

Reclosers

Type KFE and KFME (15kV)
 Bus Bar Kit KRK711-1
 Installation Instructions

Service Information

KFE10011-E

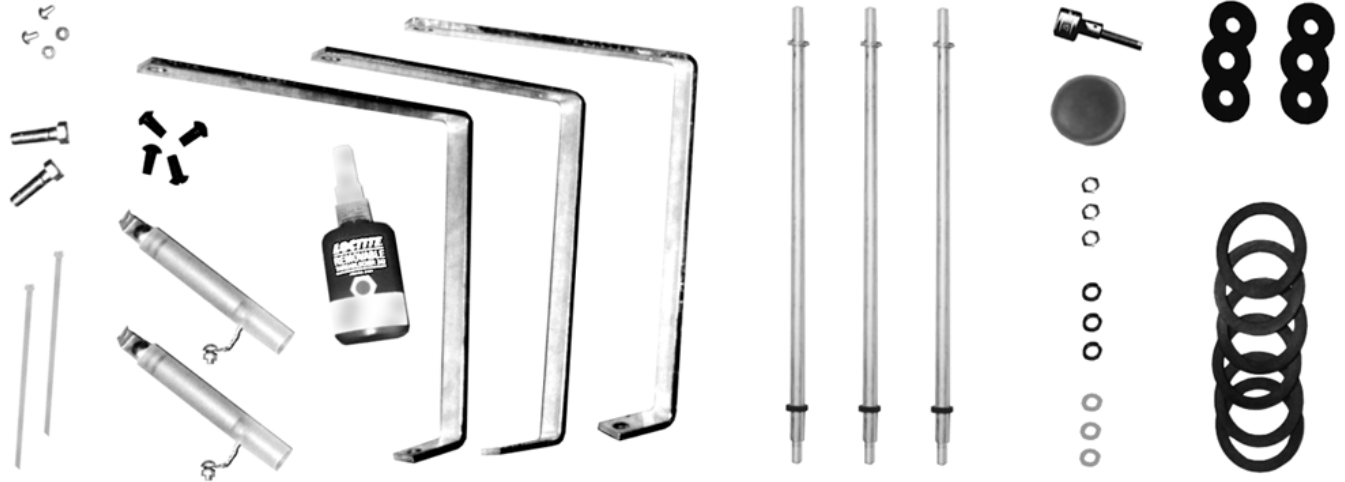


Figure 1.
 Type KFE and KFME (15kV) bus bar kit KRK711-1.

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 961047KM

Contents

Safety Information	2	Installation	4
Safety Instructions	2	Disassembly Procedures	4
Hazard Statement Definitions	2	Capscrew Replacement.....	6
Product Information	3	Reassembly Procedures.....	6
Introduction	3	Testing	10
Description.....	3		



SAFETY FOR LIFE



Kyle Distribution Switchgear products meet or exceed all applicable industry standards relating to product safety. 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 Kyle 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


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


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.


Hazard Statement Definitions


This manual contains two types of hazard statements:


 **WARNING: Refers to hazards or unsafe practices which could result in severe personal injury, or death, and equipment damage.**

 **CAUTION: Refers to hazards or unsafe practices which could result in damage to equipment or in personal injury.**

 **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 may result in contact with high voltage which will cause death or severe personal injury. T232.1

 **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

 **CAUTION:** Follow all locally approved safety practices when lifting and mounting the equipment. Use the lifting lugs provided. Lift the load smoothly and do not allow the load to shift. Improper lifting can result in equipment damage. G106.1

PRODUCT INFORMATION

Introduction

The information contained in this kit is organized into the following major categories; *Safety Information, Product Information, Installation, and Testing*. Refer to table of contents for page numbers.

Service Information KFE10003-E provides maintenance information and testing procedures for Kyle® reclosers.

Description

The bus bar kit for Type KFE and KFME reclosers includes the necessary parts to upgrade the dielectric withstand capabilities of the recloser. New bushing rod assemblies, terminal gaskets, head gaskets, bus bars and fuses have been provided for the replacement of the bushing leads and the insulating support board.

