Westinghouse AB DE-ION®
Current Limiting Circuit Breakers

Time/Current Characteristic Curves for Westinghouse Current Limit-R® Circuit Breakers and Tri-Pac® Circuit Breakers

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Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167C.

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-4340-80A. Requests for full sets of curves will not be honored.
AB DE-ION Current Limit-R® Circuit Breakers
Type FCL, 15 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers
Casing Type FCL, Breakers, 2 and 3 Pole

Application and coordination curve based on 40°C and 80% cold start connected with four 40 feet of 90°C rated wire and tested in the open air.

Maximum Ac Volts
600 Volts

Breaker Rating

Frame
240/480 Volts
300,000,000

Interrupting Rating

Frame
240/480 Volts
300,000,000

Circuit Breaker Time/Current Curves

Current Limiting Threshold

Maximum Interrupting Time at 480 Volts Ac

Maximum Interrupting Time at 240 Volts Ac

Curve No. SC-4340-80A
May 1994
Type FCL, 20 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers

Catalog Type FCL Breakers, 2 and 3 Poles

Application and coordination curves based on 40°C ambient coil temp, interconnected with four 40 feet of 600V/3 cable and tested in the spot for with current in all poles.

Maximum Ac Volts
480, 60 Hertz

Breaker Rating
Continuous Rating: 20,000 Amperes
Trip Rating: 250, 1000 Amperes

Interrupting Rating

Frame: 240 Volts
FCL: 300,000

Minimum Total Clearing Time

Maximum Interrupting Time at 480 Volts A.C.
AB DE-ION Current Limit-R® Circuit Breakers
Type FCL, 25 Amperes, 2 and 3 Poles

Current Limiting Action

Maximum Total Clearing Time

Minimum Total Clearing Time

Current Limiting Threshold

Maximum Interrupting Time at 480 Volts Ac

Maximum Interrupting Time at 240 Volts Ac

Application Data
Page 4

Curve No. SC-4342-80A
May 1994
AB DE-ION Current Limit-R® Circuit Breakers

Type FCL, 30 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers
Catalog Type FCL Breakers, 2 and 3 Poles
Application and coordination curves based on AB C ambient and rated connected with four 1/2 feet of 60°C cable wire and tested in the circuit with current in all poles.

Maximum Ac Volts (60 Hz Ac)
Breaker Rating
Continuous Rating \( I_{c} \), Fixed Instantaneous \( I_{i} \) Amperes

Interrupting Rate (UL Listed)

Breaker Frame
Continuous RMS Amperes
FCL
285.000
300.000

Maximum Interrupting Time at 480 Volts Ac

Maximum Total Clearing Time

Minimum Total Clearing Time

Current Limiting Thresholds

Maximum Interrupting Time at 480 Volts Ac

May 1994

Curve No. SC-4343-80A
AB DE-ION Current Limit-R® Circuit Breakers
Type FCL, 35 Amperes, 2 and 3 Poles

Application Data
29-167C
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Curve No. SC-4344-80A
May 1994
Type FCL, 40 Amperes, 2 and 3 Poles

AB DE-ION Current Limit-R® Circuit Breakers

Circuit Breaker Time/Current Curves

Current Limit-RCircuit Breakers
Catalog Type FCL, Brokers, 2 and 3 Poles
Application and coordination curves based on 45°C ambient coil start, connected with four (4) feet of 60/75°C rated wire size and tested in the open air with current at all poles

Maximum Ac Volts
60/75°C rated wire size and tested in the open air

Interrupting Rating (UL Listed)
Breaker Symmetrical RMS Amperes
Frame 240 Volts AC
FCL 250, 400

Maximum Total Interrupting Time at 600 Volts Ac

Maximum Total Clearing Time

Current Limiting Threshold
AB DE-ION Current Limit-R® Circuit Breakers

Type FCL, 45 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers
Catalog Type FCL Breakers, 2 and 3 Poles
Application and coordination curves based on 40 °C ambient rated input, connected with fuse (4A) rated, 60°C-rated fuse, and tested in the field at rated current in all poles

Maximum Ac Volts

120/240/480, 60 Hertz

Breaker Rating
Continuous Rating
Symmetrical RMS Amperes
Frame
FCL
45 Amperes

Interrupting Rating (UL Listed)
Breaker
Symmetrical RMS Amperes
FCL
160,000
50,000

Maximum Interrupting Time at 480 Volts Ac

Maximum Total Clearing Time

Minimum Total Clearing Time

Current Limiting Threshold

Maximum Interrupting Time at 240 Volts Ac

Curve No. SC-4346-80A

May 1994

www.ElectricalPartManuals.com
AB DE-ION Current Limit-R® Circuit Breakers

Type FCL, 50 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers
Catalog Type FCL Breakers, 2 and 3 Poles
Application and coordination curves based on AC-Coise of gas which is released through holes of 366 x 75 x 228 mm in all cases and tested in the ISO orientation with current in all phases.

Maximum AC Volts
480 60 Hertz

Interrupting Rating [UL Listed]
Breaker Frame 240 Volts 480 Volts FCL
150,000 250,000

Current Limiting Threshold
Maximum Interrupting Time at 480 Volts AC

Maximum Interrupting Time at 240 Volts AC

May 1994

Curve No. SC-4347-80A

www.ElectricalPartManuals.com
AB DE-ION Current Limit-R® Circuit Breakers
Type FCL, 60 Amperes, 2 and 3 Poles

- Circuit Breaker Time/Current Curves

- Catalog Type FCL. Breakers, 2 and 3 Poles

- Application and coordination curves based on 40°C ambient, solid dielectric, correction factor four (4) and 50/60 Hz rated line frequency at nominal current in all phases.

- Maximum Ac Volts
- 480, 60 Hertz

- Breaker Rating
- Continuous (Ig) Fixed instantaneous
- 60 800-1300

- Interrupting Rating UL Listed
- Breaker Current Interrupting Amperes
- Frame 200 Volts 600 Volts
- FCL 200, 300

- Maximum Interrupting Time at 480 Volts Ac
- Maximum Interrupting Time at 240 Volts Ac

Curve No. SC-4348-80A
May 1994

www.ElectricalPartManuals.com
Type FCL, 70 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves
Current Limit-R Circuit Breakers

- Application and coordination curves based on 40°C ambient and 60°C conductor temperature.
- Five (5) feet of #12 AWG copper wire and 10 feet of #14 AWG copper wire.
- Maximum Ac Volts: 600, 60 Hertz.
- Breaker Rating: Continuous rating in Amperes, 70 - 800 or 1300.
- Interrupting Rating (UL Listed):
  - Symmetrical RMS Amperes: 400, 500, 600.

Maximum Ac Volts: 600, 60 Hertz.

Current Limiting Threshold

Maximum Interrupting Time at 480 Volts Ac

Maximum Interrupting Time at 240 Volts Ac

May 1994

Curve No. SC-4349-80A
AB DE-ION Current Limit-R® Circuit Breakers
Type FCL, 80 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves
Current Limit-R Circuit Breakers
Catalog Type FCL Breakers, 2 and 3 Poles

Application and coordination curves based on 45°C ambient
and conductor temperature loss during fault.

Maximum Air Volts
480, 60 Hertz

Breaker Rating
Continuous Rating
150, 100 Amperes
Symmetrical

Maximum Interrupting Time at 480 Volts Ac

Maximum Interrupting Time at 240 Volts Ac

Curve No. SC-4350-80A
May 1994
AB DE-ION Current Limit-R® Circuit Breakers

Type FCL, 90 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers

Current and interrupting curves based on 480, 60 Hz rated 240 volts AC service current with current in all poles.

Maximum Ac Volts 480, 60 Hertz

Interrupting Rating

Continuous Rating

150,000 Amperes

1,000 A, 200,000 A

Current Limiting Threshold

Maximum Interrupting Time at 480 Volts Ac

Maximum Interrupting Time at 240 Volts Ac

www.ElectricalPartManuals.com

May 1994

Curve No. SC-4351-80A
AB DE-ION Current Limit-R® Circuit Breakers
Type FCL, 100 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

- Maximum Total Clearing Time
- Minimum Total Clearing Time
- Current Limiting Threshold
- Maximum Interrupting Time at 480 Volts Ac
- Maximum Interrupting Time at 240 Volts Ac

Application and coordination curves based on 40°C ambient cold start, confirmed with four feet of 600/347/C-rated wire and tested in the open air.

- Maximum Ac Volts: 480, 60 Hertz
- Breaker Rating:
  - Continuous Rating: 100 Amperes
  - Interrupting Rating (UL Listed):
    - 200A, 250 Volts
    - 200A, 480 Volts

Curve No. SC-4352-80A
May 1994
AB DE-ION Current Limit-R® Circuit Breakers

Types LCL and LCLG, 125-250 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R Circuit Breakers
Catalog Type: LCL, LCLG Breakers, 2 and 3 Poles

Curve accurately applies to 0°C to +60°C ambient. For possible continuous ratings at higher or lower ambient temperatures refer to Bulletin 29-16.01.

Maximum Ac Volts
600, 50, 60

Rated Fun x Ampere Setting

Maximum Interrupting Rating (UL/CSA Listed)
Rated fun x Ampere Setting

Rating Plugs Available

Short Delay Pickup Settings

Threshold

Maximum Clearing Time at 600 Volts Ac

Maximum Clearing Time at 480 Volts Ac

Expanded View in Current Limiting Area

Current Limiting Threshold

Maximum Clearing Time at 690 Volts Ac

Maximum Clearing Time at 480 Volts Ac

May 1994
AB DE-ION Current Limit-R® Circuit Breakers
Types LCLA and LCLGA, 125-250 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves
Current Limit-R Circuit Breakers
Catalog Type: LCLA, LCLGA Breakers, 2 and 3 Poles
Curve accuracy applies from -20°C to +55°C ambient. For possible continuous ampere derating for ambient above +40°C refer to Cutler-Hammer.

Maximum Ac Volts
600-50/60Hz

Breaker Ratings
Continuous Amperes
125, 250
5X to 10X (10kA max) value with calibration settings as shown on curve (±10%)

Interrupting Rating (UL/CSA Listed)
Frame
LCLA, LCLGA
200,000
100,000

Rating Plugs Available
Continuous Amperes Range of Adjustment
250Amp Fixed 100%
250Amp 50-100%
175Amp 50-100%
175Amp Fixed 100%
125Amp 70-100%
125Amp Fixed 100%
200Amp 70-100%
200Amp Fixed 100%

1. When adjustable rating plugs are used short delay pickup settings track the selected position of the adjustable rating plug. For example, when adjustable rating plug in rating 250 Amp the short delay pickup is 250 X 50% X 5, the short delay pickup is 250 X 0.5 X 5 = 625 amperes.

2. The threshold point changes with the amperage value of the rating plug.

3. For ground fault time-current characteristics of LCLGA, see Curve No. SC-3906-86

Expanded View in Current Limiting Area

Current Limiting Threshold

Maximum Clearing Time at 600 Volts Ac
Maximum Clearing Time at 480 Volts Ac
Maximum Clearing Time at 240 Volts Ac

Curve No. SC-3625-81A
May 1994
Types LCL and LCLG, 200-400 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Current Limit-R® Circuit Breakers
Catalog Type LCL, LCLG Breakers, 2 and 3 Poles

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

Minimum Total Clearing Time

Maximum Total Clearing Time

When adjustable rating plugs are used, short delay pickup settings track the selected position of the adjustable rating plug. For example, with adjustable 400 amp rating plug set at 50% and the short delay pickup set at 4X, the short delay pickup is 400 X 50% X 4 = 8000 amps.

The threshold points change with the amperes value of the rating plug.

For ground fault time-current characteristics of LCLG, see Curve No. SC-3906-86

Expanded View in Current Limiting Area

Curve No. SC-3626-81A

May 1994
AB DE-ION Current Limit-R® Circuit Breakers
Type LCLA and LCLGA, 200-400 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves
Current Limit-R® Circuit Breakers
Catalog Type LCLA, LCLGA Breakers, 2 and 3 Poles

Breaker Ratings
Continuous Amperes Short Delay Pickup Settings
200-400 2X to 5X rating plug value
- With calibration settings as shown on curve (± 10%)

Interrupting Rating UL/CSA Listed
240 Volts 480 Volts 600 Volts LCLA, LCLGA
200,000 100,000 50,000

Rating Plugs Available
Continuous Amperes Range of Adjustment
400 Amps Fixed 100%
300 Amps 90-100%
250 Amps 70-100%
200 Amps Fixed 100%
150 Amps Fixed 100%
125 Amps Fixed 100%
100 Amps Fixed 100%
75 Amps Fixed 100%
50 Amps Fixed 100%

When adjustable rating plugs are used, short delay pickup settings track the selected position of the adjustable rating plug. For example, with an adjustable rating plug set at 50%, the short delay pickup set at 2X 200 amp rating plug at 200 X 50% X 2 = 100 amps.

The threshold point changes with the ampere value of the rating plug.

For ground fault time-current characteristics of LCLGA, see Curve No. SC-3906-86.

Maximum Clearing Times
Maximum Clearing Time at 600 Volts Ac
Maximum Clearing Time at 480 Volts Ac
Maximum Clearing Time at 240 Volts Ac

May 1994
Ground Fault Pick-up Curves for Types LCLG and LCLGA
AB DE-ION Tri-Pac® Circuit Breakers
Type FB, 15 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers
Catalog Type FB Circuit Breakers, 15 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts De
Application and coordination curves based on 40°C ambient cold start, connected with four feet of 60°C rated wire size and tested in open air with current in all poles.
Instantaneous Trip Limiting at 100 FBP06
Rating or Above with Instantaneous Trip Amperes

Interpolating Rating Table

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<th>Current (Amp)</th>
<th>Rating (KVA)</th>
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Note: Interpolating rating data based on NEMA procedures for verifying performance of molded case circuit breakers.

Curve No. SC-3572-76A
May 1994
AB DE-ION Tri Pac® Circuit Breakers

Type FB, 20 Amperes, 2 and 3 Poles

**Trip Times at 25°C**

- Maximum Single Pole
- Limit on FP50G

**Maximum**

- 10,000
- 5,000
- 3,000
- 2,000
- 1,000

**Single Pole**

- 500
- 200
- 100

**Catalog Type FB Circuit Breakers, 20 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts Dc**

Application and coordination curves based on 40°C ambient cool air, 180°F, connected without 10 ft. of 60°C, cold air at 40°C. Performance open air, 10 ft. of 60°C, connected at 20°C. Performance open air, 10 ft. of 60°C, connected at 20°C.

**Interrupting Rating**

- Symmetrical RMS Amperes
- Circuit Breaker

**Frame**

- 480 Volts
- 600 Volts
- 250 Volts

**Trip Test Data at 25°C**

- AB Tri-Pac
- 200,000
- 200,000
- 200,000

**Performance**

- Single pole test data at 25°C based on NEMA procedures for selecting performance of molded case circuit breakers.
AB DE-ION Tri-Pac® Circuit Breakers

Type FB, 30 Amperes, 2 and 3 Poles

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 400°C rated wire size and tested in open air with currents in all poles.

Instantaneous Trip Rating in Amperes ± 20% Breaker 1

Symmetrical RMS Amperes

240 Volts 480 Volts 600 Volts

125,000 200,000 300,000

1 Miniature breakers at 20°C based on NEMA procedures for verifying performance of molded case circuit breakers.

Curve No. SC-3574-76A

May 1994
AB DE-ION Tri Pac® Circuit Breakers

Type FB, 40 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers
Catalog Type FB Circuit Breakers, 40 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts Dc

Application data based on 49°C ambient and 60°C rated for four feet of 60°C rated wire and tested in open air with current in all poles.

Instantaneous Trip

Minimum Single Pole

Maximum Single Pole Trip Times at 29°C

Linear 100 Joules

Interrupting Rating (UL Listed)

Amperes Frame

600 Volts 600 Volts 250 Volts

200,000 200,000 10,000

Single (1) pole test data at 29°C based on NEMA procedures for verifying performance of molded case circuit breakers

May 1994
AB DE-ION Tri-Pac® Circuit Breakers
Type FB, 90 Amperes, 2 and 3 Poles
AB DE-ION Tri Pac® Circuit Breakers

Type FB, 100 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Catalog Type FB Circuit Breakers, 100 Amperes, 2 and 3 Poles, 250 Volts Ac Max., 250 Volts Dc. Application and coordination curves based on 40°C ambient cold plant, connected with four 4/0 feet of 60°C rated wire size 12/3 insulated in open air with current in all poles.

