Installation Instructions For JG-DC Circuit Breaker and Molded Case Switch

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Instruction Leaflet IL01205004EH02

Installation Instructions For JG-DC Circuit Breaker and Molded Case Switch

Suitable for use on ungrounded systems.
Suitable for use on grounded systems that have one leg of load (A) connected to power supply.

J250H-DC Non-standard Interrupting Capacity

<table>
<thead>
<tr>
<th>Poles In Series</th>
<th>kA</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>125</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>250</td>
</tr>
<tr>
<td>3</td>
<td>65</td>
<td>600</td>
</tr>
</tbody>
</table>

IEC 60947-2

<table>
<thead>
<tr>
<th>Poles In Series</th>
<th>kA⁄</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22</td>
<td>125</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>250</td>
</tr>
</tbody>
</table>

Suitable for use on ungrounded systems.
Suitable for use on grounded systems that have one leg of load (A) connected to power supply.

3 Poles In Series

LOAD (B)

LOAD (A)

H02

6

7

10

Iₘ

9

5 x

Iₙ

∂ ∑

J250H-DC

Non-standard Interrupting Capacity

2 Poles In Series

300 V

50 kA

250 A max. (∟)

Cat. JGHDC3250NN

Style 69D2549G30

3 Pole

Torque

Lb-In

250

180

(N-m)

28.2

20.3

Wire

Size

4–350

4–350

(mm ²)

25–185

25–185

Terminal

Cat. No.

CU/AL

TA250FJ

CU ONLY

T250FJ

60/75°C Wire – 100 A & Lower

Industrial Circuit Breaker Frame

68C 2631

H03

Do not use with electronic trip unit.
1. Introduction

General Information

In this document, the term circuit breaker includes molded case switches. The J-frame Series G circuit breaker (Fig.1) type JG-DC is rated 600 Vdc maximum and from 70A to 250A continuous current using type JT thermal-magnetic trip units (refer to Table 1 for all available trip unit ratings). The circuit breaker is listed in accordance with Underwriters Laboratories, Inc. Standard UL489. The type JG-DC circuit breaker is for use in grounded and ungrounded applications where multiple poles are connected in series (Figures 2-5). A 3-pole breaker may be wired as a 2-pole with rated voltage and interruption based on the number of poles interruption rating is based on number of poles in series that break the ungrounded leg of the power supply.

This instruction leaflet (IL) gives procedures for installation and field testing of the type JG-DC Series G DC circuit breaker.

Table 1. Available Trip Unit Ratings.

<table>
<thead>
<tr>
<th>Circuit Breaker Types</th>
<th>Trip Unit Types</th>
<th>Thermal Magnetic Amperes $I_{th}$</th>
<th>Adjustable Magnetic Multiples of $I_{th}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>JG-DC 70</td>
<td>70</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>150</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>225</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>5 to 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For adjustable thermal trip units, the magnetic setting is a multiple of the maximum thermal setting. For Vdc applications, the magnetic tripping values may exceed the Vac values by 40%.

Figure 1. Type JG-DC Series G DC Circuit Breaker with JT Trip Unit Installed.

The recommendations and information contained herein are based on Eaton experience and judgment, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact Eaton for further information or instructions.

Figure 2. Load Connected to Power Source. Grounded or Ungrounded Systems.
2. Installation

The installation procedure consists of inspecting the circuit breaker and, as applicable, installing the trip unit, accessories, interphase barriers and terminals; mounting the circuit breaker; connecting the line and load conductors; torquing terminals; and attaching terminal shields. Circuit breaker frames, trip units, accessories, mounting hardware, and unmounted terminals may be supplied in separate packages. To install the circuit breaker, perform the following steps.

If required, internal accessory installation in any type of circuit breaker should be done before the circuit breaker is mounted and connected. Refer to individual accessory instruction leaflets.

2-1. Make sure that the circuit breaker frame is suitable for the intended installation by comparing name-plate data with existing ratings and system requirements. Inspect the circuit breaker for completeness, and check for damage before mounting. Uninstalled cover mounting hardware is supplied in a plastic bag with the circuit breaker frame (Fig. 6).

2-2. Remove installed cover screws and cover.

---

NOTICE

INSTRUCTIONS FOR INSTALLING THE TRIP UNIT AND ACCESSORIES IN THE J-FRAME CIRCUIT BREAKER ARE SUPPLIED WITH EACH ITEM.

2-3. If not already installed, mount trip unit and accessories (if required) in circuit breaker frame.

