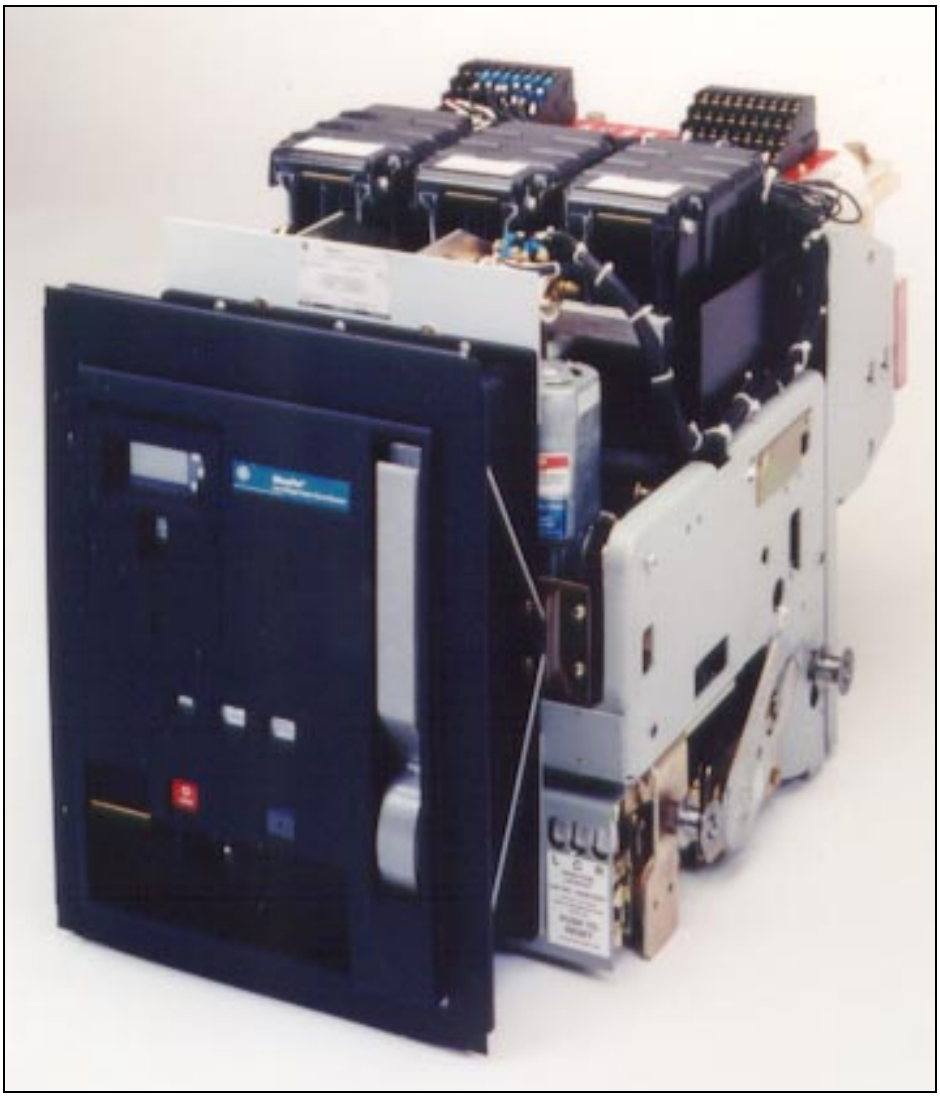
WavePro™ Power Circuit Breakers
800–2000 A Frames, 240–600 Vac

User's Guide



WavePro™
Low Voltage
Power Circuit Breakers

DEH–134

WARNINGS, CAUTIONS, AND NOTES AS USED IN THIS PUBLICATION

WARNINGS

Warning notices are used in this publication to emphasize that hazardous voltages, currents, or other conditions that could cause personal injury are present in this equipment or may be associated with its use.

Warning notices are also used for situations in which inattention or lack of equipment knowledge could cause either personal injury or damage to equipment.

CAUTIONS

Caution notices are used for situations in which equipment might be damaged if care is not taken.

NOTES

Notes call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of its publication. While efforts have been made to ensure accuracy, the information contained herein does not cover all details or variations in hardware and software, nor does it provide for every possible contingency in connection with installation, operation, and maintenance. Features may be described herein that are not present in all hardware and software systems. GE Electrical Distribution & Control assumes no obligation of notice to holders of this document with respect to changes subsequently made.

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1–1 Overview

WavePro 800–2000 ampere power circuit breakers are designed to protect low-voltage power circuits and equipment. They are available with Power+™, MicroVersaTrip Plus™, and MicroVersaTrip PM™ Trip Units.

1–2 Receiving the Breaker

Unpack the circuit breaker and inspect it for shipping damage. Ensure that the breaker has the proper current, voltage, and interruption ratings for the application.

The weights of the various frame sizes are listed in Table 1, for reference.

Breaker Frame	Operation Type	Weight, lb [kg]
800 A	Manual Electrical	200 [91] 205 [93]
800 A Fused	Manual Electrical	245 [111] 250 [114]
1600 A	Manual Electrical	210 [95] 215 [98]
1600 A Fused	Manual Electrical	255 [116] 260 [118]
2000 A	Manual Electrical	215 [98] 220 [100]

Table 1. Weights of various breaker frame sizes.

Storage

The breaker should be placed in service immediately in its permanent location. However, if it must be stored for an indefinite period, it should be carefully protected against condensation, preferably by storage in a warm dry room. Circuit breakers for outdoor equipment should be stored in that equipment only when power is available and heaters are in operation, to prevent condensation.

The breaker should be stored in a clean location, free from corrosive gases or fumes. In particular, protect the breaker from moisture and cement dust, as that combination may be corrosive.

If the breaker is stored for any length of time, it should be inspected periodically to ensure good mechanical condition.

1–3 Preparation for Installation

Check that the primary disconnect fingers are smooth and free of nicks and burrs. If they are dry, apply a thin coat of GE Lubricant D6A15A2 (catalog number183L0907P037) to the contact surfaces.

