Masterpact® NW DC Circuit Breakers

Class 0613DC

2007

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Masterpact® NW DC Circuit Breakers
General Information

Section 1—General Information

Introduction

Masterpact NW Circuit Breakers are designed to protect electrical systems from damage caused by short circuits. All Masterpact circuit breakers are designed to open and close a circuit manually, and to open the circuit automatically at a predetermined overcurrent setting.

Selection of a dc circuit breaker is based on the type of dc system, the rated voltage, and the maximum short-circuit current at the point of installation. UL® Listed circuit breakers are for use on ungrounded systems rated 500 Vdc (600 Vdc unloaded) or less. IEC Rated circuit breakers are for use on ungrounded, grounded middle point, or grounded negative systems.

Codes and Standards

Masterpact circuit breakers are manufactured and tested in accordance with the following standards:

<table>
<thead>
<tr>
<th>Insulated Case Circuit Breakers</th>
<th>IEC Rated Circuit Breaker</th>
<th>IEC Extreme Atmospheric Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 489 (UL Listed to Supplement SC)</td>
<td>IEC 60947-2</td>
<td>IEC 68-2-1: Dry cold at –55°C</td>
</tr>
<tr>
<td>NEMA AB1</td>
<td></td>
<td>IEC 68-2-2: Dry heat at +85°C</td>
</tr>
<tr>
<td>CSA C22.2 No. 5-02</td>
<td></td>
<td>IEC 68-2-30: Damp heat (temp. +55°C, rel. humidity 95%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 68-2-52 Level 2: Salt mist</td>
</tr>
</tbody>
</table>

Circuit breakers should be applied according to guidelines detailed in the National Electrical Code (NEC®) and other local wiring codes.

Masterpact circuit breakers are available in Square D®, Merlin Gerin®, or Federal Pioneer® brands.

UL File Numbers:

Masterpact NW: E63335, Vol. 4, Sec. 1

Features and Benefits

100% Rated Circuit Breaker: Masterpact circuit breakers are designed for continuous operation at 100% of their current rating.

True Two-Step Stored Energy Mechanism: Masterpact circuit breakers are operated via a stored-energy mechanism which can be manually or motor charged. The closing time is less than five cycles. Closing and opening operations can be initiated by remote control or by push buttons on the circuit breaker front cover. An O–C–O cycle is possible without recharging.

Drawout or Fixed Mount, 3-Pole (3P) or 4-Pole (4P) Construction: UL Listed (3P only) and IEC Rated (3P or 4P) Masterpact circuit breakers are available in drawout or fixed mounts.

Field-Installable Accessories: Most accessories are field installable with only the aid of a screwdriver and without adjusting the circuit breaker. The uniform design of the circuit breaker line allows most accessories to be common for the whole line.

Reinforced Insulation: Two insulation barriers separate the circuit breaker front from the current path.

Isolation Function by Positive Indication of Contact Status: The mechanical indicator is truly representative of the status of all the main contacts.

Segregated Compartment: Once the accessory cover has been removed to provide access to the accessory compartment, the main contacts remain fully isolated. Furthermore, interphase partitioning allows full insulation between each pole even if the accessory cover has been removed.

Front Connection of Secondary Circuits: All accessory terminals (ring terminals are available as an option) are located on a connecting block which is accessible from the front in the connected, test and disconnected positions. This is particularly useful for field inspection and modification.
Anti-Pumping Feature: All Masterpact NW circuit breakers are designed with an anti-pumping feature that causes an opening order to always take priority over a closing order. Specifically, if opening and closing orders occur simultaneously, the charged mechanism discharges without any movement of the main contacts keeping the circuit breaker in the open (OFF) position.

In the event that opening and closing orders are simultaneously maintained, the standard mechanism provides an anti-pumping function which continues to keep the main contacts in the open position.

In addition, after fault tripping or opening the circuit breaker intentionally (using the manual or electrical controls and with the closing coil continuously energized) the circuit breaker cannot be closed until the power supply to the closing coil is discontinued and then reactivated.

NOTE: When the automatic reset after fault trip (RAR) option is installed, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or before blocking the circuit breaker in the open position.

Disconnection Through the Front Door: The racking handle and racking mechanism are accessible through the front door cutout. Disconnecting the circuit breaker is possible without opening the door and exposing live parts.

Figure 1: Racking Handle and Mechanism

Drawout Mechanism: The drawout assembly mechanism allows the circuit breaker to be racked in four positions (connected, test, disconnected, or withdrawn), as shown in the figure below.

NOTE: For UL circuit breakers, the clusters are mounted on the circuit breaker; for IEC circuit breakers, the clusters are mounted on the cradle.

Figure 2: Racking Positions
Masterpact® NW DC Circuit Breakers
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Reduced Maintenance: Under normal operating conditions, the circuit breaker does not require maintenance. However, if maintenance or inspection is necessary, the arc chambers are easily removed so you may visually inspect the contacts and wear indicator groove (see the figure below for how wear is indicated). The operation counter can also indicate when inspections and possible maintenance should be done.

Figure 3: Contact Wear Indicators

Operating Conditions

Masterpact circuit breakers are suited for use:

- At ambient temperatures between -22°F (-30°C) and 140°F (60°C)
- At altitudes +13,000 ft. (3900 m)

Masterpact circuit breakers have been tested for operation in industrial atmospheres. It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust. Operation at temperatures above 104°F (40°C) may require derating or overbussing the circuit breaker. See the appropriate instruction bulletin and page 11 of this catalog for additional information.

Masterpact circuit breakers meet IEC 68-2-6 Standards for vibration.

- 2 to 13.2 Hz and amplitude 0.039 in. (1 mm)
- 13.2 to 100 Hz constant acceleration 0.024 oz. (0.7 g.)

The materials used in Masterpact NW circuit breakers will not support the growth of fungus and mold.

Masterpact circuit breakers have been tested to the following:

- IEC 68-2-30 — Damp heat (temperature +55°C and relative humidity of 95%)
- IEC 68-2-52 level 2 — salt mist

Storage Temperature

Circuit breakers with trip units without LCD displays may be stored in the original packaging at temperatures between -58°F (-50°C) and 185°F (85°C). For circuit breakers with trip units with LCD displays, this range is -40°F (-40°C) to 185°F (85°C).
Masterpact® NW DC Circuit Breakers
General Information

Masterpact NW Circuit Breaker Design

**NOTE:** For UL Listed circuit breakers, the clusters are mounted on the circuit breaker; for IEC Rated circuit breakers, the clusters are mounted on the cradle.
DC Systems

Selection of a dc circuit breaker is based on the type of dc system, the rated voltage, and the maximum short-circuit current at the point of installation.

The three types of dc systems are:

### Table 1: DC Systems

<table>
<thead>
<tr>
<th>Distribution System</th>
<th>Faults</th>
<th>Fault Comments</th>
<th>Worst Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated Source</td>
<td>Fault B</td>
<td>Isc maximum</td>
<td>Simultaneous faults at A and D or C and E</td>
</tr>
<tr>
<td></td>
<td>Both polarities (positive and negative) are involved in the fault</td>
<td></td>
<td>Either polarity may be involved at Voltage U</td>
</tr>
<tr>
<td></td>
<td>Fault A or C</td>
<td>No consequences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faults A and D or Faults C and E</td>
<td>Isc max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Either polarity may be involved at Voltage U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounded Middle Point</td>
<td>Fault B</td>
<td>Isc maximum</td>
<td>Fault B</td>
</tr>
<tr>
<td></td>
<td>Both polarities (positive and negative) are involved in the fault</td>
<td></td>
<td>Each polarity may be involved at voltage U/2</td>
</tr>
<tr>
<td></td>
<td>Fault A or C</td>
<td>Isc &lt; Isc maximum at U/2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The negative or positive polarity is involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounded Negative</td>
<td>Fault A</td>
<td>Isc maximum</td>
<td>Fault A</td>
</tr>
<tr>
<td></td>
<td>Positive polarity is involved in the fault</td>
<td></td>
<td>All poles taking part in breaking must be placed in series on the positive polarity. If the negative polarity is grounded, an additional pole must be provided to be used for isolation of the negative pole but not for breaking</td>
</tr>
<tr>
<td></td>
<td>Fault B</td>
<td>Isc maximum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Both polarities (positive and negative) are involved in the fault</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Circuit Breaker Connection