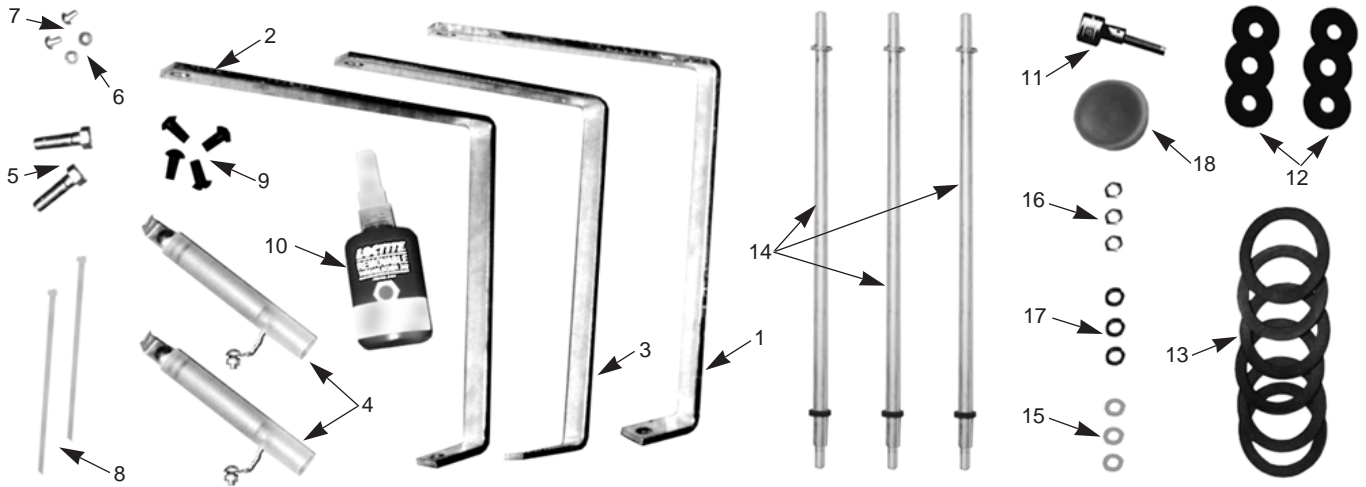


Figure 2.
Type KFE and KFME (15kV) bus bar kit KRK711-1.

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TABLE 1
Bus Bar Kit KRK711-1 for Type KFE and KFME (15kV)

Item	Quantity	Catalog Number	Description
1	1	KRK1231F	A Phase Bus Bar
2	1	KRK1232F	B Phase Bus Bar
3	1	KRK1233F	C Phase Bus Bar
4	2	KRK1280-1	Fuse Assembly
5	2	K730101143150Q	Hex Head Capscrew
6	2	K900830025000A	Lockwasher
7	2	K721525125037A	Round Head Machine Screw
8	2	KP2358A5	Wire Tie
9	4	K732101137075A	Button Head Capscrew
10	1	KP2364A1	Loctite
11	1	KP2410A1	Hex Wrench
12	6	KA209057	Bushing Terminal Gasket
13	6	KA209066	Bushing to Head Gasket
14	2	RA71641	Bushing Rod Assembly
15	6	KP2028A3	Flatwashers
16	3	K880725320050K	Nuts
17	3	K900830050000A	Lockwashers
18	3	KA2381-5	Lubricant (grease)
19	1	KA2048-428	Kit Instructions

INSTALLATION

Disassembly Procedures

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 may result in contact with high voltage which will cause death or severe personal injury. T232.1

CAUTION: Equipment damage. Recloser must be open (yellow operating handle, under sleethood, down) before untanking. Tripping the mechanism out of oil will cause excessive mechanical shock to the operating mechanism, which will cause accelerated wear and/or damage to the mechanism. T202.0

The entire installation process should be conducted in a clean environment such as a repair shop.

1. After the recloser has been de-energized, remove the recloser from service.

CAUTION: Follow all locally approved safety practices when lifting and mounting the equipment. Use the lifting lugs provided. Lift the unit smoothly and do not allow the unit to shift. Improper lifting can result in equipment damage. G106.2

2. With the recloser in the Open position, untank the recloser by loosening the six head bolts and washers on the head casting. Carefully lift the head assembly out of the tank using the lifting lugs (refer to Figure 3).

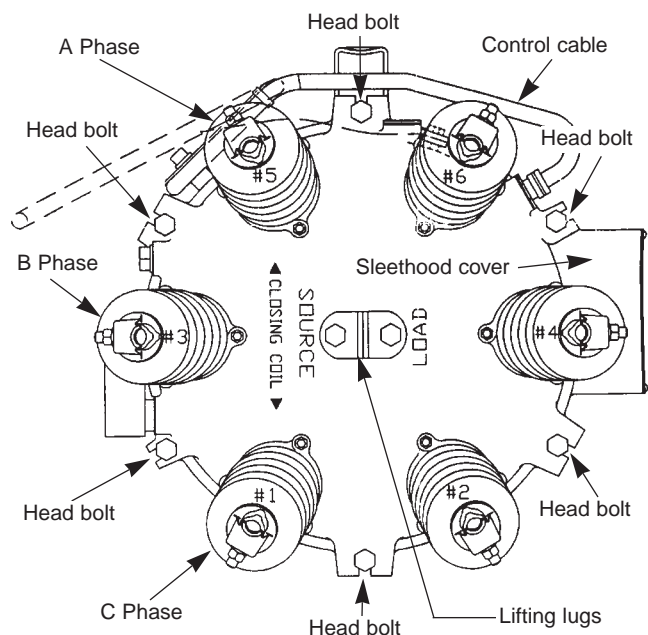


Figure 3.
Top view of head assembly.

To replace the source-side bushing leads with bushing rods for the attachment of the bus bars, place the head assembly in a service stand (shown in Figure 4). If this is not possible, the head casting could be suspended by an hoist, providing that it can adequately support the weight. Another alternative would be to lay the head casting on a clean work bench or on the ground on a clean piece of cardboard.

