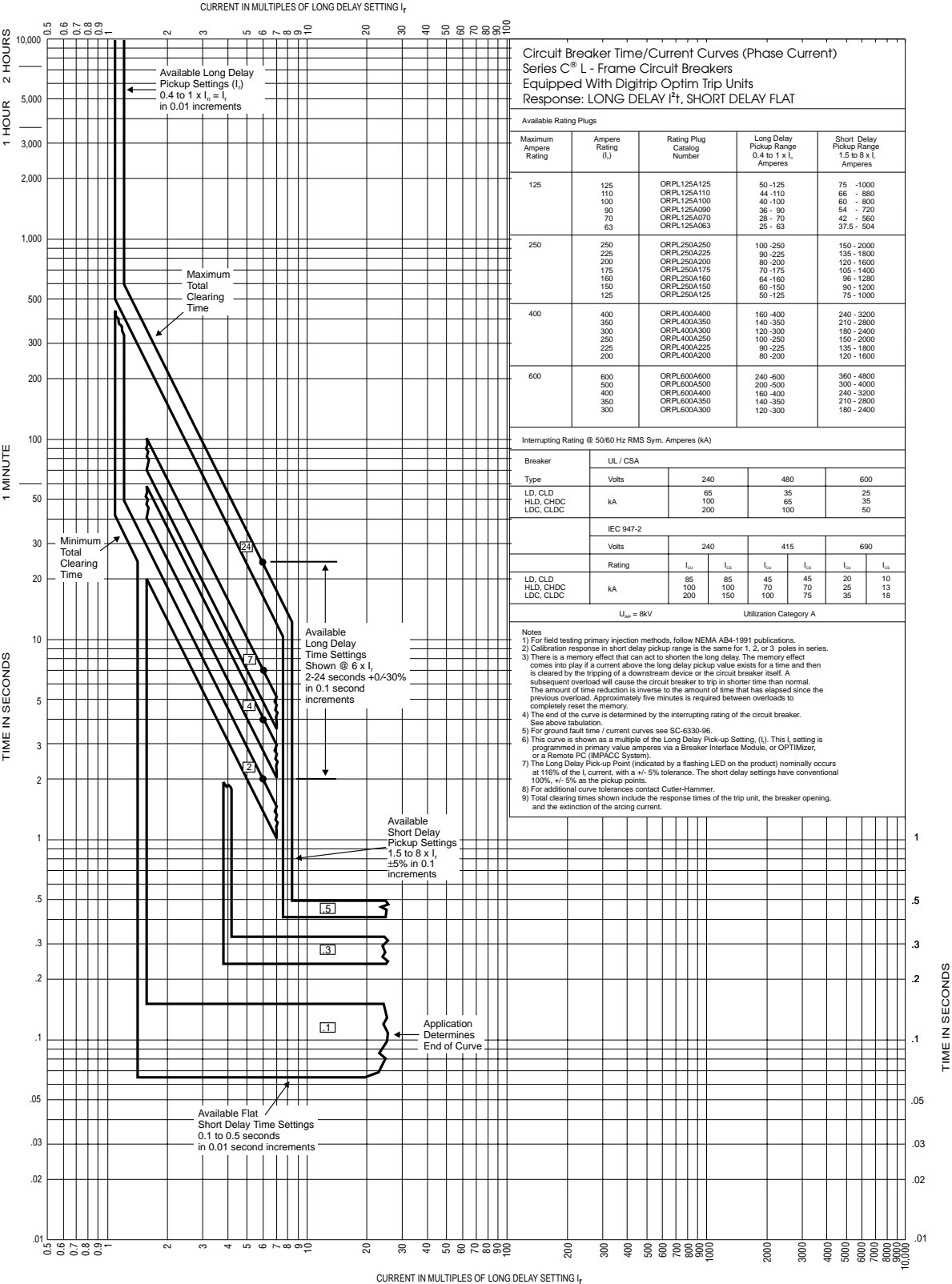
### L-Frame Circuit Breakers Equipped with Digitrip OPTIM Trip Units; Long Delay $I^2t$ , Short Delay $I^2t$





