

Switches

Type VR, VCR, VLR, VRV Switches & Type GV, GW Sectionalizers Crank Lever Replacement Kit Instructions

Service Information

S260-20-18

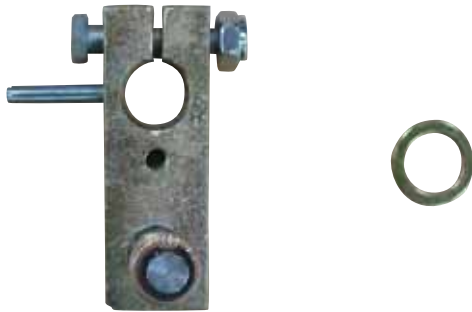


Figure 1.
KP68VR1 - Standard Kit

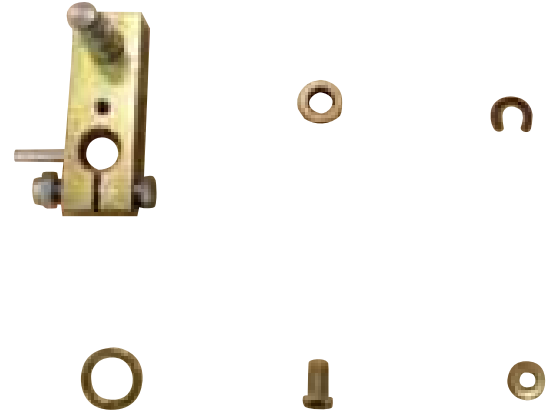


Figure 2.
KP68VR2 - Quick Close Kit

Contents

Safety Information	2
Product Information	3
Introduction	3
Quality Standards	3
Acceptance and Initial Inspection	3
Handling and Storage	3
Description	3
Installation Procedure	
- Kit KP68VR1–Standard	4
Tools Required	4
Preparing Unit For Replacement of VR-68 Crank Lever	4
Removing the Operating Mechanism Cover	4
Replacing the VR-68 Crank Lever	5
Testing the Repaired Unit	7
Installation Procedure	
- Kit KP68VR2–Quick Close	9
Tools Required	9
Preparing Unit For Replacement of VR-68 Crank Lever	9
Removing the Operating Mechanism Cover	10
Testing the Repaired Unit	14

Serial Numbers

Service Information S260-20-18 provides crank lever replacement kit instructions for all V family switches (VR, VCR, VLR, VRV) and G family sectionalizers (GV, GW) built between March and September of 2008. The serial number range is all VR, VLR, VCR, and GV units from CP571031226 to CP57117259, and all GW units from 5874 to 5880.

Note: No VRV units were built during this time period.



SAFETY FOR LIFE



Cooper Power Systems 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 Cooper Power Systems 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 flash clothing, safety glasses, face shield, hard hat, rubber gloves, 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 may 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



PRODUCT INFORMATION

Introduction

These instructions are to be used in conjunction with the appropriate installation and operation instructions that were provided with your equipment:

- *S260-20-6 Type VR, VLR, VCR and VRV Installation Instructions.*
- *S260-20-9 Type VR, VLR and VCR Maintenance Instructions*
- *S270-20-3 Type GV S/N 2265 and above, and GW S/N 4803 and above Installation Instructions*
- *S270-20-2 Type GV S/N 1302 and above Maintenance Instructions*
- *S270-20-5 Type GW S/N 2415 and above Maintenance Instructions*

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.

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. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, contact your Cooper Power Systems representative.

Quality Standards

ISO 9001:2000-Certified Quality Management System

Acceptance and Initial Inspection

Each kit is completely assembled, tested, and inspected at the factory. It is carefully calibrated, adjusted and in good condition when accepted by the carrier for shipment.

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

Handling and Storage

Refer to the installation and operation instructions that were provided with the unit for specific handling and storage information.

Description

Kit KP68VR1

G/V Family Crank Lever Replacement Kit Standard Units

This kit provides the components required to replace the VR00068 crank lever on a standard VR, VCR, VLR, or VRV switch, or GV or GW sectionalizer.

Kit KP68VR2

V Family Crank Lever Replacement Kit Units equipped with Quick Close Option

This kit provides the components required to replace the VR00068 crank lever on a standard VR, VCR, VLR, or VRV switch equipped with the Quick Close Option.

INSTALLATION PROCEDURE - KIT KP68VR1 – STANDARD

G/V Family Crank Lever Replacement Kit - Standard Units

This kit provides the components required to replace the VR00068 crank lever on a standard VR, VCR, VLR or VRV switch, or GV or GW sectionalizer.

Kit parts include the following:

Qty.	Description	Part Number
1	Crank Lever Assembly	VR00068001
1	Flat Washer	KA20280004
1	Instructions	S260-20-18

Tools Required

- 7/16" end wrench and nut driver
- Hammer
- 3/16" punch
- Soft-faced mallet
- 1/4" or larger punch
- Torque wrench for 7/16" bolt
- A dab of general purpose grease
- Crank handle provided inside unit mechanism housing

Preparing Unit For Replacement of VR-68 Crank Lever

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: 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: Hazardous voltage. Always use a hotstick when working with this equipment. Failure to do so could result in contact with high voltage, which will cause death or severe personal injury. G108.1

CAUTION: Follow all locally approved safety practices when lifting and mounting the equipment. Use the tapped lifting provisions provided. Lift the load smoothly and do not allow the load to shift. Improper lifting can result in equipment damage. G126.0

Refer to the appropriate maintenance manuals referenced in the **PRODUCT INFORMATION** section of this publication for step-by-step procedures to remove the switchgear from service, and for specific disassembly and reassembly procedures.

The entire installation process should be conducted in a clean environment, such as a repair shop. All the steps described in these instructions occur within the mechanism cabinet. The unit should not be untanked during the procedure.

1. Bypass, trip, and de-energize the switchgear.
2. Carefully transport the unit to a suitable service facility.
3. Trip unit by pulling down on the yellow Manual Trip handle. Refer to Figure 3.



Figure 3.
Yellow Manual Trip Handle.

4. The yellow flag will indicate that the unit is open. Refer to Figure 4.



Figure 4.
Unit open.

5. Remove operating mechanism cover
 - a. Hold the operating mechanism cover in place to prevent it from falling. Loosen the wing nut securing the cover and move the clamp aside. Refer to Figure 5.