Interrupting Rating (UL Listed! Breaker

Symmetrical Load Amperes

10,000 -

Single Pole test data at 25°C based on NEMA procedures for verifying performance of molded case circuit breakers.

May 1994

Curve No. SC-3579-76A

www.ElectricalPartManuals.com
AB DE-ION Tri-Pac® Circuit Breakers
Type LA, 100 Amperes, 2 and 3 Poles

Catalog Type LA Circuit Breakers, 100 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts Dc.
Application and coordination curves based on 40°C ambient cold start, connected 4 feet of 75°C rated wire and tested in open air with current in all poles.

Interrupting Ratings (UL Listed)
Tri-Pac Circuit Breakers

Instantaneous Trip Rating in Amperes
Instantaneous Trip Rating in Amperes

Symmetrical RMS Amperes

De Amperes Frame

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<tr>
<th>Breaker Type</th>
<th>Volts</th>
<th>480 Volts</th>
<th>600 Volts</th>
<th>250 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA-100</td>
<td>100,000</td>
<td>200,000</td>
<td>200,000</td>
<td>200,000</td>
</tr>
</tbody>
</table>

Single pole test data at 25°C based on NEMA procedures for verifying performance of molded case circuit breakers.

Curve No. SC-3582-76A
May 1994
AB DE-ION Tri Pac® Circuit Breakers

Type LA, 125 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers

Catalog Type LA Circuit Breakers, 125 Amperes, 2 and 3 Poles

600 Volts Ac Max., 250 Volts De

Application and coordination curves based on 40°C ambient cold start, connected with four #2 AWG wire size and tested in open air with current in all poles.

Maximum Single Pole Trip Times at 25°C

Interrupting Rating (UL Listed)

Breaker Frame

240 Volts 480 Volts 600 Volts 250 Volts

Tri-Pac

200,000 200,000 200,000 10,000

Single pole test data at 25°C based on NEMA procedures for verifying performance of molded case circuit breakers.

May 1994

Curve No. SC-3583-76A
AB DE-ION Tri-Pac® Circuit Breakers

Type LA, 150 Amperes, 2 and 3 Poles

Application and coordination curves based on NEMA procedures for verifying performance of molded case circuit breakers.
Type LA, 175 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

AB DE-ION Tri Pac® Circuit Breakers

Catalog Type LA Circuit Breakers, 175 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts De.

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire size and tested in open air with currents in all poles.

Instantaneous Trip: Trip Times at 29°C.

Current in Amperes

May 1994

Curve No. SC-3585-76A

www.ElectricalPartManuals.com
AB DE-ION Tri-Pac® Circuit Breakers
Type LA, 200 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves
Tri-Pac Circuit Breakers
Catalog Type LA Circuit Breakers, 200 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts De
Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire size and tested in open air with current in all poles.
Instantaneous Trip rating in Amperes for automatic instantaneous Trip Amperes
250
500
750
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
9500
10000

Current Limiting Rating (Low-Voltage) Breakers
<table>
<thead>
<tr>
<th>AC Amps</th>
<th>DC Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 Volts</td>
<td>500 Volts</td>
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<tr>
<td>2400</td>
<td>5000</td>
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<tr>
<td>3000</td>
<td>6500</td>
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<tr>
<td>4000</td>
<td>10000</td>
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</table>

Single-Phase data at 25°C based on NEMA procedures for verifying performance of molded case circuit breakers.

Curve No. SC-3586-76A
May 1994
Type LA, 225 Amperes, 2 and 3 Poles

AB DE-ION Tri Pac® Circuit Breakers

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 25°C rated wire size and tested in open air with current in all poles.

Instantaneous Trip Adjustable Instantaneous Trip Amperes

Interpolating Rating (UL Listed)

Single-pole resistors at 20°C based on NEMA procedures for verifying performance of molded case circuit breakers.

May 1994

Curve No. SC-3587-76A
AB DE-ION Tri-Pac® Circuit Breakers

Type LA, 250 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Catalog Type LA Circuit Breakers, 250 Amperes, 2 and 3 Poles

Application and coordination curves based on 40°C ambient, cold start, connected with four (4) feet of 75°C rated wire size and tested in open air with current in all poles.

Instantaneous Trip

Rating in Amperes

Interrupting Rating (UL Listed)

Table 1:

<table>
<thead>
<tr>
<th>Current in Amperes</th>
<th>Interrupting Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LA Tri-Pac, 200,000</td>
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</table>

Table 2:

<table>
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<tr>
<th>Current in Amperes</th>
<th>Interrupting Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LA Tri-Pac, 200,000</td>
</tr>
</tbody>
</table>

Note: Trip data at 25°C based on NEMA procedures for verifying performance of molded case circuit breakers.

Curve No. SC-3588-76A

May 1994
AB DE-ION Tri Pac® Circuit Breakers

Type LA, 300 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Maximum

Minimum

Maximum Single Pole Trip Times at 25°C

Tri-Pac Circuit Breakers
Catalog Type LA Circuit Breakers, 300 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts De

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire and tested in open air with current in all poles.

Instantaneous Trip Rating
Adjustable Instantaneous Trip Amperes

Interrupting Rating UL Listed

Single pole test data at 25°C based on NEMA procedures for verifying performance of molded case circuit breakers.

Curve No. SC-3589-76A

May 1994
AB DE-ION Tri-Pac® Circuit Breakers
Type LA, 350 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

<table>
<thead>
<tr>
<th>Current (Amperes)</th>
<th>Time (Seconds)</th>
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</thead>
<tbody>
<tr>
<td>200</td>
<td>0.1</td>
</tr>
<tr>
<td>400</td>
<td>0.2</td>
</tr>
<tr>
<td>600</td>
<td>0.4</td>
</tr>
<tr>
<td>800</td>
<td>1.0</td>
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</tbody>
</table>

Maximum Single Pole Trip Times at 25°C

Minimum

Maximum

Application and construction curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire size and tested in open air with current in all poles.

Instantaneous Trip Rating in Amperes Adjustable Instantaneous Trip Amperes

<table>
<thead>
<tr>
<th>Frame</th>
<th>240 V</th>
<th>480 V</th>
<th>600 V</th>
<th>250 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA</td>
<td>150</td>
<td>300</td>
<td>600</td>
<td>150</td>
</tr>
</tbody>
</table>

Symmetric RMS Amperes = Measured Amperes

LA Tri-Pac 200,000 200,000 200,000 10,000

Tri-Pac Circuit Breakers
Catalog Type LA Circuit Breakers, 350 Amperes, 2 and 3 Poles, 600 Volts Ac Max., 250 Volts DC.

www.ElectricalPartManuals.com

May 1994
AB DE-ION Tri Pac® Circuit Breakers

Type LA, 400 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Curve No. SC-3591-76A

ElectricalPartManuals.com
AB DE-ION Tri-Pac® Circuit Breakers
Type NB, 300 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Maximum Single Pole Trip Times at 25°C

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire size and tested in open air with current in all poles.

Instantaneous Trip Rating in Amperes Adjustable Instantaneous Trip Amperes

For single pole tests use dummy fuses or bypass the Tri-Pac fuses; otherwise, results may not agree with curve.
AB DE-ION Tri-Pac® Circuit Breakers
Type NB, 400 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Curve No. SC-3594-768
May 1994

Eaton ElectricalPartManuals.com
Type NB, 500 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Maximum Single Pole Trip Times at 25°C

Maximum

Minimum

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire size and tested in open air with current in all poles.

May 1994
AB DE-ION Tri-Pac® Circuit Breakers
Type NB, 600 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves
Tri-Pac Circuit Breakers
Catalog Type NB Circuit Breakers, 600 Amperes, 2 and 3 Poles, 600V/600A Max.
Application and coordination curves based on 40°C ambient cold start, connected with four 4/0 feet of 75°C rated wire bare and tested in open air with current in all poles.
Interrupting Current: 12 000 A
For single pole tests use dummy fuses or bypass the Tri-Pac fuse terminal; results may not agree with curve.
AB DE-ION Tri Pac® Circuit Breakers

Type NB, 700 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers
Catalog Type NB Circuit Breakers, 700 Amperes, 2 and 3 Poles, 600 Volts Ac Max.
Application and coordination curves based on 60°C ambient cold start, connected with four (4) feet of 75°C rated wire and tested in open air with current in all poles.

Maximum Single Pole Trip Times at 25°C

Interrupting Rating (UL Listed)

<table>
<thead>
<tr>
<th>Frame</th>
<th>Breaker</th>
<th>Commercial RMS Amperes</th>
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</thead>
<tbody>
<tr>
<td>200</td>
<td>200/200</td>
<td>200/200</td>
</tr>
<tr>
<td>300/300</td>
<td>300/300</td>
<td>300/300</td>
</tr>
</tbody>
</table>

For single pole tests use dummy fuses or bypass the Tri-Pac fuses; otherwise, results may not agree with curve.
AB DE-ION Tri-Pac® Circuit Breakers
Type NB, 800 Amperes, 2 and 3 Poles

Currents in Amps

Maximum

Minimum

Maximum Single Pole Trips at 50°C

Limiter 800 NB 200

Interrupting Rating (UL Listed)

<table>
<thead>
<tr>
<th>Breaker</th>
<th>800 Amp</th>
<th>800 Amp</th>
<th>800 Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB Tn-Pac</td>
<td>200,000</td>
<td>200,000</td>
<td>200,000</td>
</tr>
</tbody>
</table>

For single pole tests use fuses or bypass the Tn-Pac fuses; otherwise, results may not agree with curve.

Curve No. SC-3598-76B
May 1994
Type PB, 600 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers

Catalog Type PB Circuit Breakers, 600 Amperes, 2 and 3 Poles, 600 Volts AC Max.

Application and coordinate curves based on 40°C ambient air and connected with four 1/4 feet of 75°C rated wire and tested in open air with current in all poles.

For single pole tests use dummy fuses or bypass the Tri Pac fuses; otherwise, results may not agree with curve.

May 1994

Curve No. SC-3599-768

www.ElectricalPartManuals.com
AB DE-ION Tri-Pac® Circuit Breakers
Type PB, 800 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers
Catalog Type PB Circuit Breakers, 800 Amperes, 2 and 3 Poles, 600 Volts Ac Max.

Application and coordination curves based on 35°C ambient conditions, connected with four 1/4” net of 75°C rated wire size 52858 plugged into quarter with current in all poles.

Interrupting Rating (UL Listed)

Frame
Symmetrical RMS Amperes
300/600 Volts
600/1200
1200/2400
2400/4800
PB 1200 600 300 100 80

For single pole tests use dummy fused or bypass the Tri-Pac fuse otherwise, results of no significance without fuse.

Curve No. SC-3600-76B
May 1994
Type PB, 1000 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers
Catalog Type PB Circuit Breakers, 1000 Amperes, 2 and 3 Poles, 600 Volts, Ac Max
Application and coordination curves based on 40°C ambient cold start. Connected with four (4) feet of 75°C rated wire size and tested open air with current in all poles.

Instantaneous Trip
Rating in Amperes - Adjustable instantaneous Trip Amperes
1600-0020

Interrupting Rating (UL Listed)

- symmetrical RMS Amperes
- symmetrical RMS Amperes
- symmetrical RMS Amperes
- symmetrical RMS Amperes
- symmetrical RMS Amperes

For single pole tests use dummy fuses or bypass the Tri-Pac fuses, otherwise, results may not agree with curve.

May 1994

Curve No. SC-3601-76B

www.ElectricalPartManuals.com
AB DE-ION Tri-Pac® Circuit Breakers
Type PB, 1200 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Application Data
29-167C
Page 50

May 1994
Curve No. SC-3602-76B
www.ElectricalPartManuals.com
AB DE-ION Tri Pac® Circuit Breakers

Type PB, 1400 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Maximum Single Pole Trip Times at 25°C

CURRENT IN AMPERES

Maximum

Minimum

Limiter 600 PBR30

CURRENT IN AMPERES

Time/Current Curves

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers

Catalog Type PB Circuit Breakers, 1400 Amperes, 2 and 3 Poles, 600 Volts, AC Max.

Application and coordination curves based on 40°C ambient cold start connected with four 16 feet of 75°C rated wire size and tested in open air with current in all poles.

Adjustable Instantaneous Trip Amperes

For single pole tests use dummy fuses or bypass the Tri-Pac fuses, otherwise results may not agree with curve.
AB DE-ION Tri-Pac® Circuit Breakers
Type PB, 1600 Amperes, 2 and 3 Poles

Circuit Breaker Time/Current Curves

Tri-Pac Circuit Breakers
Catalog Type PB Circuit Breakers, 1600 Amperes, 2 and 3 Poles, 600 Volts Ac Max.

Application and coordination curves based on 40°C ambient cold start, connected with four (4) feet of 75°C rated wire and tested in air with current in all poles.

Instantaneous Trip
Rating 10 Amperes Adjustable Instantaneous Trip Amperes

Interrupting Rating (UL Listed)
Symmetrical RMS Amperes
Frame
600 Volts
300 Volts
240 Volts

NOTE: Tests are made with use dummy fuses or bypass the Tri-Pac fuses. Results may not agree with curves.

May 1994
Curve No. SC-3604-76B
AB DE-ION Circuit Breakers

Types ED, EDH and EDC

Curve No. SC-5805-94
August 1994

Cutler-Hammer
Westinghouse & Cutler-Hammer Products
Five Parkway Center
Pittsburgh, Pennsylvania, U.S.A. 15220

Application Data
Page 53

New Information
Mailed to: E/29-100A
Cutler-Hammer
Westinghouse &
Cutler-Hammer Products
Five Parkway Center
Pittsburgh, Pennsylvania, U.S.A. 15220

May 1994
Supersedes Application Data 29-161A,
pages 5-6, dated December 1988
Mailed to: E/29-100A

Time/Current Characteristic Curves for
Westinghouse Series C® G-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.

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types GB, GHB, GC, GHC 15-100 Amperes, 1 Pole</td>
<td>SC-3500-83B</td>
<td>2</td>
</tr>
<tr>
<td>Types GB, GHB, GC, GHC 15-100 Amperes, 2, 3 Poles</td>
<td>SC-3501-83B</td>
<td>3</td>
</tr>
<tr>
<td>Type GHBS 15 and 20 Amperes, 1 Pole</td>
<td>SC-5695-93A</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional copies of this application data may be ordered from the Westinghouse Printing
Division, Trafford, PA 15085. Order Application Data 29-167G.

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-3500-83B. Requests for full sets of curves will not be honored.
AB DE-ION Circuit Breakers
Types GB, GHB, GC, GHC 15-100 Amperes, 1 Pole

Circuit Breaker Time/Current Curves

For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with four (4) feet of rated wire (60/75°C) per terminal. Tested in open air with current in all phases.

Maximum Volts
- Breaking Ratings
  - GB, GC
  - GHB, GHC

Interrupting Rating UL Listed
- Breaking Ratings
  - GB, GC: 0.05 kA, 0.06 kA
  - GHB, GHC: 0.05 kA, 0.06 kA

Current in Percent of Breaker Trip Unit Rating

Curve No. SC-3500-83B
May 1994
Types GB, GHB, GC, GHC 15-100 Amperes, 2 and 3 Poles

G-Frame Circuit Breakers
Catalog Types GB, GC. 15-100 Amperes, 2 and 3 Poles, 240 Volts Ac Max.
Catalog Types GHB, GHC. 15-100 Amperes, 2 and 3 Poles, 277/480 Volts Ac Max.
For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with four (4) feet of rated wire (60/75°C) per terminal. Tested in open air with current in all poles.

Maximum Volts Breaker | Ac Volts > 60Hz
GB, GC
Type 240 Volts 277/480 Volts—See Curve

Current in Percent of Breaker Trip Unit Rating

May 1994
Curve No. SC-3501-838
AB DE-ION Circuit Breakers
Type GHBS 15 and 20 Amperes, 1 Pole

Circuit Breaker Time/Current Curves

G-Frame Circuit Breakers

Casting Type GHBS Solenoid Operated Circuit Breakers, 15 and 20 Amps, 1 Pole.

For application and coordination purposes only. Based on 40°C ambient air. Connected with four (4) feet of lead wire (60°C) for 15 amp and 100°C for 20 amp per terminal. Tested in open air with current in all poles.

Maximum Ac Volts: 277 at 60 Hz

Breaker Rating

Continuous Ampere

15, 20

Interrupting Rating (UL Listed)

Symmetrical RMS Ampere

120 volts

277 volts

GHBS

64,000

1,000,000

A Single (1) pole test data at 20°C based on NEMA Procedures for verifying performance of molded case circuit breakers.