### Table 2: Circuit Breaker Connection Based on Distribution System

<table>
<thead>
<tr>
<th>Type</th>
<th>Grounded Negative</th>
<th>Grounded Middle Point</th>
<th>Isolated Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type N</td>
<td><img src="Diagram1.png" alt="Diagram" /></td>
<td><img src="Diagram2.png" alt="Diagram" /></td>
<td><img src="Diagram3.png" alt="Diagram" /></td>
</tr>
<tr>
<td>24 Vdc ≤ UN ≤ 500 Vdc</td>
<td><img src="Diagram4.png" alt="Diagram" /></td>
<td><img src="Diagram5.png" alt="Diagram" /></td>
<td><img src="Diagram6.png" alt="Diagram" /></td>
</tr>
<tr>
<td>Type H</td>
<td><img src="Diagram7.png" alt="Diagram" /></td>
<td><img src="Diagram8.png" alt="Diagram" /></td>
<td><img src="Diagram9.png" alt="Diagram" /></td>
</tr>
<tr>
<td>24 Vdc ≤ UN ≤ 500 Vdc</td>
<td><img src="Diagram10.png" alt="Diagram" /></td>
<td><img src="Diagram11.png" alt="Diagram" /></td>
<td><img src="Diagram12.png" alt="Diagram" /></td>
</tr>
<tr>
<td>Type H</td>
<td><img src="Diagram13.png" alt="Diagram" /></td>
<td><img src="Diagram14.png" alt="Diagram" /></td>
<td><img src="Diagram15.png" alt="Diagram" /></td>
</tr>
<tr>
<td>500 Vdc &lt; UN ≤ 750 Vdc</td>
<td><img src="Diagram16.png" alt="Diagram" /></td>
<td><img src="Diagram17.png" alt="Diagram" /></td>
<td><img src="Diagram18.png" alt="Diagram" /></td>
</tr>
<tr>
<td>Type H</td>
<td><img src="Diagram19.png" alt="Diagram" /></td>
<td><img src="Diagram20.png" alt="Diagram" /></td>
<td><img src="Diagram21.png" alt="Diagram" /></td>
</tr>
<tr>
<td>750 Vdc &lt; UN ≤ 900 Vdc</td>
<td><img src="Diagram22.png" alt="Diagram" /></td>
<td><img src="Diagram23.png" alt="Diagram" /></td>
<td><img src="Diagram24.png" alt="Diagram" /></td>
</tr>
<tr>
<td>Only system applicable to UL Listed circuit breakers</td>
<td><img src="Diagram25.png" alt="Diagram" /></td>
<td><img src="Diagram26.png" alt="Diagram" /></td>
<td><img src="Diagram27.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>
Masterpact® NW DC Circuit Breakers
General Information

Frame Sizes and Interrupting ratings

Table 3: Interrupting Ratings for UL 489 Listed Masterpact NW Circuit Breakers

<table>
<thead>
<tr>
<th>Model Number (Version C)</th>
<th>Circuit Breaker Rating</th>
<th>Endurance Rating (C/O cycles) (with no maintenance)</th>
<th>Breaking Capacity(^{1}) 500 Vdc (max 600 Vdc unloaded) L/R 8 ms</th>
<th>Breaking Time</th>
<th>Closing Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mechanical</td>
<td>Electrical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW08NDC</td>
<td>800 A</td>
<td></td>
<td>10,000</td>
<td>2800</td>
<td></td>
</tr>
<tr>
<td>NW12NDC</td>
<td>1200 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW16NDC</td>
<td>1600 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW20NDC</td>
<td>2000 A</td>
<td>10,000</td>
<td>1000</td>
<td>35 kA</td>
<td>30 to 75 ms</td>
</tr>
<tr>
<td>NW25NDC</td>
<td>2500 A</td>
<td>10,000</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW30NDC</td>
<td>3000 A</td>
<td>10,000</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW40NDC</td>
<td>4000 A</td>
<td>10,000</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{1}\) This circuit breaker is only suitable for use on ungrounded UPS systems, as stipulated in UL 489 standard supplement SC (SC11.4 and SC11.5)

Table 4: Ratings for IEC 60947-2 Rated Masterpact NW Circuit Breakers

<table>
<thead>
<tr>
<th>Circuit Breaker Frame</th>
<th>NW10</th>
<th>NW20</th>
<th>NW40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit Breaker Designation (AIR)</td>
<td>N</td>
<td>H</td>
<td>N</td>
</tr>
<tr>
<td>Rated Current In</td>
<td>1000 A</td>
<td>2000 A</td>
<td>4000 A</td>
</tr>
<tr>
<td>Circuit Breaker Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultimate Breaking Capacity Icu</td>
<td>L/R ≤ 5 ms</td>
<td>500 Vdc</td>
<td>5 kA</td>
</tr>
<tr>
<td>Rated Service Breaking Capacity (kA) Ics</td>
<td>L/R ≤ 15 ms</td>
<td>750 Vdc</td>
<td>50 kA</td>
</tr>
<tr>
<td>Rated Short-Time Withstand Current (kA) Icw</td>
<td>L/R ≤ 30 ms</td>
<td>900 Vdc</td>
<td>25 kA</td>
</tr>
<tr>
<td>Rated Making Capacity (kA) Icm</td>
<td>1 s</td>
<td>50</td>
<td>85</td>
</tr>
</tbody>
</table>

Switch Designation (AIR)
- HA

Installation and maintenance
- Mechanical Without Maintenance 10,000
- Electrical Without Maintenance
  - 500 Vdc 8500 8500 5000 5000 2000 2000
  - 900 Vdc — 2000 — 2000 — 1000
Correction Factors

Table 5: Temperature Correction Factors

<table>
<thead>
<tr>
<th>Maximum Ambient Temperature</th>
<th>°F</th>
<th>°C</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>140</td>
<td>60</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>122</td>
<td>50</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>104</td>
<td>40</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>86</td>
<td>30</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td>77</td>
<td>25</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>20</td>
<td>1.14</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>10</td>
<td>1.21</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>0</td>
<td>1.27</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>-10</td>
<td>1.33</td>
</tr>
<tr>
<td></td>
<td>-4</td>
<td>-20</td>
<td>1.39</td>
</tr>
<tr>
<td></td>
<td>-22</td>
<td>-30</td>
<td>1.44</td>
</tr>
</tbody>
</table>

Table 6: Altitude Correction Factors

<table>
<thead>
<tr>
<th>Voltage</th>
<th>&lt; 6600 ft (2000 m)</th>
<th>8500 ft (2600 m)</th>
<th>13,000 ft (3900 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>1.00</td>
<td>0.95</td>
<td>0.80</td>
</tr>
<tr>
<td>Current</td>
<td>1.00</td>
<td>0.99</td>
<td>0.96</td>
</tr>
</tbody>
</table>

Shipping Weights

Table 7: Weights for UL 489 Listed Masterpact NW Circuit Breakers

<table>
<thead>
<tr>
<th>Frame Rating</th>
<th>Connector Type</th>
<th>Circuit Breaker</th>
<th>Weights (lbs./kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cradle</td>
<td>Connector</td>
</tr>
<tr>
<td>800–2500 A, Drawout</td>
<td>RCTH/RCTV</td>
<td>109 lbs. (50 kg)</td>
<td>97 lbs (44 kg)</td>
</tr>
<tr>
<td>800–2500 A, Fixed-Mounted</td>
<td>RCTH/RCTV</td>
<td>109 lbs. (50 kg)</td>
<td>—</td>
</tr>
<tr>
<td>3000–4000 A, Drawout</td>
<td>RCTH/RCTV</td>
<td>109 lbs. (50 kg)</td>
<td>97 lbs (44 kg)</td>
</tr>
<tr>
<td>3000–4000 A, Fixed-Mounted</td>
<td>RCTH/RCTV</td>
<td>109 lbs. (50 kg)</td>
<td>—</td>
</tr>
</tbody>
</table>

Table 8: Weights for IEC 60947-2 Rated Masterpact NW Circuit Breakers

<table>
<thead>
<tr>
<th>Version</th>
<th>Circuit Breaker</th>
<th>Z-Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type</td>
<td>NW10DC–NW20DC</td>
</tr>
<tr>
<td>C/D</td>
<td>3P Fixed</td>
<td>132 lbs (60 kg)</td>
</tr>
<tr>
<td></td>
<td>3P Drawout</td>
<td>198 lbs (90 kg)</td>
</tr>
<tr>
<td></td>
<td>4P Fixed</td>
<td>176 lbs (80 kg)</td>
</tr>
<tr>
<td>E</td>
<td>4P Drawout</td>
<td>264 lbs (120 kg)</td>
</tr>
</tbody>
</table>
Section 2—Micrologic® DC1.0 Trip Unit

All Masterpact NW DC circuit breakers are equipped with Micrologic DC1.0 trip units, which is designed to protect power circuits and load devices.

The Micrologic DC1.0 trip unit:

- is associated with sensors with instantaneous trip values than can be adjusted on the front of the trip unit
- has three sensor versions provide different threshold ranges:
  - 1250–2500 A
  - 2500–5400 A
  - 5000–11000 A
  See trip curves, Figure 52
- has an instantaneous protection with no time delay settings
- has no overload protection provided

Figure 4: Micrologic DC1.0 Trip Unit

![Micrologic DC1.0 Trip Unit](image)

Figure 5: Circuit Breaker Configuration and Sensor Locations

![Circuit Breaker Configuration and Sensor Locations](image)
• has sensor adjustment dials accessible in front of the circuit breaker behind the door of the cubicle. Both sensors must have the same settings.

**NOTE:** Dials are normally set to setting marked, for example B1 and B2 for 8000 A. Eleven intermediate values can also be set which are not indicated on the adjustment knob, for example between A and B for 6000 A.