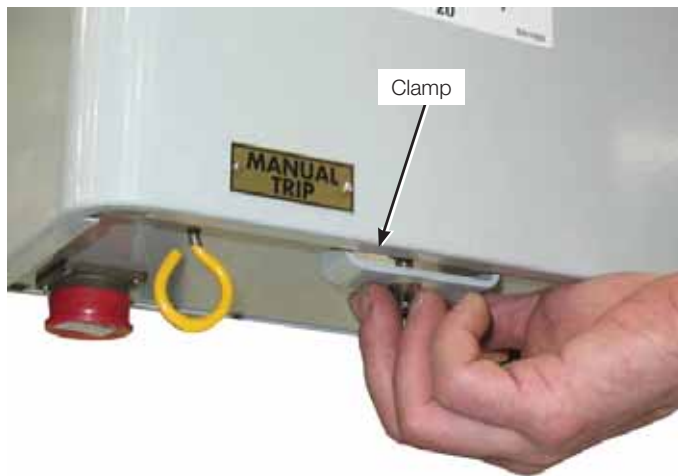


Figure 5.
Loosening cover wing nut.

- b. Slide the cover downward and remove it. Refer to Figure 6.



Figure 6.
Cover removed.

6. Replace VR-68 crank lever
 - a. Remove the closing spring from the bronze bushing on the crank lever. Allow the spring to hang down from the mechanism housing. Refer to Figures 7 and 8.



Figure 7.
Removing spring from bronze bushing.



Figure 8.
Spring hanging loose from housing.

- b. Using a 7/16" wrench, loosen clamping bolt and nut on the VR-68 crank lever. Refer to Figure 9.

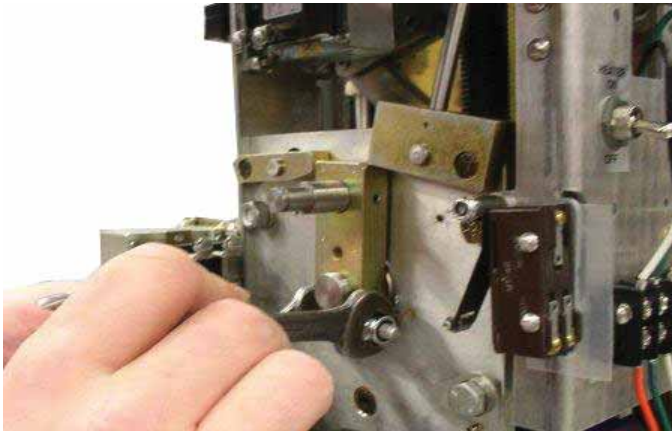


Figure 9.
Loosening clamping bolt and nut on crank lever.

- c. Using a hammer and 3/16" (5mm) punch, remove and discard the slotted roll pin securing crank lever to the shaft. Refer to Figure 10.

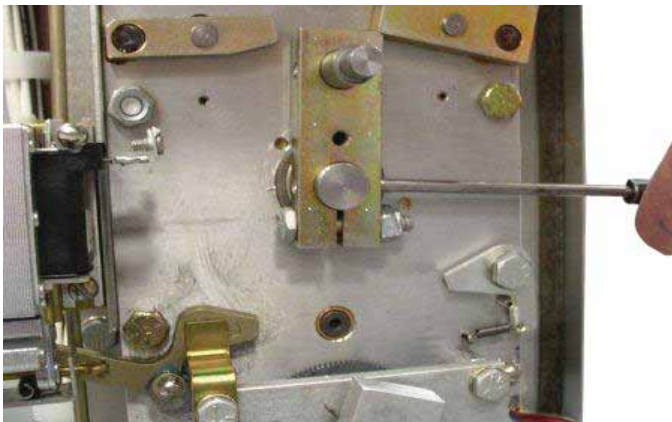


Figure 10.
Removing roll pin.

- d. Once the pin is fully removed, use a soft-faced mallet to tap the end of the shaft. The VR-68 crank lever should break loose and slide off the shaft. Refer to Figure 11.



Figure 11.
Tapping shaft end.

- e. Remove the crank lever and steel washer from the shaft. Refer to Figure 12.



Figure 12.
Removing shaft and washer.

- f. Place the new steel washer included in the service kit on the shaft. Refer to Figure 13



Figure 13.
Installing new steel washer from kit.

- g. Before installing the new crank lever assembly, ensure that the partially inserted roll pin does not interfere with the shaft hole. Refer to Figure 14.

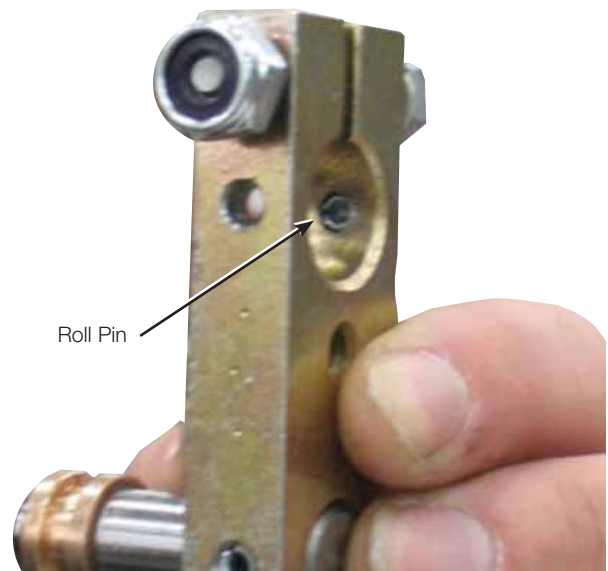


Figure 14.
Partially inserted roll pin.

- h. Place the new crank lever assembly on the shaft in the same orientation as the lever removed. Use a hammer and punch to drive the roll pin through the lever and shaft until it sits flush with the crank lever at both ends. Refer to Figure 15.

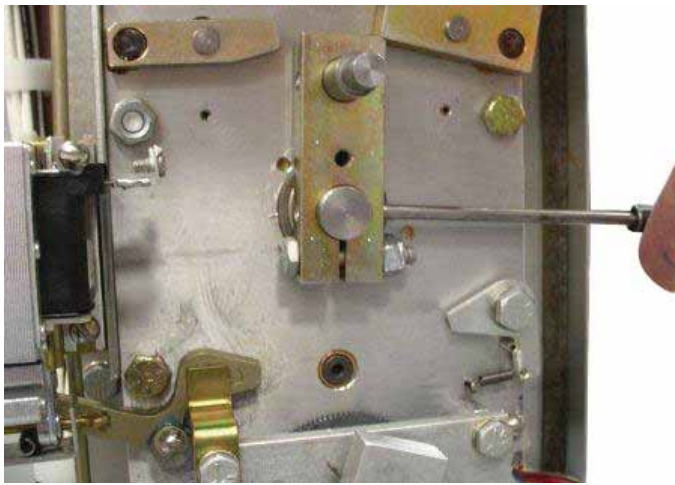


Figure 15.
Installing new crank lever on shaft..

- i. Using a 7/16" end wrench and torque wrench, torque the clamping nut and bolt to 6 ft-lbs. DO NOT OVER TORQUE. Refer to Figure 16.