Accessory Installation

The following accessories may be installed in the breaker, either at the factory when the breaker is built or as field-installable additions. Refer to the instruction sheet supplied with each accessory for catalog numbers and installation instructions.

- Undervoltage Trip Device
- Electric Lockout
- Shunt Trip
- Bell Alarm
- Bell Alarm with Lockout
- Hidden-On Push Button

1–4 Breaker Features

WavePro circuit breakers are equipped with the standard and optional features illustrated in Figure 1. The letters are keyed to the list below the figure.

Figure 1. Front of the WavePro circuit breaker, showing the locations of standard and optional features.

A Trip Unit

B Rating Plug

C Sealable Trip Unit Cover

D Indicator: DISC (white)
TEST (white)
CONN (white)

E Indicator: CHARGED (yellow)
DISCHARGED (white)

F Indicator: CLOSED (red)
OPEN (green)

G CLOSE button

H OPEN button

J Padlock provision

K Draw-out racking screw (behind cover)

L Nameplate

M Manual charging handle

N Bell Alarm target and reset button

2–1 Introduction

WavePro circuit breakers are installed in GE AKD-10 switchgear, Power Break® and AV-line switchboards, and in other manufacturers' equipment using GE OEM substructures. Draw-out construction permits activation of a new feeder, allows rapid replacement of a circuit breaker, and facilitates inspection and maintenance of the breaker with no need to deenergize the entire switchgear or switchboard lineup.

2–2 Installing the Breaker

Use the following procedure to install the draw-out breaker into its substructure, as illustrated in Figure 2.

1. Before lifting a breaker to its intended compartment location, observe the following precautions:
   - Check the compartment to ensure that it is free of foreign objects.
   - Verify that the breaker is the correct type for that compartment.
   - Ensure that the breaker is OPEN.
   - Apply a thin coat of Lubricant D6A15A2 (catalog number183L0907P037) lubricant to the breaker's primary disconnects.
   - Insert the racking handle and rotate it fully counterclockwise to ensure that the racking cams on the breaker are correctly positioned for initial engagement with the pins in the breaker cubicle or substructure. The position indicator on the front of the breaker should show DISC.
2. Attach the Lifting Bracket (catalog number 0324B4551G1) by locating the hooks in the slots on the side of the breaker and on the closing spring anchor pin.
3. Pull the rails all the way out to their withdrawn position.
4. Slowly lower the breaker onto the rails so that the grooves in the rollers on the side of the breaker align with the rails.
5. Push the breaker into the compartment until it reaches the stops. This is the Disconnect position (as shown by the legend DISC on the draw-out position indicator). At this point the racking arms are positioned to engage the fixed racking pins in the compartment and are ready to begin the racking motion. Push the rails back into the compartment.
6. Close the compartment door. Insert the Racking Handle (catalog number 568B731G1) into the racking screw opening in the breaker escutcheon. Rotate the handle clockwise, through the Test position, until the racking shaft comes to a solid stop. The breaker is now in the Connected position, as shown by the legend CONN on the position indicator flag. Note that a loud click will be heard as the spring-loaded secondary disconnects engage.

2–3 Removing the Breaker

Use the following procedure to remove the draw-out breaker from its cubicle or substructure:

1. With the compartment door closed and latched, trip the breaker.
2. Push the OPEN button and slide the racking door to the right, exposing the racking screw. Insert the Racking Handle onto the racking screw. Rotate the handle counterclockwise until the breaker travels from the Connected position through the Test position (as indicated by the legends CONN and TEST, respectively, on the draw-out position indicator) until the racking screw comes to a solid stop in the Disconnected position (as indicated by the legend DISC on the position indicator). At this point the primary and secondary disconnects are disengaged.
3. Open the compartment door. Pull out the rails, then pull the breaker out to the withdrawn position at the track travel limit
4. Verify that the indicators on the front of the breaker show that the springs are DISCHARGED and the breaker is OPEN.
5. Attach the Lifting Bracket by locating the hooks in the slots on the side of the breaker and on the closing spring anchor pin. Raise the breaker until its mounting wheels clear the rails.
6. Push the rails back into the compartment, then move the breaker forward until the primary disconnects clear the compartment. Lower the breaker onto a flat surface free of protrusions that could damage the breaker's internal parts. Close the compartment door.

2–4 Testing the Breaker

The breaker can be operated without energizing the load when it is in the TEST position. Insert the Racking Handle, then move the breaker from the CONN or DISC position to the TEST position, as shown on the draw-out position indicator. The breaker can now be operated manually or electrically without energizing the load.