AB DE-ION Circuit Breakers

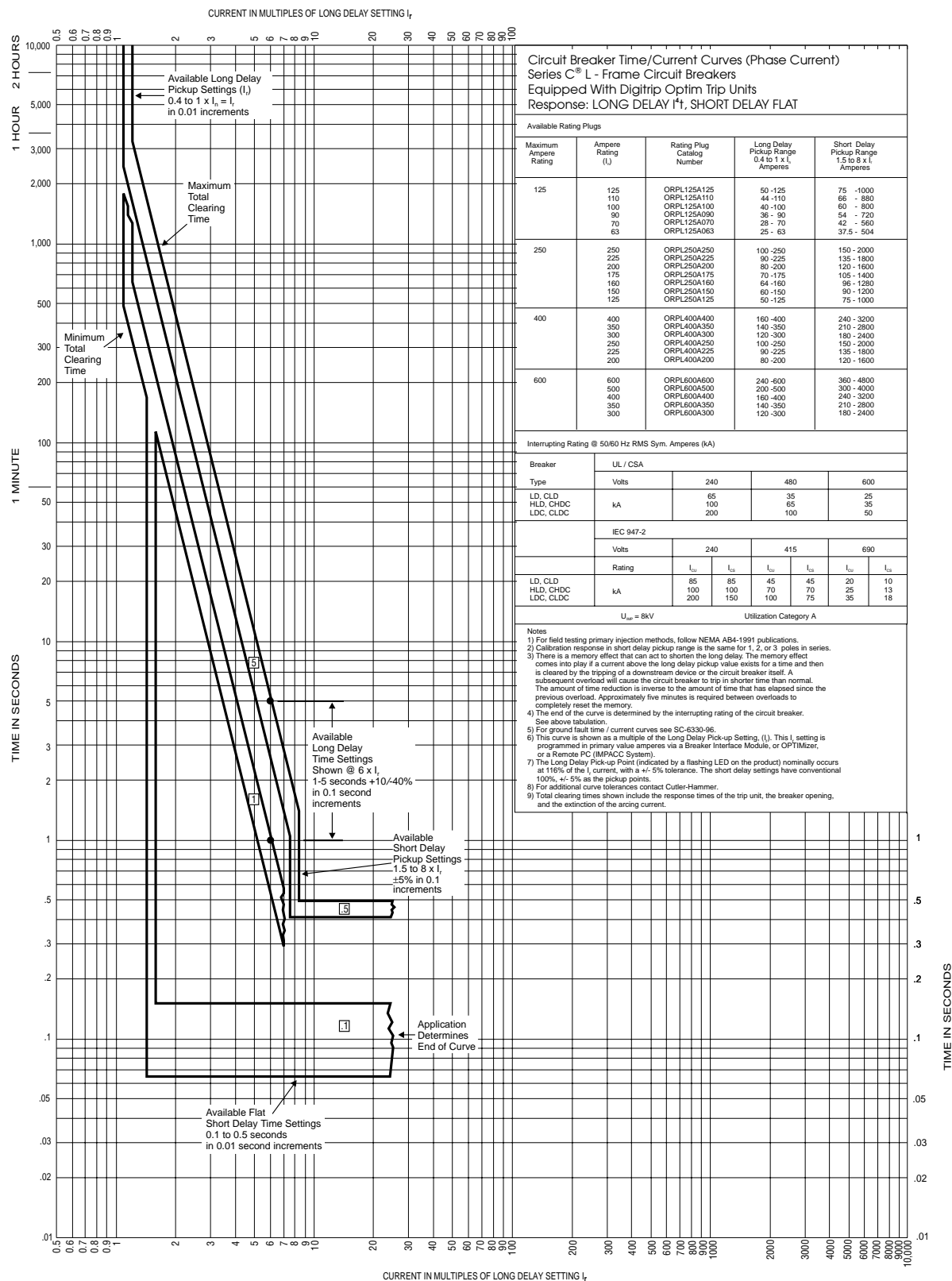
L-Frame Circuit Breakers Equipped with Digitrip OPTIM Trip Units; Long Delay I<sup>2</sup>t, Short Delay Flat