Maximum Trip Times at 20°C

Maximum Interrupting Time

End of Curve (See Above)

Curve No. SC-5695-93A

May 1994
Time/Current Characteristic Curves for

Westinghouse Series C® J-Frame
Circuit Breakers

Breaker Description | Curve No. | Page
--- | --- | ---
Series C Types JDB, JD, HJD Equipped With Type JT Thermal-Magnetic Trip Unit | SC-4247-87B | 2
Series C Types JDC Equipped With Type JT Thermal-Magnetic Trip Unit | SC-4248-87B | 3

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167J.

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-4547-87B. Requests for full sets of curves will not be honored.
AB DE-ION Circuit Breakers
Series C Types JDB, JD, HJD Equipped With Type JT Thermal-Magnetic Trip Unit

Circuit Breaker Time/Current Curves
Series C* J-Frame Circuit Breakers
Equipped with Type JT Thermal-Magnetic Trip Unit

Circuit Breaker Time/Current Curves
Series C* J-Frame Circuit Breakers
Equipped with Type JT Thermal-Magnetic Trip Unit

Note: For additional information on the trip unit, see IL 29C600 and NEMA Publication 40-C for verifying performance of molded case circuit breakers.
Series C Type JDC Equipped With Type JT Thermal-Magnetic Trip Unit

Circuit Breaker Time/Current Curves

Series C® J-Frame Circuit Breakers

Catalog Type JDC Circuit Breakers, 2, 3 and 4 Poles

For application and coordination purposes only. Thermal calibration based on 40°C ambient, cold start. Connected with four (4) feet of rated wire on single-pole tests.

Maximum Voltage
400 V. Ac. 60/50 Hz.

Rated Amperes (Ij)
Continuous Trip Amperes (See Figure Below)
10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 125, 150, 175, 200, 225, 250

Interrupting Rating

Note:
- For additional information on this unit, see AD 29-166.
- For P, ratio, and threshold values, see AD 29-166.
- Single pole trip delay is based on Type JT trip unit.

Typical Trip Unit Nameplate:

Adjustable Magnetic Trip

Maximum Interrupting Time
600 V. Ac.

140 kA, 48 kA

Eaton

Curve No. SC-4248-878

May 1994

www.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Time/Current Characteristic Curves for Westinghouse Series C® Types HMC, GMCP 63 Amperes and HMCP 150, 250, 400 and 600 Amperes Motor Circuit Protectors

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series C Type GMCP Motor Circuit Protector 63 Amperes</td>
<td>SC-5670-93</td>
<td>2</td>
</tr>
<tr>
<td>Series C Type HMC Motor Circuit Protector 150 Amperes</td>
<td>SC-4121-87B</td>
<td>3</td>
</tr>
<tr>
<td>Series C Type HMC Motor Circuit Protector 250 Amperes</td>
<td>SC-4419-88B</td>
<td>4</td>
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<tr>
<td>Series C Type HMC Motor Circuit Protector 400 Amperes</td>
<td>SC-4420-88B</td>
<td>5</td>
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<tr>
<td>Series C Type HMC Motor Circuit Protector 600 Amperes</td>
<td>SC-5373-93A</td>
<td>6</td>
</tr>
</tbody>
</table>

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167H.

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-5670-93. Requests for full sets of curves will not be honored.
Motor Circuit Protector
Type GMCP Motor Circuit Protector 63 Amperes

Motor Circuit Protector Time/Current Curve
3-Pole, 63 A, 480Y/277V

<table>
<thead>
<tr>
<th>GMCP Number</th>
<th>Setting Range</th>
</tr>
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<tbody>
<tr>
<td>GMCP003AOC</td>
<td>5 - 20 A</td>
</tr>
<tr>
<td>GMCP005BCC</td>
<td>25 - 50 A</td>
</tr>
<tr>
<td>GMCP010BCC</td>
<td>75 - 150 A</td>
</tr>
<tr>
<td>GMCP015BCC</td>
<td>150 - 300 A</td>
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<tr>
<td>GMCP020K2C</td>
<td>250 - 600 A</td>
</tr>
<tr>
<td>GMCP030H1C</td>
<td>300 - 630 A</td>
</tr>
<tr>
<td>GMCP050K2C</td>
<td>320 - 630 A</td>
</tr>
</tbody>
</table>

Maximum GMCP Interrupting Time

Curve No. SC-5670-93
May 1994
Type HMCP Motor Circuit Protector 150 Amperes

Motor Circuit Protector

Motor Circuit Protector Time/Current Curves
Series C - Type HMCP, 2 and 3 Poles

Maximum Voltage
600V. Ac (50160 Hz)
250 V. De

Maximum Current
3-150A

Application Data
29-167H
Page 3

Curve No. SC-4121-878

May 1994

www.ElectricalPartManuals.com
Motor Circuit Protector
Type HMCP Motor Circuit Protector 250 Amperes

Motor Circuit Protector Time/Current Curves
Series C - Type HMCP, 2 and 3 Poles

Maximum Voltage
600 V, 345 V AC

Maximum Current
250 A

Catalog Number
Instantaneous Pick-Up Setting
(Amperes)

3-Pole 2-Pole
HMCP250A5 1125 1455 1785 2115 2445 2775 3105 3435 3765 4095 4425 4755 5085 5415 5745 6075 6405 6735 7065 7395 7725 8055 8385 8715 9045 9375 9705 10035
HMCP250B5 1125 1375 1625 1875 2125 2375 2625 2875 3125 3375 3625 3875 4125 4375 4625 4875 5125 5375 5625 5875 6125 6375 6625 6875 7125 7375 7625 7875 8125 8375 8625 8875 9125 9375 9625 9875
HMCP250C5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6225 6375
HMCP250D5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250E5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250F5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250G5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250H5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250I5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250J5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250K5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250L5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275
HMCP250W5 1125 1275 1425 1575 1725 1875 2025 2175 2325 2475 2625 2775 2925 3075 3225 3375 3525 3675 3825 3975 4125 4275 4425 4575 4725 4875 5025 5175 5325 5475 5625 5775 5925 6075 6275

Note: Motor circuit protectors are for use only in applications where control is required.
For DC applications, pick-up settings are approximately 40% higher.

Typical Trip Unit Nameplate

Individual Pole Adjustments

Maximum Interrupting Time

For Interrupting Ratings, See Note Above.

Curve No. SC-4419-88B
May 1994

www.ElectricalPartManuals.com
Type HMCP Motor Circuit Protector 400 Amperes

Motor Circuit Protector Time/Current Curves
Series C—Type HMCP, 2 and 3 Poles

<table>
<thead>
<tr>
<th>Maximum Voltage (V, Ac 250V, 60Hz)</th>
<th>Maximum Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Pole</td>
<td></td>
</tr>
<tr>
<td>HMCP400D5S5</td>
<td>HMCP400F5S5</td>
</tr>
<tr>
<td>HMCP400E5S5</td>
<td>HMCP400G5S5</td>
</tr>
<tr>
<td>HMCP400H5S5</td>
<td>HMCP400J5S5</td>
</tr>
<tr>
<td>HMCP400I5S5</td>
<td>HMCP400K5S5</td>
</tr>
</tbody>
</table>

| 3 Pole                             |                    |
| HMCP400D5S5 | HMCP400F5S5 | 875 | 935 | 1000 |
| HMCP400E5S5 | HMCP400G5S5 | 750 | 810 | 875 | 940 |
| HMCP400H5S5 | HMCP400J5S5 | 625 | 690 | 750 | 810 | 875 |
| HMCP400I5S5 | HMCP400K5S5 | 500 | 565 | 625 | 690 | 750 | 810 | 875 |

Note: Motor circuit protectors are for use only in combination with line starters.
For trip settings, specify settings in each pole.}

Maximum Interrupting Time

For Interrupting Ratings, See Note Above.
Motor Circuit Protector
Type HMCP Motor Circuit Protector 600 Amperes

Motor Circuit Protector Time/Current Curves

<table>
<thead>
<tr>
<th>Current in Amperes</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Motor circuit protectors are for use only in combination controllers.

Typical Trip Unit Nameplate

- Adjustable Trip Settings: A - H
- Scale X 1000 = Current in Amperes
- Fixed Instantaneous Override @ 8000 A + 15%
- For Interrupting Ratings, see Note Above.

Curve No. SC-5373-93A

May 1994
Motor Circuit Protector
Cutler-Hammer
Westinghouse &
Cutler-Hammer Products
Five Parkway Center
Pittsburgh, Pennsylvania, U.S.A. 15220

May 1994
Mailed to: E/29-100A

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

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series C Type DK Circuit Breakers ............................................</td>
<td>SC-4117-87B</td>
<td>2</td>
</tr>
<tr>
<td>Series C Types KDB, KD, HKD Circuit Breakers Equipped with Type KT Thermal-Magnetic Trip Unit ..................</td>
<td>SC-4118-87B</td>
<td>3</td>
</tr>
<tr>
<td>Series C Type KDC Circuit Breakers Equipped with Type KT Thermal-Magnetic Trip Unit ..................................</td>
<td>SC-4119-87B</td>
<td>4</td>
</tr>
<tr>
<td>Series C Types KD, CKD, HKD, CHKD Circuit Breakers Equipped with Type KES Digitrip RMS 310 Trip Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types KES3400LS, KES3400LSG ..................................................</td>
<td>SC-5638-93</td>
<td>5</td>
</tr>
<tr>
<td>Types KES3400LSi, KES3400LSiG .................................................</td>
<td>SC-5639-93</td>
<td>6</td>
</tr>
<tr>
<td>Types KES3250LS, KES3250LSG .................................................</td>
<td>SC-5640-93</td>
<td>7</td>
</tr>
<tr>
<td>Types KES3250LSi, KES3250LSiG .................................................</td>
<td>SC-5641-93</td>
<td>8</td>
</tr>
<tr>
<td>Types KES3125LS, KES3125LSG .................................................</td>
<td>SC-5642-93</td>
<td>9</td>
</tr>
<tr>
<td>Types KES3125LSi, KES3125LSiG .................................................</td>
<td>SC-5643-93</td>
<td>10</td>
</tr>
<tr>
<td>Series C Type KDC Circuit Breakers Equipped with Type KES Digitrip RMS 310 Trip Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types KES3400LS, KES3400LSG ..................................................</td>
<td>SC-5644-93</td>
<td>11</td>
</tr>
<tr>
<td>Types KES3400LSi, KES3400LSiG .................................................</td>
<td>SC-5645-93</td>
<td>12</td>
</tr>
<tr>
<td>Types KES3250LS, KES3250LSG .................................................</td>
<td>SC-5646-93</td>
<td>13</td>
</tr>
<tr>
<td>Types KES3250LSi, KES3250LSiG .................................................</td>
<td>SC-5647-93</td>
<td>14</td>
</tr>
<tr>
<td>Types KES3125LS, KES3125LSG .................................................</td>
<td>SC-5648-93</td>
<td>15</td>
</tr>
<tr>
<td>Types KES3125LSi, KES3125LSiG .................................................</td>
<td>SC-5649-93</td>
<td>16</td>
</tr>
<tr>
<td>Ground Fault Protection (KES3400LSG, KES3400LSiG) ..................................</td>
<td>SC-5650-93</td>
<td>17</td>
</tr>
<tr>
<td>Ground Fault Protection (KES3250LSG, KES3250LSiG) ..................................</td>
<td>SC-5651-93</td>
<td>18</td>
</tr>
<tr>
<td>Ground Fault Protection (KES3125LSG, KES3125LSiG) ..................................</td>
<td>SC-5652-93</td>
<td>19</td>
</tr>
</tbody>
</table>

1. Use in conjunction with SC-5638-93, SC-5639-93, SC-5644-93, or SC-5645-93.
2. Use in conjunction with SC-5640-93, SC-5641-93, SC-5646-93, or SC-5647-93.
3. Use in conjunction with SC-5642-93, SC-5643-93, SC-5648-93, or SC-5649-93.

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167K.

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-4117-87B. **Requests for full sets of curves will not be honored.**
AB DE-ION Circuit Breakers
Type DK

Circuit Breaker Time/Current Curves
Series C K-Frame Circuit Breakers
Starting Type DK Thermal Magnetic
DC in Circuit Breakers: 250 VDC
2 and 3 Poles: 240 VDC for Max., 250 VDC for DC

For applications and coordination purposes only.
Rated AC Currents, solid line. Contaminant withstand four (4) feet of
rated arcs. 15% C personnel air. Tested in 90% air with current in
all phases. Interference curves based on 400 A single-phase tests.

Maximum Voltage
240V: AC, 480V: DC

Breaker Ratings
Rated Ampere (A): Instantaneous, Trip Act. Area
200: 50 to 100% of trip actuating rating
250: 100% (See Figure Below)
300: (DC values are approximately 40% higher)

Interrupting Rating
Ratings
Type Amps
CU @ 240V, DC
DK 45,000 10,000

Maximum Single Pole Trip Times at 25°C
(250-400A) Maximum Single Pole

Note: For additional information on heat unit and SC-4117-878
Typical Trip Unit Nameplate
Individual Pole Adjustments
Adjustable Magnetic Trip

Maximum Interrupting Time

Current No. SC 4117-878
May 1994
Types KDB, KD, HKD Equipped with Type KT Thermal-Magnetic Trip Unit

Circuit Breaker Time/Current Curves
Series C: K-Frame Circuit Breakers Equipped with Type KT Thermal-Magnetic Trip Unit

- Current in percent of breaker trip unit rating
- Maximum and minimum times at 25°C
- Maximum time at 129-225 A
- Maximum time at 120 A

Interruption Rating (UL/CSA)
- Rated 10 kA at 25°C
- Rated 6 kA at 75°C
- Rated 3 kA at 100°C

Breaker Rating
- Short-Time (ST) 100% of trip unit rating
- Continuous (CT) 80% of trip unit rating
- RMS Symmetrical Amperes (A)

Typical Trip Unit Nameplate
- Adjustments
- Indication of trip unit rating

Note: For additional information, refer to the manual.
AB DE-ION Circuit Breakers
Type KDC Equipped with Type KT Thermal-Magnetic Trip Unit

Circuit Breaker Time/Current Curves
Series C® K-Frame Circuit Breakers Equipped with Type KT Thermal-Magnetic Trip Unit
Catalog Type KDC Current Limiting Circuit Breakers, 2, 3 and 4 Poles

Maximum Voltage
600V, Ac 160 Hz
250 V, De

Interrupting Rating (UL/CSA)

Maximum Single Pole Trip Setting at 25°C

Typical Trip Unit Nameplate

Adjustable Magnetic Trip

Individual Pole Adjustments

Maximum Interrupting Time
600 V, Ac
240 V, Ac

Interrupting Rating Determines End of Curve

Curve No. SC-4119-87B
May 1994
Types KD, CKD, HKD, CHKD Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3400LS, KES3400LSG

Circuit Breaker Time/Current Curves (Phase Current)
Series C Y K Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Trip Units
Catalog Types KES3400LS, KES3400LSG

Available Rating Plugs

Current in Multiples of Rating Plug AMPERES

Standard Fixed Rating Plug

Long Delay Maximum Total Cleaning Time

Long Delay Minimum Total Cleaning Time

Clearing Time

Tolerance is 50%
AB DE-ION Circuit Breakers

Types KD, CKD, HKD, CKHD Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3400LSI, KES3400LSIG

Circuit Breaker Time/Current Curves (Phase Current)

Series C® K-Frame Circuit Breakers
Equipped With Type KES Digitrip RMS 310 Trip Units
Catalog Types KES3400LSI, KES3400LSIG Digitrip RMS 310 Units for use with Circuit Breaker Types KD, HKO, CKO, and CHKO, 400A max

Adjustable Short Delay Time

Available Rating Plugs

Interrupting Ratings - 50/60 Hz
RMS Sym. Amps (kA)

Interrupting Rating Determines
End of Curve
Types KD, CKD, HKD, CHKD Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3250LS, KES3250LSG

Circuit Breaker Time/Current Curves (Phase Current) -

Series C® K-Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Trip Units

Table: Intermittent Ratings - 50/60 Hz

<table>
<thead>
<tr>
<th>Apparent Power</th>
<th>Interrupting Rating (kA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 (MVA)</td>
<td>3000</td>
</tr>
<tr>
<td>1500 (MVA)</td>
<td>4500</td>
</tr>
<tr>
<td>2000 (MVA)</td>
<td>6000</td>
</tr>
</tbody>
</table>

Notes:
1. (2000 MVA RMS 3100A) is a test conducted in a test laboratory with circuit No. 6. For full rating using primary protection methods, refer to NEC, article 110-11.
2. For ground faulted circuits, refer to NEC, article 240-50.
3. Tests of the curves are determined by the interrupting ratings of the circuit breaker.
4. Curve end is determined when the arc length at 40°C increases to 50°C above 80°C, according to IEEE Standard SC 565-93.