![Sensor Adjustment Dials](image)

**Figure 6: Sensor Adjustment Dials**

### Table 9: Im Thresholds

<table>
<thead>
<tr>
<th>Sensor</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1250–2500 A</td>
<td>1250 A ± 8%</td>
<td>1500 A ±10%</td>
<td>1600 A ±10%</td>
<td>2000 A ±10%</td>
<td>2500 A ±10%</td>
</tr>
<tr>
<td>2500–5400 A</td>
<td>2500 A ± 8%</td>
<td>3300 A ±10%</td>
<td>4000 A ±10%</td>
<td>5000 A ±10%</td>
<td>5400 A ±10%</td>
</tr>
<tr>
<td>5000–11,000 A</td>
<td>5000 A ± 8%</td>
<td>8000 A ±10%</td>
<td>10000 A ±10%</td>
<td>11000 A ±10%</td>
<td>11000 A ±10%</td>
</tr>
</tbody>
</table>

### Table 10: Sensors

<table>
<thead>
<tr>
<th>Frame Rating</th>
<th>Model Number</th>
<th>Sensor Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1250–2500 A</td>
</tr>
<tr>
<td>800 A</td>
<td>NW08</td>
<td>X</td>
</tr>
<tr>
<td>1000 A</td>
<td>NW10</td>
<td>X</td>
</tr>
<tr>
<td>1200 A</td>
<td>NW12</td>
<td>X</td>
</tr>
<tr>
<td>1600 A</td>
<td>NW16</td>
<td>X</td>
</tr>
<tr>
<td>2000 A</td>
<td>NW20</td>
<td>X</td>
</tr>
<tr>
<td>2500 A</td>
<td>NW25</td>
<td>—</td>
</tr>
<tr>
<td>3000 A</td>
<td>NW30</td>
<td>—</td>
</tr>
<tr>
<td>4000 A</td>
<td>NW40</td>
<td>—</td>
</tr>
</tbody>
</table>
Section 3—Accessories

Remote Operation

NOTE: When remote operation features are used, a minimum of four seconds is required for the spring charging motor (MCH) to completely charge the circuit breaker closing springs prior to actuating the shunt close (XF) device.

Figure 7: Wiring Diagram for Remote ON/OFF Function

The remote ON/OFF function is used to remotely open and close the circuit breaker. It is made up of the following components:

- A spring-charging motor (MCH) equipped with a spring-charged limit switch; see page 15 for more information
- A shunt close (XF); see page 15 for more information
- A shunt trip (MX1); see page 15 for more information

Optionally, the function may be completed with:

- A ready-to-close contact (PF)
- An electrical closing push button (BPFE)
- A remote reset following a fault (RES)

The remote operation function may be completed with:

- Auxiliary contacts (OF)
- Overcurrent trip switch (SDE)

NOTE: Induced voltages in the circuit at terminal C2 and/or A2 can cause the shunt close to not work properly. The best way to prevent induced voltages is keep the circuit to terminal C2 and A2 as short as possible. If it is impossible to keep the circuit less than 10 feet (3 m), use an interposing relay near terminal C2 or A2.

Terminals

Table 11: Terminal Characteristics

<table>
<thead>
<tr>
<th>Standards</th>
<th>UL 486E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Termination Capacity</td>
<td>22–14 AWG solid or stranded wire with max. O.D. of insulation 3.5 mm</td>
</tr>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Nominal</td>
<td>10 A</td>
</tr>
<tr>
<td>Minimum</td>
<td>100 mA at 24 V</td>
</tr>
<tr>
<td>Pull-Out Forces</td>
<td></td>
</tr>
<tr>
<td>22 AWG</td>
<td>4.5 lbs (20 N)</td>
</tr>
<tr>
<td>20 AWG</td>
<td>6.75 lbs (30 N)</td>
</tr>
<tr>
<td>18 AWG</td>
<td>6.75 lbs (30 N)</td>
</tr>
<tr>
<td>16 AWG</td>
<td>9 lbs (40 N)</td>
</tr>
<tr>
<td>14 AWG</td>
<td>11.5 lbs (50 N)</td>
</tr>
</tbody>
</table>
Spring-Charging Motor (MCH)

The spring-charging motor automatically charges the spring mechanism for closing the circuit breaker and also recharges the spring mechanism when the circuit breaker is in the ON position. Instantaneous reclosing of the circuit breaker is thus possible following circuit breaker opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.

The spring-charging motor is equipped as standard with a limit switch contact (CH) that signals the charged position of the mechanism (springs charged).

Table 12: Spring Charging Motor Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>MCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Ratings ($V_n$)</td>
<td>Vac 50/60 Hz 48/60, 100/130, 200/250, 240/277, 380/415, 400/440, 480</td>
</tr>
<tr>
<td></td>
<td>Vdc 24/30, 48/60, 100/125, 200/250</td>
</tr>
<tr>
<td>Operating Threshold</td>
<td>0.85 to 1.1 $V_n$</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>180 VA</td>
</tr>
<tr>
<td>Motor Overcurrent</td>
<td>2–3 x $I_n$ for 0.1 s</td>
</tr>
<tr>
<td>Charging Time</td>
<td>4 s maximum on NW</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>3 cycles per minute maximum</td>
</tr>
<tr>
<td>Endurance</td>
<td>10,000 cycles for NW &lt; 4000 A</td>
</tr>
<tr>
<td></td>
<td>5000 cycles for NW ≥ 4000 A</td>
</tr>
<tr>
<td>CH Contact</td>
<td>10 A at 240 V</td>
</tr>
</tbody>
</table>

Shunt Trip (MX1) and Shunt Close (XF)

Maximum Wire Length—The inrush currents for these devices are approximately 200 VA. When low supply voltages (12, 24 or 48 V) are used, the maximum allowable wire length is dependent on the voltage and the wire size.

Table 13: Maximum Wire Length

<table>
<thead>
<tr>
<th>Device</th>
<th>Source Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 Vdc</td>
</tr>
<tr>
<td>Wire Size</td>
<td></td>
</tr>
<tr>
<td>14 AWG (2.08 mm²)</td>
<td>159 ft. (48.5 m)</td>
</tr>
<tr>
<td>16 AWG (1.31 mm²)</td>
<td></td>
</tr>
<tr>
<td>UVR (MN)</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>Shunt Trip (MX) and Shunt Close (XF)</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>57 ft. (17.4 m)</td>
</tr>
<tr>
<td>85%</td>
<td>27 ft. (8.2 m)</td>
</tr>
</tbody>
</table>

1 The length shown in the table is for each of the two supply wires.

Shunt trip (MX1): When energized, the shunt trip instantaneously opens the circuit breaker. The shunt trip may be supplied continuously or intermittently.

Shunt close (XF): Remotely closes the circuit breaker if the spring mechanism is charged.
Table 14:  Shunt Trip and Shunt Close Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>MX1</th>
<th>XF</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Ratings (V_n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vac 50/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 Vac</td>
<td>17 Vac</td>
<td>26 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 Vac</td>
<td>34 Vac</td>
<td>52 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 Vac</td>
<td>60 Vac</td>
<td>132 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240 Vac</td>
<td>168 Vac</td>
<td>264 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>277 Vac</td>
<td>194 Vac</td>
<td>304 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>380 Vac</td>
<td>266 Vac</td>
<td>418 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>480 Vac</td>
<td>336 Vac</td>
<td>528 Vac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Vdc</td>
<td>8 Vdc</td>
<td>13 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 Vdc</td>
<td>17 Vdc</td>
<td>26 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 Vdc</td>
<td>34 Vdc</td>
<td>52 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125 Vdc</td>
<td>88 Vdc</td>
<td>137 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>250 Vdc</td>
<td>175 Vdc</td>
<td>275 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Threshold</td>
<td>0.7 to 1.1 V_n</td>
<td>0.85 to 1.1 V_n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Consumption (VA or W)</td>
<td>Steady-State/Inrush</td>
<td>4.5/200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit Breaker Response Time at V_n</td>
<td>50 ms ±10</td>
<td>70 ms ±10 (NW ≤ 4000 A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>80 ms ±10 (NW &gt; 4000 A)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Shunt trip (MX1) and shunt close (XF) circuits must be energized for minimum of 200 ms.

**Additional Shunt Trip (MX2) or Undervoltage Trip (MN)**

This function opens the circuit breaker via an electrical order.

It is made up of:

- Shunt trip (MX2, second MX) or,
- Undervoltage trip (MN)
  - Instantaneous trip
  - Fixed undervoltage trip (time delayed) or,
  - Adjustable undervoltage trip (time delayed)

As shown in the wiring diagram for the remote tripping function below, the delay unit (installed outside the circuit breaker) may be disabled by an emergency off button to obtain non-delayed opening of the circuit breaker.

**Figure 8: Wire Diagram for the Remote Tripping Function**

When energized, the shunt trip (MX1) instantaneously opens the circuit breaker. A continuous supply of power to the second shunt trip (MX2) locks the circuit breaker in the off position.

The undervoltage trip (MN) instantaneously opens the circuit breaker when its supply voltage drops to a value between 35% and 70% of its rated voltage.

If the undervoltage trip is not energized, it is impossible to close the circuit breaker, either manually or electrically. An attempt to close the circuit breaker produces no movement of the main contacts. Closing is allowed when the supply voltage of the undervoltage trip reaches 85% of rated voltage.
Time-Delay Module for Undervoltage Trip

To eliminate circuit breaker nuisance tripping during temporary voltage dips (micro-breaks), operation of the undervoltage trip (MN) can be delayed. This function is achieved by adding an external delay unit (either adjustable or non-adjustable) to the undervoltage trip (MN) circuit.