## AB DE-ION Circuit Breakers

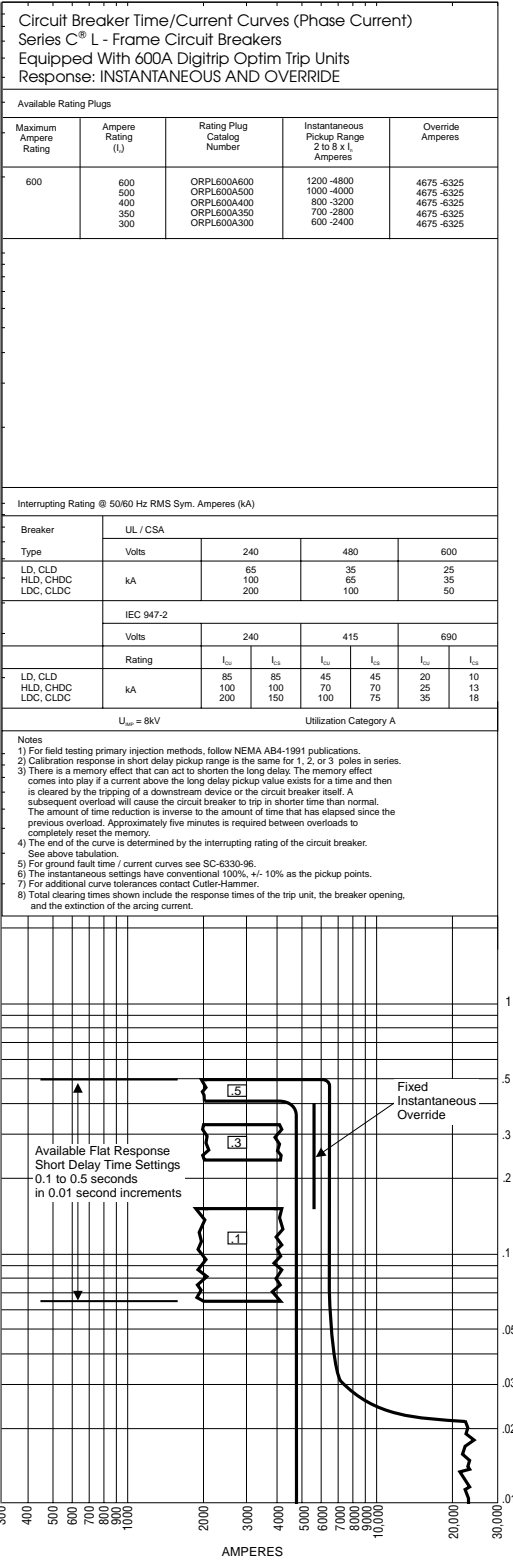
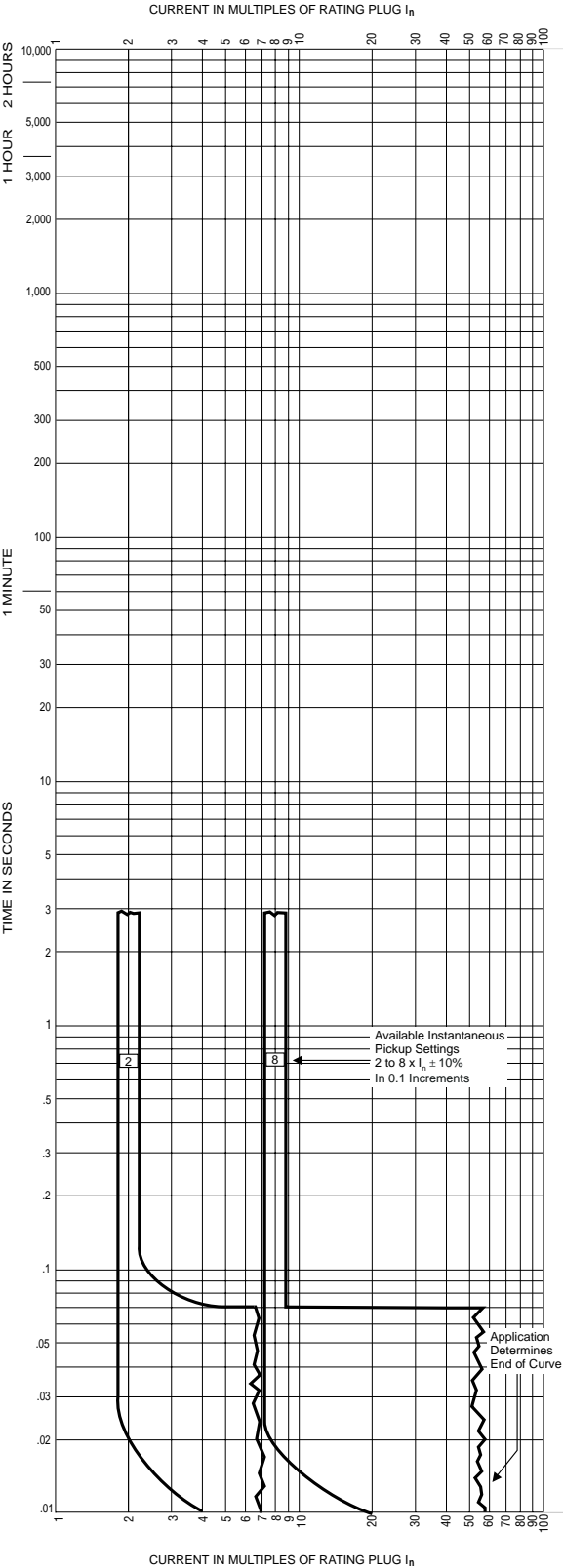
### L-Frame Circuit Breakers Equipped with Digitrip OPTIM Trip Units; Long Delay I<sup>t</sup>t, Short Delay Flat