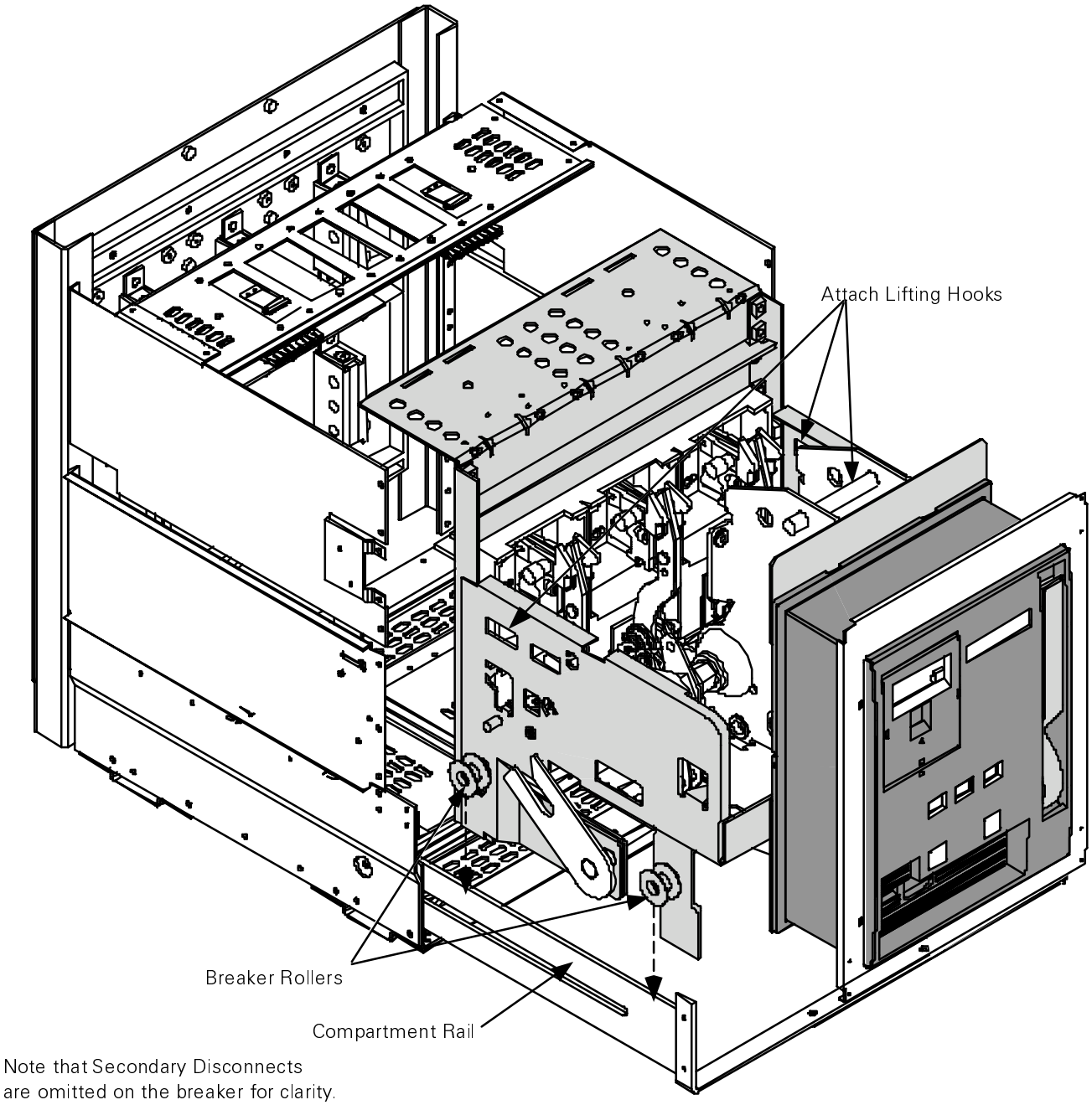


Figure 2. Installing the breaker into the compartment.

3–1 Operating Instructions

Sequence of Operations

The sequence of operations that may be performed on the circuit breaker are listed in Table 2. Refer to Chapter 4 for information about accessory operation.

Operation of the Breaker

Manually Charging the Mechanism Springs

Pull the charging handle down about 90° (until it stops) five–six times to fully charge the closing springs. *This will not close the breaker contacts.* The charge indicator will show CHARGED on a yellow background.

NOTE: The breaker cannot be closed unless the springs are fully charged and the handle is stored fully in.

NOTE: Le disjoncteur ne peut être fermé à moins que les ressorts ne soient pleinement chargés et que la poignée ne soit pleinement rentrée.

Electrically Charging the Mechanism Springs

If the breaker is equipped with the (optional) Motor Operator, the mechanism springs may also be charged with the following method:

- Engage the Motor Operator by applying the rated voltage to secondary disconnect terminals A8 and A17. Power to the motor is removed automatically by a cutoff switch when the springs are fully charged.
- If power is lost during the charge cycle, finish charging the springs by cycling the charging handle until the indicator shows CHARGED on a yellow background.

The closing springs will automatically recharge after closing if control power is maintained at terminals A8 and A17.

Closing the Breaker

Close the breaker contacts with either of the following methods:

- Depress CLOSE button on the front of the breaker.
- Energize the (optional) Remote Close accessory by applying the rated voltage to secondary disconnect terminals A9 and A18.

If the breaker is closed electrically and the closing voltage is maintained, an antipump device prevents a second closing operation on the breaker in the event it is tripped OPEN. The closing impulse must be released for 1–2.5 seconds and then reapplied before a second closing operation can occur.

If the closing voltage is applied while the closing springs are not fully charged, nothing will happen. The closing voltage must be removed and reapplied when the springs are fully charged to close the breaker.

A mechanical interlock prevents the closing springs from discharging if an attempt is made to close an already CLOSED breaker.

NOTE: The main breaker contacts cannot be closed if any of the following conditions applies:

- The draw-out mechanism is in any position other than TEST or CONN, as displayed on the breaker position indicator.
- The (optional) Bell Alarm with Lockout was not reset after an overcurrent lockout.
- The (optional) Undervoltage Trip Device or Electric Lockout is not energized.
- The (optional) Open Fuse Lockout was not reset after replacement of a blown fuse.

These conditions must be corrected before the breaker can be closed. Attempts to close the breaker before these conditions are corrected may result in discharge of the closing springs without closing the main contacts.

Open/Closed Indicator	Main Breaker Contacts	Charge Indicator	Condition of Charging Springs	Next Permissible Operating Function
OPEN	Open	DISCHARGED	Discharged	Mechanism may be charged
OPEN	Open	CHARGED	Charged	Contacts may be closed
CLOSED	Closed	DISCHARGED	Discharged	Mechanism may be recharged or Contacts may be opened
CLOSED	Closed	CHARGED	Charged	Contacts may be opened
OPEN	Open	CHARGED	Charged	Contacts may be closed or mechanism discharged without closing contacts by holding the OPEN button depressed while pushing CLOSE button

Table 2. Sequence of operations that may be performed with the WavePro circuit breaker.