May 1994
AB DE-ION Circuit Breakers
Types KD, CKD, HKD, CHKD Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3250LSI, KES3250LSIG

Circuit Breaker Time/Current Curves (Phase Current)

Standard Fixed
Rate Plug

Long Delay

Minimum Total
Closing Time

Long Delay

Maximum Total
Closing Time

AVAILABLE RATING PLUGS

CURRENT IN MULTIPLES OF RATING PLUG AMPERES

CURRENT IN AMPS

CURVE NO. SC-5641-93

MAY 1994

www.ElectricalPartManuals.com
Types KD, CKD, HKD, CHKD Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3125LS, KES3125LSG

Circuit Breaker Time/Current Curves (Phase Current)

Interrupting Ratings - 50/60Hz

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>UL/CSA</th>
<th>Breaker IEC 947-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>KD, CKD</td>
<td>480V</td>
<td>35 65</td>
</tr>
<tr>
<td>HKD, CHKD</td>
<td>415V</td>
<td>40 65</td>
</tr>
<tr>
<td></td>
<td>415V</td>
<td>40 65</td>
</tr>
</tbody>
</table>

Notes:
1. All curves are based on a single pole test circuit. The curves shown are based on zero 
2. Currents are shown at 65°C or 140°F and are based on a 3-hour test circuit. The curves shown are based on zero 
3. For ground fault time/current curve see SC-5652-93

May 1994
AB DE-ION Circuit Breakers

Types KD, CKD, HKD, CHKD Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3125LSI, KES3125LSIG

Circuit Breaker Time/Curent Curves (Phase Current):

Series C: K-Frame Circuit Breakers Equipped with Type KES Digitrip RMS 310 Trip Units
Catalog Types KES3125LSI, KES3125LSIG Digitrip RMS 310 Trip Units for use with Circuit Breaker Types KD, HKD, CKD, and CHKD. 125A. max.

Adjustable Short Delay Time

Typical Trip Unit Nameplate

Available Rating Plugs

<table>
<thead>
<tr>
<th>Amperes</th>
<th>Rating-C</th>
<th>Type</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1KES</td>
<td>Fixed</td>
<td>KES 225T</td>
<td>200-1000A</td>
</tr>
<tr>
<td>180</td>
<td>Fixed</td>
<td>KES 125T</td>
<td>200-1000A</td>
</tr>
<tr>
<td>150</td>
<td>Fixed</td>
<td>KES 100T</td>
<td>200-1000A</td>
</tr>
<tr>
<td>90</td>
<td>Fixed</td>
<td>KES 50</td>
<td>200-1000A</td>
</tr>
<tr>
<td>75</td>
<td>Adjustable</td>
<td>KES 3125LSI</td>
<td>100-1250A</td>
</tr>
</tbody>
</table>

Interruption Ratings - 50/60 Hz

RMS sym. Amperes (6A)

<table>
<thead>
<tr>
<th>Breaker</th>
<th>Type</th>
<th>Nameplate</th>
</tr>
</thead>
<tbody>
<tr>
<td>225V</td>
<td>KD, CKD</td>
<td>65</td>
</tr>
<tr>
<td>415V</td>
<td>HKD, CHKD</td>
<td>100</td>
</tr>
</tbody>
</table>

Attention

Digitrip RMS 310 trip units are suitable for full-time service in phase with use at Cat. No. 29-167K. For field testing using primary type 2 methods, see UL 489A revision A-8-1991.

There is a memory effect that can act as a protector's delay. The memory effect comes into play if a current passes the trip delay trip or value exists for a time and then is cleared by the tripping of a current-limiting device in the circuit breaker shall. A memory feature is intended to maintain the current-time characteristic to minimize time from occurrence to trip, should a fault occur. This is a feature of the breaker and not a function of the trip unit since the vehicle is isolated. Approximate five cycles is required between intervals to completely reset the breaker.

1. Curve and may appear as a C or C-C-s shaped. For possible continuous ampere derating, consult the breaker's manufacturer.

2. Per high fault current, the fixed instantaneous overload is provided at 4000A (tolerance 10%).

3. The time at which curve is determined by the interrupting rating of the circuit breaker. See section 6.8.3.

Curve No. SC-6663-93

May 1994
AB DE-ION Circuit Breakers
Type KDC Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3400LSI, KES3400LSIG

Circuit Breaker Time/Current Curves (Phase Current)
Series C K-Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Trip Units
Catalog Types KES3400LSI, KES3400LSIG. Digitrip RMS 310 Trip Units for use with Circuit Breaker Type KDC, 400A.

Adjustable Short Delay Time
Typical Trip Unit Nomenclature

Available Rating Plugs

<table>
<thead>
<tr>
<th>Ampere Rating (In)</th>
<th>Type</th>
<th>Catalog Number</th>
<th>Short Delay Pick-up Range Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>Fixed</td>
<td>4KES 400F</td>
<td>800-3200</td>
</tr>
<tr>
<td>350</td>
<td>Fixed</td>
<td>4KES 350F</td>
<td>700-2800</td>
</tr>
<tr>
<td>300</td>
<td>Fixed</td>
<td>4KES 300F</td>
<td>600-2400</td>
</tr>
<tr>
<td>250</td>
<td>Fixed</td>
<td>4KES 250F</td>
<td>500-2000</td>
</tr>
<tr>
<td>225</td>
<td>Fixed</td>
<td>4KES 225F</td>
<td>450-1800</td>
</tr>
<tr>
<td>200</td>
<td>Fixed</td>
<td>4KES 200F</td>
<td>400-1600</td>
</tr>
<tr>
<td>150, 200, 300, 400</td>
<td>Adjustable</td>
<td>4KES 200F</td>
<td>400-3200</td>
</tr>
<tr>
<td>150, 250, 300, 400</td>
<td>Adjustable</td>
<td>4KES 250F</td>
<td>500-3200</td>
</tr>
</tbody>
</table>

Interrupting Ratings - 50/60 Hz
RMS Sym. Amperes (MA)

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>UL/CSA</th>
<th>KDC 200</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDC 30V-3</td>
<td>150</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>KDC 45V</td>
<td>200</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Notes

1. Digitrip RMS 310 trip units are suitable for functional field testing with test kit Cat. No. STK2. For field testing using primary fault methods, refer to NEMA publication AB 4-1991.
2. There is a memory effect that acts to shorten the long delay. The memory effect comes into play if a fault occurs and the long delay pick-up value exists for a time and then is cleared by the clearing of a circuit switch or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inversely proportional to the amount of time that has elapsed since the previous overload. Approximately five minutes is required between overloads to completely reset the memory.
3. Curve accuracy applicable to -5°C to +55°C ambient. For possible continuous ampere derating for ambient above +40°C refer to Cutler-Hammer.
4. For high fault current levels a fixed instantaneous override is provided at 4000A (5% tolerance at 100A).
5. The maximum interrupting time is determined by the interrupting rating of the circuit breaker. See related ratings.
6. For ground fault currents, refer to curve SC-5650-93.
Type KDC Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3250LS, KES3250LSG

Circuit Breaker Time/Current Curves (Phase Current)

Series D® K-Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Trip Units

Catalog Types KES3250LS, KES3250LSG Digitrip RMS 310 Units for use with Circuit Breaker Type KDC, 250A. max.

<table>
<thead>
<tr>
<th>Available Rating Plugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>250 Fixed</td>
</tr>
<tr>
<td>225 Fixed</td>
</tr>
<tr>
<td>200 Fixed</td>
</tr>
<tr>
<td>175 Fixed</td>
</tr>
<tr>
<td>150 Fixed</td>
</tr>
<tr>
<td>125 Fixed</td>
</tr>
<tr>
<td>125 Adjustable</td>
</tr>
<tr>
<td>150 Adjustable</td>
</tr>
<tr>
<td>200 Adjustable</td>
</tr>
<tr>
<td>250 Adjustable</td>
</tr>
</tbody>
</table>

Interrupting Ratings - 50/60Hz

RMS Sym. Amperes (kA)

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>240V</th>
<th>480V</th>
<th>600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDC 250</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Notes:

1. 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 AB-4-1991.

2. For high fault current levels at fixed instantaneous, an override at 4000A (Tolerance ±15%) is provided.

3. There is a memory effect that can act to shorten the long delay. The memory effect occurs if the current is above the long delay pick up value exists for a time and then returns to the clearing of a down stream device or the circuit breaker itself. A subsequent current that causes the circuit breaker to trip in shorter time than normal. The amount of memory effect is inverse to the amount of time that has elapsed since the previous overload. Approximately 10 minutes is required between overloads to completely clear the memory.

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

5. The end of the curve is determined by the interrupting rating of the circuit breaker. See above table.

6. For ground fault/time/ampere curve see SC-5651-93.
AB DE-ION Circuit Breakers

Type KDC Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3250LSI, KES3250LSIG

Circuit Breaker Time/Current Curves (Phase Current) -

Series C / K-Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Units

Adjustable Short Delay Time

Typical Trip Unit Nameplate

Available Rating Plugs

| Capacity Type | Designation | Short Delay Time
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>250A</td>
<td>Type KES 250LSI</td>
<td>250ms</td>
</tr>
<tr>
<td>200A</td>
<td>Type KES 200LSI</td>
<td>200ms</td>
</tr>
<tr>
<td>150A</td>
<td>Type KES 150LSI</td>
<td>150ms</td>
</tr>
<tr>
<td>100A</td>
<td>Type KES 100LSI</td>
<td>100ms</td>
</tr>
</tbody>
</table>

Interrupting Ratings - 50/60 Hz

RMS Symmetrical (A)

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>240V</th>
<th>480V</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDC 200</td>
<td>200A</td>
<td>200A</td>
</tr>
</tbody>
</table>

Notes:

- Digitrip KES-310 trip units are available for use with Type KES fixed instantaneous trip units.
- The nominal rating of a circuit breaker is determined by the interrupting rating specified on the nameplate.
- There is a memory effect in addition to the long delay. The memory effect occurs after a fault, before the short delay pick-up value is reached. This effect can be eliminated by using the short delay of the circuit breaker itself. A separate short delay is required for faulted circuit breakers to trip in a time that is shorter than the nominal time of the circuit breaker.
- The amount of time that the circuit breaker can interrupt depends on the interrupting rating specified on the nameplate. The amount of time that the circuit breaker can interrupt is limited by the memory effect.
- For ground fault curves, see SC-5651-93.

Curve No. SC-5647-93

May 1994
Type KDC Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3125LS, KES3125LSG

Circuit Breaker Time/Current Curves (Phase Current) 

Series C® K-Frame Circuit Breakers
Equipped With Type KES Digitrip RMS 310 Trip Units

Catalog Type: KES3125LS, KES3125LSG Digital RMS 310 Trip Units for use with Circuit Breaker Type KDC, 150A, max.

Fixed Short Delay Time
Typical Trip Unit Navigation

Available Rating Plugs

| Current in Multiples of Rating | Ampere Type | Catalog Number | Short Delay
|-----------------------------|---------|--------------|-------------
| 125 | Fixed | KES3125T | 125000 |
| 100 | Fixed | KES3125T | 100000 |
| 60 | Fixed | KES3125T | 60000 |
| 30 | Adjustable | KES3125A | 30000 |

Interruping Ratings ~50/60Hz
RMS Sym. Amperes AIC

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDC</td>
<td>200</td>
</tr>
<tr>
<td>KES3125T</td>
<td>125000</td>
</tr>
<tr>
<td>KES3125A</td>
<td>120000</td>
</tr>
</tbody>
</table>

Notes:
- Digital RMS 310 trip units are suitable for additional field testing with test set Cat. No. 2545. For field testing, use the procedures in the manual, Eaton publication AB-4-1991.
- There is a long delay which can act to shorten the delay. The memory effect comes into play if current above the long delay pick up value exists for a time and then falls below this value. The circuit breaker then delays the pick-up time from normal. The amount of the delay is inversely proportional to the duration of time that the trip has elapsed since the previous event. An automatic 5 minute delay is required between interruptions to compensate for this memory.
- To obtain satisfactory operation, a fixed instantaneous override must be provided at AIC, 150% of AIC.
- The fixed instantaneous override of Type 120000 is provided at AIC, 150% of AIC.
- The fixed instantaneous override of Type 125000 is provided at AIC, 150% of AIC.
- The fixed instantaneous override of Type 120000 is provided at AIC, 150% of AIC.
- The fixed instantaneous override of Type 125000 is provided at AIC, 150% of AIC.

Application Data
29-167K
Page 15

AB DE-ION Circuit Breakers

May 1994
AB DE-ION Circuit Breakers

Type KDC Equipped with Type KES Digitrip RMS 310 Trip Units, Types KES3125LSI, KES3125LSIG

Circuit Breaker Time/Current Curves (Phase Current)

Series C® K-Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Trip Units
Catalog Types KES3125LSI, KES3125LSIG

Available Rating Plugs

<table>
<thead>
<tr>
<th>Ampere Rating Plug</th>
<th>Type</th>
<th>Catalog</th>
<th>Short Delay Number</th>
<th>Pickup Range Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>Fixed</td>
<td>KES 125</td>
<td>110</td>
<td>140-1000</td>
</tr>
<tr>
<td>110</td>
<td>Fixed</td>
<td>KES 110</td>
<td>100</td>
<td>200-800</td>
</tr>
<tr>
<td>100</td>
<td>Fixed</td>
<td>KES 100</td>
<td>90</td>
<td>50-720</td>
</tr>
<tr>
<td>70</td>
<td>Fixed</td>
<td>KES 70</td>
<td>70, 90, 125</td>
<td>140-560</td>
</tr>
<tr>
<td>50</td>
<td>Adjustable</td>
<td>KES 50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interrupting Ratings - 50/60 Hz
RMS Sym. Ampères (kA)

- Breaker ULCSA Type 240V 380V 480V 600V
- Breaker IEC M1-2 Type 240V 415V
- Breaker KDC Type 240V 500V

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 publication AB-4-1991
- 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 trip unit. A short-circuit device or the circuit breaker itself. If left for a prolonged period of time, the long delay time will be reduced. The amount of time it takes to actuate is inversely proportional to the amount of time that has elapsed since the previous trip. Approximate times to clear between overloads to completely reset the memory are:
  - Curve accuracy may differ from -20°C to +55°C ambient. For possible continuous ampere derating for ambient above 40°C, refer to Cutler-Hammer
  - For high fault current levels a fixed instantaneous override is provided at 4000A.
  - The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.

Curve No. SC-5649-93

May 1994
Ground Fault Protection (KES3400LSG, KES3400LSIG)

Circuit Breaker Time/Current Curves (Ground Current)

Series C® K-Frame Circuit Breakers Equipped With Type KES Digitrip RMS 310 Trip Units For Ground Fault Protection

Type Digitrip RMS 310 Trip Unit for use with Circuit Breaker Types KD, KDC, C40, and C500
For use with Trip Unit Catalog Numbers:
KES3400LSG
KES3400LSIG

Settings (Tolerance ± 10% Except ± 20% on 11xG Setting)

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 AB-4-1991.
- For phase time/current curves see SC-5638-93, SC-5639-93, SC-5644-93, or SC-5645-93.

Application Data

AB DE-ION Circuit Breakers

Curve No. SC-5650-93

May 1994

www.ElectricalPartManuals.com
AB DE-ION Circuit Breakers

Ground Fault Protection (KES3250LSG, KES3250LSIG)

Circuit Breaker Time/Current Curves (Ground Current)

Series 0 K Frame Circuit Breakers
Equipped With Type KES Digitrip RMS 310 Trip Units
For Ground Fault Protection

Type Digitrip RMS 310 Trip Unit for use with Circuit Breaker Types KD, KDC, CKD, and CKKD
For use with Trip Unit Catalog Numbers
KES3250LSG, KES3250LSIG

Notes
Curve accuracy applies from -20°C to +40°C ambient. For proof-of-performance service, a duplicate curve is provided for ambient above 40°C, with Instruction Guide.