⚠️ CAUTION

WHEN REMOVED AND REINSTALLED, THREAD-FORMING SCREWS WILL TRY TO REFORM THE THREADS IN THE BASE. CARE SHOULD BE TAKEN EVERY TIME A THREAD-FORMING SCREW IS USED TO ENSURE THE SCREW STARTS IN THE ORIGINAL THREADS. DAMAGED THREADS CAN RESULT IN IMPROPER CIRCUIT BREAKER COVER RETENTION.
2-4. As shown in Figure 7, install secondary cover with flat head screws (7 screws) and torque as specified in Figure 7.

\[\text{Flat Head Screw 4} \times 0.625\]
\[\text{Torque Required: 6-8 In-Lbs (0.7-0.9 N.m)}\]

**Figure 7. Cover Screw Installation Positions.**

2-5. If not already installed, mount terminals as shown in (Fig. 8). When using terminal (Catalog No. TA250FJ), secure the terminal to the circuit breaker positioning the terminal on top of the conductor. Attach the mounting screw to the terminal and torque to 8-10 lb-in (10.8-13.6 N-m). After mounting the circuit breaker and before installation of the conductors, the terminal mounting screw can be checked or retightened through the terminal when the conductor screw is removed.

**Figure 8. Terminal Installation.**

---

**WARNING**

BEFORE MOUNTING THE CIRCUIT BREAKER IN AN ELECTRICAL SYSTEM, MAKE SURE THERE IS NO VOLTAGE PRESENT WHERE WORK IS TO BE PERFORMED. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE NO VOLTAGE IS PRESENT. THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY.

**NOTICE**

DEPENDING ON THE EQUIPMENT CONFIGURATION, THE CIRCUIT BREAKER CAN BE MOUNTED USING DIFFERENT STYLES OF HARDWARE. THE FOLLOWING STEPS DESCRIBE HOW TO MOUNT THE CIRCUIT BREAKER USING STANDARD HARDWARE. WHEN SPECIAL HARDWARE IS NEEDED (FOR EXAMPLE, WITH THE ELECTRICAL OPERATOR), THE INSTRUCTION LEAFLET DESCRIBING THE ACCESSORY ALSO DESCRIBES THE SPECIAL MOUNTING ARRANGEMENTS.

2-6. To mount the circuit breaker, perform the following steps:

a. For individual surface mounting, drill mounting panel using the drilling plan shown in (Fig. 9). For panel board mounting, only load end support mounting holes are required. For dead front cover applications, cut out cover to correct escutcheon dimensions (Fig. 10).

**Figure 9. Circuit Breaker Mounting Bolt Drilling Plans.**
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Manual Operation

Manual operation of the circuit breaker is controlled by the circuit breaker handles and the PUSH-TO-TRIP button in the trip unit. The circuit breaker handle has three positions, two of which are shown on the cover with raised lettering to indicate ON and OFF. On the sliding handle barrier, ON, OFF, and trip are also shown by a color coded strip for each circuit breaker handle position: red for ON, white for tripped, and green for OFF. ON/OFF is also shown with the international symbols I/0 (Fig. 11).

![Figure 10. Circuit Breaker Escutcheon Dimensions.](image)

![Figure 11. Circuit Breaker Manual Controls.](image)

## NOTICE

LABELS WITH ACCESSORY CONNECTION SCHEMATIC DIAGRAMS ARE PROVIDED ON THE SIDE OF THE CIRCUIT BREAKER. A NOTE SHOULD BE MADE OF THE DIAGRAMS IF THE LABELS CANNOT BE SEEN WHEN THE CIRCUIT BREAKER IS MOUNTED.

- NOTICE

WHEN ALUMINUM CONDUCTORS ARE USED, THE APPLICATION OF A SUITABLE JOINT COMPOUND IS RECOMMENDED TO REDUCE THE POSSIBILITY OF TERMINAL OVERHEATING. OVERHEATING CAN CAUSE NUISANCE TRIPPING AND DAMAGE TO THE CIRCUIT BREAKER.

### 2.7

Connect line and load conductors and accessory leads.

### 2.8

If required, install terminal shield on circuit breaker cover with mounting screws provided.

### 2.9

After the circuit breaker is installed, check all mounting hardware and terminal connecting hardware for correct torque loading. Torque values for line/load terminals are given in Table 2 and on the circuit breaker nameplate.