Table 15: Undervoltage Trip Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>MX2</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Ratings (V&lt;sub&gt;n&lt;/sub&gt;) 50/60 Hz</td>
<td>Vac</td>
<td>24 Vac</td>
<td>17 Vac</td>
</tr>
<tr>
<td></td>
<td>48 Vac</td>
<td>34 Vac</td>
<td>52 Vac</td>
</tr>
<tr>
<td></td>
<td>120 Vac</td>
<td>60 Vac</td>
<td>132 Vac</td>
</tr>
<tr>
<td></td>
<td>240 Vac</td>
<td>168 Vac</td>
<td>264 Vac</td>
</tr>
<tr>
<td></td>
<td>277 Vac</td>
<td>194 Vac</td>
<td>304 Vac</td>
</tr>
<tr>
<td></td>
<td>380 Vac</td>
<td>266 Vac</td>
<td>418 Vac</td>
</tr>
<tr>
<td></td>
<td>480 Vac</td>
<td>336 Vac</td>
<td>528 Vac</td>
</tr>
<tr>
<td>Voltage Ratings (V&lt;sub&gt;d&lt;/sub&gt;)</td>
<td>12 Vdc</td>
<td>8 Vdc</td>
<td>13 Vdc</td>
</tr>
<tr>
<td></td>
<td>24 Vdc</td>
<td>17 Vdc</td>
<td>26 Vdc</td>
</tr>
<tr>
<td></td>
<td>48 Vdc</td>
<td>34 Vdc</td>
<td>52 Vdc</td>
</tr>
<tr>
<td></td>
<td>125 Vdc</td>
<td>88 Vdc</td>
<td>137 Vdc</td>
</tr>
<tr>
<td></td>
<td>250 Vdc</td>
<td>175 Vdc</td>
<td>275 Vdc</td>
</tr>
<tr>
<td>Power Consumption (VA or W)</td>
<td>Constant/Inrush</td>
<td>4.5/200</td>
<td></td>
</tr>
<tr>
<td>Circuit Breaker Response Time at V&lt;sub&gt;n&lt;/sub&gt;</td>
<td>50 ms ±10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time-Delay Module Characteristics

Table 16: Time-Delay Module Characteristics

<table>
<thead>
<tr>
<th>Voltage Ratings of Undervoltage Trip</th>
<th>Vac 50/60 Hz</th>
<th>24/30, 48/60, 100/130, 200/250, 380/480</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Ratings of Time-Delay Module</td>
<td>Vdc</td>
<td>24/30, 48/60, 100/130, 200/250</td>
</tr>
<tr>
<td>Adjustable</td>
<td>Vac 50/60 Hz</td>
<td>48/60, 100/130, 200/250, 380/480</td>
</tr>
<tr>
<td></td>
<td>Vdc</td>
<td>48/60, 100/130, 200/250</td>
</tr>
<tr>
<td>Non-Adjustable</td>
<td>Vac 50/60 Hz</td>
<td>100/130, 200/250</td>
</tr>
<tr>
<td></td>
<td>Vdc</td>
<td>100/130, 200/250</td>
</tr>
<tr>
<td>Operating Threshold</td>
<td>Opening</td>
<td>0.35 to 0.7 V&lt;sub&gt;n&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>Closing</td>
<td>0.85 V&lt;sub&gt;n&lt;/sub&gt;</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>4.5 VA/W (Holding), 200 VA/W (Inrush)</td>
<td></td>
</tr>
<tr>
<td>Time-Delay Settings</td>
<td>Adjustable</td>
<td>0.5, 0.9, 1.5, and 3.0 s</td>
</tr>
<tr>
<td></td>
<td>Non-Adjustable</td>
<td>0.25 s</td>
</tr>
</tbody>
</table>
Switches

Ready-to-Close Switch (PF)

The ready-to-close position switch indicates that the following conditions are met and the circuit breaker can be closed:

- The circuit breaker is open
- The closing springs are charged
- There is no standing closing or opening order

Table 17: Ready-to-Close Switch Characteristics

<table>
<thead>
<tr>
<th>Type of Contact</th>
<th>Maximum Number of Contacts</th>
<th>Standard: 100 mA/24V minimum load</th>
<th>Low-Level: 2 mA/15 V minimum load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a/1b Form C</td>
<td>1</td>
<td>240/380 Vac 5 A</td>
<td>240 Vac 3 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>480 Vac 5 A</td>
<td>240/380 Vac 3 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>600/690 Vac 3 A</td>
<td>380 Vac 3 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24/48 Vdc 3 A</td>
<td>24/48 Vdc 3 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>240 Vdc 0.3 A</td>
<td>125 Vdc 0.3 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>380 Vdc 0.15 A</td>
<td>250 Vdc 0.15 A</td>
</tr>
</tbody>
</table>

Electrical Closing Push Button (BPFE)

Located on the front panel of the circuit breaker, this push button carries out electrical closing of the circuit breaker, taking into account all of the safety functions that are part of the control/monitoring system of the installation. The push button is installed on the control circuit of the shunt close, and connects to the communicating shunt close module (XF-COM). Terminal A2 of XF-COM is used to remotely close the circuit breaker.

Remote Reset (RES) and Automatic Reset After Fault Trip

- Following tripping, the remote reset (RES) resets the overcurrent trip switch (SDE) and the mechanical indicator. (Voltage rating: 110/130 Vac and 200/240 Vac.) RES is not compatible with an additional overcurrent trip switch (SDE2).
- Automatic reset after fault-trip: Following tripping, a reset of the mechanical indicator (reset button) is no longer required to enable circuit breaker closing (factory adjustable only).
Auxiliary Switch (OF)

The rotary-type auxiliary switches are directly driven by the trip mechanism when the minimum isolation distance between the main circuit breaker contact is reached.

Table 18: Auxiliary Switch Characteristics

<table>
<thead>
<tr>
<th>Supplied as Standard (Form C)</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Number of Contacts</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vac</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>240/380</td>
<td>10 A</td>
</tr>
<tr>
<td>480</td>
<td>10 A</td>
</tr>
<tr>
<td>600/690</td>
<td>6 A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vdc</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24/48</td>
<td>10 A</td>
</tr>
<tr>
<td>240</td>
<td>10 A</td>
</tr>
<tr>
<td>380</td>
<td>3 A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Breaking Capacity at a Power Factor (p.f.) of 0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Level (1 mA/4 V minimum load with a maximum current and voltage of 100 mA/10 V. Note: If the maximum voltage and current is exceeded, the low-level function of the switch will be lost but the switch will continue to function as a standard switch with the following specifications.</td>
</tr>
<tr>
<td>Vac</td>
</tr>
<tr>
<td>24/48 Vac</td>
</tr>
<tr>
<td>240 Vac</td>
</tr>
<tr>
<td>380 Vac</td>
</tr>
</tbody>
</table>

| Vdc  |                      |
| 24/48 Vdc | 6 A            |
| 125 Vdc   | 6 A            |
| 250 Vdc   | 3 A            |

Overcurrent Trip Switch (SDE)

Circuit breaker tripping due to a fault is signalled by a red mechanical fault indicator (reset) and one overcurrent trip switch (SDE).

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed. An additional overcurrent trip switch (SDE2) is supplied as an option and is not compatible with the remote reset (RES).

Table 19: Overcurrent Trip Switch Characteristics

<table>
<thead>
<tr>
<th>Supplied as Standard</th>
<th>1a/1b Form C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Number of Contacts</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Breaking Capacity at a Power Factor (p.f.) of 0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard: 100 mA/24 V Minimum Load</td>
</tr>
<tr>
<td>240/380 Vac</td>
</tr>
<tr>
<td>480 Vac</td>
</tr>
<tr>
<td>600/690 Vac</td>
</tr>
<tr>
<td>24/48 Vdc</td>
</tr>
<tr>
<td>240 Vdc</td>
</tr>
<tr>
<td>380 Vdc</td>
</tr>
</tbody>
</table>
Masterpact® NW DC Circuit Breakers
Accessories

Connected/Closed Switch (EF)

This switch combines the “device connected” and “device closed” information to produce “circuit closed” information. The connected/closed switch (EF) is supplied as an option and must be used with an additional auxiliary switch (OF) and fits into its connector (it is not available for ring terminals).

Table 20: Connected/Closed Switch Characteristics

<table>
<thead>
<tr>
<th>Circuit Breaker Type</th>
<th>NW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Number of Contacts</td>
<td>8a/8b Form C</td>
</tr>
<tr>
<td>Breaking Capacity at a Power Factor (p.f.) of 0.3</td>
<td></td>
</tr>
<tr>
<td>Standard: 100 mA/24 V Minimum Load</td>
<td>Low-Level: 2 mA/15 V Minimum Load</td>
</tr>
<tr>
<td>240/380 Vac</td>
<td>6 A</td>
</tr>
<tr>
<td>480 Vac</td>
<td>6 A</td>
</tr>
<tr>
<td>600/690 Vac</td>
<td>6 A</td>
</tr>
<tr>
<td>24/48 Vdc</td>
<td>2.5 A</td>
</tr>
<tr>
<td>125 Vdc</td>
<td>0.8 A</td>
</tr>
<tr>
<td>250 Vdc</td>
<td>0.3 A</td>
</tr>
</tbody>
</table>

Cradle Position Switch

Three series of optional auxiliary switches are available for the cradle:

- Cradle position switches (CE) to indicate the connected position.
- Cradle position switches (CD) to indicate the disconnected position. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached.
- Cradle position switches (CT) to indicate the test position. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Table 21: Cradle Position Switch Characteristics

<table>
<thead>
<tr>
<th>Circuit Breaker Type</th>
<th>NW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Push-In Switches with Standard Actuators</td>
<td></td>
</tr>
<tr>
<td>3 3 3</td>
<td></td>
</tr>
<tr>
<td>With Additional Actuators</td>
<td></td>
</tr>
<tr>
<td>9 0 0</td>
<td></td>
</tr>
<tr>
<td>6 3 0</td>
<td></td>
</tr>
<tr>
<td>3 6 0</td>
<td></td>
</tr>
<tr>
<td>6 0 3</td>
<td></td>
</tr>
</tbody>
</table>

