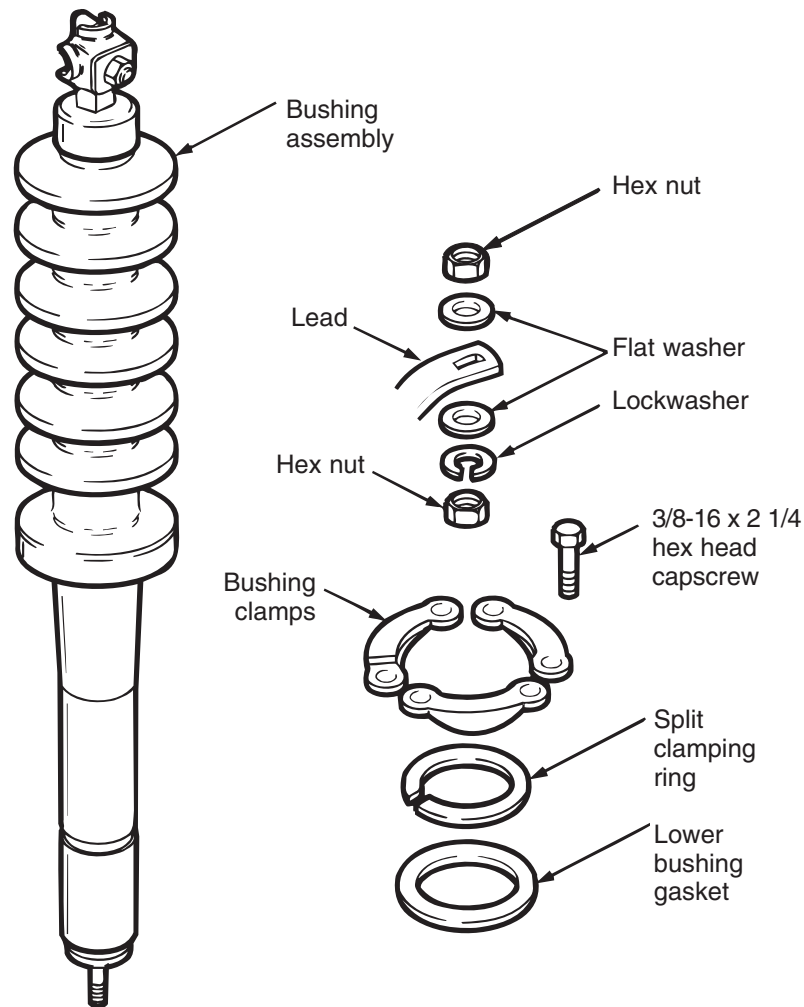


CT field modification kit KA906R1 installation and testing instructions

This kit is for use with types RE, RVE, WE, WVE, VWE, VWVE27, and VWVE38 reclosers.

Not for use with type RE reclosers serial number 101 through 399 or type WE reclosers serial number 101 through 299.



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Safety for life



Eaton meets or exceeds all applicable industry standards relating to product safety in its Cooper Power™ series products. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Eaton employees involved in product design, manufacture, marketing, and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment, and support our “Safety For Life” mission.

Safety information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it.

A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as arc flash clothing, safety glasses, face shield, hard hat, rubber gloves, clampstick, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in equipment damage only.

Safety instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

DANGER

Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment.

G103.3

WARNING

Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.

G101.0

WARNING

This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage.

G102.1

WARNING

Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage.

G122.3

CT field modification kit ka906r1 installation and testing instructions

Table 1. Serial number break for reclosers with type a sensing CTS

Recloser	Below serial number
RXE	5831
RVE	5894
WE	11199
WVE	3695
VWE	7199
VWVE27	7208
VWVE38	1204

All VSA reclosers are equipped with Type A Sensing CTs.

All VSML reclosers are equipped with Type A Sensing CTs.

All VSA12, VSA12B, VSA16, VSA20, VSA20A, and VSA20B reclosers are equipped with Type B Sensing CTs.

All VWVE38X and VWE38X reclosers are equipped with Type B Sensing CTs.