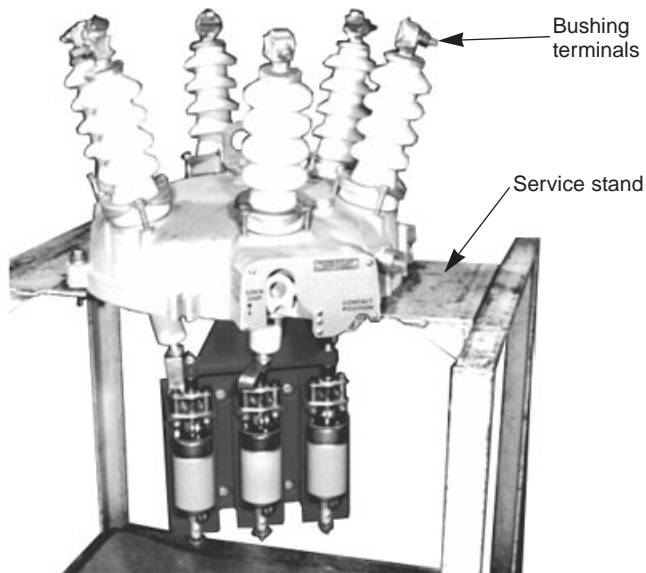


Figure 4.
Head assembly in service stand.

961039KM

3. Remove the source-side bushing terminals 1, 3, and 5 from their bushings (refer to Figure 3). Remove and discard the terminal gaskets.

Note: Six bushing to terminal gaskets have been included with this kit. For maintenance purposes, it is suggested that the load side terminal gaskets also be replaced at this time.

IMPORTANT: The following parts from the original assembly will be reused during this retrofit:

- 2 steel lockwashers from bridge plate
- 3 brass hex head capscrews, 3 bronze lockwashers, and 3 brass flatwashers from bottom of interrupter assembly
- 4 steel lockwashers and 4 flatwashers from the interrupter support plate
- 3 source-side bushing clamping rings and bushing clamps with hardware

4. Remove the bushing clamps and carefully remove the clamping rings by slightly bending them (refer to Figure 5). Save all of the hardware from the clamps and the clamping rings for reassembly.
5. To break the bushing seals, carefully tap the ceramic bushings with your hand to loosen each and then pull the three ceramic bushings off the head assembly. Discard the three bushing gaskets.

Note: Six bushing to head gaskets have been included with this kit. For maintenance purposes, it is suggested that the load side bushing to head gaskets also be replaced at this time.

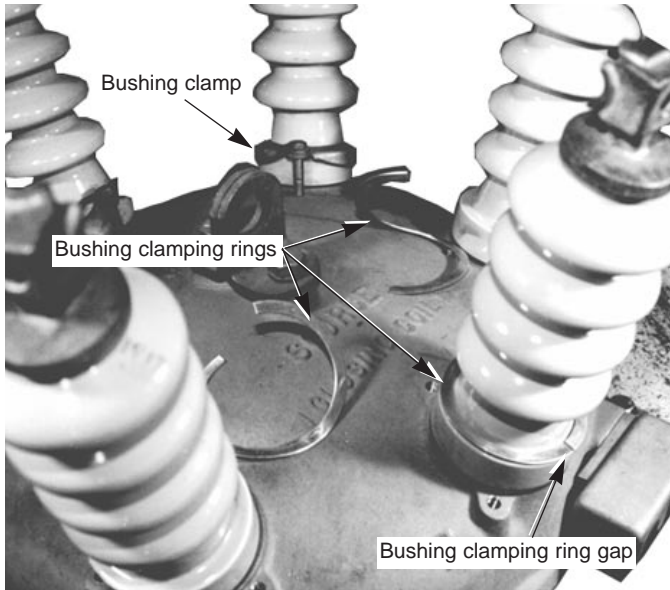


Figure 5.
Bushings clamps.

961040KM

6. Remove the three hex head capscrews, bronze lockwashers and brass flatwashers connecting the bushing leads to the bottom of the interrupter assembly and save the hardware (refer to Figure 6).

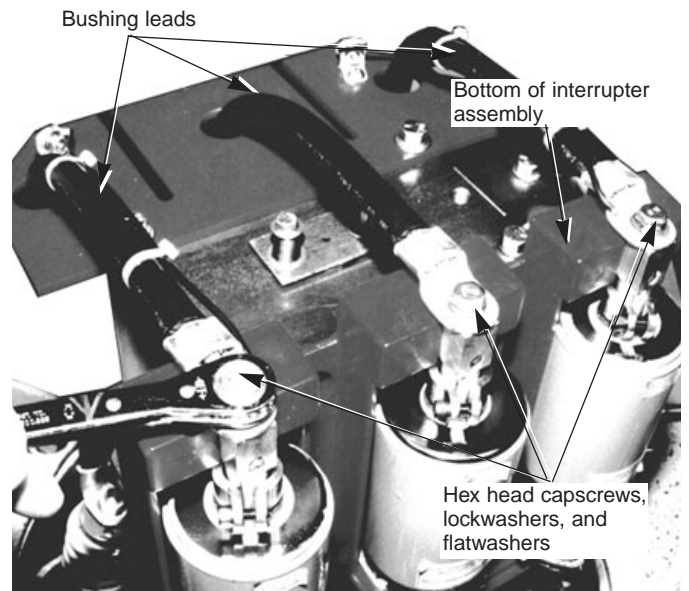


Figure 6.
Bottom view of mechanism.