* Possible Ring-Terminal Combinations

| CE | CD | CT |
| 1b | 1a | 1b |
| 1b | 1a, 1b | 1b |
| 1a, 2b | 1a, 2b | 1a |
| 1a, 2b | 2a, 1b | 1b |
| 2a, 1b | 1a, 2b | 1b |
| 1a | 1a | 1a |
| 3a | 3a | 1a |
| 3b | 3a | 1b |

Additional Actuators for Cradle Position Switches on Masterpact NW Circuit Breakers

A set of additional actuators may be installed on the cradle to change or add the functions of the cradle position switches. Each standard actuator can be replaced by any other actuator to change the function of the cradle position switch.
### Cradle Connections

**Table 22: Masterpact NW UL Listed Circuit Breaker Connectors (Rear Connections)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Connector</th>
<th>Drawout Circuit Breaker</th>
<th>Fixed Circuit Breaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear-Connected &quot;T&quot; Vertical (RCTV)</td>
<td>800–2500 A</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>3000–4000 A</td>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>Rear-Connected &quot;T&quot; Horizontal (RCTH)</td>
<td>800–2500 A</td>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>3000–4000 A</td>
<td><img src="image10.png" alt="Image" /></td>
<td><img src="image11.png" alt="Image" /></td>
<td><img src="image12.png" alt="Image" /></td>
</tr>
</tbody>
</table>
## Table 23: Masterpact NW IEC Rated 3P/4P Drawout Circuit Breakers

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Connector Type</th>
<th>Ampere Rating</th>
<th>Connector and Bussing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version C (3P)</td>
<td>RCTV</td>
<td>1000–2000 A</td>
<td><img src="image1.png" alt="Diagram of RCTV 1000-2000 A" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td><img src="image2.png" alt="Diagram of RCTV 4000 A" /></td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>1000–2000 A</td>
<td><img src="image3.png" alt="Diagram of RCTH 1000-2000 A" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td><img src="image4.png" alt="Diagram of RCTH 4000 A" /></td>
</tr>
</tbody>
</table>
Table 23: Masterpact NW IEC Rated 3P/4P Drawout Circuit Breakers (continued)

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Connector Type</th>
<th>Ampere Rating</th>
<th>Connector and Bussing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version D (3P)</td>
<td>RCTV</td>
<td>1000–2000 A</td>
<td><img src="RCTV_1000-2000_A.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td><img src="RCTV_4000_A.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>1000–2000 A</td>
<td><img src="RCTH_1000-2000_A.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td><img src="RCTH_4000_A.png" alt="Image" /></td>
</tr>
</tbody>
</table>

NA: Not Available

Continued on next page
### Table 23: Masterpact NW IEC Rated 3P/4P Drawout Circuit Breakers (continued)

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Connector Type</th>
<th>Ampere Rating</th>
<th>Connector and Bussing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RCTV</td>
<td>1000–2000 A</td>
<td>Ø146 Ø196 Ø236 Ø296 Ø386 Ø476 Ø596 Ø676 Ø836 Ø1006 Ø1206 Ø1306 Ø1406 Ø1516 Ø1686 Ø1946 Ø2216 Ø2486 Ø2756 Ø3026 Ø3396 Ø3736 Ø4096 Ø4466 Ø4836 Ø5206 Ø5576 Ø5946 Ø6316 Ø6686 Ø7056 Ø7426 Ø7796 Ø8166 Ø8536 Ø8906 Ø9276 Ø9646 Ø10016 Ø10386 Ø10756 Ø11126 Ø11496 Ø11866 Ø12236 Ø12596 Ø12966 Ø13336 Ø13696 Ø14066 Ø14436 Ø14796 Ø15166 Ø15536 Ø15896 Ø16266 Ø16636 Ø16996 Ø17366 Ø17736 Ø18096 Ø18466 Ø18836 Ø19206 Ø19576 Ø19946 Ø20316 Ø20686 Ø21056 Ø21426 Ø21796 Ø22166 Ø22536 Ø22896 Ø23266 Ø23636 Ø23996 Ø24366 Ø24736 Ø25106 Ø25476 Ø25846 Ø26216 Ø26586 Ø26956 Ø27326 Ø27696 Ø28066 Ø28436 Ø28806 Ø29176 Ø29546 Ø29916 Ø30286 Ø30656 Ø31026 Ø31396 Ø31766 Ø32136 Ø32496 Ø32866 Ø33236 Ø33606 Ø33976 Ø34346 Ø34716 Ø35086 Ø35456 Ø35826 Ø36196 Ø36566 Ø36936 Ø37306 Ø37676 Ø38046 Ø38416 Ø38786 Ø39156 Ø39526 Ø39896 Ø40266 Ø40636 Ø40996 Ø41366 Ø41736 Ø42106 Ø42476 Ø42846 Ø43216 Ø43586 Ø43956 Ø44326 Ø44696 Ø45066 Ø45436 Ø45796 Ø46166 Ø46536 Ø46896 Ø47266 Ø47636 Ø47996 Ø48366 Ø48736 Ø49106 Ø49476 Ø49846 Ø50216 Ø50586 Ø50956 Ø51326 Ø51696 Ø52066 Ø52436 Ø52796 Ø53166 Ø53536 Ø53896 Ø54266 Ø54636 Ø54996 Ø55366 Ø55736 Ø56096 Ø56466 Ø56836 Ø57196 Ø57566 Ø57936 Ø58296 Ø58666 Ø59036 Ø59396 Ø59766 Ø60136 Ø60496 Ø60866 Ø61236 Ø61596 Ø61966 Ø62336 Ø62696 Ø63066 Ø63436 Ø63796 Ø64166 Ø64536 Ø64896 Ø65266 Ø65636 Ø65996 Ø66366 Ø66736 Ø67096 Ø67466 Ø67836 Ø68196 Ø68566 Ø68936 Ø69296 Ø69666 Ø69996 Ø70266 Ø70636 Ø70996 Ø71366 Ø71736 Ø72096 Ø72466 Ø72836 Ø73196 Ø73566 Ø73936 Ø74296 Ø74666 Ø74996 Ø75466 Ø75836 Ø76196 Ø76566 Ø76936 Ø77296 Ø77566 Ø77936 Ø78396 Ø78766 Ø79136 Ø79496 Ø79866 Ø80236 Ø80596 Ø80966 Ø81336 Ø81696 Ø82066 Ø82436 Ø82796 Ø83166 Ø83536 Ø83896 Ø84266 Ø84636 Ø84996 Ø85366 Ø85736 Ø86096 Ø86466 Ø86836 Ø87196 Ø87566 Ø87936 Ø88296 Ø88666 Ø88996 Ø89366 Ø89736 Ø90096 Ø90466 Ø90836 Ø91196 Ø91566 Ø91936 Ø92296 Ø92666 Ø92996 Ø93366 Ø93736 Ø94096 Ø94466 Ø94836 Ø95196 Ø95566 Ø95936 Ø96296 Ø96666 Ø96996 Ø97366 Ø97736 Ø98096 Ø98466 Ø98836 Ø99196 Ø99566 Ø99966</td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>1000–2000 A</td>
<td>06135572 06135573</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td>06135571</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td></td>
<td>06135572 06135573</td>
</tr>
</tbody>
</table>
### Table 24: Masterpact NW IEC Rated 3P/4P Fixed Circuit Breakers

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Connector Type</th>
<th>Ampere Rating</th>
<th>Connectors and Bussing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version C (3P)</td>
<td>RCTV</td>
<td>1000–2000 A</td>
<td>[Diagram]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>1000–2000 A</td>
<td>[Diagram]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td>NA</td>
</tr>
</tbody>
</table>

Continued on next page
### Table 24: Masterpact NW IEC Rated 3P/4P Fixed Circuit Breakers (continued)

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Connector Type</th>
<th>Ampere Rating</th>
<th>Connectors and Bussing</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCTV</td>
<td></td>
<td>1000–2000 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td></td>
</tr>
<tr>
<td>RCTH</td>
<td></td>
<td>1000–2000 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td>NA</td>
</tr>
</tbody>
</table>

*Continued on next page*
Table 24:  Masterpact NW IEC Rated 3P/4P Fixed Circuit Breakers *(continued)*

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Connector Type</th>
<th>Ampere Rating</th>
<th>Connectors and Bussing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td><a href="#">Diagram</a></td>
</tr>
<tr>
<td></td>
<td>RCTH</td>
<td>1000–2000 A</td>
<td><a href="#">Diagram</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 A</td>
<td>NA <a href="#">Diagram</a></td>
</tr>
</tbody>
</table>
Masterpact® NW DC Circuit Breakers
Accessories

Circuit Breaker Locking and Interlocking

Push Button Lock

A transparent cover blocks access to the push buttons used to open and close the device. It is possible to independently lock the opening button and/or the closing button. The push buttons may be locked using:

- One to three padlocks: 3/16–5/16 in. diameter, not supplied
- A lead seal
- Two screws

Open Position Padlock and Key Lock Provisions

The circuit breaker is locked in the off position by physically keeping the opening push button pressed down using one of the following:

- One to three padlocks: 3/16–5/16 in. diameter, not supplied
- Key locks: One or two Kirk® or Federal Pioneer® key locks (keyed alike or differently) are available for UL® Listed/ANSI Certified circuit breakers; for IEC Rated circuit breakers, Ronis, Castell, or Profalux key locks are available

Keys may be removed only when locking is effective. The key locks are available in any of the following configurations:

- One key lock
- One key lock mounted on the device + one identical key lock supplied separately for interlocking with another device
- Two different key locks mounted on the circuit breaker for double locking

A locking kit for installation of one or two key locks may be ordered separately.