NOTE: Les contacts principaux du disjoncteur ne peuvent être fermés si l'une ou l'autre des conditions suivantes s'appliquent:

- Le mécanisme de retrait du ressort est en tout autre position que: TEST ou CONN, tel que montré à la position indicatrice du disjoncteur.
- L'alarme optionnelle avec cloche n'a pas été remise en place après un blocage par surintensité de courant.
- Le mécanisme optionnel de déclenchement par sous voltage n'a pas été enclenché.
- Le mécanisme optionnel de blocage pour fusible ouvert n'a pas été remis en place après le remplacement d'un fusible éclaté.

Il faut que ces situations soient corrigées avant de procéder à la fermeture du disjoncteur. Toute tentative de fermer le disjoncteur avant que ces conditions ne soient corrigées pourra résulter en une décharge des ressorts de fermeture sans fermer les contacts principaux.

Opening the Breaker

Open the breaker contacts with either of the following methods:

- Depress the OPEN button on the front of the breaker.
- Energize the (optional) Shunt Trip accessory or de-energize the (optional) Undervoltage Trip Device accessory.

Padlock Operation

The padlock provision prevents the breaker from closing by holding the trip latch in the tripped position. Up to three padlocks with $^{1}\square_{4}$" to $^{3}\square_{8}$" diameter shanks may be inserted at one time. To install a padlock, use the following procedure:

1. Trip the breaker (press the OPEN button).
2. While holding the OPEN button in, slide the racking door to the right. Slide the padlock plate down and hold it in place.
3. Put the padlock into the slot in the padlock plate; this will prevent the plate from returning to its unlocked position and prevent the breaker from closing.

3–2 Control Wiring

Figure 3 is the wiring diagram for the breaker control circuit. Table 3 lists the secondary disconnect terminals and the items connected to each. The locations of the secondary disconnects are illustrated in Figure 4.

3–3 Breaker Interlocks

WavePro breakers are equipped with a number of safety interlocks to prevent improper operation of the breaker.

Drawout Interlock

The Drawout Interlock prevents the breaker from being closed when the breaker is between the CONN and TEST position. A pin on the side of the breaker engages a ramped cam in the switchgear compartment or substructure. When the pin is lifted $^{3}\square_{8}$" the breaker is held trip-free.

An additional interlock holds the breaker trip-free whenever the access door to the racking mechanism is open.

Contact Interlock

The Contact Interlock keeps the door to the draw-out mechanism racking screw closed whenever the breaker contacts are CLOSED. This prevents changes to the breaker's position with the main contacts CLOSED.

Spring Discharge Interlock

The Spring Discharge Interlock automatically discharges the closing springs when the breaker is racked from the TEST position to the DISC position. This eliminates the potential hazard of the closing springs' inadvertently discharging during maintenance. The contacts will not close because the trip latch is held trip-free by other interlocks.

3–4 Equipment Interlocks

Additional optional interlocks may be furnished with the breaker enclosure. The Key Interlock prevents the breaker from closing when the interlock is engaged and requires one or more keys to operate. The Door Interlock prevents opening of the enclosure door when the breaker is in the TEST or CONN position. It is defeatable for authorized access.

3–5 Trip Unit Operation and Setup

See DEH–179 for detailed instructions on setting up Power+™ Trip Units.

See DEH–178 for detailed instructions on setting up MicroVersaTrip Plus™ and MicroVersaTrip PM™ Trip Units.