Digitrip RMS 310 trip units are suitable for functional testing with test set.
Curve No. 0712. For field testing using primary station equipment, follow NEMA publication AE 4-1991

For phase interruption curves see SC 5649-93, SC 5649-93, SC 5649-93, or SC 5647-93

Curve No. SC-5651-93
May 1994
Ground Fault Protection (KES3125LSG, KES3125LSIG)

Circuit Breaker Time/Current Curves (Ground Current)
Series C 1K Frame Circuit Breakers
Equipped With Type KES Trip Unit RYS 310 Units
For Ground Fault Protection

Type Diagonal RMS Trip Last for use with Currents in 10 Ticks (x 0.7777) THRU 20 Ticks

Ground Fault Trip Settings
(Tolerance \(\pm 10\%\) Except \(\pm 30\%\) on 240V Settings)

Times
Currents exceeding twice (2X) C to 10-Ticks in the ground system do
require limiting for alteration above 40 C to 10-Ticks in the time.

Equipment RMS Trip units are suitable for use with the above settings
with rated Currents in 50 Amps to 2000 Amps for all RMS settings using

For primary (4000 Amp) currents no DC, AC 250V, 480V, 600V, 1200V, or
DC 1000V+

Ground Current (mA)
AB DE-ION Circuit Breakers
Time/Current Characteristic Curves for Westinghouse Series C® L-Frame Circuit Breakers

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series C Types LOB, LD, HLD Circuit Breakers Equipped With Type LT Thermal-Magnetic Trip Unit</td>
<td>SC-4547-89B</td>
<td>2</td>
</tr>
<tr>
<td>Series C Type LDC Circuit Breakers Equipped With Type LT Thermal-Magnetic Trip Unit</td>
<td>SC-5760-94</td>
<td>3</td>
</tr>
<tr>
<td>Series C Types LD, HLD, CLD, and CHLD Circuit Breakers Equipped With Type LES Digitrip RMS 310 Trip Units</td>
<td>SC-5653-93</td>
<td>4</td>
</tr>
<tr>
<td>Catalog Types LES3600LS, LES3600LSG, LES4600LS, LES4600LS, LES4600LS, LES4600LS, LES4600LSG</td>
<td>SC-5654-93</td>
<td>5</td>
</tr>
<tr>
<td>Catalog Types LES3600LSI, LES3600LSIG, LES4600LSI, LES4600LSI, LES4600LSI</td>
<td>SC-5661-93</td>
<td>6</td>
</tr>
<tr>
<td>Ground Fault Protection</td>
<td>SC-5661-93</td>
<td>6</td>
</tr>
<tr>
<td>Series C Types LDC and CLDC Circuit Breakers Equipped With Type LES Digitrip RMS 310 Trip Units</td>
<td>SC-5657-93</td>
<td>7</td>
</tr>
<tr>
<td>Catalog Types LES3600LS, LES3600LSG, LES4600LS, LES4600LS, LES4600LS, LES4600LS, LES4600LSG</td>
<td>SC-5658-93</td>
<td>8</td>
</tr>
<tr>
<td>Catalog Types LES3600LSI, LES3600LSIG, LES4600LSI, LES4600LSI, LES4600LSI</td>
<td>SC-5661-93</td>
<td>6</td>
</tr>
<tr>
<td>Ground Fault Protection</td>
<td>SC-5661-93</td>
<td>6</td>
</tr>
</tbody>
</table>

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167L.

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
Type LDC Equipped With Type LT Thermal-Magnetic Trip Unit

Circuit Breaker Time/Current Curves
Series C® L-Frame Circuit Breakers
Equipped With Type LT Thermal-Magnetic Trip Unit

Catalog Type LDC Circuit Breakers, 2, 3 and 4 Poles

Maximum Voltage
600V. As determined

Breaker Rating
Rated Amperes (A) Interpretable Trip Amperes (One Figure Below)
300, 350, 400, 450, 500
500 to 600, approximate

Interrupting Rating
Source: UL 1077
Type: RMS Sym, 50/60Hz.

Maximum Single Point Trip Times at 20°C:

Note: For additional information see the trip unit data in FIG1.
Single pole data at 20°C based on PDVC and 108 A x 1.0727, for single phase, for each cabinet or breaker.

www.ElectricalPartManuals.com
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)

Fixed Instantaneous Override

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

Notes:

- Digitrip RMS 310 trip units are available for functional field testing with test set Catalog No. STK2.
- For field testing, using primary injection methods, follow NEMA ANSI 149 publication.
- Calibration response in short delay pickup range is same for 1, 2 or 3 poles in series.
- There is a memory effect that can affect the long delay. The memory effect comes into play if a current above a pickup value exists for a time and then is cleared by the operation of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip before it 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°C to +55°C ambient. For possible continuous ampere derating for ambient above 40°C, refer to Cutler-Hammer publication.
- For high fault current levels a fixed instantaneous override is provided Catalog No. 5504A. (Tolerance ± 15%)
- The end of the curve is determined by the interrupting rating of the circuit breaker. See above table.
- For ground fault time/current curves see SC-5661-93.

Curve No. SC-5653-93

May 1994
Types LD, HLD, CLD, and CHLD Equipped With Type LES Digitrip RMS 310 Trip Units, Types LES3600LSI, LES3600LSIG, LES4600LSI, LES4600LSIP

Adjustable Short Delay Time

Available Rating Plugs

<table>
<thead>
<tr>
<th>Current in Multiples of Rating Plug Ampères</th>
<th>Type</th>
<th>Rating Plug</th>
<th>Single Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>FLS500T</td>
<td>600-4000</td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>FLS500T</td>
<td>1000-4000</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>FLS500T</td>
<td>800-3200</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>FLS500T</td>
<td>600-2400</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>FLS500T</td>
<td>600-2400</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Breaker</th>
<th>UICsA</th>
<th>kA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>CLD</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>HLD</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>CHLD</td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>

Application Data

Curve No. SC-5664-93

May 1994
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)

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, LCD, CLD, CHLD, and CLDC

Fixed Short Delay Time Typical Trip Unit Nameplate

Adjustable Short Delay Time Typical Trip Unit Nameplate

Notes

- Curve accuracy applies from -40°C to +85°C ambient. For possible continuous power derating for ambient above 65°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 published methods.

For more information, see SC-5653-93, SC-5654-93, SC-5657-93, SC-5658-93.

Curve No. SC-5661-93

May 1994
Types LDC and CLDC Equipped With Type LES Digitrip RMS 310 Trip Units, Types LES3600LS, LES3600LSG, LES4600LS, LES4600LSE, and LES4600LSP

Circuit Breaker Time/Current Curves (Phase Current)

Series O’L Frame Circuit Breakers

Equipment With Type LES Digitrip RMS 310 Trip Units

Available Rating Plugs

<table>
<thead>
<tr>
<th>Ampere Rating</th>
<th>Type</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>Fixed</td>
<td>6LES600T</td>
</tr>
<tr>
<td>500</td>
<td>Fixed</td>
<td>6LES500T</td>
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<tr>
<td>400</td>
<td>Fixed</td>
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<tr>
<td>350</td>
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<td>6LES200T</td>
</tr>
<tr>
<td>100</td>
<td>Adjustable</td>
<td>A6LES100T</td>
</tr>
</tbody>
</table>

interrupting Ratings @ 50{60 Hz RMS Sym. Amperes (kA)

For ground fault time/current curves see SC-5657-93

Notes

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 55kA (Triangle time: 15%).
3. The end of the curve is determined by the interrupting rating of the circuit breaker. See above table.
4. May 1994

Current in Multiples of Rating Plug Amperes (Iu)

10,000
5,000
3,000
2,000
1,000
0

Volts = 8kV

1. Circuit accuracy is same for all polarizations

2. Short Delay Pick Up Settings (Tolerance ± 10%)
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)

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 Nameplates

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

Notes

1. DigiTrip RMS 310 trip units are ANSI 1990 functional testing with test in Cat No. STK2. For functional testing using pre-trip detection methods, refer to NEMA A24-1991 publications.

2. Calibration response in short delay plug range is 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 plays if a current above the long delay threshold is present for some time and then is cleared by the operation of a trip unit resulting in a circuit breaker trip. A subsequent overload will cause the circuit breaker to trip in shorter time than normal. The amount of time delay reduction is greater the longer the time that has elapsed since the previous overload. Approximately five minutes are required between overloads to completely reset the memory.

4. Curve accuracy applies for all amperes and for amperes above 40°C. For possible continuous ampere derating for amperes above 40°C refer to Cutler Hammer.

5. The end of the curve is determined by the interrupting rating of the circuit breaker. See chapter 3 for details.

6. For ground fault time (current curves see SC-5658-93)

Fixed Instantaneous Override 2
### Breaker Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series C Type MD Circuit Breakers, 125-600 Amperes</td>
<td>SC-5702-94</td>
<td>2</td>
</tr>
<tr>
<td>Series C Type MD Circuit Breakers, 700-800 Amperes</td>
<td>SC-5703-94</td>
<td>3</td>
</tr>
<tr>
<td>Series C Type MDS Circuit Breakers, 400-800 Amperes</td>
<td>SC-5704-94</td>
<td>4</td>
</tr>
<tr>
<td>Series C Types MD SA, MD SGA Circuit Breakers, 400-800 Amperes</td>
<td>SC-5705-94</td>
<td>5</td>
</tr>
<tr>
<td>Series C Types MDSG, MD SGA Ground Fault Pick-up Curves</td>
<td>SC-5706-94</td>
<td>6</td>
</tr>
</tbody>
</table>

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167M.

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-5702-94. Requests for full sets of curves will not be honored.
AB DE-ION Circuit Breakers
Type MD, 125-600 Amperes

Series C M-Frame Circuit Breakers
Catalog Type MD Circuit Breakers, 125-600 Amperes, 2 and 3 Poles, 900 Volts AC, Max. 250 Volts DC.

For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with fluid in heated raceway 1½ ft² per terminal. Tested in open air with terminal all poles.

Maximum Ac Volts: 600 at 60 Hz
Maximum Dc Volts: 250

Adjustable Magnetic Trip

Maximum Single Pole Trip Times at 20°C

Interrupting Rating (UL Listed)

Maximum Instantaneous Trip Amperes: 500% of Trip Unit Rating

Curve No. SC-5702-94
May 1994
Type MD, 700-800 Amperes

Circuit Breaker Times/Current Curves

Series C® M-Frame Circuit Breakers

Calculations for type MD Circuit Breakers, 700-800 Amperes, 2 and 3 Poles, 50/60 Hz only.

For application and coordination purposes only. Based on 40°C ambient. Cold start. Connected with four (4) feet of rated wire per terminal. Tested to open air with current in all poles.

Maximum Air Volts: 600 or 60 Hz

Breaker Ratings

Continuous Amps

Instantaneous Trip Amps

Symmetrical RMS Amperes

Type

MD

Interruption Ratings (UL Listed)

Breaker Symmetrical RMS Amperes

Type

MD

5.000

3.000

2.000

1.000

500

300

100

50

May 1994

AB DE-ION Circuit Breakers

Curves No. SC-5703-94

www.ElectricalPartManuals.com
### AB DE-ION Circuit Breakers

**Type MDS, 400-800 Amperes**

#### Circuit Breaker Time/Current Curves

**Series C® M-Frame Circuit Breakers**

Catalog Type MDS Circuit Breakers, 400-800 Amperes, 2 and 3 Poles

Curve accuracy applies from 20°C to +50°C ambient. For possible continuous ampere derating for ambient above +40°C refer to Cutler-Hammer.

**Maximum Ac Volts:**

- 600, at 50/60 Hz

#### Breaker Ratings

<table>
<thead>
<tr>
<th>Breaker</th>
<th>Symmetrical Amperes</th>
<th>Continuous Amps</th>
<th>Short Delay Pickup Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS</td>
<td>42,000</td>
<td>35,000</td>
<td>22,000</td>
</tr>
</tbody>
</table>

**Rating Plugs Available**

<table>
<thead>
<tr>
<th>Continuous Amps</th>
<th>Rating Plug Value with Calibration Settings (as shown on Curve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Amp</td>
<td>50%</td>
</tr>
<tr>
<td>500 Amp</td>
<td>35%</td>
</tr>
<tr>
<td>600 Amp</td>
<td>20%</td>
</tr>
<tr>
<td>700 Amp</td>
<td>15%</td>
</tr>
<tr>
<td>800 Amp</td>
<td>12%</td>
</tr>
</tbody>
</table>

**Range Adjustment**

- When adjustable rating plugs are used, short delay pickup settings track the selected position of the adjustable rating plug.
- For example, a short delay pickup set at 50% of the short delay pickup plug value when the adjustable rating plug set at 50%, and the short delay pickup set at 4x.

**Interrupting Rating (UL/CSA Listed)**

<table>
<thead>
<tr>
<th>Breaker</th>
<th>Symmetrical Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS</td>
<td>42,000</td>
</tr>
</tbody>
</table>

**Fixed_Override**

- For high fault current levels, a fixed instantaneous override is provided. The pickup for each rating plug is shown in the curve.

**Tolerances ±5%**

- The end of the curve is determined by the interrupting rating and the specific application.

**Ground Fault Time-Current Characteristics of MDGG see Curve No. SC-5706-94**

---


*Curve No. SC-5704-94*

May 1994
Types MDSA, MDSGA, 400-800 Amperes

Circuit Breaker Time/Current Curves
Series C® M-Frame Circuit Breakers
Catalog Types MDSA, MDSGA Circuit Breakers, 400-800 Amperes, 2 and 3 Poles
Curve accuracy applies from -20°C to +55°C ambient. For possible continuous ampere derating for ambient above +40°C refer to Cutler-Hammer Maximum Ac Volts:
600, at 50/60Hz

Breaker Ratings
Continuous Amperes 800 Amp 800 Amp 700 Amp 700 Amp 600 Amp 600 Amp 500 Amp 500 Amp 400 Amp

Range of Available Rating Plugs
Continuous Amperes 800 Amp 800 Amp 700 Amp 700 Amp 600 Amp 600 Amp 500 Amp 500 Amp 400 Amp

% Fixed
80% 80% 70% 70% 60% 60% 50% 50% 40%

When adjustable rating plugs are used, short delay pickup settings track the selected position of the adjustable rating plug. For example, with an adjustable 800 amp rating plug set at 50%, and the adjustable rating plug set for the short delay pickup at 800 x 0.5 x 8 = 3200 amps.

For ground fault time-current characteristics of MDSGA see Curve No. SC-5706-94.

Expanded view in short circuit area with short time adjustment set at minimum
400 Amp Rating Plug
500 Amp Rating Plug

May 1994
AB DE-ION Circuit Breakers
Types MDSG, MDSGA Ground Fault Pick-up Curves

Circuit Breaker Time/Current Curves
Series C® M-Frame Circuit Breakers
Casting Types MDSG, MDSGA Ground Fault Pick-up Curves

Curve No. SC-5706-94
May 1994
AB DE-ION Circuit Breakers
### Breaker Description

<table>
<thead>
<tr>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-5375-92A</td>
<td>2</td>
</tr>
<tr>
<td>SC-5376-92A</td>
<td>3</td>
</tr>
<tr>
<td>SC-5377-92A</td>
<td>4</td>
</tr>
</tbody>
</table>

**Series C Types NO, CND, HND, CHND, NDC, CNDC Circuit Breakers Equipped With Type NES Digitrip RMS 310 Trip Units With**

- **12t Ramp Short Time Delay (Phase Protection)** ........................................ SC-5375-92A 2
- **Adjustable Short Time Delay (Phase Protection)** ................................ SC-5376-92A 3
- **Ground Fault Protection** ................................................................. SC-5377-92A 4

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167N.