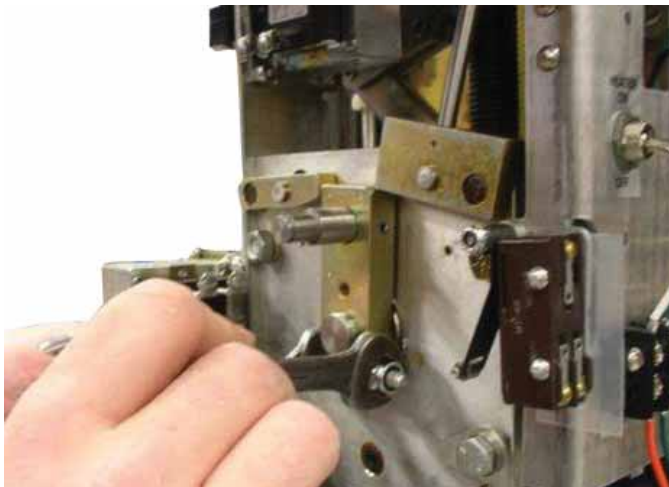


Figure 16.
Tightening clamping bolt and nut.

- j. Ensure closing spring is hooked on the correct pin. Refer to Figure 17.
- On VR, VLR, VCR and VRV switches, hook the spring on the pin farthest from the operating shaft.
 - On GV and GW sectionalizers, hook the spring on the pin closest to the operating shaft.

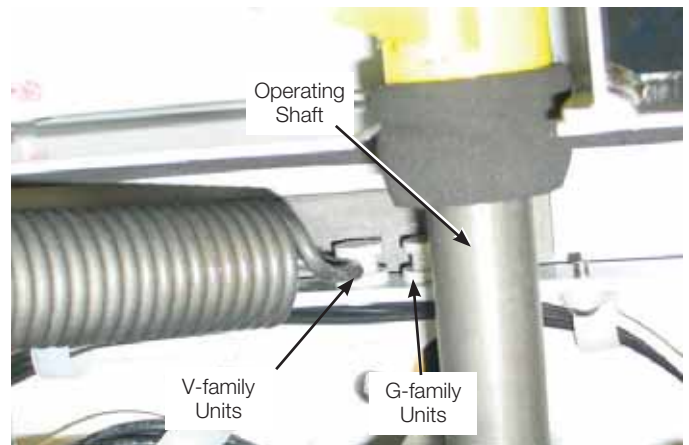


Figure 17.
Installing spring on pin.

- k. Lubricate the bronze bushing with general purpose grease. Pull the loose end of the closing spring onto the bronze bushing on the crank lever. Refer to Figure 18.

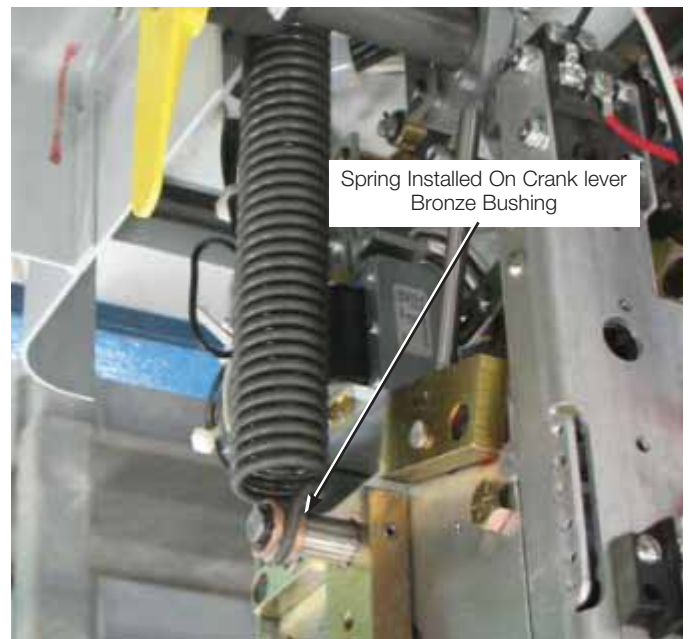


Figure 18.
Installing spring on bronze bushing.

7. Manually test the repaired unit. When performing this manual test, the unit should be in its normal, oil-filled, fully assembled state.
- a. Manually operate the unit through a full cycle as follows:
- i. Using the crank handle provided with the unit, crank the switch until the crank lever snaps closed.
 - ii. Pull the yellow handle to manually trip the unit.
 - iii. Repeat steps i and ii five times to confirm proper operation

8. Electrically test the repaired unit.

Note: This step only applies to VR, VRV, VCR, and VLR units.

- a. To close the switch, apply rated operating voltage across terminals 2 and G long enough for motor to complete its closing cycle (approximately 10 seconds). Refer to Figure 19.
- b. To open the switch, momentarily apply rated operating voltage across terminals 3 and G to energize the trip solenoid. Refer to Figure 19.

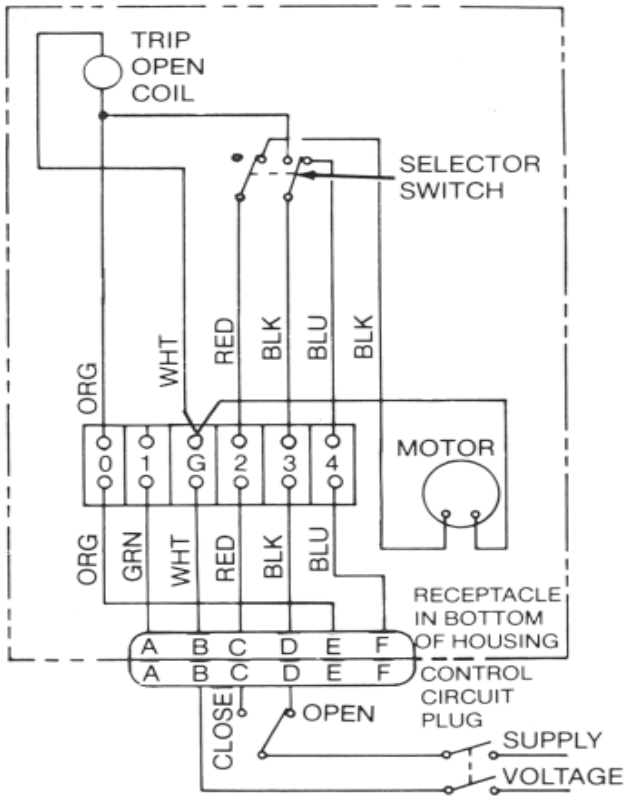


Figure 19.
Standard actuator circuit diagram.

- 9. Reinstall mechanism cover. Secure by tightening clamp and wing nut. Refer to Figure 5.

INSTALLATION PROCEDURE - KIT KP68VR2 – QUICK CLOSE

V Family Crank Lever Replacement Kit Units equipped with Quick Close Option

This provides the components required to replace the VR00068 crank lever on a standard VR, VCR, VLR or VRV switch equipped with the Quick Close Option.