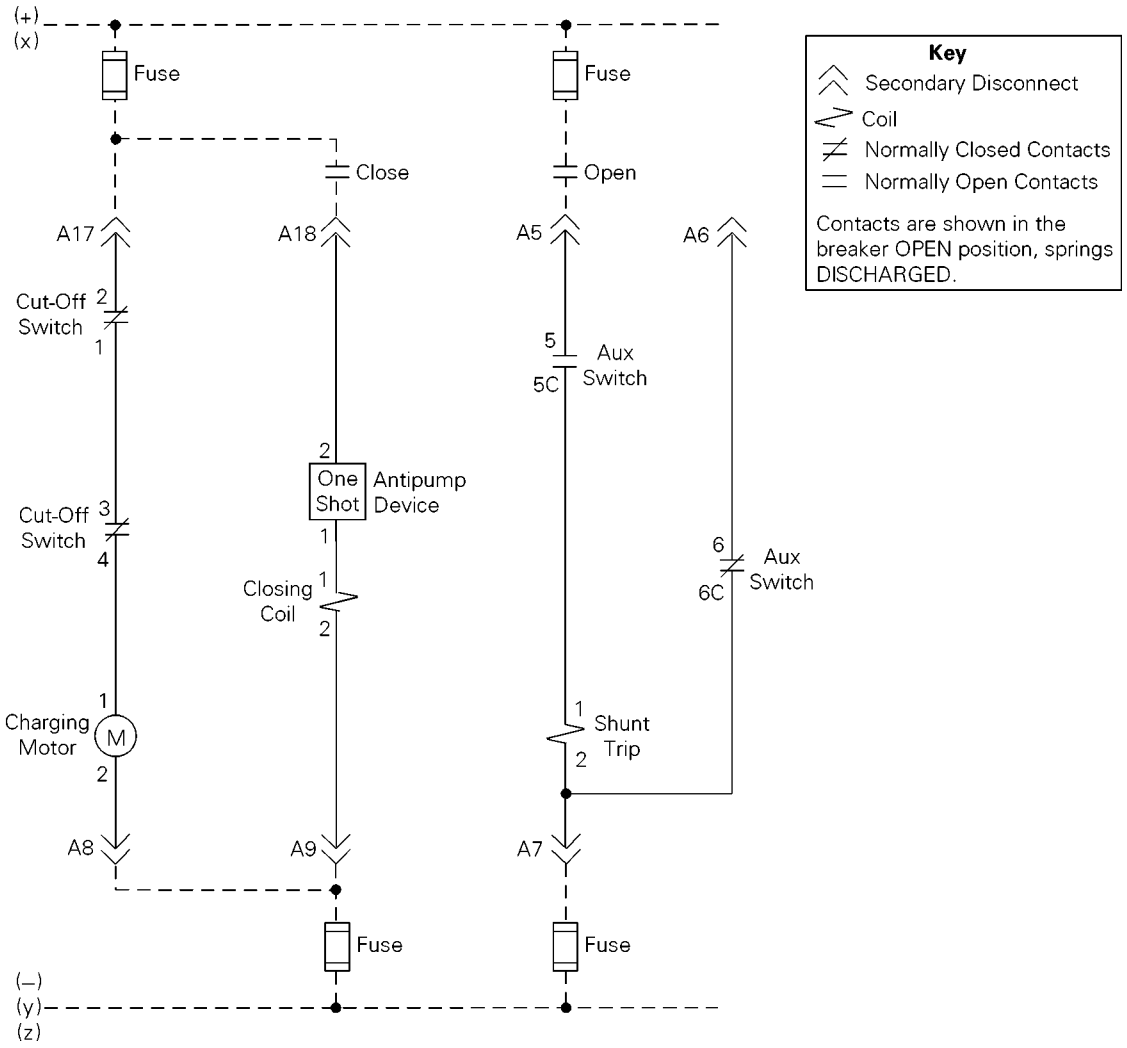


Figure 3. Elementary diagram of the breaker control circuit.

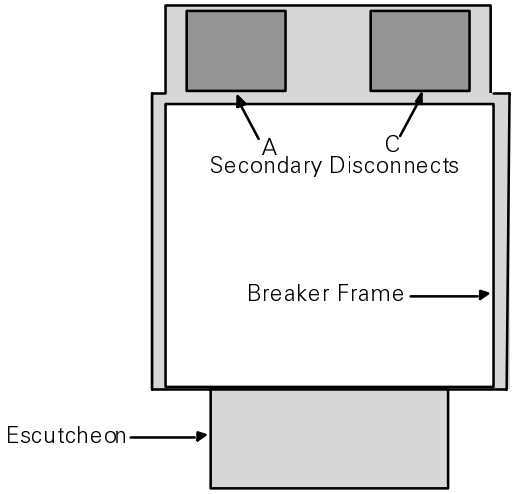
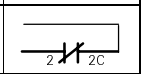
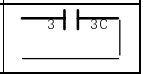
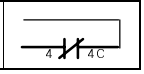
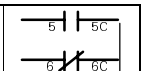


Figure 4. Locations of the secondary disconnects on the top view of the breaker.

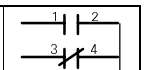
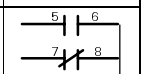
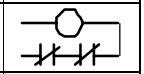
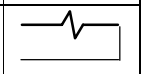
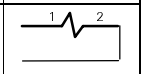
A Disconnect Block (left side from front)

10	Aux Switch (NO contact)	
1	Aux Switch	
2	Aux Switch	
11	Aux Switch (NC contact)	
12	Aux Switch (NO contact)	
3	Aux Switch	
4	Aux Switch	
13	Aux Switch (NC contact)	

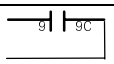
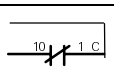
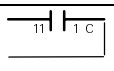
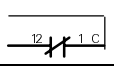
5	Aux Switch (NO contact)	
6	Aux Switch (NC contact)	
7	Aux Switch (common)[3]	

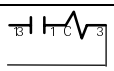
OR

5	Shunt Trip (NO contact)	
6	Shunt Trip (NC contact)	
7	Shunt Trip (common)[3]	

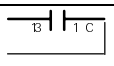
14	Bell Alarm (NO contact)	
15	Bell Alarm (NC contact)	
16	Bell Alarm (common)	
19	Bell Alarm (NO contact)	
20	Bell Alarm (NC contact)	
21	Bell Alarm (common)	
8	Closing Spring Charging Motor	
17	Closing Spring Charging Motor	
9	Close Circuit [1]	
18	Close Circuit [1]	
22	Undervoltage or Electric Lockout	
23	Undervoltage or Electric Lockout	
24	Neutral Sensor – tap	
25	Neutral Sensor – common	
26	Commnet+	
27	Commnet–	
28	Zone Selective Interlock (In+)	
29	Zone Selective Interlock (In–)	
30	Zone Selective Interlock (Out+)	
31	Zone Selective Interlock (Out–)	
32	Va (voltage conditioner)	
33	Vb (voltage conditioner)	
34	Vc (voltage conditioner)	
35	Trip Unit Aux Pwr (24 Vdc+)	
36	Trip Unit Aux Pwr (24 Vdc–)	

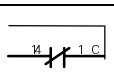
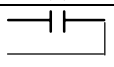
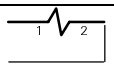
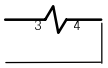
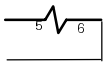
C Disconnect Block (right side from front)

10	Aux Switch (N.O. contact)	
1	Aux Switch	
2	Aux Switch	
11	Aux Switch (NC contact)	
12	Aux Switch (NO contact)	
3	Aux Switch	
4	Aux Switch	
13	Aux Switch (NC contact)	

14	Second Shunt Trip	
5	Second Shunt Trip[3]	

OR

14	Aux Switch (NO contact)	
5	Aux Switch[3]	

6	Aux Switch	
15	Aux Switch (N.C. contact)	
8	Remote Charge Indicator[2]	
17	Remote Charge Indicator[2]	
16	Reserved	
7	Reserved	
9	Spare	
18	Spare	
19	Spare	
20	Spare	
21	Spare	
22	OFLO (phase A)	
23	OFLO (phase A)	
24	OFLO (phase B)	
25	OFLO (phase B)	
26	OFLO (phase C)	
27	OFLO (phase C)	
28	Spare	
29	Spare	
30	Spare	
31	Spare	
32	Spare	
33	Spare	
34	Spare	
35	Spare	
36	Spare	

[1] *For electrically operated breaker; Remote Close Accessory on manual breaker.*

[2] *Remote Charge Indicator applies to electrically operated breaker only.*

[3] *Auxiliary Switch contacts are wired out if Shunt Trip is not provided.*

Table 3. Secondary disconnect terminals with standard and optional connections.

