

Installation Instructions for KPS and KPH Circuit Breakers and Molded Case Switches

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Powering Business Worldwide

⚠ WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

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The user is cautioned to observe all recommendations, warnings, and cautions relating to the safety of personnel and equipment, as well as all general and local health and safety laws, codes, and procedures.

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.

1. Introduction

General Information

The KPS and KPH Series C circuit breakers are 600 Vac maximum rated devices with interchangeable thermal-magnetic trip units rated 400 A maximum continuous current. The circuit breakers and molded case switch are listed in accordance with Underwriters Laboratories, Inc. Standard UL489.

This instruction leaflet (IL) gives procedures for installation and field testing of KPS and KPH Series C circuit breakers. For this publication, the term circuit breaker shall also include the molded case switch.

2. Installation

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

NOTICE

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 is suitable for the intended installation by comparing nameplate data with existing equipment 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 (See Figure 1).

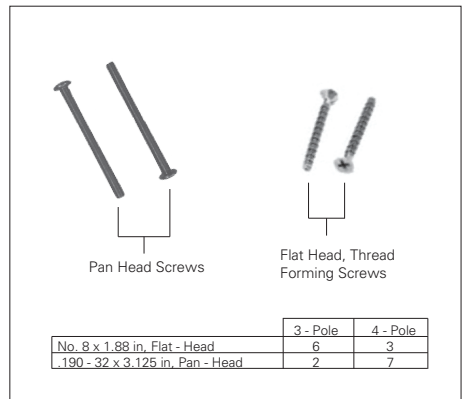


Figure 1. Cover Mounting Hardware.

2.2 Remove installed cover screws and cover.

NOTICE

THE CIRCUIT BREAKER HANDLE MUST BE IN THE TRIPPED OR OFF POSITION TO REMOVE THE COVER. INSTRUCTIONS FOR INSTALLING THE ACCESSORIES ARE SUPPLIED WITH THE DEVICES.

2.3 If not already installed, install accessories (if required) in the circuit breaker.

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 Replace cover and install pan-head screws followed by thread-forming screws as shown in Figure 2. Torque cover screws to 18-23 lb-in (2-2.6 N.m.).

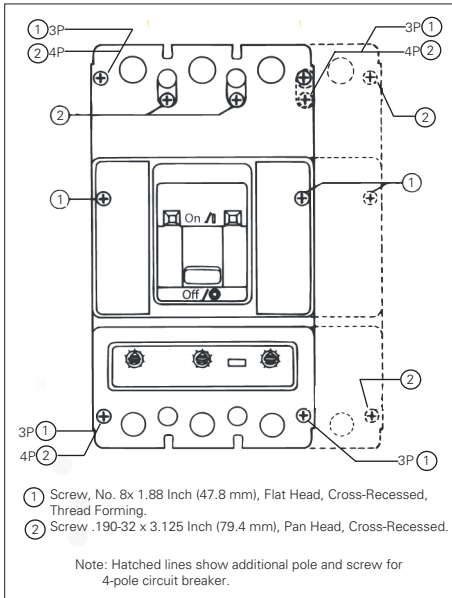


Figure 2. Cover Screw Installation Positions.

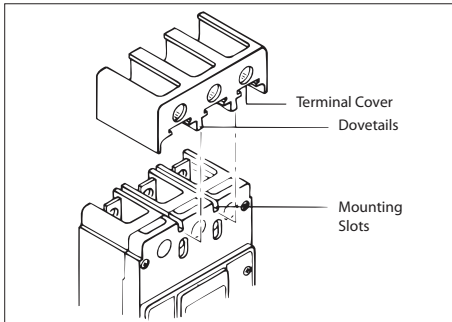


Figure 3. Terminal Cover Installation.

2.5 Mount terminals as shown in Figure 4. Secure the terminals to the circuit breaker using a 7/32-inch socket wrench, and torque to 6-8 lb-ft (8-11 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. If warning label is supplied with terminal, place on upper portion of circuit breaker cover.

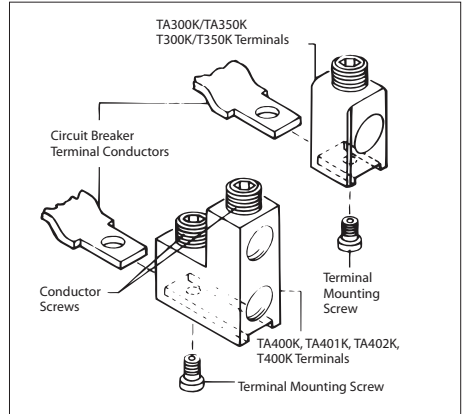


Figure 4. Terminal Installation Positions.

WARNING

THE VOLTAGE IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. 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.

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 Figure 5. For panelboard mounting, only load end support mounting holes are required. For deadfront cover applications, cut out cover to correct escutcheon dimensions (see Figure 6).

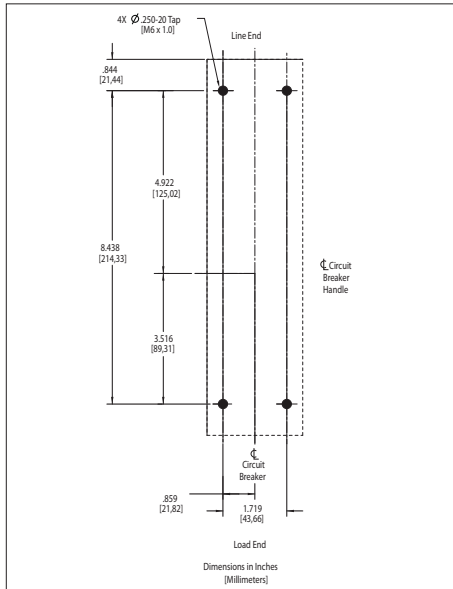


Figure 5. Circuit Breaker Mounting Bolt Drilling Plans.