Table 2. CT field modification kit contents

Item no.	QTY.	Description	Part number
1	1	Label	KP2560R
2	6	Bushing gasket	KA1193R
3	2	Varistor assembly *	KA1240R
4	3	1000:1 current transformer	KA86RE3
5	1	3" wire assembly *	KA260ME268
6	1	4" wire assembly *	KA260ME269
7	1	7" wire assembly *	KA260ME270
8	1	Terminal strip *	KP2101A3
9	1	Head gasket	KP2103A8
10	6	Spacer	KP3009A212
11	2	Rd. hd. screw, #6-32 x 3/4 *	K721515106075A
12	2	Elastic stop nut, #6-32 *	KP2020A6
13	6	Shrink tube	KA2137-13
14	6	Rd. head screw 1/4-20 x 2	K721515125200A
15	1	Label	KP1373ME
16	2	Terminal *	KP2010A38

* Items used when kit is installed on a recloser that is equipped with the low-voltage closing accessory.

Product information

Introduction

Service Information MN280068EN provides installation and testing instructions for the CT Field Modification Kit.

Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment.

Refer to the applicable maintenance manual for additional service and repair procedures.

- S280-40-3, Type RE, Three-Phase Maintenance Instructions
- S280-40-4, Type WE, Three-Phase Maintenance Instructions
- S280-40-5, Types RVE and WVE, Three-Phase Maintenance Instructions
- *MN280061EN*, Types VWE, VWVE27, and VWVE38X Maintenance Instructions

Additional information

These instructions cannot cover all details or variations in the equipment, procedures, or process described, nor provide directions for meeting every possible contingency during installation, operation, or maintenance. For additional information, contact your Eaton representative.

Acceptance and initial inspection

This product is completely assembled, tested, and inspected at the factory. It is in good condition when accepted by the carrier for shipment.

Upon receipt, inspect the carton for signs of damage. Unpack the control and inspect it thoroughly for damage incurred during shipment. If damage is discovered, file a claim with the carrier immediately.

Handling and storage

Be careful during handling and storage of this equipment to minimize the possibility of damage.

Quality standards

ISO 9001-Certified Quality Management System.

Description

The Type B sensing current transformers supplied in this kit are used to update Type RE or WE family reclosers for use with an Eaton Cooper Power series microprocessor electronic control.

Reclosers manufactured prior to June 1989 are equipped with Type A bushing current transformers (CT's). These reclosers were designed for use with Form 2, Form 3, and Form 3A controls. Eaton Cooper Power series microprocessor-based controls, Form 4A, Form 4C, Form 5, and Form 6, have the ability to generate event records and/or oscillographs during a fault. These controls should be used with Type B sensing CT's. Type B sensing CT's may also be used with Form 2, Form 3, and Form 3A controls.

The terminal board and varistors, included in this kit, are only used on reclosers equipped with the low-voltage closing accessory. The varistors provide additional surge protection for units equipped with low-voltage closing.

Installation procedure

IMPORTANT

Type R and W family reclosers interfaced with Type 3/3A controls featuring Low-Current Ground Fault Trip capability do not have 100 ohm resistors that normally shunt the recloser sensing current transformers. Consequently, high voltage from the current transformers can be present at the recloser/control interface when the recloser is under load. Do not disconnect control from recloser unless recloser is de-energized or, if equipped with in-line Low-Current Ground Fault Tripping Accessory KA1009ME/ KA1009ME2 (located between control and recloser), placing Low-Current Ground Fault Tripping Accessory KA1009ME/ KA1009ME2 into the NORMAL position and disconnecting the interface cable at the control.

If shunt resistors are not present, contact your Eaton representative for additional information before proceeding with the installation of this kit.

⚠ WARNING

Hazardous voltage. De-energize the switchgear before installing this kit. Follow all locally approved safety practices and procedures when working around high voltage lines and equipment. Failure to comply can result in contact with high voltage, which will cause death or severe personal injury.

T232.3

⚠ WARNING

Falling equipment. Use the lifting lugs provided and follow all locally approved safety practices when lifting and mounting the equipment. Lift the unit smoothly and do not allow the unit to shift. Improper lifting can result in severe personal injury, death, and/or equipment damage.