Kit parts include the following:

Qty.	Description	Part Number
1	Crank Lever Assembly	VR00068002
1	Flat Washer	KA20280004
1	Sleeve	VR00280001
1	C-ring	970901375000M
1	Pan Head Screw	721501125050Z
1	Split Lock Washer	900801025000Z
1	Instructions	S260-20-18
1	Loctite® 242 Blue	KA23640018

Tools Required

- Flat screwdriver
- 7/16" end wrench and nut driver
- Hammer
- 3/16" punch
- Soft-faced mallet
- 1/4" or larger punch
- Torque wrench for 7/16" bolt
- Pliers (to crimp C-clamp)
- A dab of general purpose grease
- Crank handle provided inside unit mechanism housing

⚠ 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: 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: Hazardous voltage. Always use a hotstick when working with this equipment. Failure to do so could result in contact with high voltage, which will cause death or severe personal injury. G108.1

⚠ CAUTION: Follow all locally approved safety practices when lifting and mounting the equipment. Use the tapped lifting provisions provided. Lift the load smoothly and do not allow the load to shift. Improper lifting can result in equipment damage. G126.0

1. Prepare unit for replacement of VR-68 crank lever.

Refer to the appropriate maintenance manuals referenced in the **PRODUCT INFORMATION** section of this publication for step-by-step procedures to remove the switchgear from service, and for specific disassembly and reassembly procedures.

The entire installation process should be conducted in a clean environment, such as a repair shop. All the steps described in these instructions occur within the mechanism cabinet. The unit should not be untanked during the procedure.

2. Bypass, trip, and de-energize the switchgear.
3. Carefully transport the unit to a suitable service facility.
4. Trip unit by pulling down on the yellow Manual Trip handle. Refer to Figure 20.

Note: The yellow flag will indicate that the unit is open. Refer to Figure 21.



Figure 20.
Yellow Manual Trip Handle.



Figure 21.
Unit open.

5. Remove the operating mechanism cover

- a.** Hold the operating mechanism cover in place to prevent it from falling. Loosen the wing nut securing the cover and move the clamp aside. Refer to Figure 22.

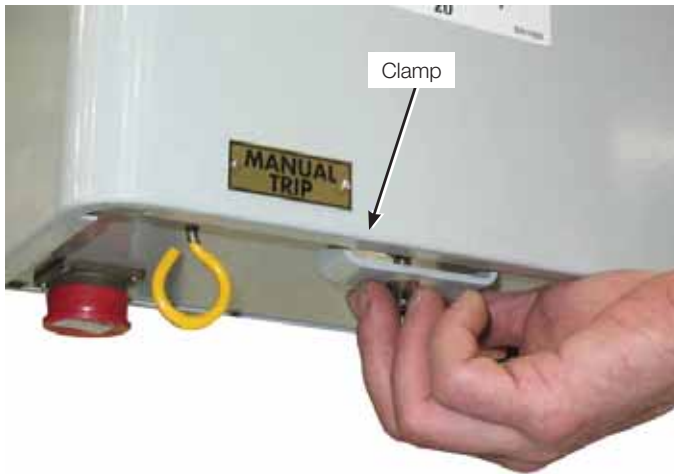


Figure 22.
Loosening cover wing nut.

- b.** Slide cover downward and remove it. Refer to Figure 23.

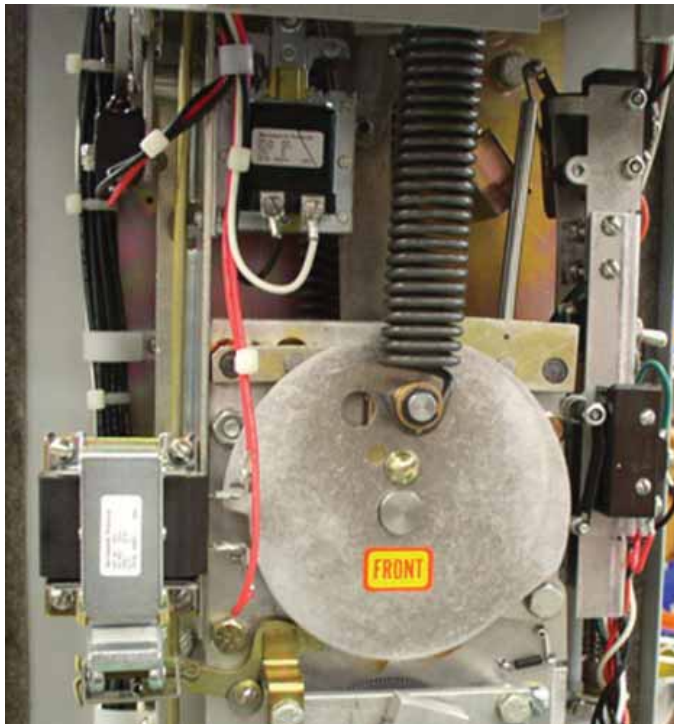


Figure 23.
Cover removed.

6. Replace the VR-68 crank lever.

- a.** Remove the closing spring from the bronze bushing on the crank lever. Allow the spring to hang down from the mechanism housing. Refer to Figure 24.

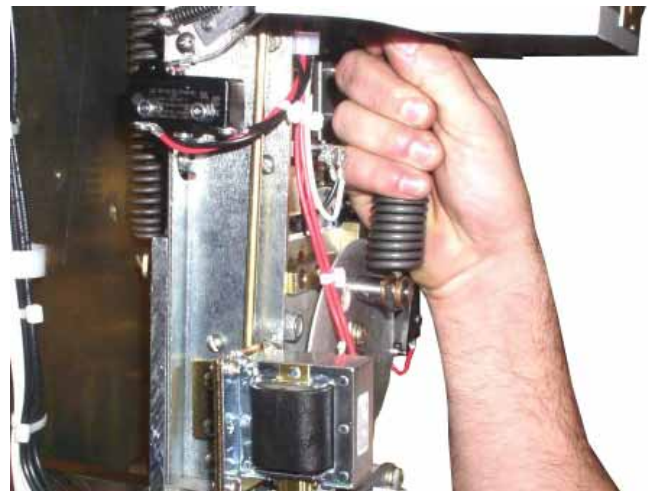


Figure 24.
Removing spring from bronze bushing.

- b.** Remove and discard the C-ring and bronze bushing from the crank lever. Refer to Figure 25.