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-5375-92A. **Requests for full sets of curves will not be honored.**

© Use in conjunction with SC-5375-92A or SC-5376-92A.
AB DE-ION Circuit Breakers

Types ND, CND, HND, CHND, NDC, CNDC Equipped With Type NES Digitrip RMS 310 Trip Units With T' Ramp Short Time Delay (Phase Protection)

Circuit Breaker Time/Current Curves (Phase Current)

Available Rating Plugs

<table>
<thead>
<tr>
<th>Amperes</th>
<th>Catalog Rating (In) Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>8NES800T</td>
</tr>
<tr>
<td>1600</td>
<td>8NES1600T</td>
</tr>
<tr>
<td>2500</td>
<td>8NES2500T</td>
</tr>
<tr>
<td>3500</td>
<td>8NES3500T</td>
</tr>
<tr>
<td>5000</td>
<td>8NES5000T</td>
</tr>
<tr>
<td>6300</td>
<td>8NES6300T</td>
</tr>
<tr>
<td>8000</td>
<td>8NES8000T</td>
</tr>
<tr>
<td>10000</td>
<td>8NES10000T</td>
</tr>
<tr>
<td>12500</td>
<td>8NES12500T</td>
</tr>
</tbody>
</table>

Notes:

Curve accuracy applies to short circuit current, for additional details please refer to the Circuit Breaker Time Protection Manual. Listed products comply with IEC 947-2 standard. The Ampere derating for ambient temperature above 40°C is per NEC Table 310.15(B)(16). The Nominal voltage of this circuit breaker is 240V AC. The Fixed Instantaneous Characteristic is provided at 14000A. The Max. instantaneous Overload is based on 100% of the Rating Plugs. The Circuit Breaker is tested to meet the requirements of the NEC. The Circuit Breaker is marked with the UL list number and the CSA list number. The Circuit Breaker is marked with the IP rating. The Circuit Breaker is marked with the CE mark. The Circuit Breaker is marked with the NEMA list number.
AB DE-ION Circuit Breakers

Types ND, CND, HND, CHND, NDC, CNDC Equipped With Type NES Digitrip RMS 310 Trip Units With Adjustable Short Time Delay (Phase Protection)

Circuit Breaker Time/Current Curves (Phase Current)
Series C+ N-Frame Circuit Breakers
Equipped With Type NES Digitrip RMS 310 Trip Units

The NES Class RMS 310 Trip Units are all only accept fixed or adjustable thermal characteristic setting. The adjustment is done from the setting mode for proper coordination with thermal characteristics of the conductor and equipment. They are used with Circuit Breaker Types ND, CND, HND, CHND, NDC, and CNDC.

Adjustable Short Time Delay
Typical Trip Unit Nameplate

Available Rating Plugs

<table>
<thead>
<tr>
<th>Frame Rating</th>
<th>Amps</th>
<th>Type</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>800</td>
<td>Fixed</td>
<td>NES300T</td>
</tr>
<tr>
<td>500</td>
<td>600</td>
<td>Fixed</td>
<td>NES400T</td>
</tr>
<tr>
<td>400</td>
<td>500</td>
<td>Fixed</td>
<td>NES500T</td>
</tr>
<tr>
<td>300</td>
<td>400</td>
<td>Fixed</td>
<td>NES600T</td>
</tr>
<tr>
<td>200</td>
<td>300</td>
<td>Fixed</td>
<td>NES700T</td>
</tr>
<tr>
<td>100</td>
<td>200</td>
<td>Fixed</td>
<td>NES800T</td>
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<tr>
<td>50</td>
<td>100</td>
<td>Fixed</td>
<td>NES900T</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
<td>Fixed</td>
<td>NES1000T</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>Fixed</td>
<td>NES1200T</td>
</tr>
</tbody>
</table>

Interrupting Ratings - 50/60 Hz
Rating: 4800 A (5750 A) 8000 A (9000 A)
Short Delay Pick-Up Settings (Tolerance ±10%)

Short Delay
50 Amps
100 Amps
200 Amps
500 Amps
1000 Amps

Notes
For ground fault current curves see SC 5377 92A
For high fault current levels a fixed instantaneous override is provided at 8000A (10 000A)

WORLD-WIDE ELECTRICAL PARTS
WWW.ElectricalPartManuals.com
May 1994
AB DE-ION Circuit Breakers

Types ND, CND, HND, CHND, NDC, CNDC Equipped With Type NES Digitrip RMS 310 Trip Units With Ground Fault Protection

Circuit Breaker Time/Current Curves (Ground Current)

Series C (N-Frame Circuit Breakers Equipped With Type NES Digitrip RMS 310 Trip Units)

The NES Digitrip RMS 310 Trip Units are AC-only devices that employ microprocessor-based technology that provides true RMS current sensing means for proper correlation with the thermal characteristics of conductors and equipment. They are used with Circuit Breaker Types NO, CND, HND, CHND, NDC, and CNDC.

Typical Trip Unit Nameplate

Notes

- Curve accuracy specified from 20°C to +5°C environment.
- NES Digitrip RMS 310 Trip Units are available for use in control applications with NEC 430.24 and 772.62.
- For phase time-compliance see NEC 310.52 and 680.46A.

Ground Fault Pick Up Settings

- Reference 100% Exempt
- 100% on 200 A Setting

Curve No. SC-5377-92A

May 1994
Cutler-Hammer  
Westinghouse & Cutler-Hammer Products  
Five Parkway Center  
Pittsburgh, Pennsylvania, U.S.A. 15220

May 1994  
New Information and Supersedes  
Application Data 29-167D, dated March 1993, and Application Data 29-167J, dated August 1990  
Mailed to: E/29-100A

---

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

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series C Types RD, CRD, RDC, CRDC Circuit Breakers Equipped With Digitrip RMS 310 Trip Units</td>
<td>Typical Instantaneous Time-Phase Current Characteristic Curve Based on $I_n$</td>
<td>SC-5629-93</td>
</tr>
<tr>
<td></td>
<td>Typical Long Delay/Short Delay Time-Phase Current Characteristic Curve Based on $I_n$</td>
<td>SC-5630-93</td>
</tr>
<tr>
<td></td>
<td>Typical Ground Fault/Protection Time/Current Characteristic Curve Based on $I_n$</td>
<td>SC-5631-93</td>
</tr>
<tr>
<td>Series C Types RD, CRD, RDC, CRDC Circuit Breakers Equipped With Digitrip RMS 510/610/810 Trip Units</td>
<td>Typical Instantaneous Time-Phase Current Characteristic Curve Based on $I_n$</td>
<td>SC-5626-93</td>
</tr>
<tr>
<td></td>
<td>Typical Long Delay/Short Delay Time-Phase Current Characteristic Curve Based on $I_L$</td>
<td>SC-5627-93</td>
</tr>
<tr>
<td></td>
<td>Typical Ground Fault/Protection Time/Current Characteristic Curve Based on $I_n$</td>
<td>SC-5628-93</td>
</tr>
</tbody>
</table>

### Definitions

- $I_n$ is the maximum value of continuous current for which the trip unit can be set.
- $I_n$ is the basis (or reference) for both the Instantaneous and the Ground protection current settings.

The value of the rating plug is printed on the Rating Plug.

- $I_L$ is the basis for both the Long Delay and the Short Delay (if provided) protection current settings.
- The value of $I_L$ is the Long Delay Current Setting $\times I_n$.

### Additional Information

- 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-5629-93. **Requests for full sets of curves will not be honored.**
AB DE-ION Circuit Breakers
Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 310 Trip Units. Typical Instantaneous Time-Phase Current Characteristic Curve Based on Iₚ

Circuit Breaker Time/Current Curves (Phase Current)
Series CR R-Frame Circuit Breakers Equipped With Type Digitrip RMS 310 Trip Units

Typical Trip Unit Nameplate
For use with Trip Unit Catalog Numbers

Frame Amps
1600 Max 2000 Max 2500 Max

Available Rating Plugs
Ampere Rating (In)
1600 1400 1250 1200 1000 800 600 400 200

Interrupting Ratings- 50/60 Hz RMS Amps (kA)

Notes
1. Curve accuracy applies from -20°C to +55°C ambient. For possible ampere derating for ambient above 40°C, refer to Cutler-Hammer.
2. 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 A4-1991.
3. For 2500 A styles, maximum short delay pickup setting = 6X.
4. For high fault current levels a fixed instantaneous override is provided at 17,500A (Tolerance+15%).
5. The end of the curve is determined by the interrupting rating of the circuit breaker. See above tabulation.
6. Ground fault time-current curves see SC-5631-93.
7. Not ULCSA listed.

Curve No. SC-5629-93
May 1994

www.ElectricalPartManuals.com
Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 310 Trip Units. Typical Long Delay/Short Delay Time-Phase Current Characteristic Curve Based on \( I_n \).

Circuit Breaker Time/Current Curves (Phase Current): Series C® R-Frame Circuit Breakers Equipped With Type Digitrip RMS 310 Trip Units.

For use with Trip Unit Catalog Numbers:
- 1600A Max.
- 2000A Max.
- 2500A Max.

Available Rating Plugs:
- Frame Rating Amperes (Max.):
  - 1600
  - 2000
  - 2500

Interrupting Ratings:
- 2000A Max.
- 2500A Max.

RMS Sym. Amperes (kA):
- Breaker [UUCSA]

Utilization Category:
- ALCS
- 0.25
- 1

Notes:
- Curve applies to 20°C to 40°C ambient. For possible ampere derating above 40°C, refer to Cutler-Hammer Digitrip RMS 310 trip units are suitable for functional field testing with field test kit Cat. No. STK2. For field testing using primary injection methods, follow NEMA publication AB-4-1991.

For ground fault time-current curves see SC-5631-93.
AB DE-ION Circuit Breakers

Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 310 Trip Units. Typical Ground Fault/Protection Time/Current Characteristic Curve Based on $I_n$

Circuit Breaker Time/Current Curves (Phase Current)

Series CR® A-Frame Circuit Breakers Equipped with Type Digitrip RMS 310 Trip Units for Ground Fault Protection

For use with Trip Unit Catalog Numbers:

- AES1 600LSG
- RES2000LSG
- AES1600LSIG
- RES2000LSIG

Notes:
- Curve accuracy applies from -20°C to +55°C ambient.
- Digitrip RMS 310 trip units are suitable for functional testing with test kit Cat. No. STK2.
- For testing using primary methods, follow NEMA practice AB-4-1991.
- For phase time-current curves see SC-5629-93 and SC-5630-93.

Ground Fault Pickup Settings

(Tolerance ±10% Except, ±20% on 200 A Settings)

May 1994

Curve No. SC-5631-93
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)

Application Data

May 1994
AB DE-ION Circuit Breakers

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 Iₖ.

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

Typical Long Delay and Short Delay Time-Phase Current Characteristic Curve (LS)

Available Rating Plugs 50/60Hz

Minimum Total Clearing Time

Fixed Instantaneous Override

Available First Response Short Delay Time Settings 1.2, 3, 4, 5, 6

Application Determines End of Curve

Current in Multiples of Long Delay Settings Iₖ

Available Short Delay Settings 2, 3, 4, 5, 6, 81/2 or 521/2 x Iₖ

Curve No. SC-5627-93

May 1994
Types RD, CRD, RDC, CRDC Equipped With Digitrip RMS 510/610/810 Trip Units. Typical Ground Fault/Protection Time/Current Characteristic Curve Based on $I_n$

Series CR-Frame Circuit Breakers with DIGITRIP RMS 510/610/810 Trip Units
Typical Time-Ground Current Characteristic Curve (G)

CURRENT IN MULTIPLES OF PLUG RATING $I_p$

Available Ground Fault Settings (Typical) for Exact Values and Tolerances of Letter Codes, See Chart

Ground Fault Settings (Multiple $I_p$)

<table>
<thead>
<tr>
<th>Code</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
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<td>200</td>
<td>300</td>
<td>400</td>
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<td>600</td>
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<td>800</td>
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<tr>
<td>1200</td>
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<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
<td>900</td>
</tr>
</tbody>
</table>

May 1994

Curve No. SC-5628-93

Application Data
29-167R
Page 7

www.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Time/Current Characteristic Curves for Westinghouse Series C® G-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.

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types GB, GHB, GC, GHC 15-100 Amperes, 1 Pole</td>
<td>SC-3500-838</td>
<td>2</td>
</tr>
<tr>
<td>Types GB, GHB, GC, GHC 15-100 Amperes, 2, 3 Poles</td>
<td>SC-3501-838</td>
<td>3</td>
</tr>
<tr>
<td>Type GHBS 15 and 20 Amperes, 1 Pole</td>
<td>SC-5695-93A</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional copies of this application data may be ordered from the Westinghouse Printing Division, Trafford, PA 15085. Order Application Data 29-167G.

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-3500-838. Requests for full sets of curves will not be honored.
AB DE-ION Circuit Breakers
Types GB, GHB, GC, GHC 15-100 Amperes, 1 Pole

Circuit Breaker Time/Current Curves

G-Frame Circuit Breakers
Catalog Types GB, GC, 15-100 Amperes, 1 Pole, 120 Volts, As Max Catalog Types GHB, GHC, 15-100 Amperes, 1 Pole, 277 Volts, Ac Max.

For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with four times rated current at 100/25°C per terminal. Rated in open air with current in all poles.

Maximum Volts

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>As units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB, GC</td>
<td>GB, GC</td>
</tr>
</tbody>
</table>

Maximum Interrupting Ratings (UL Listed)

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>Maximum Interrupting Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB, GC</td>
<td>40,000</td>
</tr>
<tr>
<td>GHB, GHC</td>
<td>65,000</td>
</tr>
</tbody>
</table>

May 1994

Curve No. SC-3500-83B
Types GB, GHB, GC, GHC 15-100 Amperes, 2 and 3 Poles

Application Data

May 1994

EATON

AB DE-ION Circuit Breakers

Curve No. SC-3501-83B

www.ElectricalPartManuals.com
AB DE-ION Circuit Breakers

Type GHBS 15 and 20 Amperes, 1 Pole

Circuit Breaker Time/Current Curves

G-Frame Circuit Breakers

Casting Type GHBS Solenoid Operated Circuit Breakers, 15 and 20 Amperes, 1 Pole

For application and coordination purposes only. Based on 40°C ambient, cold start. Connected with four (4) feet of rated wire 60°C up to 500 amps, 70°C above 500 amps per terminal. Tested in open air with current in all poles.

Maximum Ac Volts: 317 at 60 Hz

Single (1) pole test data at 25°C based on NEMA Procedures for performance of molded case circuit breakers.

Curve No. SC-5695-93A

May 1994
Westinghouse
AB DE-ION®
Circuit Breakers

Time/Current Characteristic Curves for
Westinghouse Series C® F-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.

<table>
<thead>
<tr>
<th>Breaker Description</th>
<th>Curve No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Pole</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 15 Amperes</td>
<td>SC-4423-88A</td>
<td>2</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 20 Amperes</td>
<td>SC-4424-88A</td>
<td>3</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 25 Amperes</td>
<td>SC-4425-88A</td>
<td>4</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 30 Amperes</td>
<td>SC-4426-88A</td>
<td>5</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 35 Amperes</td>
<td>SC-4427-88A</td>
<td>6</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 40 Amperes</td>
<td>SC-4428-88A</td>
<td>7</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 45 Amperes</td>
<td>SC-4429-88A</td>
<td>8</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 50 Amperes</td>
<td>SC-4430-88A</td>
<td>9</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 60 Amperes</td>
<td>SC-4431-88A</td>
<td>10</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 70 Amperes</td>
<td>SC-4432-88A</td>
<td>11</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 80 Amperes</td>
<td>SC-4433-88A</td>
<td>12</td>
</tr>
<tr>
<td>Series C Types EHD, FD &amp; HFD 90 Amperes</td>
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Additional copies of this application data
may be ordered from the Westinghouse
Printing Division, Trafford, PA 15085.
Order Application Data 29-167F.

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

While ordering onion-skin curves, use num-
ber at bottom of page where curve appears,
i.e., SC-4423-88A. Requests for full sets of
curves will not be honored.
AB DE-ION Circuit Breakers
Types EHD, FD and HFD 15 Amperes

Circuit Breaker Time/Current Curves
Series C® F-Frame Circuit Breakers
Catalog Types EHD, FD and HFD Circuit Breakers, One Pole

Maximum AC Volts: 277 at 50/60 Hz
2,000

Maximum DC Volts: 125

Breaker Rating
Continuous Amperes
15 Amps
Instantaneous Trip Amperes
See Curve

Interrupting Rating (ULCOS listed)
Type
Symmetrical RMS Amperes (kA)
277 Volts
EHD
14
FD
16
HFD
20

Minimum and Maximum Single Pole Trip Times at 25°C

Maximum Interrupting Time

Interrupting Rating Determines End of Curve

Curve No. SC-4423-88A
May 1994
Types EHD, FD and HFD 20 Amperes

Circuit Breaker Time/Current Curves
Series C' F-Frame Circuit Breakers
Catalog Types EHD, FD and HFD Circuit Breakers, One Pole

For application and coordination purposes only.
Section 40C with its counterpart. Connected with four 40 feet of
conductors 60°C up to 100 amps, 75°C above 125 amps per terminal.
Setup in open air.

Maximum AC Volts: 277 at 50/60Hz
Maximum DC Volts: 125

Passed test data at 60°C per NEC Article 404.
Passed test data at 115V by verifying performance at the rated current.