G106.3

⚠ CAUTION

Equipment damage. Refer to the specific switchgear unit maintenance manual for tanking/untanking procedures and related instructions. Failure to follow these instructions could result in equipment damage or personal injury.

T238.0

IMPORTANT

Remove the recloser from service and transport it to a clean suitably equipped service center prior to installing the kit.

Refer to the appropriate service information instruction manual for the step-by-step procedures to remove the recloser from service. Refer to the **Product Information** section of this manual for specific service manual information.

1. Bypass, trip, de-energize, and remove the recloser from service using all locally approved safety practices.

2. Untank recloser and position head assembly in a suitable service stand as described in recloser maintenance manual. Refer to the **Read This Manual First** section of this manual.
3. Remove lower bushing nuts and leads.

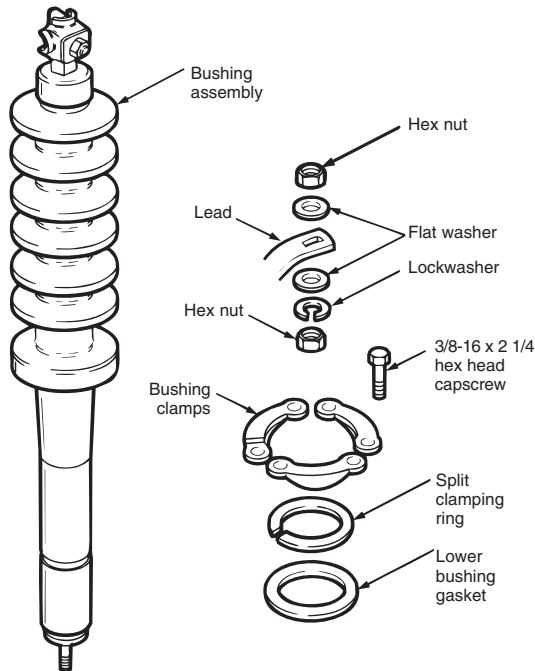


Figure 1. Bushing removal

4. If bushings are equipped with corona shields, loosen clamps and slide corona shields from bushings, see Figure 1.
5. Remove bushing clamps and carefully remove bushings. Discard lower bushing gaskets.
6. Remove original head gasket and discard. Install new gasket, using a permanent, flexible adhesive (such as Pliobond® 20 Industrial Adhesive) to retain.

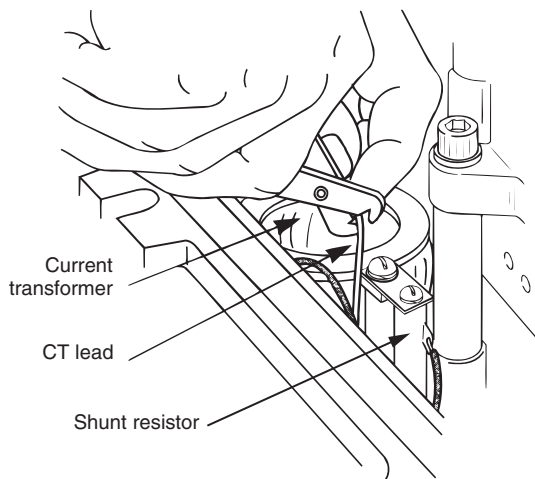


Figure 2. Cutting CT leads

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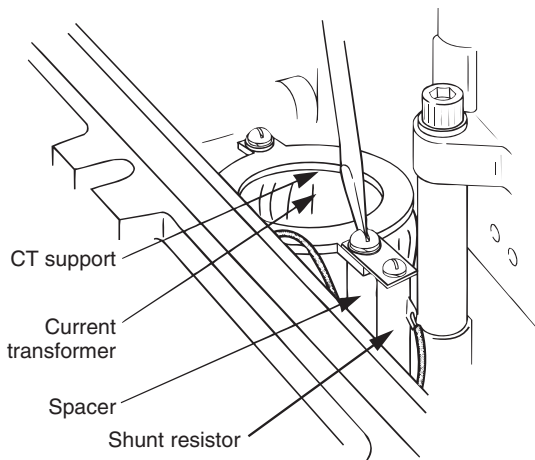