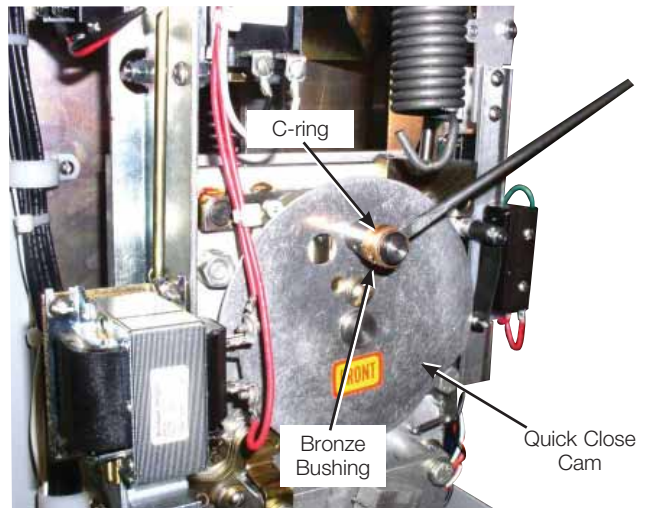


Figure 25.
Removing C-ring and bronze bushing.

- c.** Remove the pan head screw securing the Quick Close cam to the crank lever. Refer to Figure 26.

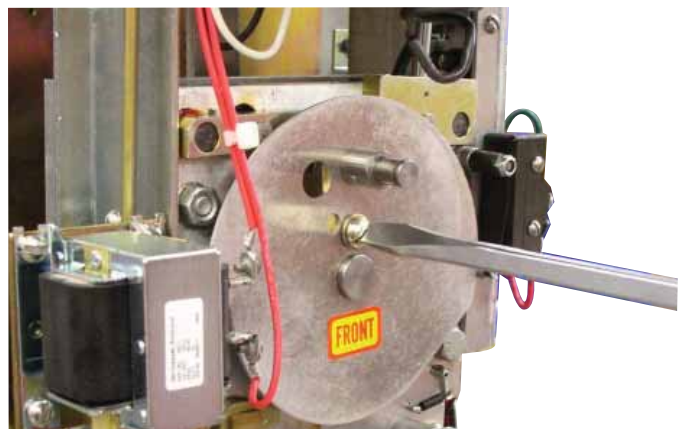


Figure 26.
Removing pan head screw.

- d. Carefully remove the cam plate (Figure 27) to expose the crank lever (Figure 28).

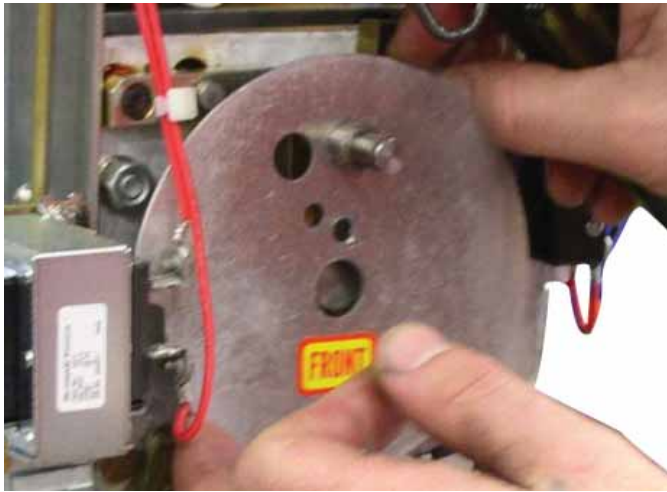


Figure 27.
Removing cam plate.

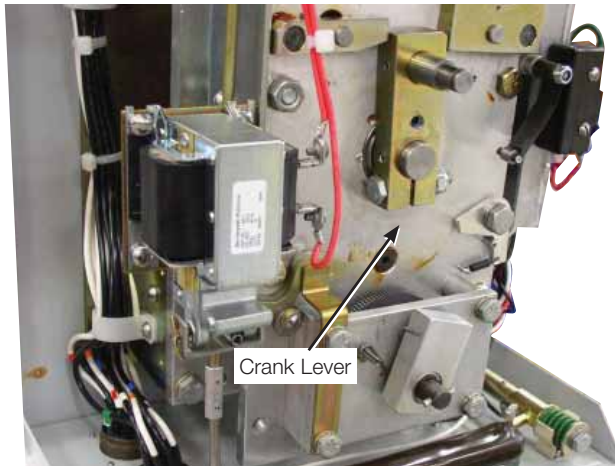


Figure 28.
Crank lever exposed.

- e. Remove the three pan head screws securing the microswitch mounting plate. Do not disconnect wiring. Refer to Figure 29.

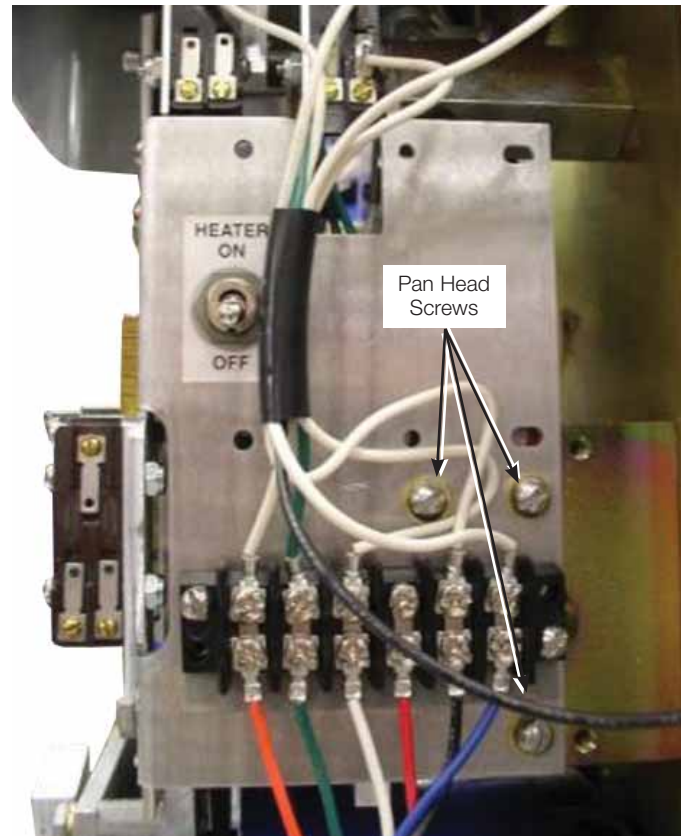


Figure 29.
Removing pan head mounting screws.

- f. Gently set aside the microswitch plate and wiring. Refer to Figure 30.