961049KM

7. Remove the round head capscrews, hex nuts, bronze lockwashers and brass flatwashers from the contactor plate used to connect the fuse leads, and discard the hardware (refer to Figure 7).

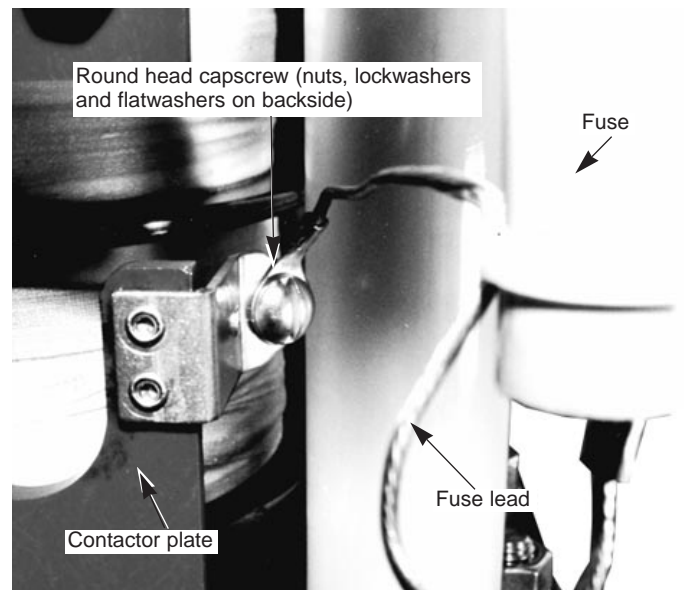


Figure 7.
Fuse lead attachment.

961051KM

8. Remove the two hex head capscrews, lockwashers, and steel flatwashers from the bushing lead support board (refer to Figure 8).

A. Discard the steel flatwashers and discard the hex head capscrews but keep the lockwashers for reuse during reassembly.

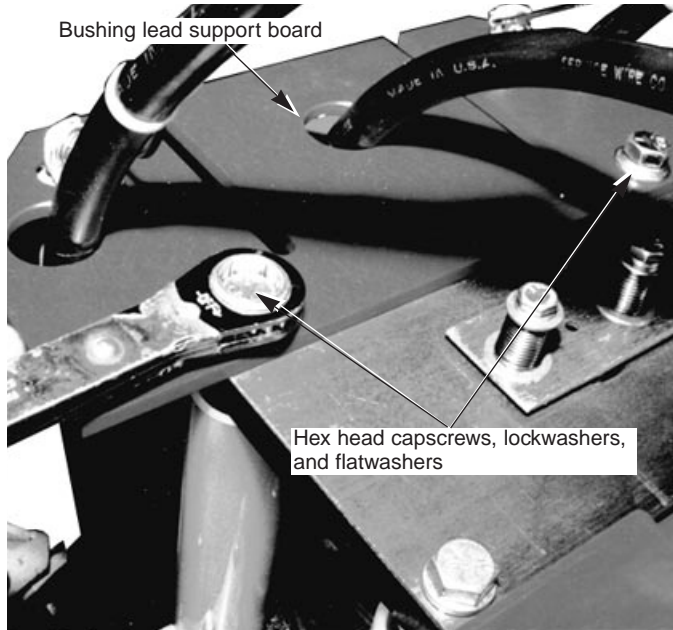


Figure 8.
Bushing lead support board.

961052KM

B. Remove and discard the bushing lead support board, the three black bushing leads, and the two fuses (refer to Figure 9).

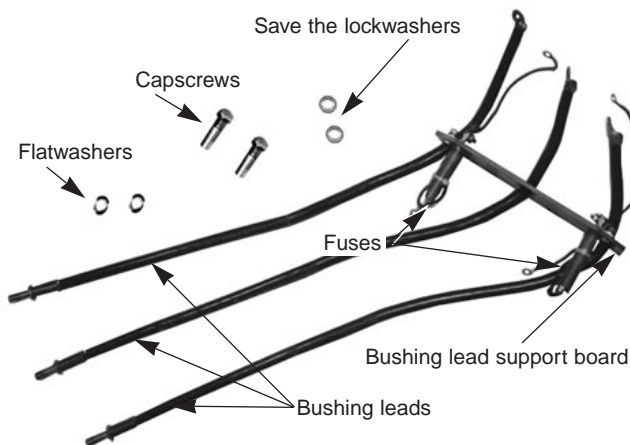


Figure 9.
Discarded components.

961041KM

Capscrew Replacement

There are four button head capscrews included with this kit to replace the four hex head capscrews currently used on the interrupter mounting plate.

IMPORTANT: To prevent the interrupter mounting plate from shifting, replace one hex head capscrew with one button head capscrew at a time.

1. **One at a time** replace the four hex head capscrews holding the interrupter support plate with the four button head capscrews (refer to Figure 10).

A. Reuse the lockwashers with the button head capscrews. Discard the hex head capscrews and the flatwashers.

B. The threads of each screw hole must be free of oil before applying Loctite to the threads of the button head capscrews. If oil is present, the holes will have to be flushed with alcohol.