This chapter contains the operation procedures for each of the available breaker accessories. All accessories are available as factory-installed options and, unless otherwise noted, in field-installable kit form.

4–1 Bell Alarm

The Bell Alarm provides a switch to remotely indicate that the circuit breaker has tripped because of a protection trip. Table 4 contains the contact ratings for the Bell Alarm. The catalog number for the replacement Bell Alarm kit is WPBASF. For installation instructions and trouble-shooting, see DEH–163.

Voltage	Contact Rating, A
125 Vdc	0.50
250 Vdc	0.25
240 Vac	6.0

Table 4. Bell Alarm contact ratings.

Operation

The Bell Alarm provides normally open and normally closed outputs available at the secondary disconnects, as illustrated in Figure 5. The Bell Alarm is activated and the outputs change state whenever the breaker is tripped by an overcurrent or ground fault or protective relay function via the Trip Unit. A trip caused by the manual OPEN button or by the Shunt Trip or Undervoltage Trip Device accessories does not activate the Bell Alarm.

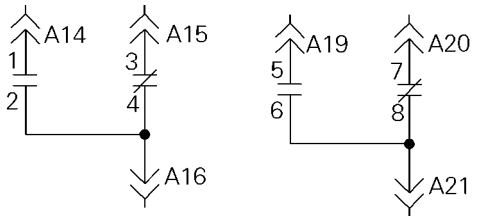


Figure 5. Bell Alarm connections on the secondary disconnect. The contacts are shown in the reset state.

The Bell Alarm can be reset, returning the contacts to their normal configuration, by reclosing the breaker or by manually resetting the Bell Alarm target on the breaker escutcheon.

4–2 Bell Alarm with Lockout

The Bell Alarm with Lockout prevents closing of the breaker after a protection trip until the Bell Alarm with Lockout is reset. It also provides switch contacts to remotely indicate that the circuit breaker has tripped because of a protection trip. The catalog number for the replacement Bell Alarm with Lockout kit is WPBASF. For installation instructions and trouble-shooting, see DEH–163.

Operation

The Bell Alarm with Lockout prevents reclosing of the breaker after a trip until it is reset. It also provides normally open and normally closed outputs available at the secondary disconnects, as illustrated in Figure 5. The Bell Alarm with Lockout is activated and the outputs change state whenever the breaker is tripped by an overcurrent or ground fault or protective relay function via the Trip Unit. A trip caused by the manual OPEN button or by the Shunt Trip or Undervoltage Trip Device does not activate the Bell Alarm with Lockout.

The Bell Alarm with Lockout can be reset by manually resetting the target on the breaker escutcheon. This will return the Bell Alarm contacts to their normal configuration and allow the breaker to be closed.

4–3 Shunt Trip

The Shunt Trip accessory allows the breaker to be tripped electrically from a remote location. The catalog numbers for the Shunt Trip for various voltage applications are listed in Table 5. For installation instructions and trouble-shooting, see DEH–168.

Catalog Number	Voltage Rating	Inrush Current, A	Sealed Current, A
WPS1SF60070	70 Vac, 60 Hz	3.75	3.75
WPS1SF60120	120 Vac, 60 Hz	12.3	10.8
WPS1SF60208	208 Vac, 60 Hz	3.2	2.6
WPS1SF60240	240 Vac, 60 Hz	3.9	3.4
WPS1SF50120	120 Vac, 50 Hz	7.6	6.7
WPS1SF50208	208 Vac, 50 Hz	3.8	3.1
WPS1SF50240	240 Vac, 50 Hz	4.7	4.1
WPS1SFDC012	12 Vdc	4.1	4.1
WPS1SFDC024	24 Vdc	8.3	8.3
WPS1SFDC048	48 Vdc	4.5	4.5
WPS1SFDC125	110/125 Vdc	2.0	2.0
WPS1SFDC250	250 Vdc	1.0	1.0

Table 5. Catalog numbers and electrical ratings for the Shunt Trip accessory.

Operation

The Shunt Trip causes the circuit breaker to trip when its coil is energized. An "A" auxiliary switch, which is closed when the breaker is closed, is in series with the Shunt Trip coil, as illustrated in Figure 6. The external tripping source is connected to positions A5 and A7 on the secondary disconnect.

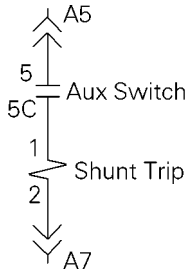


Figure 6. Shunt Trip connections to the secondary disconnect.

4–4 Undervoltage Trip Device (Instantaneous)

The Undervoltage Trip Device accessory trips the circuit breaker when its coil is deenergized. The catalog numbers for the Undervoltage Trip Device for various voltage applications are listed in Table 6. For installation instructions and trouble-shooting, see DEH–165.

Catalog Number	Voltage Rating	Holding Current, A
WPUVSF56110	120 Vac	0.15
WPUVSF56240	240 Vac	0.07
WPUVSFDC024	24 Vdc	0.58
WPUVSFDC048	48 Vdc	0.32
WPUVSFDC110	110 Vdc	0.15
WPUVSFDC125	125 Vdc	0.15
WPUVSFDC250	250 Vdc	0.07

Table 6. Catalog numbers and electrical ratings for the Undervoltage Trip Device accessory.

Operation

The Undervoltage Trip Device trips the breaker when its coil is de-energized. The coil leads are connected to terminals A22 and A23 on the secondary disconnect, as illustrated in Figure 7.

When the applied control voltage is above 85% of the Undervoltage Trip Device's rated voltage, the breaker can be closed. Control voltage must be applied for one second before the breaker can be closed. When the control voltage drops to 30–60% (nonadjustable) of the rated value, the Undervoltage Trip Device will trip the breaker.

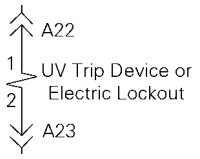


Figure 7. Undervoltage Trip Device or Electric Lockout connections to the secondary disconnect.