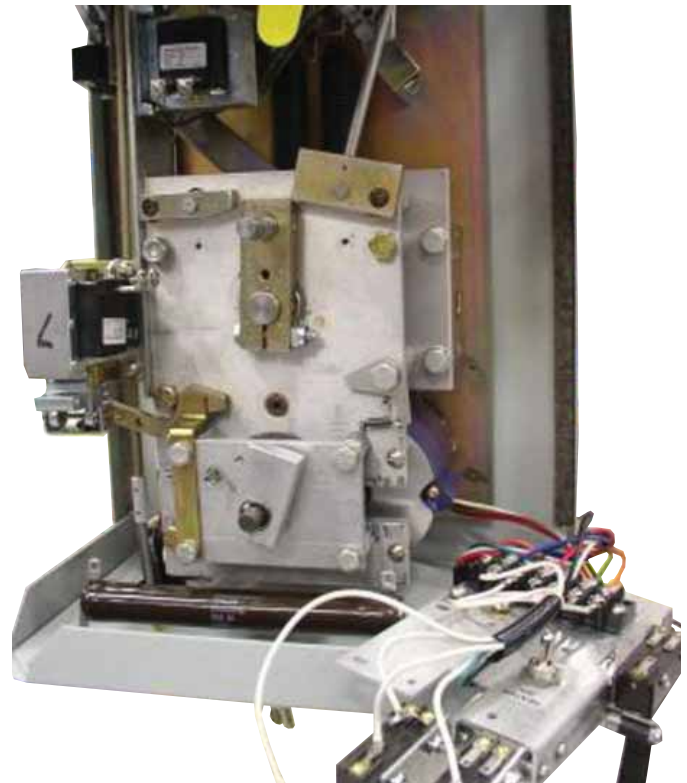


Figure 30.
Setting aside microswitch plate and wiring.

- g. Using a 7/16" wrench, loosen the clamping bolt and nut on the VR-68 crank lever. Refer to Figure 31.

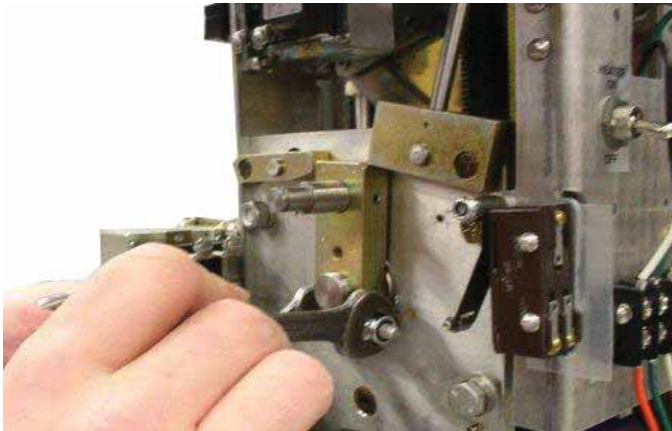


Figure 31.
Loosening crank lever clamping bolt and nut.

- h. Using a hammer and a 3/16" (5 mm) punch, remove and discard the slotted roll pin securing the crank lever to the shaft. Refer to Figure 32.



Figure 32.
Removing roll pin.

- i. Once the pin is fully removed, use a soft-faced mallet to tap the end of the shaft. The VR-68 crank lever should break loose and slide off the shaft. Refer to Figure 33.



Figure 33.
Tapping shaft end.

- j. Remove the crank lever and steel washer from the shaft. Refer to Figure 34.



Figure 34.
Removing shaft and washer.

- k. Place the new steel washer included in the service kit on the shaft. Refer to Figure 35.



Figure 35.
Installing new steel washer from kit.

- l. Before installing the new crank lever assembly, ensure that the partially inserted roll pin does not interfere with the shaft hole. Refer to Figure 36.

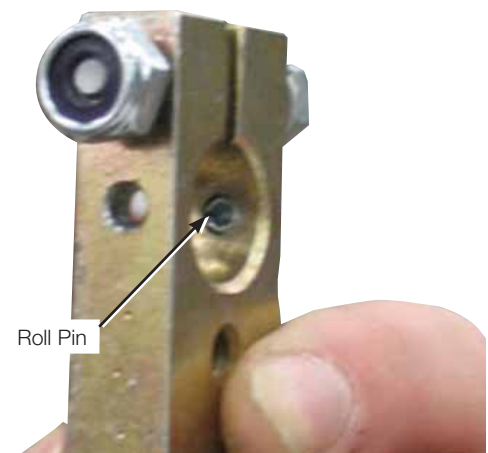


Figure 36.
Partially inserted roll pin.

- m. Place the new crank lever assembly on the shaft in the same orientation as the lever removed. Use a hammer and punch to drive the roll pin through the lever and shaft until it sits flush with the crank lever at both end. Refer to Figure 37.



Figure 37.
Installing new crank lever on shaft.

- n. Using a 7/16" end wrench and torque wrench, torque the clamping nut and bolt to 6 ft-lbs. DO NOT OVER TORQUE. Refer to Figure 38.

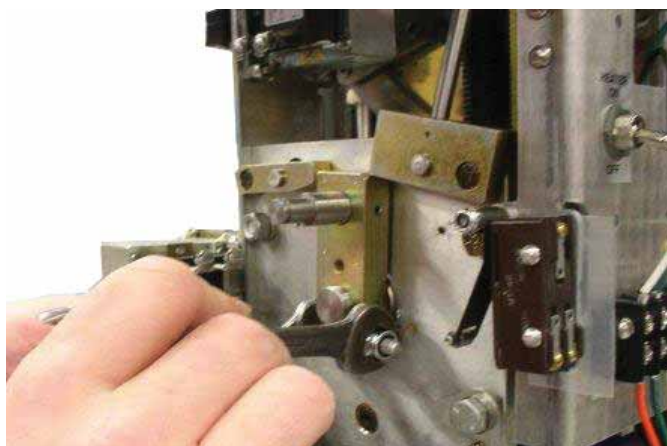


Figure 38.
Tightening clamping nut and bolt.

- o. Place microswitch mounting plate in its original location. Ensure the trip and close microswitches are actuated when the plate is installed. Refer to Figure 39.



Figure 39.
Positioning microswitch mounting plate.

- p. Reinstall the three pan head screws to secure the microswitch plate. Refer to Figure 40.

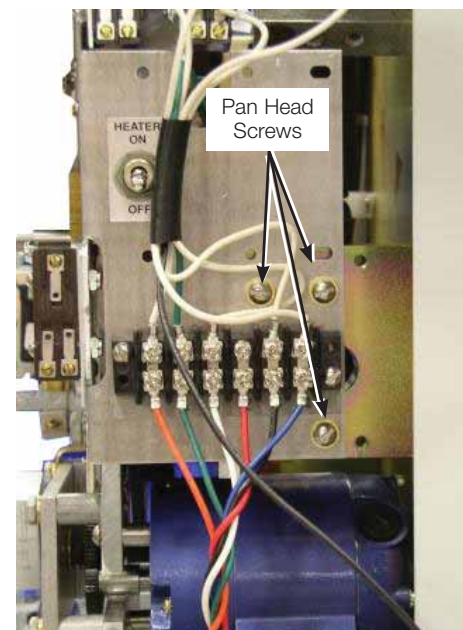


Figure 40.
Installing pan head mounting screws.