C. Torque (using the hex wrench included with this kit) each button head capscrew to 15 Nm (140 in. lbs.).

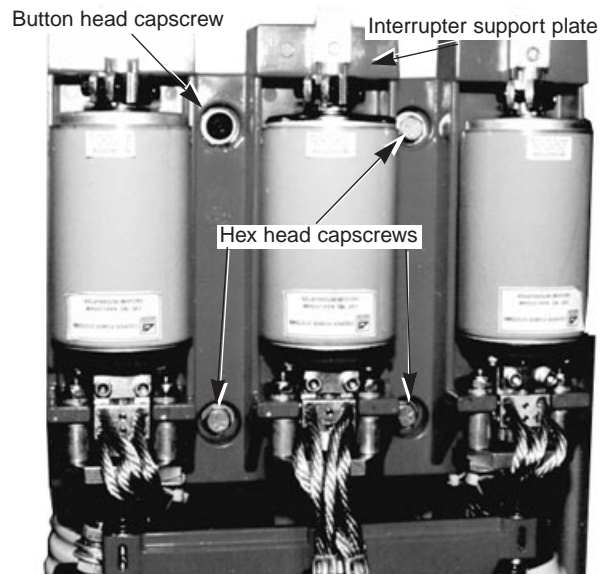


Figure 10.
Capscrew replacement.

961054KM

Reassembly Procedures

1. In the top of the bridge plate, use the two 1-1/2 inch capscrews supplied with the kit and the two previously saved lockwashers to reattach the bridge plate (refer to Figure 11).

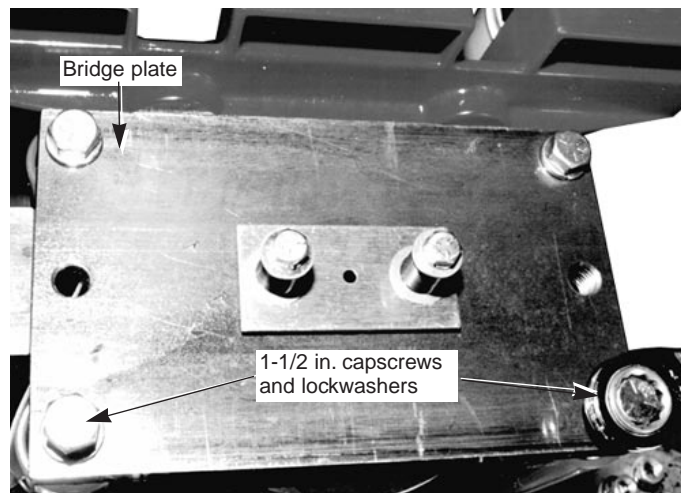


Figure 11.
Bridge plate attachment.

961055KM

2. Place the bushing rod assembly inside of the ceramic bushing with the roll pin end toward the top of the bushing. Turn the assembly until the roll pin fits into the slots on the top inner end of the ceramic bushing (refer to Figures 12 and 14). Repeat this step with the other two bushings.

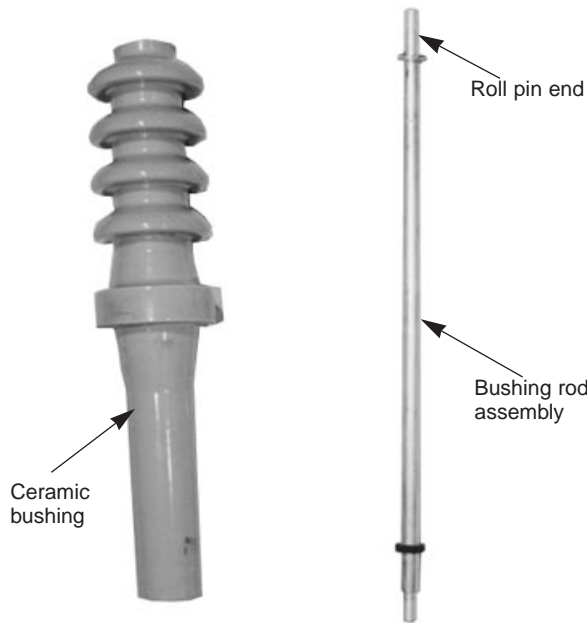


Figure 12.
Bushing rod assembly.

961042KM

3. Apply a light layer of lubricant (grease), included with this kit, on the knurled face inside of the bushing terminal (refer to Figure 13). Then place a new terminal gasket on top of the lubricated area of the bushing terminal.

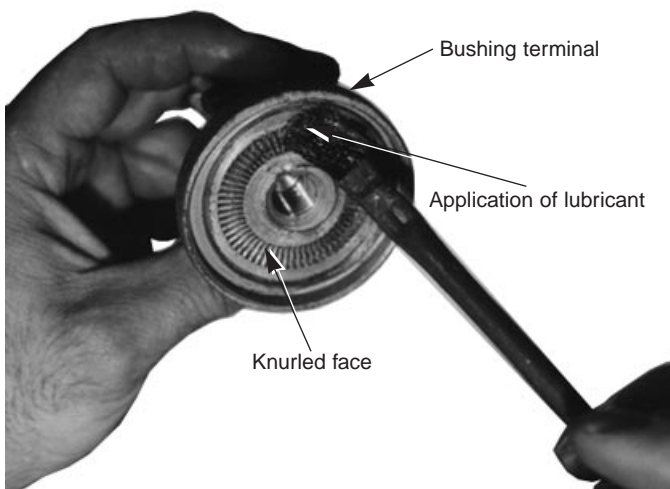


Figure 13.
Bushing terminal lubricant.