AB DE-ION Circuit Breakers

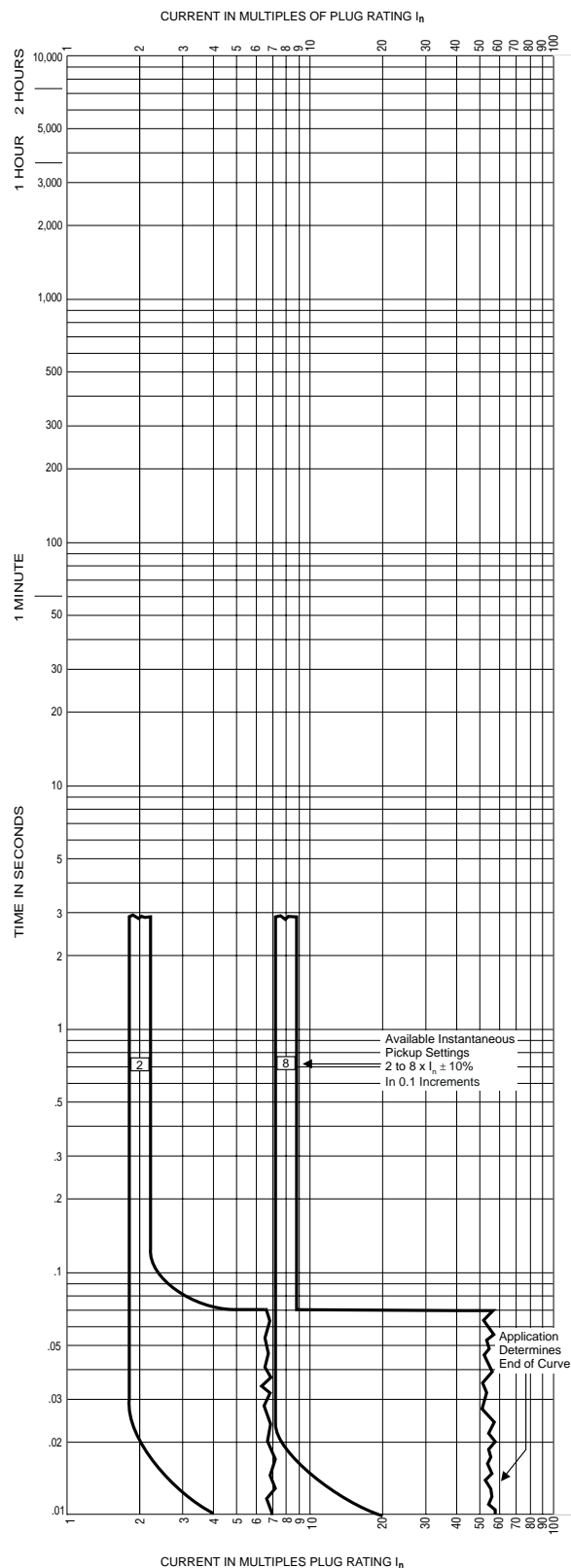
L-Frame Circuit Breakers Equipped with 600A Digitrip OPTIM Trip Units; Instantaneous and Override