Curve No. SC-4424-88A
AB DE-ION Circuit Breakers
Types EHD, FD and HFD 25 Amperes

Circuit Breaker Time/Current Curves
Series C® F-Frame Circuit Breakers
- For application and coordination purposes only.
- Based on 40°C ambient, cold start. Connected with four feet of
  conductor at 80°C up to 100 amps, 75°C above 100 amperes per terminal.
  Tested in open air.
- Maximum AC Values: 277 at 60Hz
- Maximum DC Values: 175

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Interruption Rating (UL/CSA Listed)
- EHD: 25A
- FD: 25A
- HFD: 25A
- Single pole rated at 25A minimum NEMA Grounded. Six (6) for full time performance of molded case circuit breakers.

Curve No. SC-4429-88A
May 1994
Types EHD, FD and HFD 30 Amperes

Circuit Breaker Time/Current Curves
Series C, F-Frame Circuit Breakers
Catalog Types EHD, FD and HFD Circuit Breakers, One Pole
- Application: Residential and commercial
- Rated AC Volts: 120V
- Maximum DC Volts: 125V
- Rated Wire: Up to 1000V
- Temperature: 75°C above 65°C
- Humidity: Up to 85% relative

Maximum AC Volts: 277 at 50/60 Hz
Maximum DC Volt: 125

Breaker Rating
- Continuous: 30 Amps
- Instantaneous Trip Current: See Curve

Interrupting Rating (kVA/KA): See Curve
Total Interrupting Time: See Curve

Suggested sales and data at 20°C based on 1/4 pole make/break applications
Check (charts) for complete performance of different applications.
AB DE-ION Circuit Breakers
Types EHD, FD and HFD 35 Amperes

Circuit Breaker Time/Current Curves
Series C® F-Frame Circuit Breakers
Catalog Types EHD, FD and HFD Circuit Breakers, One Pole
For application and coordination purposes only.
Breakdown of circuit, overloads. Connected with four feet of
radial wire 50°C up to 100 amps. 5°C above 100 amps per terminal
Tested in open air.

Maximum AC Volts: 277 at 50/60Hz
Maximum DC Volts: 125

Breaker Rating
Continuous
35Amps
Instantaneous Trip, Amperes
See Curve

Interrupting Rating UL / CSA Listed
Type
EHD
FD
HFD

Maximum Single Pole Trip Times at 50°C

Curve No. SC-4427-88A
May 1994
Types EHD, FD and HFD 40 Amperes

Circuit Breaker Time/Current Curves
Series C - F-Frame Circuit Breakers
Catalog Type EHD, FD and HFD Circuit Breakers, 4-Pole
For application and coordination purposes only.
A type of current-time characteristic for use with 40 A type of current as in CC, up to 125 amperes. 75°C ambient, 120 amp per terminal, rated in open air.

Maximum AC Volts: 277 at 50/60 Hz
Maximum DC Volts: 125

Continuous Amperes: 40 A
Interrupting Time: See Curve

May 1994

Curve No. SC-4428-88A
EATON
AB DE-ION Circuit Breakers
Types EHD, FD and HFD 45 Amperes

Circuit Breaker Time/Current Curves
Series C® F-Frame Circuit Breakers
Catalog Types EHD, FD and HFD Circuit Breakers, One Pole
- Continuous and Interrupting current ratings only up to 45 amperes per phase.
- Maximum of five feet of standard Type B wire (50°C) and one foot of Type A wire (75°C)
- Breaking rating (UL/CSA Listed) 277 volts, 50/60 Hz
- End of Curve

Maximum AC Volts: 277 at 50/60 Hz
Maximum DC Volts: 125

Breaker Rating
Continuous Amps
Instantaneous Trip, Amperes

Maximum Single Pole Trip Times at 25°C

Interrupting Rating (UL/CSA Listed)

Curve No. SC-4429-88A
May 1994
Types EHD, FD and HFD 50 Amperes

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers

Types EHD, FD and HFD Circuit Breakers, One Pole

Maximum AC Volts: 277 at 50/60Hz
Maximum DC Volts: 175

Interrupting Rating (UL/CSA Listed)

Single pole tested at 25°C based on IEC test procedure

May 1994

Curve No. SC-4430-88A
Types EHD, FD and HFD 70 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
Catalog Types EHD, FD and HFD Circuit Breakers. One Pole
For applicability and coordination purposes only. As four times load of
time current rating (30A, 150A) above 125 Amps per available
preset time system.

Maximum AC Volts: 277 at 50/60 Hz
Maximum DC Volts: 125

Breaker Rating
Continuous Amperes
32 Amps
125 Amps

Interrupting Rating (UL, CSA Listed)
Type 7772 Arms

Maximum Single Pole Trip Times at 25°C

Maximum Intermittent Rating
End of Curve

Curve No. SC-4432-88A
May 1994

www.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Types EHD, FD and HFD 80 Amperes
AB DE-ION Circuit Breakers
Types EHD, FD and HFD 100 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
Cabling Types EHD, FD and HFD Circuit Breakers, One Pole
For application and coordination purposes only.
Based on 90°C ambient, cold start. Connects with four (4) feet of rated wire 60°C up to 100 amps, 75°C above 105 amps per terminal labeled as open air.

Maximum AC Volts: 125

Breaker Rating
Continuous Amperes
Instantaneous Trip Amperes
100 Amps

Interrupting Rating (UL/CSA Listed)
Rated Asymmetric RMS Amperes (All)
Type 277 Volts 125 Volts
240 14 8
480 29 15
720 43 15
1,000 60 15


Maximum Single Pole Trip Times at 25°C

Interrupting Rating
Determines End of Curve

Curve No. SC-4435-88A
May 1994
Types FD and HFD 110 Amperes

Circuit Breaker Time/Current Curves
Series C & F-Frame Circuit Breakers

- Maximum AC Value: 277 at 50/60 Hz
- Maximum DC Value: 125

 Interrupting Rating (UL/CSA Listed):
- Single Pole:
  - Type: 277 volts
  - 5000 Amperes

Maximum Single Pole Trip Times at 29°C

- Minimum
- Maximum

Rating Determines End of Curve

May 1994
AB DE-ION Circuit Breakers
Types FD and HFD 125 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
Leaking Type FD & HFD Circuit Breakers, One Pole

Maximum AC Voltage: 277 at 50/60Hz
Maximum DC Voltage: 125

Breaker Rating
Continuous Amperes: 125
Instantaneous Trip Amperes: See Curve

Interrupting Rating (UL/CSA Listed)
Rated Symmetrical RMS Amperes: 1500
De Amperes: 1500

Maximum Single Pole Trip Times at 25°C

Interrupting Determined End of Curve

Curve No. SC-4437-88A
May 1994
Types FD and HFD 150 Amperes

AB DE-ION Circuit Breakers

Circuit Breaker Time/Current Curves
Series C® F-Frame Circuit Breakers
Catalog Types FD & HFD Circuit Breakers, One Pole

Maximum AC Volts: 277 at 50, 60 Hz
Maximum DC Volts: 125

Interrupting Rating: 100 kA rms symmetrical
Type FD
Type HFD

Maximum Single Pole Trip Times at 25°C

Interrupting Rating Determines End of Curve

May 1994

Curve No. SC-4438-88A
AB DE-ION Circuit Breakers
Types EHD, FDB, FD and HFD 15 Amperes
Types EHD, FDB, FD and HFD 20 Amperes

Circuit Breaker Time/Current Curves

Series C F-Iron Circuit Breakers
Casting Types EHD, FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles

For application and interlocking purposes only.
Based on 400 V circuit, cold air.
Rated with fuse of 110% of rated wire AWG up to 100 amps. TCC above 125amps per terminal.
Tested in system with current in all poles.

Maximum AC Volts: 600 to 690
Maximum DC Volts: 600

Breaker Rating
Conducting Amperes
Instantaneous Trip Amperes

Interlocking Rating (UL/CSA listed)
Breaker Symmetrical RMS Amperes (A)
Type @ 240 V, Ac @ 480 V, Ac @ 600 V, Ac
EHD 18 14 14 14
FDB 16 14 14 14
FD 14 14 14 14
HFD 12 10 10 10

Single pole test data at 20°C based on NEMA test data.
(AB 4-1991) for verifying performance in molded case circuit breakers.

Maximum Single Pole Trip Time at 20°C (V)
Maximum Interrupting Time
Maximum Interlocking Time

Supported by Eaton Corporation.
AB DE-ION Circuit Breakers
Types EHD, FDB, FD and HFD 25 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers, Eutectic and Four Frames
For application and coordination purposes only.
Rated on 480V, 60Hz, 3 phase, Connected with four 60-feet of wire over 100°C to 120°C range, 75°C above 120°C maximum terminal. Tapped to open on sets current at 60Hz.
Maximum AC Volts: 480 and 60Hz
Maximum DC Volts: 250
Interrupting Rating UL/CSA Listed
Breaker Current Rating, 1000 Ampere (KA)
Type 240 V, Ac @ 480 V, Ac @ 600 V, Ac 2000 A
HFD 10 14 14 10
FD 65 25 25 10
Maximum Intermittent Time
Maximum Single Pole Trip Times at 25°C

www.ElectricalPartManuals.com
May 1994

Curve No. SC-4136-87B
Types EHD, FDB, FD and HFD 30 Amperes

Circuit Breaker Time/Current Curves

Series C® F-Frame Circuit Breakers

Types EHD, FDB, FD and HFD Circuit Breakers. Two, Three and Four Poles

Rated Wire

Maximum Single Pole Trip Times at 25°C Metal Clad

Minimum Maximum

Continuous Rating

Interrupting Rating

(UL!CSA Listed) Breaker Symmetrical RMS Amperes IKA)

Maximum AC Volts: 600 at 60Hz

Maximum DC Volts: 250

Breaker Rating

Determines

End of Curve

(See Above)

Single point test data at 25°C based on UL Standard 489

A. May 1994

B. Page 21

Curves No. SC-4137-87B

Application Data

29-167F

AB DE-ION Circuit Breakers

WWW.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Types EHD, FDB, FD and HFD 35 Amperes
Types EHD, FDB, FD and HFD 40 Amperes

Maximum Single Pole Trip Times at 25°C

Minimum Maximum

Interrupting Rating (UL/CSA Listed)

Single point data at 25°C based on full load test. Use curve to determine instantaneous trip amperes.

Maximum AC Volts: 600 at 60 Hz
Maximum DC Volts: 250

Continuous Amperes

Interrupting Rating

Curve No. SC-4139-878

AB DE-ION Circuit Breakers

May 1994
AB DE-ION Circuit Breakers
Types EHD, FDB, FD and HFD 45 Amperes

Circuit Breaker Time/Current Curves

Series C7-Frames Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers; Two, Three and Four Poles

For application and coordination purposes only.

Based on 120°C ambient, cold start. Connected with four 77 feet of rated wire 105°C up to 25°C amps. 70°C above 10°C amp per terminal. Selection open air with current in all poles.

Maximum AC Value: 600 at 60 Hz

Maximum DC Value: 250

Interrupting Rating
UL/CSA Listed

Maximum Single Pole Tripping Times
at 20°C ()

Maximum

Minimum

End of Curve

Interpreting Rating Determines
End of Curve (See Above)

Maximum Interrupting Time

CURRENT IN AMPERES

Circuit Breaker Time/Current Curves

Series C7-Frames Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers; Two, Three and Four Poles

For application and coordination purposes only.

Based on 120°C ambient, cold start. Connected with four 77 feet of rated wire 105°C up to 25°C amps. 70°C above 10°C amp per terminal. Selection open air with current in all poles.

Maximum AC Value: 600 at 60 Hz

Maximum DC Value: 250

Interrupting Rating
UL/CSA Listed

Maximum Single Pole Tripping Times
at 20°C ()

Maximum

Minimum

End of Curve

Interpreting Rating Determines
End of Curve (See Above)

Maximum Interrupting Time

CURRENT IN AMPERES

Circuit Breaker Time/Current Curves

Series C7-Frames Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers; Two, Three and Four Poles

For application and coordination purposes only.

Based on 120°C ambient, cold start. Connected with four 77 feet of rated wire 105°C up to 25°C amps. 70°C above 10°C amp per terminal. Selection open air with current in all poles.

Maximum AC Value: 600 at 60 Hz

Maximum DC Value: 250

Interrupting Rating
UL/CSA Listed

Maximum Single Pole Tripping Times
at 20°C ()

Maximum

Minimum

End of Curve

Interpreting Rating Determines
End of Curve (See Above)

Maximum Interrupting Time

CURRENT IN AMPERES

Circuit Breaker Time/Current Curves

Series C7-Frames Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers; Two, Three and Four Poles

For application and coordination purposes only.

Based on 120°C ambient, cold start. Connected with four 77 feet of rated wire 105°C up to 25°C amps. 70°C above 10°C amp per terminal. Selection open air with current in all poles.

Maximum AC Value: 600 at 60 Hz

Maximum DC Value: 250

Interrupting Rating
UL/CSA Listed

Maximum Single Pole Tripping Times
at 20°C ()

Maximum

Minimum

End of Curve

Interpreting Rating Determines
End of Curve (See Above)

Maximum Interrupting Time

CURRENT IN AMPERES

Circuit Breaker Time/Current Curves

Series C7-Frames Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers; Two, Three and Four Poles

For application and coordination purposes only.

Based on 120°C ambient, cold start. Connected with four 77 feet of rated wire 105°C up to 25°C amps. 70°C above 10°C amp per terminal. Selection open air with current in all poles.

Maximum AC Value: 600 at 60 Hz

Maximum DC Value: 250

Interrupting Rating
UL/CSA Listed

Maximum Single Pole Tripping Times
at 20°C ()

Maximum

Minimum

End of Curve

Interpreting Rating Determines
End of Curve (See Above)

Maximum Interrupting Time

CURRENT IN AMPERES
Types EHD, FDB, FD and HFD 50 Amperes

AB DE-ION Circuit Breakers

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers
Catalog Types: EHD, FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles

For application and coordination purposes only.
Rated for 60 C, 600Vac. Connected with four (4) sets of rated wire (60 C, up to 125 Amps, 10 C, above 125 amp per terminal). Rated to operate with current in all poles.

Maximum AC Value: 600 at 60Hz
Maximum DC Value: 750

Breaker Rating
Continuous Amperes
60 Amps
Interrupting Rating (UL/CSA listed)

- Maximum Single Pole Trip Times at 25 C
- Maximum Intermittent Rating

Maximum Intermittent Duty

Maximum Single Pole Trip Times at 25 C

Maximum Intermittent Duty

For varying performance, consult rated circuit breakers.

Maximum Single Pole Trip Times at 25 C

Maximum Intermittent Duty
AB DE-ION Circuit Breakers
Types EHD, FOB, FD and HFD 60 Amperes

Circuit Breaker Time/Current Curves
Series C® F-Frame Circuit Breakers
Catalog Types EHD, FOB, FD and HFD Circuit Breakers. Two, Three and Four Poles

Maximum Interrupting Time

Interrupting Rating Determines End of Curve (See Above)

Current/Time Curves

Curve No. SC-4142-878
May 1994

www.ElectricalPartManuals.com
Types EHD, FDB, FD and HFD 70 Amperes

Circuit Breaker Time/Current Curves

Series 2F Frame Circuit Breakers

Continuous (60 and 80 Hz) Amperes

Maximum DC Value: 250 V

Breaker Rating

Continuous Amperes

Instantaneous Trip Amperes

Interruption Rating (UL/CSA Listed)

Maximum Single Pole Trip Times at 25°C

Minimum

Maximum

See Curve

May 1994
AB DE-ION Circuit Breakers
Types EHD, FDB, FD and HFD 80 Amperes

Circuit Breaker Time/Current Curves

Series E 3-frame Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles

For application and coordination purposes only.
Based on 40°C ambient, cold start. Connected with four 60 ft. (18 m) rated wire
160°C up to 125 amps, 75°C above 125 amps (per terminal).
Tested in open air with current in all poles.

Current in Ampères

Maximum AC Volts: 250 ac
Maximum DC Volts: 275

Breaker Rating
Continuous Ampères
Instantaneous Trip Ampères

Interrupting Rating UL/CSA Listed
Breaker Symmetrical RMS Amperes DC Medical

Maximum Intermittent Time
Determine End of Curve (See Curve)

Minimum

Curve No. SC-4144-87B
May 1994
Types EHD, FDB, FD and HFD 90 Amperes

Circuit Breaker Time/Current Curves

Series C T-Frame Circuit Breakers

- Types EHD, FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles
- For application and coordination purposes only.
- Based on 45°C ambient, cold start. Connected with four (4) feet of steel wire 60°C up to 125 amps; 15°C above 125 amps per terminal. Tested in open air with current in all poles.