Figure 3. CT removal

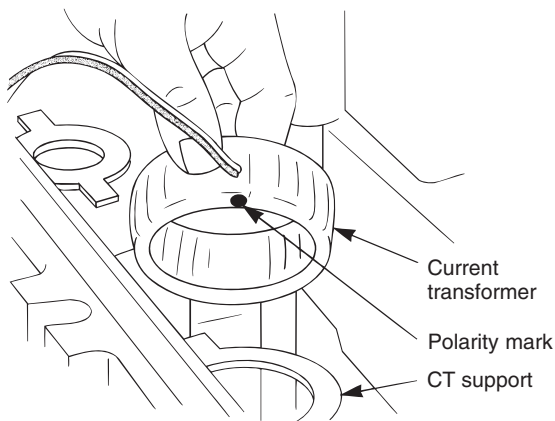


Figure 4. CT installation

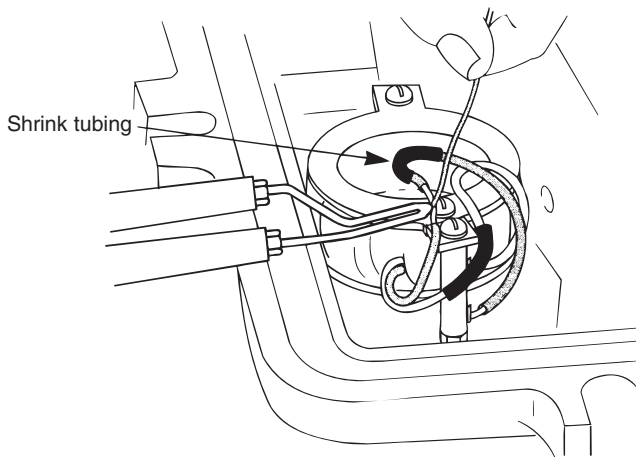


Figure 5. Splicing CT leads

7. Cut the leads from the original current transformers approximately 4" from the shunt resistor. See Figure 2.
8. Remove screws and hardware that secure CT supports; note the routing of the CT leads as the transformers are being removed. Discard original current transformers, and spacers. Save shunt resistor and mounting screw for reuse. See Figure 3.
9. Place new CT's into position, with the polarity mark toward the head casting, as shown in Figure 4. Position the leads so they are oriented similarly to the leads of the CT removed.
10. Strip the stub ends of the shunt resistor leads.
11. Install the new spacers and CT support. Secure with new 1/4-20 x 2" machine screws and the previously removed washers. Re-attach the shunt resistor assembly. See Figure 3.
12. Cut the CT leads to leave a stub approximately 3" long. Strip the ends, slide the shrink tube over the wire, splice, and solder the leads together. Remove any sharp edges or burrs. See Figure 5.

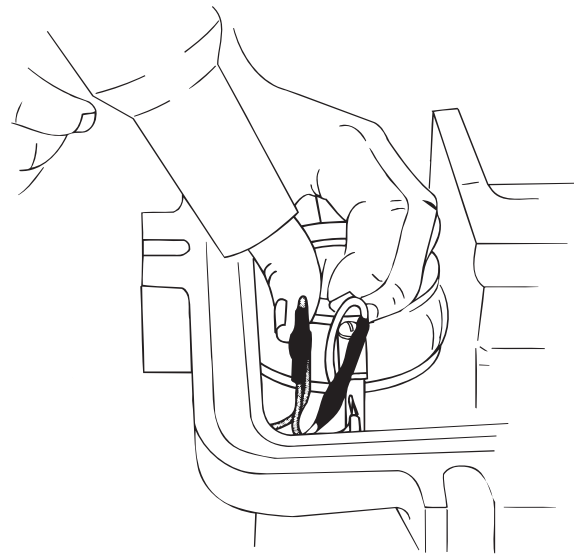


Figure 6. Securing shrink tubing

13. Slide shrink tubing over splice and apply heat to secure, see Figure 6.
14. Tuck wires toward head casting.
15. Check the split aluminum clamping rings on each bushing. Clamping rings can be reused if in good condition, replace if damaged.