961043KM

4. Hand tighten the bushing terminal to the top end of the bushing rod assembly inside of the ceramic bushing (refer to Figure 14). Repeat this step with the other two bushings.

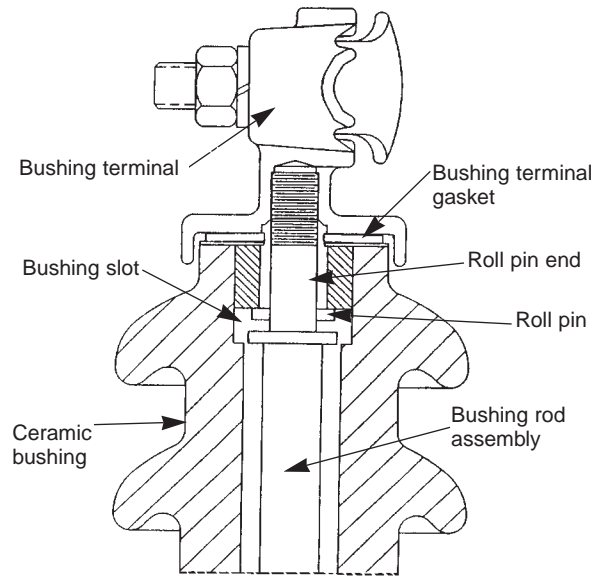


Figure 14.
Interior view of bushing and terminal.

5. This step is not necessary if zinc plated (non-stainless steel) hardware is being used. However, if stainless steel hardware is being used, proceed with step 5A.

A. Place Loctite into the bushing clamp bolt holes on top of the head casting (shown in Figure 15).

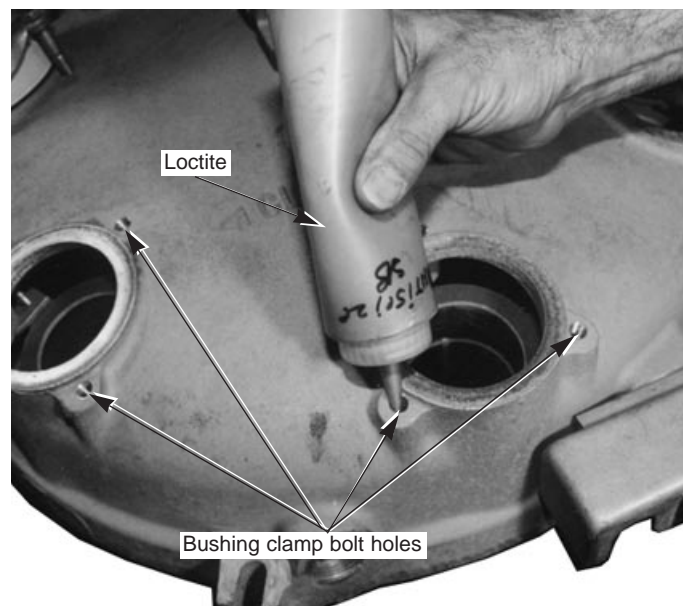


Figure 15.
Bushing clamp bolt hole location.

961044KM

6. Place the bushing gaskets on top of the bushing holes on the source-side of the head casting.

7. Set the bushings in place over the gaskets and replace the bushing clamping rings on the base of the bushings.

Note: The bushing clamping rings are to be mounted with the gap toward the outside of the head casting to allow liquids to drain out (refer to Figure 5).

8. Replace all of the bushing clamps with the previously saved hardware.

9. Torque the bushing clamps to 13-20 Nm (10-15 ft. lbs.).

10. Torque the bushing terminals to 27-33 Nm (20-25 ft. lbs.).

11. Loosen the bushing clamps and position the bushing terminals with the studs toward the outside of the head casting and the eyelets toward the inside of the head casting (refer to Figure 16).

12. Torque the bushing clamps to 13-20 Nm (10-15 ft. lbs.).

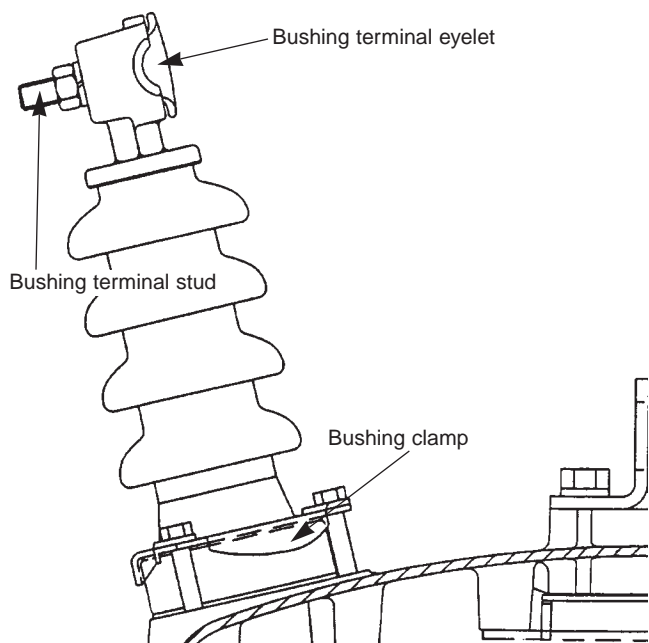


Figure 16.
Bushing terminal position.