Table 25: Circuit Breaker and Switch Locking Options

<table>
<thead>
<tr>
<th>Type of Locking</th>
<th>Maximum Number of Locks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pushbutton Locking Using padlocks</td>
<td>Three padlocks</td>
</tr>
<tr>
<td>Open Position Locking Using key locks</td>
<td>Two key locks (optional)</td>
</tr>
<tr>
<td>Open Position Locking Using padlocks and key locks</td>
<td>Up to three padlocks and two key locks (optional)</td>
</tr>
</tbody>
</table>

Cradle Locking and Interlocking

Disconnected Position Locking

The circuit breaker can be locked in the disconnected position by key interlock (optional) or padlock (standard). The key interlock is on the cradle and accessible with the door locked.

- Key interlock, Kirk or Federal Pioneer are available for UL/ANSI circuit breakers; for IEC circuit breakers, Ronis, Castell, or Profalux key locks are available. Captive key when unlocked.
- Locking on disconnected, test, and connected positions is optional for IEC circuit breakers and standard for UL/ANSI circuit breakers.
Door Interlock

The door interlock prevents the compartment door from being opened when the circuit breaker is in the connected or test position. If the circuit breaker is put into the connected position with the door open, the door can be closed without disconnecting the circuit breaker. For greater protection, this interlock can be used in conjunction with the open door racking interlock.

Racking Interlock Between Racking Crank and Off Position

The racking interlock is standard for UL® and ANSI circuit breakers, and optional for IEC circuit breakers. It prevents insertion of the racking crank unless the OFF push button is pressed.

Cable Door Interlock Kit

This option prevents the compartment door from being opened when the circuit breaker is in the closed position. This kit includes:

Figure 9: Cable Door Interlock Kit Contents

<table>
<thead>
<tr>
<th>Kit Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Panel Interlocking Plate</td>
</tr>
<tr>
<td>(B) Circuit Breaker Interlocking Plate</td>
</tr>
<tr>
<td>(C) Interlocking Cables</td>
</tr>
<tr>
<td>(D) Bolts with Washers</td>
</tr>
<tr>
<td>(E) Guide-Bolt with Washer</td>
</tr>
<tr>
<td>(F) Interlocking Bracket</td>
</tr>
<tr>
<td>(G) Calibration Tray</td>
</tr>
</tbody>
</table>

Source Changeover Interlocks

Source changeover interlocks allow mechanical interlocking between two or three circuit breakers (fixed and drawout).

Figure 10: Source Changeover Interlocks

Interlocking Two Circuit Breakers
- Interlocking Two Mains Using Rods
- Interlocking Two Mains Using Cables

Interlocking Three Circuit Breakers Using Cables
- Interlocking Two Mains and One Generator
- Interlocking Two Mains and One Tie
- Interlocking Three Mains
Masterpact® NW DC Circuit Breakers
Accessories

Open Door Racking Interlock

The racking interlock prevents racking in the circuit breaker when the door is open. (Insertion of the
 circuit breaker racking crank is not possible when the compartment door is open.)

Automatic Spring Discharge Mechanism

The automatic spring discharge mechanism is standard for UL and ANSI circuit breakers, and optional
 for IEC circuit breakers. It releases the closing spring energy when the circuit breaker is moved from
 the disconnected position to the fully withdrawn position.

Cradle Rejection Kits

The cradle rejection feature (standard) ensures that only the properly designated circuit breaker or
 switch is matched with the selected cradle assembly.

Figure 11: Cradle Rejection Kits

Rail Padlocking

Rail padlocking is standard for UL, ANSI, and IEC cradles. When used in combination with the
 disconnected position locking device, rail padlocking prevents the movement of the circuit breaker from
 the disconnected position to the fully withdrawn position when the padlock hasp is pulled out and locked.

Miscellaneous Accessories

Mechanical Operation Counter (CDM)

The mechanical operation counter (CDM) registers the total number of operating cycles. One CDM is
 installed per circuit breaker.
Shutter and Shutter Lock

The shutters automatically block access to the main disconnects when the circuit breaker is in the disconnected, test, or fully withdrawn position. The shutter lock is used to prevent connection of the circuit breaker or to lock the shutters in the closed position.

Door Escutcheon (CDP)

These door escutcheons provide a frame and seal for the circuit breaker.

Figure 12: Door Escutcheons

Transparent Cover (CCP) for Door Escutcheon

The cover is hinged-mounted and locked with a milled head, and is designed to be installed on the door escutcheon.
**Section 4—Wiring Diagrams**

**NOTE:** All diagrams are showing circuit breaker open, connected and charged.

**Figure 13:** Wiring Diagrams for Masterpact NW Circuit Breakers

- **Trip Unit**
- **Cell Switches**

### Markings for Push-In Type Terminals

<table>
<thead>
<tr>
<th>Cell Switches</th>
<th>Trip Unit</th>
<th>Cell Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD3</td>
<td>COM</td>
<td>CD3</td>
</tr>
<tr>
<td>CD2</td>
<td>UC1</td>
<td>CD2</td>
</tr>
<tr>
<td>CD1</td>
<td>UC2</td>
<td>CD1</td>
</tr>
<tr>
<td>834</td>
<td>E5</td>
<td>814</td>
</tr>
<tr>
<td>824</td>
<td>E6</td>
<td>812</td>
</tr>
<tr>
<td>814</td>
<td>Z5</td>
<td>811</td>
</tr>
<tr>
<td>832</td>
<td>Z6</td>
<td>822</td>
</tr>
<tr>
<td>822</td>
<td>Z7</td>
<td>824</td>
</tr>
<tr>
<td>824</td>
<td>M2</td>
<td>824</td>
</tr>
<tr>
<td>812</td>
<td>M3</td>
<td>812</td>
</tr>
<tr>
<td>814</td>
<td>P2⁺</td>
<td>814</td>
</tr>
<tr>
<td>831</td>
<td>V3</td>
<td>831</td>
</tr>
<tr>
<td>821</td>
<td>V4</td>
<td>821</td>
</tr>
<tr>
<td>811</td>
<td>V5</td>
<td>811</td>
</tr>
</tbody>
</table>

or

<table>
<thead>
<tr>
<th>CE6</th>
<th>CE3</th>
<th>CE5</th>
<th>CE4</th>
</tr>
</thead>
<tbody>
<tr>
<td>364</td>
<td>484/Q3</td>
<td>354</td>
<td>344</td>
</tr>
<tr>
<td>362</td>
<td>184/K2</td>
<td>352</td>
<td>342</td>
</tr>
<tr>
<td>361</td>
<td>181/K1</td>
<td>351</td>
<td>341</td>
</tr>
</tbody>
</table>

### Markings for Ring Terminals

<table>
<thead>
<tr>
<th>Cell Switches</th>
<th>Trip Unit</th>
<th>Cell Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD3</td>
<td>COM</td>
<td>CD3</td>
</tr>
<tr>
<td>CD2</td>
<td>UC1</td>
<td>CD2</td>
</tr>
<tr>
<td>CD1</td>
<td>UC2</td>
<td>CD1</td>
</tr>
<tr>
<td>834/832</td>
<td>E5</td>
<td>814/812</td>
</tr>
<tr>
<td>824/822</td>
<td>E6</td>
<td>822/824</td>
</tr>
<tr>
<td>814/812</td>
<td>Z5</td>
<td>811/811</td>
</tr>
<tr>
<td>831</td>
<td>Z6</td>
<td>821</td>
</tr>
<tr>
<td>821</td>
<td>Z7</td>
<td>824</td>
</tr>
<tr>
<td>824</td>
<td>M2</td>
<td>824</td>
</tr>
<tr>
<td>812</td>
<td>M3</td>
<td>812</td>
</tr>
<tr>
<td>814</td>
<td>F2⁺</td>
<td>814</td>
</tr>
<tr>
<td>831</td>
<td>VN</td>
<td>831</td>
</tr>
<tr>
<td>821</td>
<td>V2</td>
<td>821</td>
</tr>
<tr>
<td>811</td>
<td>V3</td>
<td>811</td>
</tr>
</tbody>
</table>

- = Not available on this circuit breaker
NOTE: All diagrams are showing circuit breaker open, connected and charged.