### Table 2. Terminal Types

<table>
<thead>
<tr>
<th>Terminal Catalog Number</th>
<th>Terminal Material Body</th>
<th>Screw Head Type</th>
<th>AWG Wire Range</th>
<th>Metric Wire Range</th>
<th>Wire Type</th>
<th>Torque Value lb-in (N.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T250FJ</td>
<td>Stainless Steel</td>
<td>Socket</td>
<td>4-350 MCM</td>
<td>25-185</td>
<td>Cu</td>
<td>180 (20.3)</td>
</tr>
<tr>
<td>TA250FJ</td>
<td>Aluminum</td>
<td>Socket</td>
<td>4-350 MCM</td>
<td>25-185</td>
<td>Cu/Al</td>
<td>250 (28)</td>
</tr>
</tbody>
</table>

### Circuit Breaker Reset

After an automatic or accessory initiated trip, or a manual PUSH-TO-TRIP operation, the circuit breaker is reset by moving the circuit breaker handle to the extreme OFF position.

### NOTICE

IN THE EVENT OF A THERMAL TRIP IN A THERMAL MAGNETIC TYPE TRIP UNIT, THE CIRCUIT BREAKER CANNOT BE RESET UNTIL THE THERMAL ELEMENT IN THE TRIP UNIT COOLS. NO CIRCUIT BREAKER SHOULD BE RECLOSED UNTIL THE CAUSE OF TRIP IS KNOWN AND THE SITUATION RECTIFIED.

### PUSH-TO-TRIP Button

The PUSH-TO-TRIP button checks the circuit breaker tripping function and is used to periodically exercise the operating mechanism in thermal-magnetic trip units. The button is designed to be operated by a small screwdriver.

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Thermal-Magnetic Trip Unit Adjustment

The magnetic element of each pole of the trip unit can be adjusted by rotating the adjustment buttons on the front face of the trip unit with a small screwdriver. The buttons have several settings, as indicated on the nameplate, with values in multiples of the trip unit ampere rating (In), (Fig. 12). To adjust the setting, rotate each button clockwise until arrow on button points to desired setting.

![Figure 12. Trip Unit Magnetic Trip Adjustment Buttons.](image)

**4. Inspection and Field Testing**

Series G molded case circuit breakers are designed to provide years of almost maintenance-free operation. The following procedure describes how to inspect and test a circuit breaker in service.

**Inspection**

Circuit breakers in service should be inspected periodically. The inspection should include the following checks (4-1 through 4-7).

---

**WARNING**

BEFORE INSPECTING THE CIRCUIT BREAKER IN AN ELECTRICAL SYSTEM, MAKE SURE THE CIRCUIT BREAKER IS SWITCHED TO THE OFF POSITION AND THAT THERE IS NO VOLTAGE PRESENT WHERE WORK IS TO BE PERFORMED. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE VOLTAGE IS PRESENT. THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY.

---

**CAUTION**

MAKE SURE THAT CLEANING AGENTS OR SOLVENTS USED TO CLEAN THE CIRCUIT BREAKER ARE SUITABLE FOR THE JOB. SOME COMMERCIAL CLEANING AGENTS WILL DAMAGE THE NAME PLATES OR MOLDED PARTS.

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4-1. Remove dust, dirt, soot, grease, or moisture from the surface of the circuit breaker using a lint-free dry cloth, brush, or vacuum cleaner. Do not blow debris into circuit breaker. If contamination is found, look for the source and eliminate the problem.

4-2. Switch circuit breaker to ON and OFF several times to be sure that the mechanical linkages are free and do not bind. If mechanical linkages are not free, replace circuit breaker.

4-3. With the circuit breaker in the ON position, press the PUSH-TO-TRIP button to mechanically trip the circuit breaker. Trip, reset, and switch circuit breaker ON several times. If mechanism does not reset each time the circuit breaker is tripped, replace the circuit breaker.

4-4. Check base, cover and operating handle for cracks, chipping, and discoloration. Circuit breakers should be replaced if cracks or severe discoloration is found.

4-5. Check terminals and connectors for looseness or signs of overheating. Overheating will show as discoloration, melting, or blistering of conductor insulation, or as pitting or melting of conductor surfaces due to arcing. If there is no evidence of overheating or looseness, do not disturb or tighten the connections. If there is evidence of overheating, terminations should be cleaned or replaced. Before reenergizing the circuit breaker, all terminations and cable should be refurbished to the condition when originally installed.

4-6. Check circuit breaker mounting hardware, tighten if necessary.

4-7. Check area where circuit breaker is installed for any safety hazards, including personal safety and fire hazards. Exposure to certain types of chemicals can cause deterioration of electrical connections.

**Field Testing**

Any field testing should be done in accordance with applicable NEMA Standards.
Notes:
The instructions for installation, testing, maintenance, or repair herein are provided for the use of the product in general commercial applications and may not be appropriate for use in nuclear applications. Additional instructions may be available upon specific request to replace, amend, or supplement these instructions to qualify them for use with the product in safety-related applications in a nuclear facility.

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