- q. Place the Quick Close cam on the VR-68 crank lever assembly. Ensure the Quick Close micro-switch “clicks” closed when the cam is installed. Refer to Figure 41. Secure with pan head screw and lockwasher from kit. Apply 1 to 2 drops of Loctite® #242 Blue to screw threads before installing.

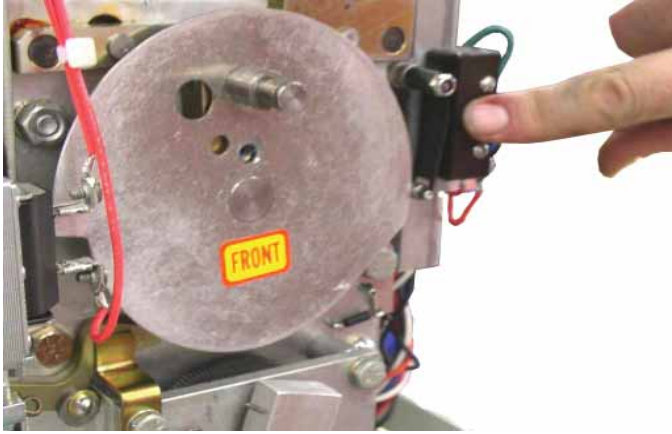


Figure 41.
Installing Quick Close cam on crank lever assembly.

- r. Install new bronze bushing on VR-68 pin. Secure with new C-ring. Refer to Figure 42.

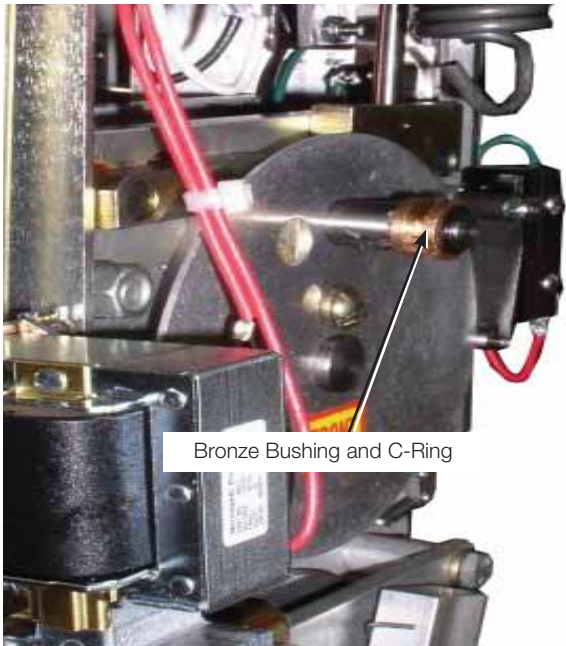


Figure 42.
Installing new bronze bushing and C-ring.

- s. Ensure trip spring is hooked on the correct pin in the operating mechanism housing. Refer to Figure 43.
- On VR, VLR, VCR and VRV switches, hook the spring on the pin farthest from the operating shaft.
 - On GV and GW sectionalizers, hook the spring on the pin closest to the operating shaft.

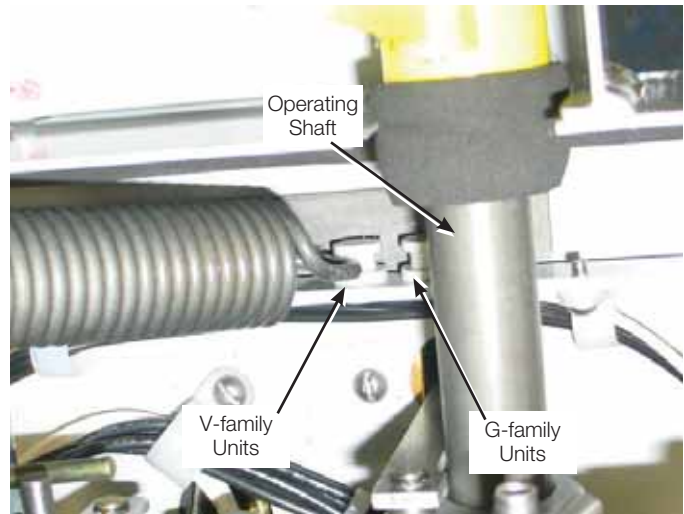


Figure 43.
Installing spring on pin.

- t. Lubricate the bronze bushing with general purpose grease. Pull the loose end of the closing spring onto the bronze bushing. Refer to Figure 44.

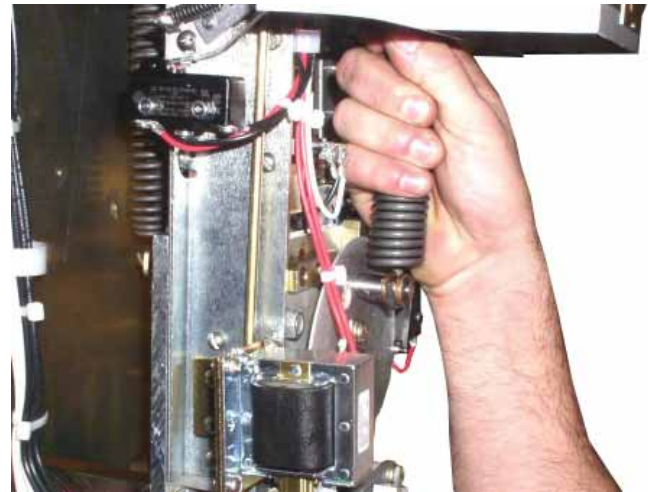


Figure 44.
Installing spring on bronze bushing.

7. Manually test the repaired unit. When performing this manual test, the unit should be in its normal, oil-filled, fully assembled state.

- a. Crank the unit through a full cycle as follows:
- i. Using the crank handle provided with the unit, crank the switch until the crank lever begins to rotate. Refer to Figure 45.

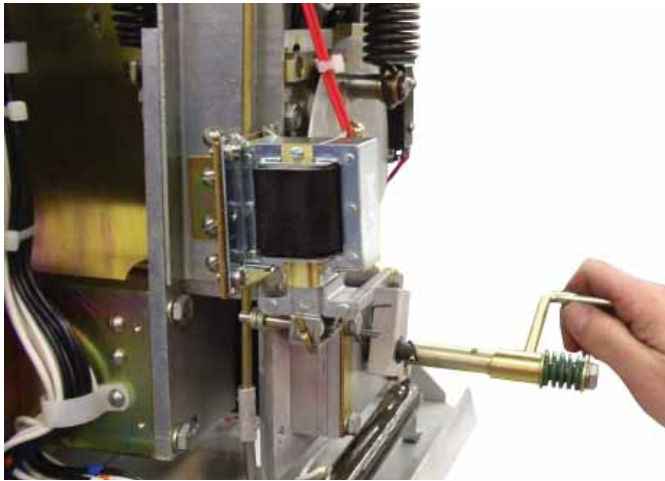


Figure 45.
Cranking handle to rotate lever.