Note: The clamping rings cushion and distribute the pressure between the ceramic and the clamps. **DO NOT OMIT.**

16. Install bushing assemblies with the new lower bushing gaskets provided. Position each bushing with the stud end of the terminal pointing outward.

Note: If corona shields were installed on the bushings, slide them onto the bushings as they are being installed.

17. Position clamping rings with the split centered between two clamping bolts.

18. Reassemble the bushing clamps to head casting. Tighten the bolts evenly, a little at a time, to a torque of 10-15 ft-lbs.

Note: The clamping forces must be applied gradually and equally in rotation to each bolt, to provide evenly distributed gasket sealing pressure.

19. Reconnect leads to each bushing rod.

20. If the bushings are equipped with corona shields, slide shield assemblies into position and secure clamps.

21. Install labels on sleet hood. See Figure 7.

NOTICE

RECLOSER IS EQUIPPED WITH TYPE B SENSING CT'S.

RECLOSER DOES NOT HAVE A BATTERY CHARGER.

Figure 7. Type B sensing CT label

Testing current transformers

The current sensing transformers are mounted on the source side bushings underneath the head casting. The battery charger CT power source (if applicable) is mounted on the load side center bushing. Refer to Figure 8 for these tests.

Continuity check

1. Connect an ohmmeter, in turn, to pin sockets K and G, K and H, and K and J to check the continuity of the three current sensing transformers.
 - The meter should read approximately 3 ohms, the DC resistance of each winding.
2. Connect the ohmmeter to pin sockets K and L to check the continuity of the battery charger CT winding, if used.
 - The meter should read approximately 1000 ohms. A zero ohms reading indicates the 0.2 mfd capacitor may be short circuited. Readings deviating more than $\pm 20\%$ from 1000 ohms indicates a damaged resistor or transformer winding.

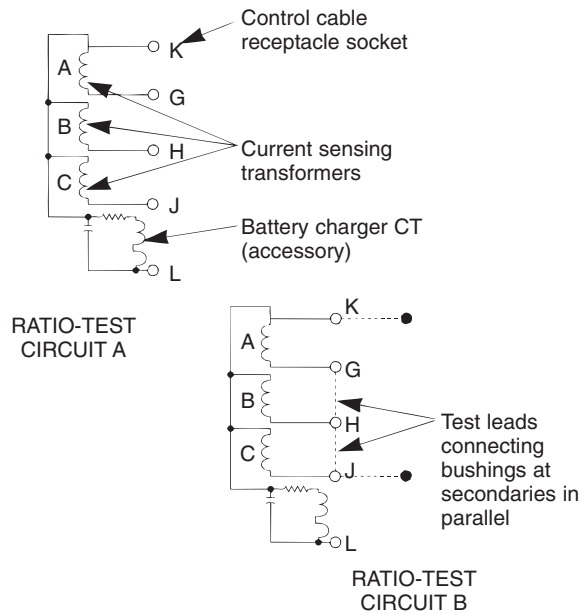
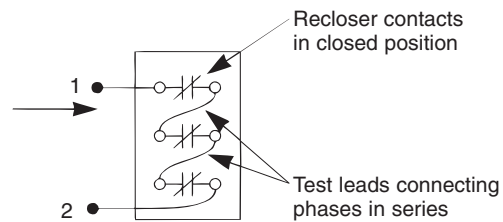


Figure 8. Testing current transformers

Ratio test for sensing CT's

⚠ CAUTION

Hazardous voltage. Open CT secondaries can generate high voltages. Contact with CT pins of the disconnected cable can cause electric shock and may result in personal injury. Open recloser contacts and open disconnect switches before disconnecting control cable. T204.3

1. Connect all three phases of the recloser in series as shown in Figure 8 and close the recloser contacts with the manual closing tool.
2. Connect a 100 ampere ac test current to test points 1 and 2.
3. Energize the 100 ampere test source.
4. Using a 0-500 milliammeter check the current output across socket pins K-G, K-H, and K-J (Figure 8, Ratio-Test Circuit A).
 - The output of each CT should measure 100 mA $\pm 10\%$.