## AB DE-ION Circuit Breakers

### L-Frame Circuit Breakers Equipped with 400A Digitrip OPTIM Trip Units; Instantaneous and Override



#### Circuit Breaker Time/Current Curves (Phase Current) Series C<sup>®</sup> L - Frame Circuit Breakers Equipped With 400A Digitrip Optim Trip Units Response: INSTANTANEOUS AND OVERRIDE

##### Available Rating Plugs

Maximum Ampere Rating	Ampere Rating (I <sub>n</sub> )	Rating Plug Catalog Number	Instantaneous Pickup Range 2 to 8 x I <sub>n</sub> Amperes	Override Amperes
400	400	ORPL400A400	800-3200	4080-5520
	350	ORPL400A350	700-2800	4080-5520
	300	ORPL400A300	600-2400	4080-5520
	250	ORPL400A250	500-2000	4080-5520
	225	ORPL400A225	450-1800	4080-5520
	200	ORPL400A200	400-1600	4080-5520

##### Interrupting Rating @ 50/60 Hz RMS Sym. Amperes (kA)

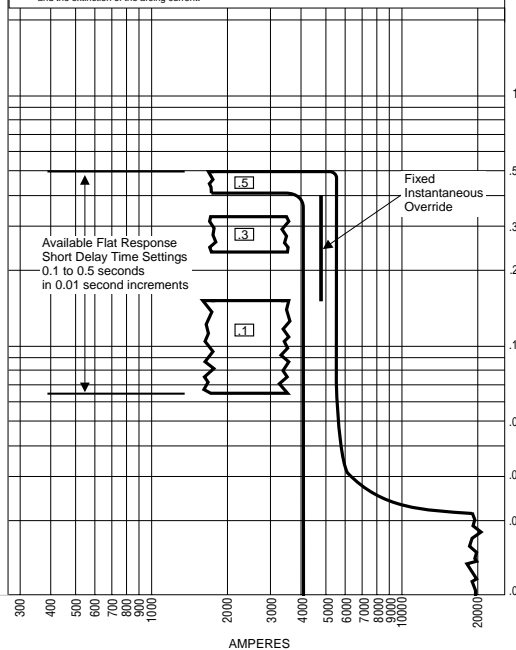
Breaker	UL / CSA				
Type	Volts	240	480	600	
LD, CLD		65	35	25	
HLD, CHDC	kA	100	65	35	
LDC, CLDC		200	100	50	
IEC 947-2					
	Volts	240	415	690	
	Rating	I <sub>ow</sub>	I <sub>cs</sub>	I <sub>ow</sub>	I <sub>cs</sub>
LD, CLD		85	85	45	45
HLD, CHDC	kA	100	100	70	70
LDC, CLDC		200	150	100	75
				35	18