4–5 Undervoltage Trip Device with Time Delay

The Undervoltage Trip Device with Time Delay consists of an instantaneous Undervoltage Trip Device accessory, similar to that described in section 4–4, with a separately mounted time-delay unit. The time-delay unit prevents the breaker from tripping on a momentary voltage drop in the monitored source. The catalog numbers for the time-delay unit for various control voltages are listed in Table 7. For installation instructions and trouble-shooting, see GEH–4545.

Underfoltage with Time-Delay	Time-Delay	Voltage Rating
WPUVSFTD125	TAKYUVT-1	125 Vdc
WPUVSFTD250	TAKYUVT-2	250 Vdc
WPUVSFTD240	TAKYUVT-3	208/240 Vac

Table 7. Catalog numbers and control voltages for the Time Delay accessory.

Operation

The time-delay unit is separately mounted from the breaker. The voltage to be monitored is connected to terminals 1 and 2 of the time-delay unit. Terminals 4 and 5 of the time-delay unit are connected to the Undervoltage Trip Device through terminals A22 and A23 on the secondary disconnect, as illustrated in Figure 8.

An ac control voltage other than 208–240 Vac can be used if an appropriate control power transformer is provided. This transformer must have a minimum rating of 100 VA.

The delay time is adjustable from 2–6 seconds. Control voltage must be applied for one second before the breaker can be closed.

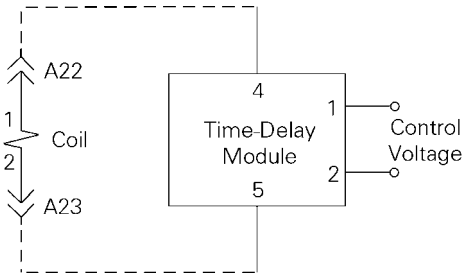


Figure 8. Undervoltage Trip Device time-delay unit connections.

4–6 Electric Lockout

The Electric Lockout accessory uses a coil similar to an Undervoltage Trip Device to keep the breaker from closing unless the coil is energized. The breaker thus cannot be closed unless control voltage is applied; however, loss of control voltage will not trip the breaker. For example, two breakers can be interlocked so that they cannot both be closed at the same time. The catalog numbers and voltage ratings for the available Electric Lockout models are listed in Table 8. For installation instructions and trouble-shooting, see DEH–170.

Catalog Number	Voltage Rating
WPELSF56120	120 Vac
WPELSF56240	240 Vac
WPELSFDC024	24 Vdc
WPELSFDC048	48 Vdc
WPELSFDC110	110 Vdc
WPELSFDC125	125 Vdc
WPELSFDC250	250 Vdc

Table 8. Catalog numbers and voltage ratings for the Electric Lockout accessory.

Operation

The Electric Lockout coil is connected to terminals A22 and A23 on the secondary disconnect, as illustrated in Figure 7. The Electric Lockout coils on the two breakers to be interlocked can then be wired in series with a normally closed Auxiliary Switch contact on the other breaker to provide the interlocking function.

A mechanical bypass is provided to permit cold startup when control power is not available.

4–7 Motor Operator (Electrically Operated Breaker)

The Motor Operator accessory provides a means of electrically charging the springs that close the breaker. The Motor Operator is available only as a factory-installed option. A Remote Close accessory, Auxiliary Switch, and a Shunt Trip are always provided on a breaker equipped with a Motor Operator

Operation

The circuit breaker closing springs are charged automatically when control voltage is applied to terminals A8 and A17 of the secondary disconnects. When the springs are fully charged, a cutoff switch automatically deenergizes the motor. The closing springs will recharge automatically after the breaker closes unless an external switch contact is wired into the spring charging circuit.

4–8 Remote Close

The Remote Close accessory provides a means of remotely closing the circuit breaker after the closing springs have been charged. It is always provided when a Motor Operator is ordered, but may be installed in a manually operated breaker. Catalog numbers and operating voltages are listed in Table 9. For installation instructions and trouble-shooting, see DEH–172.

Catalog Number	Voltage Rating
WPRCSF60120	120 Vac, 60 Hz
WPRCSF50120	120 Vac, 50 Hz
WPRCSF60240	240 Vac, 60 Hz
WPRCSF50240	240 Vac, 50 Hz
WPRCSFDC048	48 Vdc
WPRCSFDC110	110 Vdc
WPRCSFDC125	125 Vdc
WPRCSFDC250	250 Vdc

Table 9. Catalog numbers and operating voltages for the Remote Close accessory.

Operation

A circuit breaker equipped with the Remote Close accessory can be closed remotely by applying the rated control voltage to terminals A9 and A18 of the secondary disconnects.

The Remote Close accessory is continuously rated and has an antipump feature that prevents a motor-operated breaker from repeatedly closing if the closing signal is maintained. Closing control voltage must be removed for 1-2.5 seconds and then reapplied for each breaker closure.

4–9 Open-Fuse Lockout

The Open-Fuse Lockout, shown in Figure 9, is supplied on integrally fused breakers or when the breaker is used in combination with a Fuse Rollout Element. When any fuse blows, the Open-Fuse Lockout trips the breaker to prevent single-phasing. This accessory is available only as a factory-installed option.

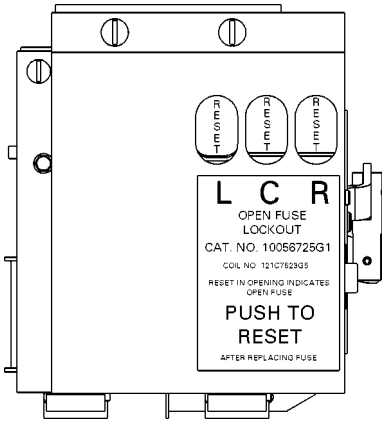


Figure 9. Open-Fuse Lockout accessory.