13. Attach the two new fuse assemblies to the contactor plate. Use the hardware attached to the new fuse assemblies (refer to Figure 17).

14. Train the fuse leads as shown the Figure 17.

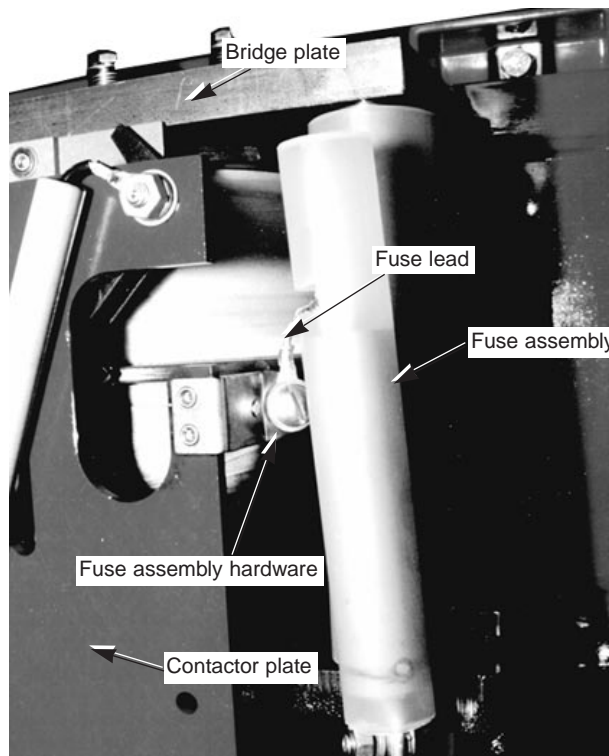


Figure 17.
Fuse assembly.

961056KM

15. Place a bus bar on each of the bushing studs and align the bus bar screw holes on the bottom of the interrupter (refer to Figure 18). The bus bars are pre-formed at different angles to fit in only one position. It may be necessary to switch the bus bars around to determine their exact position.

A. Attach the bus bars to the bottom of the interrupter using the capscrews, bronze lockwashers and brass flatwashers saved earlier (refer to Figure 18).

B. Use the nuts, flatwashers and lockwashers supplied with this kit. Place a flatwasher on the bottom bushing stud first, then the bus bar, followed with another flatwasher, the lockwasher, and then the nut (refer to Figure 18). Tighten the bus bar hardware.

Note: To prevent a strain on the bus bars, adjustments of the hardware on either side of the bus bar may be necessary for a tight connection.

16. Connect the fuse bracket to the bottom of the bus bar in the pre-drilled hole (refer to Figure 18) with the lockwasher and slotted screw furnished with the kit.

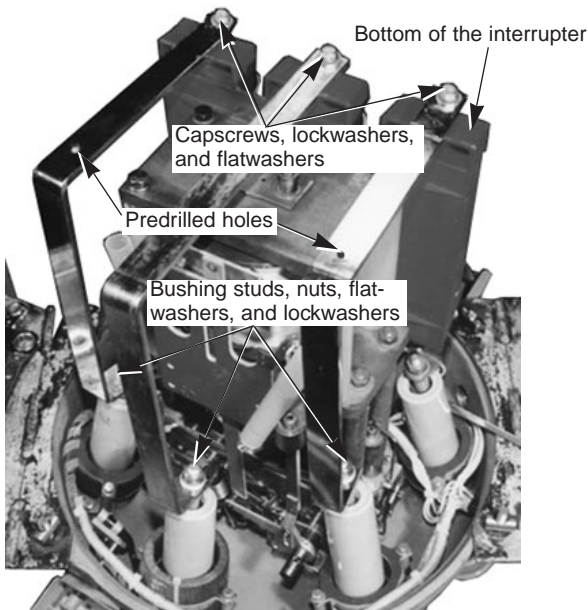


Figure 18.
Bus bars.

961045KM

A. Tighten the carriage bolt on the bracket at the bottom of the fuse (refer to Figure 19).

17. Push the fuse insulator down (toward the bushings) as far as it will go. Place a wire tie (furnished with the kit) around the bottom of the fuse and tighten the tie (refer to Figure 19). This will protect the insulator from sliding down when the unit is replaced in the tank.