Figure 14: Wiring Diagrams for Auxiliary Connections

Markings for Push-In Type Terminals

<table>
<thead>
<tr>
<th>Remote Operation</th>
<th>Auxiliary Switches</th>
<th>Cell Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN/MX2</td>
<td>MX1</td>
<td>XF</td>
</tr>
<tr>
<td>D2/C12</td>
<td>C2</td>
<td>A2</td>
</tr>
<tr>
<td>C13</td>
<td>C3</td>
<td>A3</td>
</tr>
<tr>
<td>D1/C11</td>
<td>C1</td>
<td>A1</td>
</tr>
</tbody>
</table>

Markings for Ring Terminals

<table>
<thead>
<tr>
<th>Remote Operation</th>
<th>Auxiliary Switches</th>
<th>Cell Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>MX1</td>
<td>MX1a</td>
</tr>
<tr>
<td>O</td>
<td>D1</td>
<td>C1</td>
</tr>
</tbody>
</table>

A—When remote operation features are used, make sure there is a minimum of four seconds for the spring charging motor (MCH) to completely charge the circuit breaker closing springs prior to actuating the shunt close (XF) device.
# Additional Wiring Information

## Alarm Contacts (OF1, OF2, OF3 and OF4 are standard equipment)

<table>
<thead>
<tr>
<th>OF4</th>
<th>Open/Closed Circuit Breaker or Switch Position Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>OF3</td>
<td></td>
</tr>
<tr>
<td>OF2</td>
<td></td>
</tr>
<tr>
<td>OF1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OF24</th>
<th>Open/Closed Circuit Breaker or Switch Position Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td>EF24: Combined Connected and Closed Contact</td>
</tr>
</tbody>
</table>

| OF23 or EF23 |
| OF22 or EF22 |
| OF21 or EF21 |
| OF14 or EF14 |
| OF13 or EF13 |
| OF12 or EF12 |
| OF22 or EF22 |
| OF11 or EF11 |

## Cradle Contacts

<table>
<thead>
<tr>
<th>CD3</th>
<th>Disconnected Position Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD2</td>
<td></td>
</tr>
<tr>
<td>CD1</td>
<td>or</td>
</tr>
<tr>
<td></td>
<td>Connected Position Contacts</td>
</tr>
<tr>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td>Connected Position Contacts</td>
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<tr>
<td></td>
<td>or</td>
</tr>
<tr>
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<td>Connected Position Contacts</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CE3</th>
<th>Connected Position Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE2</td>
<td></td>
</tr>
<tr>
<td>CE1</td>
<td>or</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CT3</th>
<th>Test Position Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT2</td>
<td></td>
</tr>
<tr>
<td>CT1</td>
<td>or</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Connected Position Contacts</th>
</tr>
</thead>
<tbody>
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<td>CE8</td>
<td></td>
</tr>
<tr>
<td>CE7</td>
<td>or</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Disconnected Position Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD5</td>
<td></td>
</tr>
<tr>
<td>CD4</td>
<td>or</td>
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</tbody>
</table>

## Remote Operation

<table>
<thead>
<tr>
<th>SDE</th>
<th>Electrical Fault Alarm Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>RES</td>
<td>Remote Reset</td>
</tr>
<tr>
<td>MN</td>
<td>Undervoltage Trip Device</td>
</tr>
<tr>
<td>MX</td>
<td>Shunt Trip</td>
</tr>
<tr>
<td>XF</td>
<td>Shunt Close</td>
</tr>
<tr>
<td>PF</td>
<td>Ready-to-Close Contact</td>
</tr>
<tr>
<td>MCH</td>
<td>Spring-Charging Motor</td>
</tr>
</tbody>
</table>
Section 5—Dimensional Drawings

Enclosure Information

Table 26: Minimum Enclosure Information

<table>
<thead>
<tr>
<th>Number of Poles</th>
<th>Circuit Breaker</th>
<th>Circuit Breaker Enclosure Dimensions (H x W x D)</th>
<th>Ventilation Area</th>
<th>Top</th>
<th>Bottom</th>
<th>Front Face</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>in. x mm x in. mm</td>
<td>in.²  mm²</td>
<td>in.²  mm²</td>
<td>in.²  mm²</td>
<td>in.²  mm²</td>
</tr>
<tr>
<td>3P</td>
<td>UL® Listed</td>
<td>18.37 x 30.00 x 15.75 466.6 x 762.0 x 400</td>
<td>16.62 10 720</td>
<td>16.62 10 720</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

UL 3P Drawout Circuit Breakers

Figure 15: 800–2500 A Master Drawing

1. Minimum to withdraw circuit breaker.
2. Distance to drawout position.
3. Circuit breaker mounting surface.
4. Minimum for circuit breaker racking handle.
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 16: 800–2500 A Rear-Connected "T" Vertical (RCTV)

Figure 17: 800–2500 A Rear Connected "T" Horizontal (RCTH)
Figure 18: 3000–4000 A Rear Connected "T" Horizontal (RCTV)

Figure 19: 3000–4000 A Rear Connected "T" Horizontal (RCTH)
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 20: Drawout Cradle Mounting

Dimensions: in. mm

Figure 21: Door Cutout

Dimensions: in. mm
Figure 22: Door Escutcheon Hole Pattern
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

UL 3P Fixed Circuit Breakers

Figure 23: 800–4000 A Master Drawing

Figure 24: 800–2500 A Rear Connected "T" Vertical (RCTV)
Figure 25: 800–2500 A Rear Connected "T" Horizontal (RCTH)

Figure 26: 3000–4000 A Rear Connected "T" Vertical (RCTV)
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 27: 3000–4000 A Rear Connected "T" Horizontal (RCTH)

Figure 28: Door Cutout

Figure 29: Circuit Breaker Mounting
IEC 3P Drawout Circuit Breakers

Figure 30: 1000–2000 A Version “C” Rear Connected "T" Vertical (RCTV)
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 31: 1000–2000 A Version “C” Rear Connected “T” Horizontal (RCTH)

Figure 32: 4000 A Version “C” Rear Connected “T” Vertical (RCTV)
Figure 33: 1000–2000 A Version “D” Rear Connected "T" Vertical (RCTV)

Figure 34: 1000–2000 A Version “D” Rear Connected "T" Horizontal (RCTH)
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 35: 4000 A Version “D” Rear Connected “T” Vertical (RCTV)
IEC 4P Drawout Circuit Breakers

Figure 36: 1000–2000 A Version “E” Rear Connected “T” Vertical (RCTV)
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 37: 1000–2000 A Version “E” Rear Connected “T” Horizontal (RCTH)

Figure 38: 4000 A Version “E” Rear Connected “T” Vertical (RCTV)
IEC 3P Fixed Circuit Breakers

Figure 39: 1000–2000 A Version “C” Rear Connected "T" Vertical (RCTV)

Figure 40: 1000–2000 A Version “C” Rear Connected "T" Horizontal (RCTH)
Masterpact® NW DC Circuit Breakers
Dimensional Drawings

Figure 41: 4000 A Version “C” Rear Connected “T” Vertical (RCTV)

Dimensions: in. [mm]

Figure 42: 1000–2000 A Version “D” Rear Connected “T” Vertical (RCTV)
Figure 43: 1000–2000 A Version “D” Rear Connected “T” Horizontal (RCTH)

Figure 44: 4000 A Version “D” Rear Connected “T” Vertical (RCTV)
Figure 45: 1000–2000 A Version “E” Rear Connected “T” Vertical (RCTV)

Dimensions: in. mm

- TOP VIEW
- BACK VIEW
- SIDE VIEW

Dimensions: in. mm
**Masterpact® NW DC Circuit Breakers**

**Dimensional Drawings**

Figure 46: 1000–2000 A Version “E” Rear Connected “T” Horizontal (RCTH)

![Diagram of 1000–2000 A Version “E” Rear Connected “T” Horizontal (RCTH)]

Figure 47: 4000 A Version “E” Rear Connected “T” Vertical (RCTV)

![Diagram of 4000 A Version “E” Rear Connected “T” Vertical (RCTV)]
Section 6—Trip Curves

Figure 48: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 5 ms (IEC) or 8 ms (UL)

- 1250–2500 A Sensors
- 2500–5400 A Sensors
- 5000–11000 A Sensors
Figure 49: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 5 ms

1250–2500 A Sensors

2500–5400 A Sensors

5000–11000 A Sensors
Masterpact® NW DC Circuit Breakers
Trip Curves

Figure 50: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 15 ms

1250–2500 A Sensors

2500–5400 A Sensors

5000–11000 A Sensors

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Figure 51: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 15 ms

1250–2500 A Sensors

2500–5400 A Sensors

5000–11000 A Sensors
Figure 52: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 30 ms

- 1250–2500 A Sensors
- 2500–5400 A Sensors
- 5000–11000 A Sensors

Instantaneous (adjustable from 1.25 to 2.5 kA)

Thermal withstand NW20DC
Thermal withstand NW10DC

Instantaneous (adjustable from 2.5 to 5.4 kA)

Thermal withstand NW40DC
Thermal withstand NW20DC
Thermal withstand NW10DC

Instantaneous (adjust, from 5 to 11 kA)

N (500 V)

N (500 V)
Figure 53: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 30 ms

- 1250–2500 A Sensors
  - Instantaneous (adjustable from 1.25 to 2.5 kA)

- 2500–5400 A Sensors
  - Instantaneous (adjustable from 2.5 to 5.4 kA)

- 5000–11000 A Sensors
  - Instantaneous (adjust. from 5 to 11 kA)
Section 7—Selection

Introduction

Overview of Selection Procedure

1. Select the completely assembled circuit breaker (circuit breaker frame plus trip unit):
   — The frame ampere rating required
   — The system voltage
   — The interruption rating required
   — The grounding system
   — The connections
2. Select circuit breaker frame options, if required.
3. Select cradle options, if required.