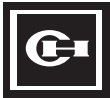
U<sub>me</sub> = 8kV

Utilization Category A

##### Notes

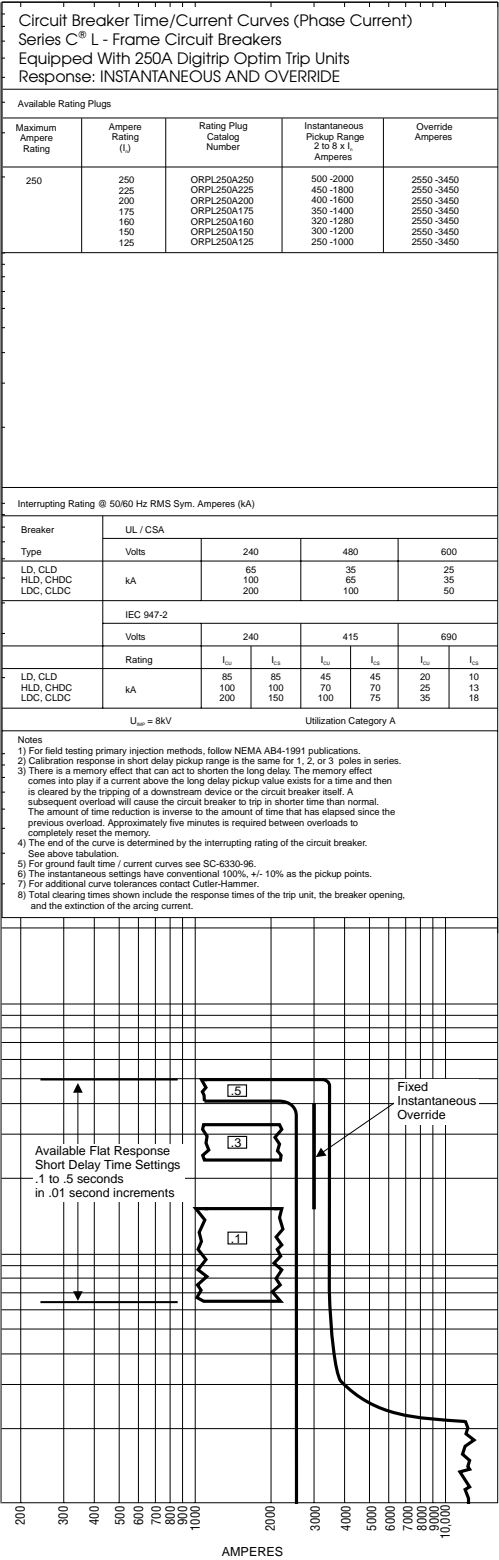
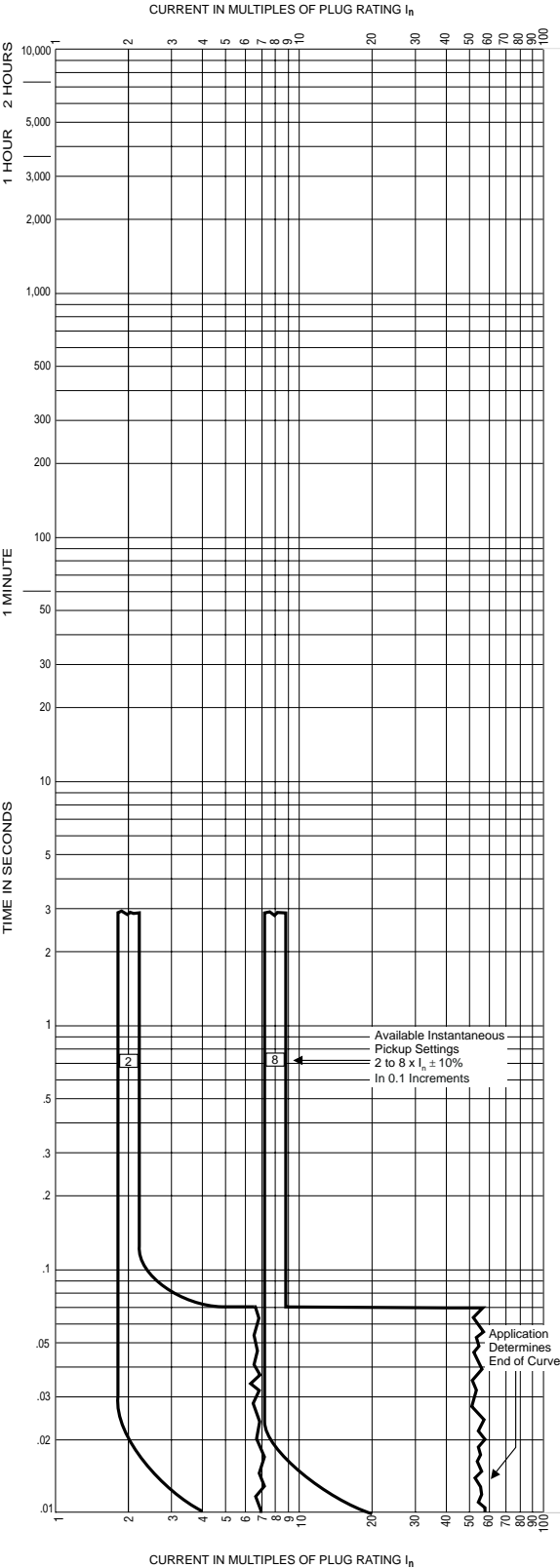
- 1) For field testing primary injection methods, follow NEMA AB4-1991 publications.
- 2) Calibration response in short delay pickup range is the same for 1, 2, or 3 poles in series.
- 3) There is a memory effect that can act to shorten the long delay. The memory effect comes into play if a current above 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.
- 4) The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.
- 5) For ground fault time / current curves see SC-6330-96.
- 6) The instantaneous settings have conventional 100%, +/- 10% as the pickup points.
- 7) For additional curve tolerances contact Cutler-Hammer.
- 8) Total clearing times shown include the response times of the trip unit, the breaker opening, and the extinction of the arcing current.