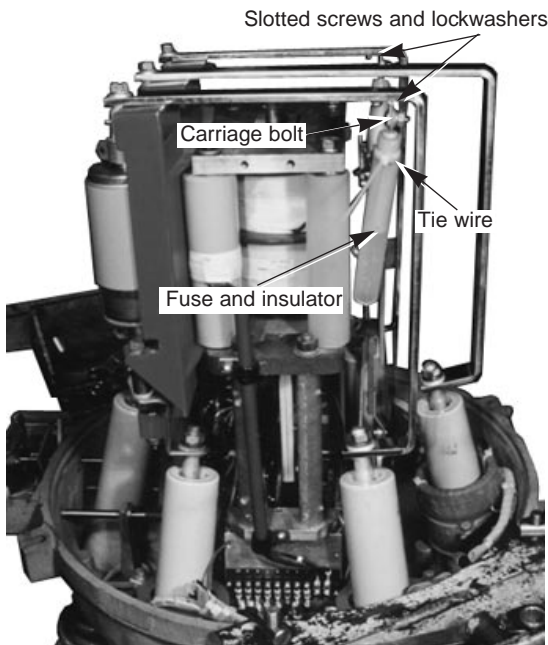


Figure 19.
Fuse assembly attachment.

961046KM

18. Carefully place the head assembly back into the tank.

- A. The head assembly must be adjusted to seat over the cover gasket properly.
- B. The sleethood should be located at 90° to the tank pole mounting bracket (refer to Figure 20).

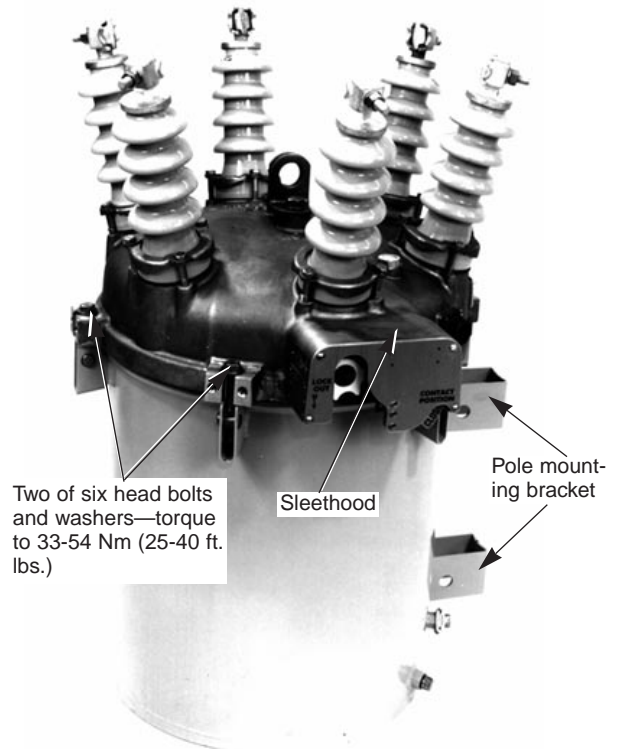


Figure 20.
Head assembly placement.

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19. Tighten the six head bolts and washers on the head assembly of the tank in an alternating pattern according to the sequence shown in Figure 21. Torque each head bolt to 33-54 Nm (25-40 ft. lbs.).

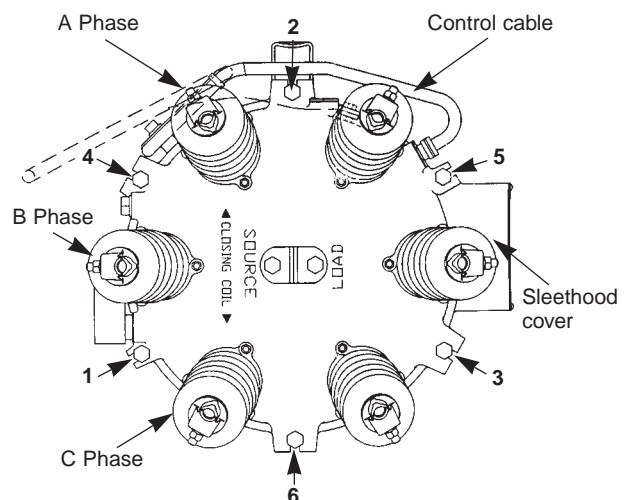




Figure 21.
Head bolt torque sequence.

TESTING


Safety Requirements

 **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:** Hazardous voltage. The switchgear and high voltage transformer must be in a test cage or similar protective device to prevent accidental contact with the high voltage parts. Solidly ground all equipment. Failure to comply can result in death, severe personal injury, and equipment damage. T221.3

When high-voltage closing is used, both the recloser and the high-voltage test transformer should be enclosed in a test cage to prevent accidental contact with live high-voltage parts. All metering and measuring equipment must be located outside the test cage. Observe all proper grounding and test procedures.

High-Potential Tests

 **CAUTION:** Radiation. At voltages up to the specified test voltages, the radiation emitted by the vacuum interrupter is negligible. However, above these voltages, radiation injurious to personnel can be emitted. See *Service Information S280-90-1, Vacuum Interrupter Withstand Test Voltage Ratings Information* for further information. G109.2

After the installation of the bus bar kit has been completed, it will be necessary to conduct a high potential test of the unit. The high potential withstand tests of the recloser should be performed as per the *KFE10003-E Maintenance Service Instructions Manual*.



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