Table 27: Circuit Breaker Accessory Options

<table>
<thead>
<tr>
<th>Accessories Available for the Circuit Breaker and Cradle</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Shunt close</td>
</tr>
<tr>
<td>• Shunt trip</td>
</tr>
<tr>
<td>• Undervoltage trip</td>
</tr>
<tr>
<td>• Fixed time delay</td>
</tr>
<tr>
<td>• Adjustable time delay</td>
</tr>
<tr>
<td>• Spring-charging motor</td>
</tr>
<tr>
<td>• Auxiliary contacts (standard)</td>
</tr>
<tr>
<td>• Ready-to-close contact</td>
</tr>
<tr>
<td>• Overcurrent trip switch (standard)</td>
</tr>
<tr>
<td>• Rack in interlock</td>
</tr>
<tr>
<td>• Key locks for circuit breaker and cradle</td>
</tr>
<tr>
<td>• Padlock attachment (circuit breaker + cradle)</td>
</tr>
<tr>
<td>• Mechanical interlocks</td>
</tr>
<tr>
<td>• Cradle position switches</td>
</tr>
<tr>
<td>• Door interlock</td>
</tr>
<tr>
<td>• Operations counter</td>
</tr>
<tr>
<td>• Safety Shutter</td>
</tr>
<tr>
<td>• Cradle rejection kit (standard)</td>
</tr>
<tr>
<td>• Rail Padlocking</td>
</tr>
</tbody>
</table>

Factory-Assembled Circuit Breakers and Switches

Table 28: UL 489 Listed Circuit Breakers

<table>
<thead>
<tr>
<th>Frame Rating (A)</th>
<th>Model Number</th>
<th>Interrupting Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>NW08N</td>
<td>600 Vdc unloaded (500 Vdc loaded)</td>
</tr>
<tr>
<td>1200</td>
<td>NW12N</td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>NW16N</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>NW20N</td>
<td>35 kA</td>
</tr>
<tr>
<td>2500</td>
<td>NW25N</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>NW30N</td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>NW40N</td>
<td></td>
</tr>
</tbody>
</table>
### Table 29: IEC 60947-2 Rated Circuit Breakers

<table>
<thead>
<tr>
<th>Frame Rating (A)</th>
<th>Model Number</th>
<th>Interrupting Rating</th>
<th>500 Vdc</th>
<th>750 Vdc</th>
<th>900 Vdc</th>
<th>500 Vdc</th>
<th>750 Vdc</th>
<th>900 Vdc</th>
<th>500 Vdc</th>
<th>750 Vdc</th>
<th>900 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>NW10N</td>
<td>85 kA</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>35 kA</td>
<td>—</td>
<td>25 kA</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>NW10H</td>
<td>100 kA</td>
<td>85 kA</td>
<td>85 kA</td>
<td>85 kA</td>
<td>50 kA</td>
<td>35 kA</td>
<td>50 kA</td>
<td>50 kA</td>
<td>25 kA</td>
<td>—</td>
</tr>
<tr>
<td>2000</td>
<td>NW20N</td>
<td>85 kA</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>35 kA</td>
<td>—</td>
<td>25 kA</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>NW20H</td>
<td>100 kA</td>
<td>85 kA</td>
<td>85 kA</td>
<td>85 kA</td>
<td>50 kA</td>
<td>35 kA</td>
<td>50 kA</td>
<td>50 kA</td>
<td>25 kA</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>NW40N</td>
<td>85 kA</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>35 kA</td>
<td>—</td>
<td>25 kA</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>NW40H</td>
<td>100 kA</td>
<td>85 kA</td>
<td>85 kA</td>
<td>85 kA</td>
<td>50 kA</td>
<td>35 kA</td>
<td>50 kA</td>
<td>50 kA</td>
<td>25 kA</td>
<td>—</td>
</tr>
</tbody>
</table>

### Switch Selection

### Table 30: IEC 60947-3 Rated, Non-Automatic Switch

<table>
<thead>
<tr>
<th>Frame Rating (A)</th>
<th>Model Number</th>
<th>Making Capacity Icm</th>
<th>Withstand Current Icw (1 s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>NW10HA</td>
<td>85 kA</td>
<td>85 kA</td>
</tr>
<tr>
<td>2000</td>
<td>NW20HA</td>
<td>85 kA</td>
<td>85 kA</td>
</tr>
<tr>
<td>4000</td>
<td>NW40HA</td>
<td>85 kA</td>
<td>85 kA</td>
</tr>
</tbody>
</table>
**REQUEST FOR QUOTATION FORM**

For faster quote processing, please use the following request for quotation form. For each section, check the applicable box or enter values corresponding to your choice. Note: this request for quotation form does not take into account incompatibilities. Order to be placed on CSSS.

### UL Listed Circuit Breaker

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW08</td>
<td></td>
</tr>
<tr>
<td>NW12</td>
<td></td>
</tr>
<tr>
<td>NW16</td>
<td></td>
</tr>
</tbody>
</table>

### Masterpact Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW20</td>
<td></td>
</tr>
<tr>
<td>NW25</td>
<td></td>
</tr>
<tr>
<td>NW30</td>
<td></td>
</tr>
<tr>
<td>NW40</td>
<td></td>
</tr>
</tbody>
</table>

### Circuit Breaker Interruption Rating

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Sensor

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1250 to 2500 A</td>
<td></td>
</tr>
<tr>
<td>2500 to 5400 A</td>
<td></td>
</tr>
<tr>
<td>5000 to 11000 A</td>
<td></td>
</tr>
</tbody>
</table>

### Load Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td>Drawout chassis</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Equipment

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td></td>
</tr>
</tbody>
</table>

### IEC Rated Circuit Breaker or Switch Disconnector

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW10</td>
<td></td>
</tr>
</tbody>
</table>

### Masterpact Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW20</td>
<td></td>
</tr>
<tr>
<td>NW40</td>
<td></td>
</tr>
</tbody>
</table>

### Circuit Breaker Interruption Rating

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

### Switch-Disconnector Interruption Rating

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Sensor

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1250 to 2500 A</td>
<td></td>
</tr>
<tr>
<td>2500 to 5400 A</td>
<td></td>
</tr>
<tr>
<td>5000 to 11000 A</td>
<td></td>
</tr>
</tbody>
</table>

### Load Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Equipment

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td>Drawout</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td></td>
</tr>
</tbody>
</table>

### Accessories for Remote Operation

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring-Charging Motor (MCH)</td>
<td></td>
</tr>
</tbody>
</table>

### Cradle Secondary Disconnects

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-In Terminal (standard)</td>
<td></td>
</tr>
<tr>
<td>Ring Terminal (UL option only)</td>
<td></td>
</tr>
</tbody>
</table>

### Load Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instantaneous</td>
<td></td>
</tr>
<tr>
<td>Fixed-time delay</td>
<td></td>
</tr>
<tr>
<td>Adjustable-time delay</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Equipment

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td>Wiring for cradle without circuit breaker</td>
<td></td>
</tr>
</tbody>
</table>

### Type of Connection

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring for ready-to-close contact (PF)</td>
<td></td>
</tr>
<tr>
<td>Wiring for four additional form C auxiliary switches (push-in terminals) or 2a+2b auxiliary switches (ring terminals (OF))</td>
<td></td>
</tr>
</tbody>
</table>

### Wiring for Cradle

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring for additional overcurrent trip switch (SDE2) or electrical reset (RES)</td>
<td></td>
</tr>
<tr>
<td>Wiring for undervoltage trip (MN) or additional shunt trip (MX2)</td>
<td></td>
</tr>
<tr>
<td>Wiring for shunt trip (MX), shunt close (XF) and spring-charging motor (MCH)</td>
<td></td>
</tr>
<tr>
<td>Wiring for ready-to-close contact (PF)</td>
<td></td>
</tr>
<tr>
<td>Wiring for eight additional form C auxiliary switches (Push-in terminals) (OF)</td>
<td></td>
</tr>
</tbody>
</table>

### Manufacturing Numbers Provided with Quotation

| Circuit Breaker: | Cradle: |

---

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11/2007

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REQUEST FOR QUOTATION FORM

Auxiliary, Alarm and Cradle Position Switches

Auxiliary Switch (OF)
Choose one:
- Push-in type terminal or Ring terminal
  - 4a/4b form C (std.) 2a + 2b
  - 8a/8b form C 4a + 4b
  - 12A/12B form C

Overcurrent trip switches
- Standard (1a/1b form C) (SDE1) standard
- Additional overcurrent trip switches (choose one)
  - 1a/1b form C (incompatible with RES) (SDE2)
  - (1a/1b form C) (incompatible with RES) (low-level (SDE2))

Ready-to-close switch (PF)
- Std
- low-level

Push-in type cradle position switches (1a/1b form C)
- Connected position (max. qty.: 3) qty __
- Test position (max. qty.: 3) qty __
- Disconnected position (max. qty.: 3) qty __

Low-level cradle position switch
- Choose one:
  - Qty.
  - Connected/Closed switch (max. qty.: 8) (EF) ___________
  - Connected/Closed switch (max. qty.: 8) (low-level EF) ___________

Ring terminal type cradle position switches (1a or 1b contact)
- Connected position (max. 3a or 3b) qty/type ___________
- Test position (max. 1a or 1b) qty/type ___________
- Disconnected position (max. 3a or 3b) qty/type ___________

Overcurrent trip switches

Cradle Interlocking and Accessories
- Door interlock
  - Racking interlock between racking crank and Off position
  - std on UL, check for IEC
- Open door racking interlock
  - std on UL, check for IEC
- Automatic spring discharge
  - std on UL, check for IEC
- Cradle rejection kit
  - standard
- Terminal Shield

Miscellaneous Accessories
- Mechanical operation counter
- Shutter
- Shutter with padlock provision and position indicator
- Transparent cover w/ door escutcheon (drawout circuit breaker only)
- Locking and Interlocking
  - Cradle
  - Brkr.

Padlockable push button cover
- Padlock provision only
- Std
- One key lock
  - (Select manufacturer below)
- Two key locks keyed alike
  - (Select manufacturer below)
- Two key locks keyed differently
  - (Select manufacturer below)

Key lock manufacturer
- Kirk
- Ronis
- Federal Pioneer
- Profalux
- Castell

Manufacturing Number (provided with quotation)

Main Circuit Breaker: List Price $ Delivery (from receipt of order) $

Cradle: $

Total $ Delivery Schedule

Circuit Breaker and cradle to be shipped together

Cradle to be shipped prior to circuit breaker

Schneider Electric Conditions of Sale Apply