### Characteristic Curves for Series NRX Type NF and RF Frame with Digitrip 520 and 520M Trip Unit

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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 (Earth) protection current settings. The Ampere value of $I_n$ is printed on the Rating Plug.

$I_l$ is the basis for both the Long Delay Time and Short Delay Pick Up protection current settings. The Ampere value of $I_l$ is the Long Delay Pickup Setting $\times I_n$.

Further information may be obtained from:

Eaton
Electrical Group
1000 Cherrington Parkway
Moon Township, Pennsylvania 15108-4312
United States of America
Telephone: 1-800-525-2000 or
1-877-ETN-CARE (877-386-2273)

http://www.eaton.com/
Curves can also be found on-line by searching for the curve number.
Circuit Breaker Time / Current Curves (Phase Current)
Series NRX - Type NF or RF Frame Power Circuit Breakers
Response: Long Delay & Short Delay Trip (FLAT & IT)
This curve is for 50Hz or 60Hz applications.

Notes:
1. These curves are comprehensive for the complete family of Series NRX circuit breakers, including all frame sizes, ratings, and constructions. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed.
2. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.
4. This curve is shown as a multiple of the Long Delay Setting.
5. If Long Delay Thermal Memory is enabled, trip times may be shorter than indicated on this chart.
6. The Long Delay Pickup Point (indicated by rapid flashing of Unit Status LED on the product) occurs at 110%, with a ±10% tolerance. The Short Delay settings have conventional 100% ±10% at the pick-up points.
7. Breakpoint back to FLAT response indicated by dots occurs @8x I for higher current levels of IT curve.

October 2011
Series NRX - Type NF or RF Frame with Digitrip 520(LI) - Long Delay Curves

Circuit Breaker Time / Current Curves (Phase Current)
Series NRX - TYPE NF or RF Frame Power Circuit Breakers
Response: Long Delay
This curve is for 50Hz or 60Hz applications.

Notes:
1. These curves are comprehensive for the complete family of Series NRX circuit breakers, including all frame sizes, ratings, and constructions. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed.
2. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.
4. This curve is shown as a multiple of the Long Delay setting.
5. If Long Delay Thermal Memory is enabled, trip times may be shorter than indicated on this chart.
6. The Long Delay Pickup Point (indicated by rapid flashing of Unit Status LED on the product) occurs at 110%, with a ±10% tolerance.
Series NRX - Type NF Frame with Digitrip 520 / 520M - Instantaneous Curve

Circuit Breaker Time / Current Curves
(Phase Current)
Series NRX - Type NF Frame Circuit Breakers
Response: Adjustable and High Instantaneous Trip
This curve is for 50Hz and 60Hz applications.

Notes:
1. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed.

2. The end of the curve is determined by the interrupting rating of the circuit breaker.

3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.

4. This curve is shown as a multiple of the Rating Plug (Iₚ) for adjustable instantaneous current, and as symmetrical RMS Current for high instantaneous values.

5. The Instantaneous settings have conventional 100% ±10% as the pickup points.

6. One additional OFF setting is available for customer selection, except for the Digitrip 520 (LI) style.

7. On the NF Frame, an additional, fixed High Instantaneous Trip function is provided in the circuit breaker set to pickup at 42kA RMS symmetrical (or 90kA instantaneous peak asymmetrical) current level. This protection is functional even when the Instantaneous is set to the OFF position.
Series NRX - Type RF Frame with Digitrip 520 / 520M - Instantaneous Curve

**Notes:**

1. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed.

2. The end of the curve is determined by the interrupting rating of the circuit breaker.

3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.

4. This curve is shown as a multiple of the Rating Plug (I_n) for adjustable instantaneous current, and as symmetrical RMS Current for high instantaneous values.

5. The Instantaneous settings have conventional 100% ±10% as the pickup points.

4. One additional OFF setting is available for customer selection, except for the Digitrip 520 (LI) style.

5. On the RF Frame, an additional, fixed High Instantaneous Trip function is provided in the circuit breaker. The circuit breaker’s Short Delay rating is marked according to Test Standards with a preset value of 85kA Symmetrical RMS Current (140kA instantaneous peak asymmetrical). This protection is functional even when the Instantaneous is set to the OFF position.

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**Available Adjustable Instantaneous Setting 2 to 12x I_n ± 10%**

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**High Instantaneous RF Frame ONLY**

(See Note 5)
Notes:

1. These curves are comprehensive for the complete family of Series NRX circuit breakers, including all frame sizes, ratings, and constructions. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed.

2. The end of the curve is determined by the interrupting rating of the circuit breaker.

3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.

4. The curve is shown as a multiple of the Rating Plug (Iₙ).

5. The ground fault settings have conventional 100% ±10% as the pickup points.

6. The ground fault pick up is limited to 1200A setting for non international styles.

7. Transition point from IT back to FLAT response indicated by dot occurs @ 0.625x Iₙ for higher current levels of IT curve.
Series NRX - Type NF Frame with Digitrip 520M with Maintenance Mode Trip

Maintenance Mode Characteristic

Series NRX - Type NF Frame Circuit Breakers
Trip Unit - Digitrip 520M with Maintenance Mode

Response: Maintenance Mode Trip
This curve is for 50Hz and 60Hz applications.

Notes:

1. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed. Clearing times are shown with auxiliary power present.

2. The end of the curve is determined by the interrupting rating of the circuit breaker.

3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.

4. The Maintenance Mode feature must be turned ON via switch or Communications for these curves to apply. A blue LED verifies Maintenance Mode setting is active.

5. The Digitrip 520M will light the Instantaneous LED for a Maintenance Mode Trip.

6. Maintenance mode trip setting is fixed at 2000A. Tolerance is ±15%

See Note #6
Series NRX - Type -RF- Frame Circuit Breakers
Trip Unit - Digitrip 520M with Maintenance Mode

Response: Maintenance Mode Trip
This curve is for 50Hz and 60Hz applications.

Notes:

1. The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current under factors that contribute to worst case conditions, like: maximum rated voltages, single phase interruption, and minimum power factor. Faster clearing times are possible depending on the specific system conditions, the type of circuit breaker applied, and if any arc reduction settings are employed. Clearing times are shown with auxiliary power present.

2. The end of the curve is determined by the interrupting rating of the circuit breaker.

3. Curve applies from -20°C to +70°C ambient. Temperatures above +85°C cause automatic trip indicated by the Long Delay (orange) LED.

4. The Maintenance Mode feature must be turned ON via switch or Communications for these curves to apply. A blue LED verifies Maintenance Mode setting is active.

5. The Digitrip 520M will light the Instantaneous LED for a Maintenance Mode Trip.

6. Maintenance mode trip setting is fixed at 8000A. Tolerance is ±15%
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