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Note: Be sure to allow for the tolerances of meter being used. The resistance of certain type of meters is not negligible. Use as high a scale (lower resistance) as is accurately readable.

5. A 100 mA reading verifies the 1000:1 ratio of the sensing CT's. If the 100 mA is not attained, replace the CT.
6. De-energize the test source.

Polarity test for sensing CT's

1. With the phases still connected in series from the previous test, connect the secondaries of the CT's in parallel by connecting pin socket G to H to J and measure the output between pin sockets K and J as shown in Figure 8 (Ratio-Test Circuit B).
2. Energize the 100 ampere ac test source.
 - A. All three transformers should have the same polarity; the output should measure 300 mA.
 - B. If one transformer has its polarity opposite of the remaining two the output will measure 100 mA. Check to determine which CT is reversed and then correct by rotating that CT 180°.
3. De-energize the test source and remove the jumper wires from the receptacle.

CT insulation withstand test

To check the integrity of the CT wiring, ground the recloser head and apply 500 Vac to receptacle pin K for one minute.

Surge suppressors (low-voltage closing coils only)

The terminal block and surge suppressors included in this kit are installed on the closing coil contactor of reclosers equipped with the low-voltage closing accessory. To install the suppressor, refer to Figures 9 and 10.

1. Drill two 5/32" holes as shown in Figure 9.
2. Install terminal block onto closing coil contactor; secure with #6 screws and locknuts provided.

3. Remove power leads from each side of the closing coil contactor assembly; cut leads to provide sufficient length for attachment to the terminal board. Strip ends of leads and install terminals provided.
4. Connect varistors and leads as shown in Figure 10.

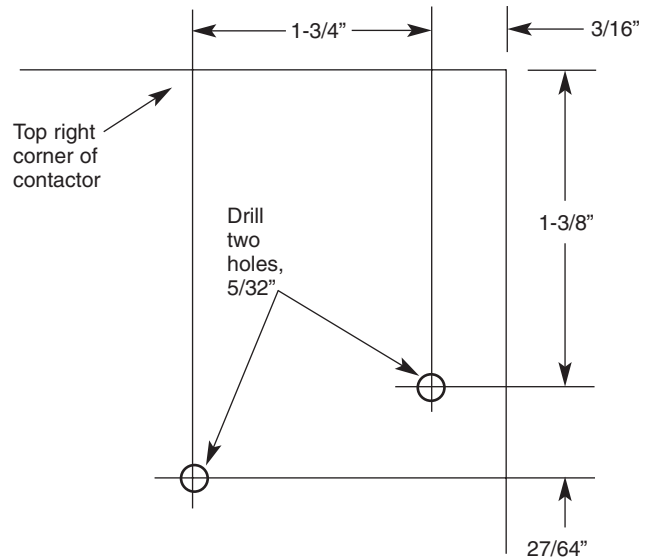


Figure 9. Drilling for terminal block

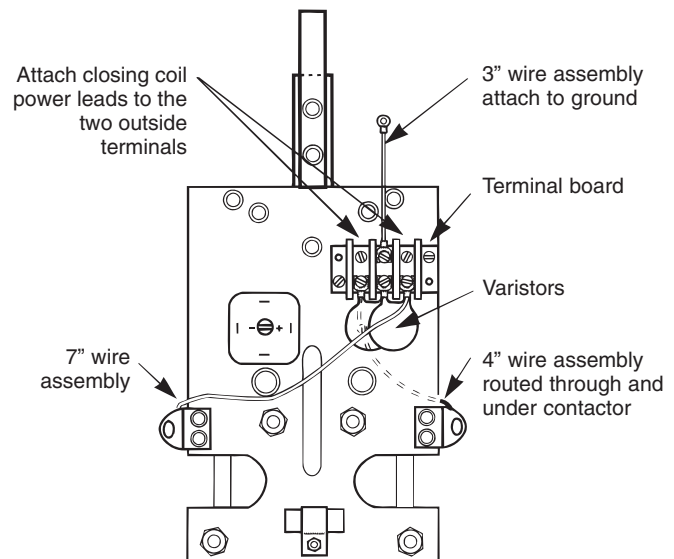


Figure 10. Wiring surge suppression varistors

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