AB DE-ION Circuit Breakers

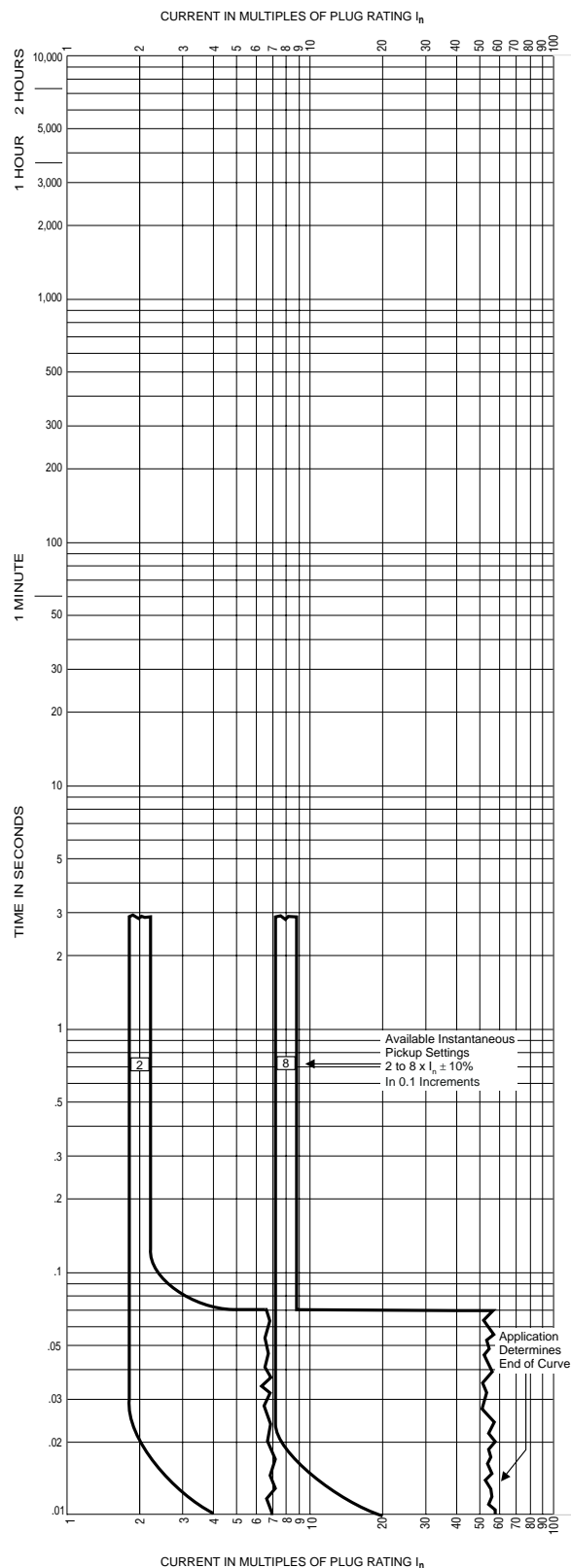
L-Frame Circuit Breakers Equipped with 250A Digitrip OPTIM Trip Units; Instantaneous and Override