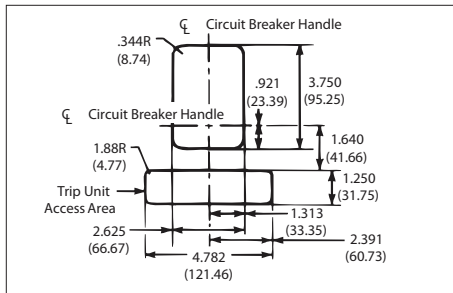


Figure 6. Circuit Breaker Escutcheon Dimensions for 3-Pole Circuit Breakers.

- b. If circuit breaker includes internal accessories, make sure

accessory wiring can be reached when the circuit breaker is mounted.

- c. Position circuit breaker on mounting surface.

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.

- d. Install circuit breaker mounting screws, washers, and nuts. Tighten screws firmly, but do not exceed 28 lb-in (3 N.m.).

CAUTION

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.

NOTICE

WHEN A DUAL CONDUCTOR TERMINAL (CATALOG NO. TA401K, TA400K, OR T400K) IS INSTALLED ON THE CIRCUIT BREAKER AND A SINGLE CONDUCTOR IS USED, THE CONDUCTOR SHOULD BE INSTALLED IN THE TERMINAL OPENING NEAREST TO THE CIRCUIT BREAKER TERMINAL MOUNTING CONDUCTOR.

2.7 Connect line and load conductors and accessory leads.

2.8 When step-type terminals (Cat. No. TA400K, TA401K, TA402K, and T400K) are used, terminal shields (supplied with the terminals) must be installed on the circuit breaker (see Figure 3). Warning label supplied with the kit must be attached to the circuit breaker front cover.

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

2.10 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 1 and on the circuit breaker nameplate.

Table 1. Terminal Types

Terminal Cat. No.	Terminal Material Body	Screw Head Type	AWG Wire Range	Metric Wire Range	Wire Type	Torque Value lb-in (N.m.)
TA300K	Aluminum	Socket	3-350(1)	35-185	Cu/Al	275 (31)
TA350K	Aluminum	Socket	250-500(1)	120-240	Cu/Al	375 (42)
TA400K	Aluminum	Socket	3/0-250(2)	95-120(2)	Cu/Al	275 (31)
TA401K	Aluminum	Socket	250(2)	120(2)	Cu/Al	275 & 375 (31 & 42)
			500(1)	240(1)	Cu/Al	375 (42)
TA402K	Aluminum	Socket	500-750(1)	240-300	Cu/Al	550 (62)
T300K	Copper	Socket	3-350(1)	35-185	Cu Only	275 (31)
T350K	Copper	Socket	250-500(1)	120-240	Cu Only	375 (42)
T400K	Copper	Socket	3/0-250(2)	95-120(2)	Cu Only	275 (31)

3. Manual Operation and Thermal-Magnetic Trip Unit Adjustment

Manual Operation

Manual operation of the circuit breaker is controlled by the circuit breaker handle 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. (see Figure 7).

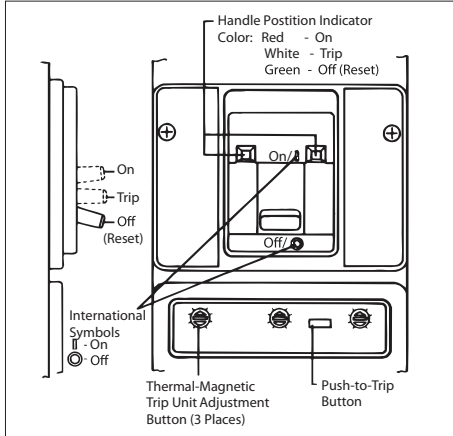


Figure 7. Circuit Breaker Manual Controls.

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. There is no PUSH-TO-TRIP button in the molded case switch.

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 screwdriver. The buttons have several settings as indicated on the nameplate with values in multiples of the trip unit ampere rating (I_n) as shown in Figure 8. To adjust the setting, rotate each button clockwise until arrow button points to desired setting.

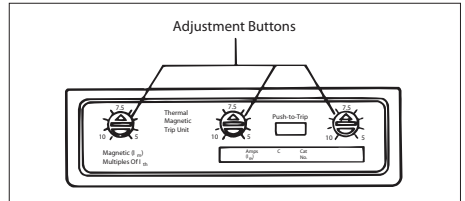


Figure 8. Trip Unit Magnetic Adjustment Buttons

4. Inspection and Field Testing

KPS and KPH 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 and Field Testing

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

WARNING

THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. BEFORE INSPECTING 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.

CAUTION

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

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.

NOTICE

ON MOLDED CASE SWITCHES, THERE IS NO PUSH-TO-TRIP FEATURE. OMIT STEP 4-3 WHEN INSPECTING A MOLDED CASE SWITCH AND PROCEED WITH STEP 4-4

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 re-energizing the circuit breaker, all terminations and cable should be refurbished to the condition when originally installed.

4.6 Check circuit breaker mounting hardware, and 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 Standard.

Notes:

Instruction Leaflet IL 01206001E

Effective April 2015

Installation Instructions for KPS and KPH
Circuit Breakers and Molded Case Switches

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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Printed in Dominican Republic
Publication No. IL01206001E
Part No. IL01206001EH02
April 2015