Operation

The Open-Fuse Lockout contains an individual trip solenoid for each pole, connected directly across the fuse in that phase. When any fuse blows, its solenoid is energized and trips the breaker. An indicator shows which fuse has blown. The breaker is mechanically trip-free and cannot be reclosed until the Open-Fuse Lockout is reset.

The Open-Fuse Lockout is internally wired to the fuses on 800 and 1600 ampere frame breakers. The 2000 ampere frame breaker is available with a Fuse Rollout Element and its Open-Fuse Lockout is wired to the secondary disconnect as illustrated in Figure 10. The Open-Fuse Lockout must be wired to the fuses in the Fuse Rollout Element through the secondary disconnect on the Fuse Rollout Element.

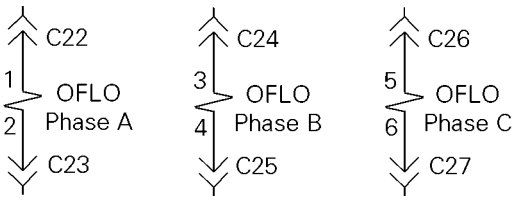


Figure 10. Open-Fuse Lockout (OFLO) connections to the secondary disconnect for WPS-20 breakers.

4–10 Auxiliary Switches

Auxiliary Switches provide remote indication of the breaker main contact position.

Auxiliary Switches are available with four or seven stages, with catalog numbers WPAUXSF4STG (four-stage) and WPAUXSF7STG (seven-stage) for 800–2000A breakers. Contact ratings are listed in Table 10. For installation instructions and trouble-shooting, see DEH–188.

Voltage	Rating
120 Vac	15 A
240 Vac	10 A
125 Vdc	10 A
250 Vdc	5 A
120/240 Vac	1□2 hp

Table 10. Auxiliary Switch contact ratings.

Operation

Each Auxiliary Switch stage provides two contacts that can be used to indicate breaker main contact position. The A contact is open or closed the same as the breaker, while the B contact is opposite to the breaker contacts. Odd-numbered switches are A type and even-numbered switches are B type.

The Auxiliary Switch connections to the secondary disconnects are listed in Table 3.

4–11 Hidden-Close Button

The Hidden Close Button is an unmarked replacement for the normal CLOSE button. Pressing the Hidden Close Button in the normal manner will not close the breaker. The catalog number is WPHIDONKIT1. For installation instructions, see DEH–187.

Operation

Charge the breaker closing springs, then insert the end of a stiff rod, with maximum diameter of 0.1", through the hole in the center of the Hidden Close Button, as illustrated in Figure 11. When the rod engages the mechanism, light pressure on the rod will close the breaker mechanism. The Hidden Close Button is double-insulated from the current-carrying parts of the breaker.

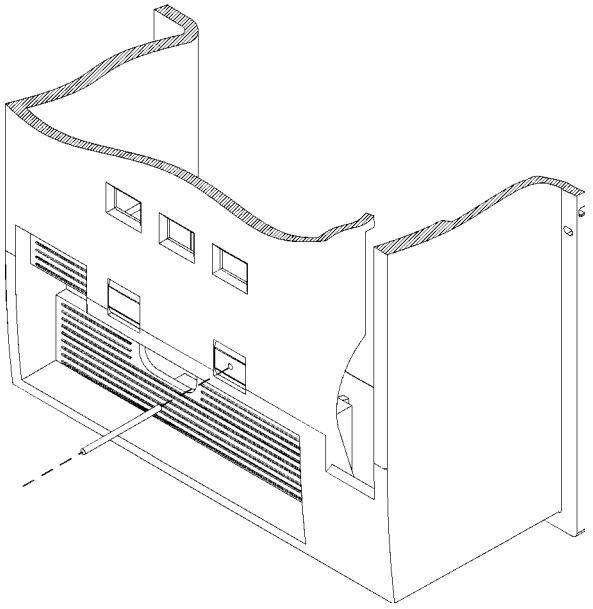


Figure 11. Operation of the Hidden Close Button.

5–1 Inspection

The circuit breaker should be inspected at least once a year. More-frequent inspections are recommended when the breaker is employed under unfavorable conditions such as severe load, dust, moisture, a large number of operations, or if the vital nature of the load warrants it.

Always inspect the breaker after it has interrupted a short circuit or ground fault.

WARNING: Before inspecting the breaker, disconnect it from all voltage sources.

AVERTISSEMENT: Débrancher le disjoncteur de toutes sources de courant avant de l'inspecter.

The following checks should be made with the breaker drawn out to the TEST position.

1. Manually operate the breaker several times, checking for obstructions or excessive friction.
   - To charge the mechanism springs, pull the operating handle down until it stops (about 90°) five–six times. The charge indicator will show CHARGED on a yellow background.
   - Depress the CLOSE button on the front of the breaker. The springs should discharge and, if the latch is properly reset, the breaker will close.
2. Check electrical operation of all installed accessories and the motor-charge system, if so equipped.
3. Remove the arc chutes, then inspect the arc chutes and contacts for breakage or excessive burning. For the proper procedure for removing and reinstalling the arc chutes, see DEH–136.
4. Check the Trip Unit for proper operation as described in the Trip Unit User Guide (DEH–179 for Power+ Trip Units or DEH–178 for MicroVersaTrip Plus and MicroVersaTrip PM Trip Units).
5. Check insulating parts for evidence of overheating and for cracks that may indicate thermal aging.

5–2 Lubrication

Bearing points and sliding surfaces should be lubricated with a thin film of GE Lubricant D6A15A2 (catalog number 183L0907P037). Clean the surfaces to be lubricated with an industry-approved solvent. *All excess lubricant should be removed with a clean, lint-free cloth to avoid accumulation of dirt or dust.*

The contact surfaces of the primary disconnect fingers should be cleaned and lubricated with GE Lubricant D6A15A2. *Do not lubricate the breaker contacts.*

5–3 Maintenance Publications

See DEH–136 for detailed maintenance procedures and DEF–004 for available renewal parts.

Notes

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DEH134 R01 0298