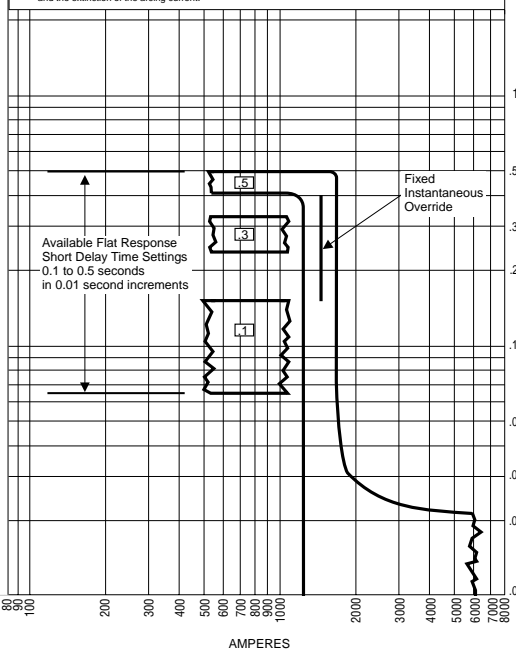


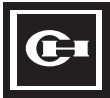
## AB DE-ION Circuit Breakers

### L-Frame Circuit Breakers Equipped with 125A Digitrip OPTIM Trip Units; Instantaneous and Override



Circuit Breaker Time/Current Curves (Phase Current) Series C® L - Frame Circuit Breakers Equipped With 125A Digitrip Optim Trip Units Response: INSTANTANEOUS AND OVERRIDE						
Available Rating Plugs						
Maximum Ampere Rating	Ampere Rating (I <sub>N</sub> )	Rating Plug Catalog Number	Instantaneous Pickup Range 2 to 8 x I <sub>N</sub> Amperes	Override Amperes		
125	125	ORPL125A125	250 - 1000	1275 - 1725		
	110	ORPL125A110	220 - 880	1275 - 1725		
	100	ORPL125A100	200 - 800	1275 - 1725		
	90	ORPL125A090	180 - 720	1275 - 1725		
	70	ORPL125A070	140 - 560	1275 - 1725		
Interrupting Rating @ 50/60 Hz RMS Sym. Amperes (kA)						
Breaker	UL / CSA					
Type	Volts	240	480	600		
LD, CLD	kA	65	35	25		
HLD, CHDC		100	65	35		
LDC, CLDC		200	100	50		
IEC 947-2						
Volts	240	415		690		
Rating	I <sub>cs</sub>	I <sub>cs</sub>	I <sub>cs</sub>	I <sub>cs</sub>		
LD, CLD	kA	85	45	20	10	
HLD, CHDC		100	70	25	13	
LDC, CLDC		200	150	75	35	18
U <sub>me</sub> = 8kV		Utilization Category A				
Notes						
1) For field testing primary injection methods, follow NEMA AB4-1991 publications.						
2) Calibration response in short delay pickup range is the same for 1, 2, or 3 poles in series.						
3) 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.						
4) The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.						
5) For ground fault time / current curves see SC-6330-96.						
6) The instantaneous settings have conventional 100%, +/- 10% as the pickup points.						
7) For additional curve tolerances contact Cutler-Hammer.						
8) Total clearing times shown include the response times of the trip unit, the breaker opening, and the extinction of the arcing current.						





**AB DE-ION Circuit Breakers**

**L-Frame Circuit Breakers Equipped with Digitrip OPTIM Trip Units; Ground Fault or Ground Fault Alarm Only**