Maximum AC Volts: 600 at 60 Hz
Maximum DC Volts: 250

Breaker Rating
- Continuous Amperes Instantaneous Trip Amperes

Maximum Single Pole Trip Times at 25°C

Minimum

Maximum

Maximum Interrupting Time

Interpolating Rating (UL/CSA Listed)

Minimum

Maximum

Determines End of Curve (See Above)

Curve No. SC-4145-87B

May 1994
AB DE-ION Circuit Breakers

Types EHD, FDB, FD and HFD 100 Amperes

Circuit Breaker Time/Current Curves

Series C® E-frame Circuit Breakers

Circuit Breaker Time/Current Curves

Series C® E-frame Circuit Breakers

Catalog® types EHD, FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles

For application and coordination purposes only

Based on 40°C ambient, cold start. Connected with four (4) feet of rated wire 20°C up to 125 amps, 75°C above 125 amps per terminal.

Maximum AC Volts: 600 at 60 Hz

Maximum DC Volts: 250

Current Rating

Continuous Amps

Interrupting Rating

UL/CSA Listed

Minimum

Maximum

Single Pole Test Time at 20°C (1)

Maximum Single Pole Trip Time at 20°C (1)

Minimum

Maximum

Interrupting Rating

Determines End of Curve

See Curve

Curve No. SC-4146-87B

May 1994
Types FDB, FD and HFD 110 Amps

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers
Catalog Types EHD, FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles.

For application and coordination purposes only. Based on AC and DC ambient, static data. Currents with four (4) sets of rated wire (40°C up to 70°C amps, (9°C above 125 amps) per terminal listed in open air with current in all poles.

Maximum AC Voltage: 600 at 60 Hz

Maximum DC Voltage: 250

Breaker Rating
Continuous Ampere
110 Amps See Curve

Interrupting Rating (UL/CSA Listed)

AB DE-ION Circuit Breakers
Types FDB, FD and HFD 125 Amperes

Circuit Breaker Time/Current Curves

Series C® F-Frame Circuit Breakers
Catalog Types: FDB, FD and HFD Circuit Breakers, Two, Three and Four Poles.

For application and coordination purposes only:
Based on 40°C ambient temperature. Connected with four (4) feet of rated wire (90°C up to 125 amps, 105°C above 125 amps) per terminal tested in open air with current in all poles.

Maximum AC Voltage: 600 at 60Hz
Maximum DC Voltage: 250

Breaker Rating
Continuous Amperes
125 Amps See Curve

Interrupting Rating (UL/CSA Listed)

<table>
<thead>
<tr>
<th>Type</th>
<th>@ 240 V., Ac</th>
<th>@ 480 V., Ac</th>
<th>@ 600 V., Ac</th>
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<td>FDB</td>
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<tr>
<td>HFD</td>
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<td>65</td>
<td>25</td>
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</tbody>
</table>


Maximum Single Pole Trip Times at 25°C

Minimum

Maximum

Interruption Rating
Determining End of Curve
See Above

Curve No. SC-4148-87B
May 1994
Types FDB, FD and HFD 150 Amperes

AB DE-ION Circuit Breakers

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers

Types FDB, FD and HFD Circuit Breakers. Two, Three and Four Poles.

For application and coordination purposes only.

Based on 40°C ambient, cool start. Connected with four layers of rated wire 80°C up to 1/2 amps, 75°C above 1/2 amp per terminal. Taped in open air with current in all poles.

Maximum AC Value: 600 at 60 Hz
Maximum DC Value: 250

Maximum Single Pole Trip Times at 20°C 0.1

Continuous Amperes

Interruption Rating

150 Amps

See Curve

Interpolating Rating (UL CSA Listed)

Type: Symmetrical RMS Amperes (KA)

Series FD

60 80 100 125 150 175 200

HFD

85 100 125 150 175

For application purposes only. See Data Catalog.

May 1994

Curve No. SC-4149-87B

WWW.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Type FDC 15 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
For application, and coordination purposes only.
Based on 40°C ambient, rated amps. Connected with four 14 feet of
rated wire 60°C up to 125 amps. 75°C above 125 amps per terminal.
Tested in open air with current in all poles.

Breaker Rating
Continuous Amperes Instantaneous Trip Amperes
See Curve

Interrupting Rating (UL/CSA Listed)
Breach Symmetrical RMS Amperes (KA)
Type @ 240 V, Ac @ 480 V, Ac @ 600 V, Ac @ 750 V, Duc
FDC 250 100 25 25 25

Single pole test data at 25°C based on NEMA Procedures
(AB # 1993) for verifying performance of molded case circuit
breakers.
Type FDC 20 Amperes

Circuit Breaker Time/Current Curves

Series C - F-Frame Circuit Breakers

Catalog Type FDC Circuit Breaker, Two, Three and Four Poles

For application and coordination guidance only.

Based on AC amperes constant, Connected with four 1/0 feet of
rated wire 30°C up to 90°C, 110°C above 90°C amperes per terminal.
Rated in open air with current at all phases.

Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Minimum Maximum

Interruption Rating
Breaker (UL/CSA Listed)
Symmetrical RMS Amperes (KA) Interrupting Rating (UL/CSA Listed)

Type @ 240 V., Ac @ 480 V., Ac @ 600 V., Ac
FDC 20 100 50

Single pole test at 25°C based on NEMA Standards.

Maximum Single-Pole Trip Times at 25°C

Maximum Interrupting Time

Curve No. SC-5517-93A

May 1994
AB DE-ION Circuit Breakers
Type FDC 25 Amperes
Type FDC 30 Amperes

Circuit Breaker Time/Current Curves

Series C® F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles

Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Breaker Rating
Continuous Amperes
Instantaneous Trip Amperes

Interrupting Rating (UL/CSA Listed)
Breaker Symmetrical RMS Amperes (KA)
Type
AC AC AC AC
480V 480V 600V 600V
FDC 200 100 35 22

Maximum Single Pole Trip Times at 25°C

May 1994
AB DE-ION Circuit Breakers
Type FDC 35 Amperes

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles
For application and coordination purposes only.
Rated on 40°F ambient, cold start. Connected with feeders and/ or overcurrent devices
Fixed or adjustable, rated at 150% of rated current at 25°C. Designated as "I".
Tests in open air with current in all poles.

Maximum AC Volts: 600 at 60 Hz
Maximum DC Volts: 250

Continuous Amperes Interrupting Rating
Type Amps
FDC 200 100 35 22

Type FDC 40 Amperes

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles
For application and coordination purposes only
Based on NEC, edition 70 A, 2006
Connected with 100 ft (30.48 m) of
rated wire 60°C up to 125 amps, 75°C above 125 amps per terminal.
Product is open air with current in all poles.

Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Interrupting Rating
(UL/CSA Listed) Breaker Symmetrical RMS Amperes (KA)
(type 240V, 480V, 600V, 250V, DC)
FDC 200 100 50

Single pole test data at 25°C based on NEMA procedures
(AS A 150 1 for verifying performance of Molded Case Circuit Breakers)

Maximum Single Pole Trip Times
at 25°C.

Maximum Interrupting Time

Maximum:

Minimum
AB DE-ION Circuit Breakers
Type FDC 45 Amperes

**Circuit Breaker Time/Current Curves**

- **Series C F-Frame Circuit Breakers**
- Catalog Type FDC Circuit Breaker, Two, Three and Four Poles
- For application and coordination purposes only

<table>
<thead>
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<th>Current (A)</th>
<th>Time (s)</th>
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<td>9.60</td>
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<tr>
<td>1000</td>
<td>10.00</td>
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</tbody>
</table>

**Maximum AC Voltage**
- 600V at 60 Hz

**Maximum DC Voltage**
- 250V

**Breaker Rating**
- Continuous Amperes
- Interrupting Trip Amperes

**Interrupting Rating (UL/CSA Listed)**
- 200A, 250A, 300A, 350A, 400A, 450A, 500A

**Note:** Single pole test data at 25°C based on NEMA Procedures (AB 4-1991) for verifying performance of molded case circuit breakers.
Type FDC 50 Amperes

**Series C F-Frame Circuit Breakers**

- Circuit breaker time/current curves
- Maximum AC Volts: 600 at 60 Hz
- Maximum DC Volts: 250
- Breaker rating: 1000 A (50 Amperes)
- Interrupting rating (UL, CSA Listed)
  - Continuous RMS currents: 1000 A
  - Interrupting RMS currents: 50 A

- Application data
  - Maximum single pole trip times at 25°C
  - Minimum
  - Maximum
  - Interrupting rating
  - Determines end of curve (see above)

- Curve No. SC-5523-93A

May 1994
AB DE-ION Circuit Breakers
Type FDC 60 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles
Rated on 40°C ambient, cold start. Connected with four (4) feet of
cable over 40°C eq 36 amps, 55°C above 25 amperes per terminal.
Tested on open air with current in all poles.
Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Circuit Breaker Rating
Continuous Amperes
Interrupting Rating
(UUCSA Listed)

Single pole test data at 2s·c based on NEMA Procedures (AB
4-1991) for verifying performance of molded case circuit
breakers.

Maximum Single Pole Trip Times

Minimum

Maximum

Interrupting Determines End of Curve
(See Above)

Curve No. SC-5524-93A
May 1994
Type FDC 70 Amperes

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers

Catalog Type FDC Circuit Breaker. Two, Three and Four Poles

For application and installation purposes only.

Based on 40°C ambient, solid-state. Connected with four feet of

90°C rated wire. Size 0000 to 1/0 gauge. 90°C above 1/0 gauge per terminal.

Tested in open air with current in all poles.

Maximum AC Volts: 500 at 60 Hz

Maximum DC Volts: 500

Breaker Rating

Continuous Amperes

Interpolated Trip Amperes

10 Amps

See Curve

Interrupting Rating (A.C.,UL Listed):

Type

Maximum Single Pole Trip Time (ms) at 30°C

FDC

200

100

90

Maximum Single

Pole Trip Time

at 30°C

Minimum

Maximum

Minimum

Maximum

600V

480V

240V

60Hz

400Hz

30Hz

20Hz

10Hz

0Hz

500

100

50

20

10

5

2

1

0.5

0

0.5

1

1.5

2

2.5

3

3.5

4

4.5

5

5.5

6

6.5

7

7.5

8

8.5

9

9.5

10

10.5

11

11.5

12

12.5

13

13.5

14

14.5

15

15.5

16

16.5

17

17.5

18

18.5

19

19.5

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20.5

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21.5

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22.5

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23.5

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24.5

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25.5

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26.5

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27.5

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28.5

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29.5

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30.5

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31.5

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32.5

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33.5

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34.5

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35.5

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36.5

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37.5

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38.5

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39.5

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40.5

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41.5

42

42.5

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43.5

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44.5

45

45.5

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46.5

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47.5

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48.5

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49.5

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50.5

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51.5

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52.5

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53.5

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54.5

55

55.5

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56.5

57

57.5

58

58.5

59

59.5

60

60.5

61

61.5

62

62.5

63

63.5

64

64.5

65

65.5

66

66.5

67

67.5

68

68.5

69

69.5

70
AB DE-ION Circuit Breakers
Type FDC 80 Amperes

Circuit Breaker Time/Current Curves

Series C Frame Circuit Breaker

- Grounded Type FDC Circuit Breaker, Two, Three, and Four Poles
- For application and coordination purposes only
- Rated at 40°C ambient, 60°C derat. Connected with four, six feet of twisted wire (NEC) up to 30 A, 15 A wiring, 15 A ampacity per terminal. Tested in open air at 500°C ambient.

Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Breaker Rating

<table>
<thead>
<tr>
<th>Continuous Amps</th>
<th>Interrupting Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 Amps</td>
<td>See Curve</td>
</tr>
</tbody>
</table>

Interrupting Rating (UL/CSA Listed)

Type
240V, Ac @ 600 V, Ac @ 800 V, 2000 V, 250 V,
FDC 200 100 35 22

200 Single pole test data at 20°C based on NEMA Procedures.

AB EX 1994 for verifying performance modified for circuit breakers.

Curve No. SC-5526-93A
May 1994
Type FDC 90 Amperes

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles

For application and coordination purposes only.
Based on 45°C ambient cold start. Connected with four (4) feet of rated wire at 60°C up to 125 amps, 75°C above 125 amps per terminal.
Rated in open air with current in all poles.

Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Breaker Rating

Continuous Amperes
Interrupting Rating

3 Phase
UL Listed

Type
@ 240V, Ac
@ 480V, Ac
@ 600V, Ac
@ 480V, DC
FDC 200
150
100

Minimum - Maximum

0.5
0.3
0.2
0.1

10
30
50

Maximum Single Pole Trip Times at 95°C

0.5
0.6
0.7
0.8
0.9
1.0
1.1

Maximum Single

Minimum

0.5
0.6
0.7
0.8
0.9
1.0
1.1

Time in Seconds

10
30
50
70
90
110
130
150

CURRENT IN AMPERES

90A

90
70
50
30
10
0

CURVE NO. SC-5527-93A

AB DE-ION Circuit Breakers

May 1994

Curve No. SC-5527-93A

Application Data
29-167F
Page 45

WWW.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Type FDC 100 Amperes

Circuit Breaker Time/Current Curves
Series C F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles
For application and coordination purposes only
Based on 40°C ambient, resistive. Connected with feet of cable are at 40°C up to 1.5 amperes. 75°C above 1.5 amperes per terminal
Tested in open air with current in all poles.
Maximum AC Volts: 600 at 60Hz
Maximum DC Volts: 250

Breaker Rating
Continuous Amperes: Instantaneous Trip Amperes
See Curve

Interrupting Rating (UL/CSA Listed)
Type: Single Pole, Double Pole, Three Pole, Four Pole
Rated 1000V, 480V, 600V, 2000V, 2500V
600A, 1500A, 3000A, 6000A, 12000A

Single pole test data at 25°C based on NEMA Procedures
(AB & 419-1991)
For verifying performance of molded case circuit breakers

Curve No. SC-5528-93A
May 1994
Type FDC 110 Amperes

Circuit Breaker Time/Current Curves

Series C F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker: Two, Three and Four Poles
For application and coordination purposes only.
Based on 45°C ambient, cold start. Conduit with four (4) feet of
self-cool (400°C up to 125 amps, 75°C above 125 amp per terminal).
Tested in open air with current in all poles.
Maximum AC Volts: 600 or 80 Hz
Maximum DC Volts: 250

Table

<table>
<thead>
<tr>
<th>Test Voltage</th>
<th>Continuous Amps</th>
<th>Instantaneous Trip Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Minimum Interrupting Time

600V

240V

Curve No. SC-5529-93A

www.ElectricalPartManuals.com
AB DE-ION Circuit Breakers
Type FDC 125 Amperes
Type FDC 150 Amperes

Circuit Breaker Time/Current Curves

Series C® F-Frame Circuit Breakers
Catalog Type FDC Circuit Breaker, Two, Three and Four Poles

For application and coordination purposes only.
Based on 60°C ambient, solid state. Connected with four 6 feet of
cable wire 60°C up to 25 amps, 75°C above 25 amp per terminal.
Tested in open air with current in all poles.

Maximum AC Volts: 600 at 60 Hz
Maximum DC Volts: 250

Breaker Rating
Continuous Amperes: 180 Amps
Interrupting Rating (UL/CSA Listed)
Symmetrical RMS Amperes (KA): 200, 100, 35, 22
Type: 240V, Ac @ 600V, Ac @ 600V, Ac @ 250V, DC

Single pole test data at 95°C based on NEMA Procedures
(AB-1990) for verifying performance of molded case circuit
breakers.

Curve No. SC-5531-93A

May 1994
AB DE-ION Circuit Breakers
AB DE-ION Circuit Breakers
New Information
Mailed to: E/29-100A

Types ED, EDH and EDC

Current in Multiples of Iₖ

Circuit Breaker Time/Current Curves

Series C³ F-Frame Circuit Breakers
Catalog Types ED, EDH and EDC-Obtain Breaker, Two and Three Pole

For application and coordination purposes only.
Based on 48°C ambient; compliant. Connected with four 16 feet of
rated wire (75°C) per terminal. Tested in open air with current in all
poles.

Maximum AC Volts: 240 at 60Hz
Maximum DC Volts: 125

Brookfield Rating:
Continuous Amps
Instantaneous Trip Amps

Interrupting Rating (U.L.CSA Listed)
Breaker Type

SYNCHRONOUS RMS Amperes (KA) Amps (KA)
ED 65 10
EDH 100 10
ECD 200

Minimum - Maximum

August 1994