- ii. While cranking, ensure that the Quick Close microswitch rides along the cam throughout the cycle. If the microswitch does not ride on the cam, correct it by carefully bending the microswitch actuating lever into position. Refer to Figure 46.

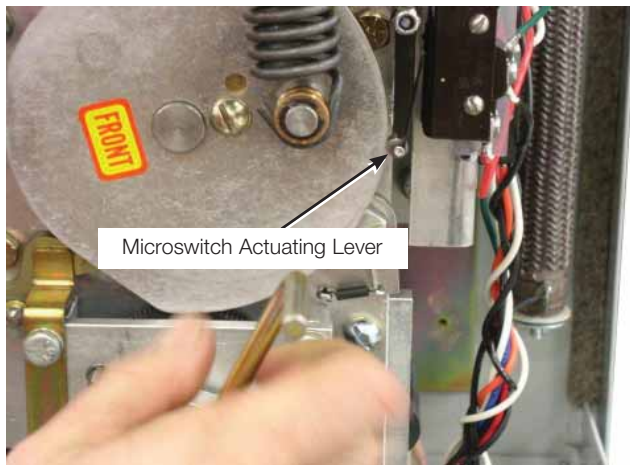


Figure 46.
Adjusting microswitch actuating lever.

- iii. Crank the unit until the VR-68 crank lever snaps against the Quick Close latch. Refer to Figure 47.

CAUTION: Personal injury. Ensure fingers, hands, and arms are clear of moving parts. Crank and cam move at high speed. Failure to ensure fingers, hands, and arms are clear of moving parts can result in personal injury.

T357.0

- iv. Carefully squeeze the Quick Close coil to close the unit. Refer to Figure 48.

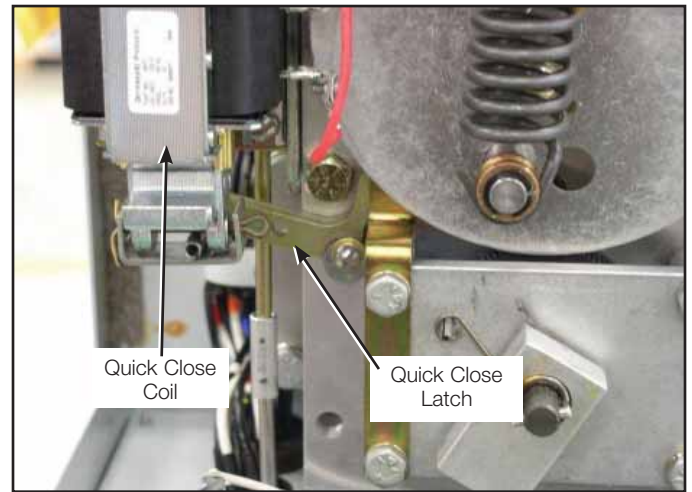


Figure 47.
Cranking unit until lever snaps against latch.

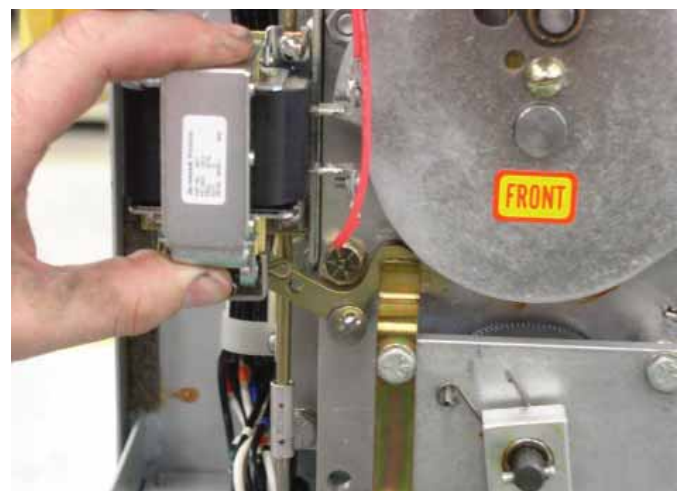


Figure 48.
Manually closing the unit.

- v. Pull the yellow handle to manually trip the unit.
 - vi. Repeat steps i through v five times to confirm proper operation.
8. Electrically test the repaired unit.
- Note:** This step only applies to VR, VRV, VCR, and VLR units.
- a. To close the switch, apply rated operating voltage across terminals 1 and G. If the closing spring is not preloaded, the motor will operate to extend the spring (approximately 10 seconds). When closing spring is preloaded, temporarily jumper terminals 1 and 2 to energize the Quick Close solenoid. Refer to Figure 49.
 - b. To open the switch, apply rated operating voltage across terminals 3 and G to energize the trip solenoid. Refer to Figure 49.
9. Reinstall mechanism cover. Secure by tightening clamp and wing nut. Refer to Figure 22.

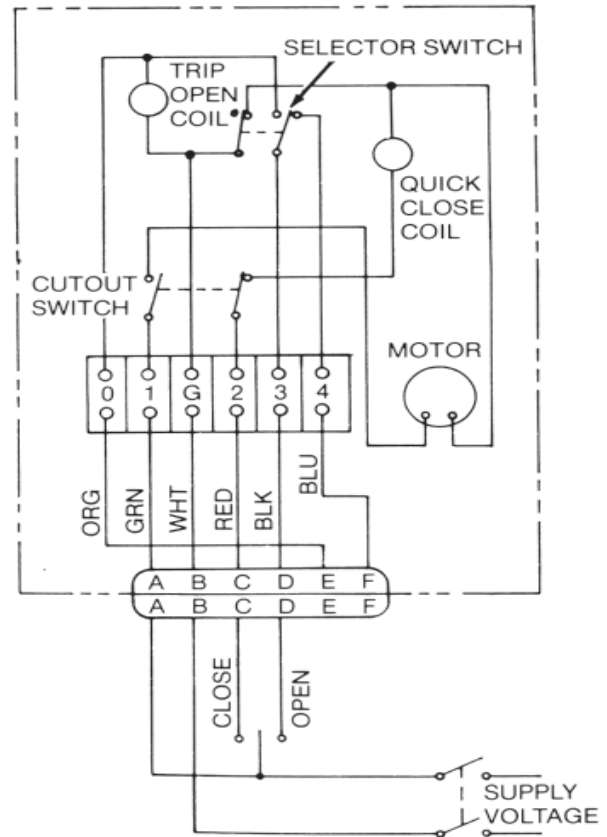


Figure 49.
Quick Close actuator circuit diagram.

