

Inspection Recommendations

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Introduction

Qualified Persons

WARNING

Only qualified persons knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution and transmission equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read This Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before inspecting the Mark VI Circuit Switcher. Become familiar with the Safety Information on page 3 and Safety Precautions on page 4. The latest version of this publication is available online in PDF format at sandc.com/en/contact-us/product-literature/.

Retain This Instruction Sheet

This instruction sheet is a permanent part of the Mark VI Circuit Switcher. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

WARNING

The equipment in this publication is only intended for use in the switching and protection of capacitor banks and substation transformers. The application must be within the ratings furnished for the equipment. The ratings for this Mark VI Circuit-Switcher are listed on the nameplate on the side of the Mark VI CS-1A Switch Operator. They can also be found in S&C Specification Bulletin 712-31.

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the product. Become familiar with these types of messages and the importance of these various signal words:

⚠ DANGER
“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.


⚠ WARNING
“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION
“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE
“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE	
Read this instruction sheet thoroughly and carefully before inspecting the Mark VI Circuit Switcher.	

Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

⚠ DANGER



Mark VI Circuit Switchers operate at high voltage. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

- 1. QUALIFIED PERSONS.** Access to substation switching equipment must be restricted only to qualified persons. See "Qualified Persons" on page 2.
- 2. SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
- 3. PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing in accordance with safe operating procedures and rules.
- 4. SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
- 5. ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded. Voltage levels can be as high as the peak line-to-ground voltage last applied to the unit. Units that have been energized or installed near energized lines should be considered live until tested and grounded.
- 6. GROUNDING.** The Mark VI Circuit-Switcher must be connected to a suitable earth ground at the base of the utility pole, or to a suitable building ground for testing, before energizing the switch and at all times when energized.
The ground wire(s) must be bonded to the system neutral, if present. If the system neutral is not present, proper precautions must be taken to ensure the local earth ground, or building ground, cannot be severed or removed.
- 7. CIRCUIT-SWITCHER POSITION.** Always confirm the **Open/Close** position of circuit-switchers by visually observing the position of the blades. Switches may be energized from either side and with the blades in either position.
- 8. MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
- 9. OPERATION.** Circuit making and breaking is involved in the normal operation of this interrupter switch and, as a result, "partway" opening or closing is undesirable. To operate, follow the operating procedure as outlined in Instruction Sheet 712-501.

To ensure a Mark VI Circuit-Switcher's continued proper performance, it should be inspected in accordance with the recommended schedule and procedures contained in this publication. Table 1 on page 7 indicates the frequency with which each major circuit-switcher component should be inspected. Table 2 on page 8 lists a

summary of inspection procedures appropriate for each component.

Become familiar with the parts of the Mark VI Circuit-Switcher as shown in Figure 1 and Figure 2 on page 6.

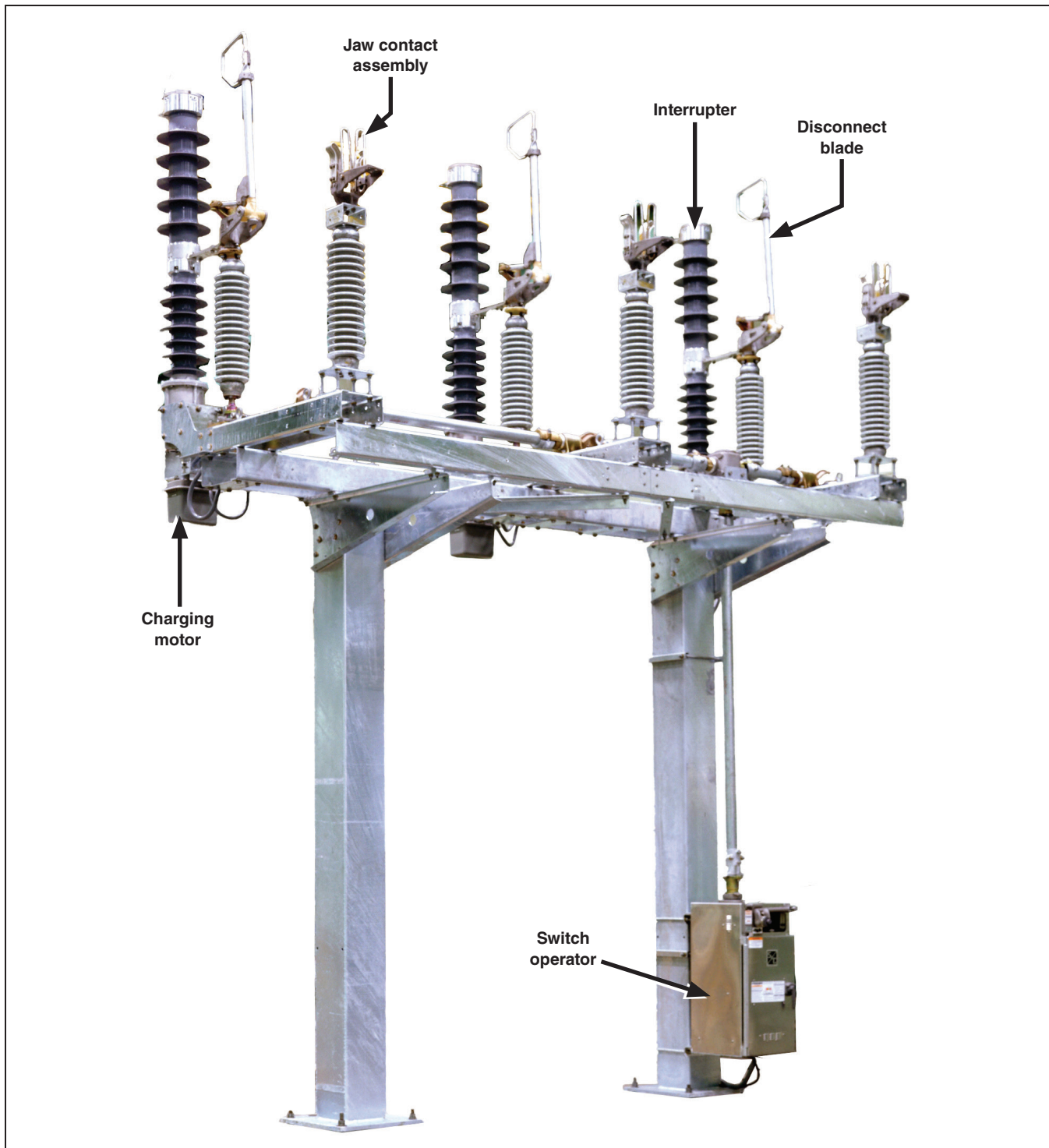


Figure 1. 69-kV Mark VI Circuit-Switcher on S&C Mounting Pedestals.

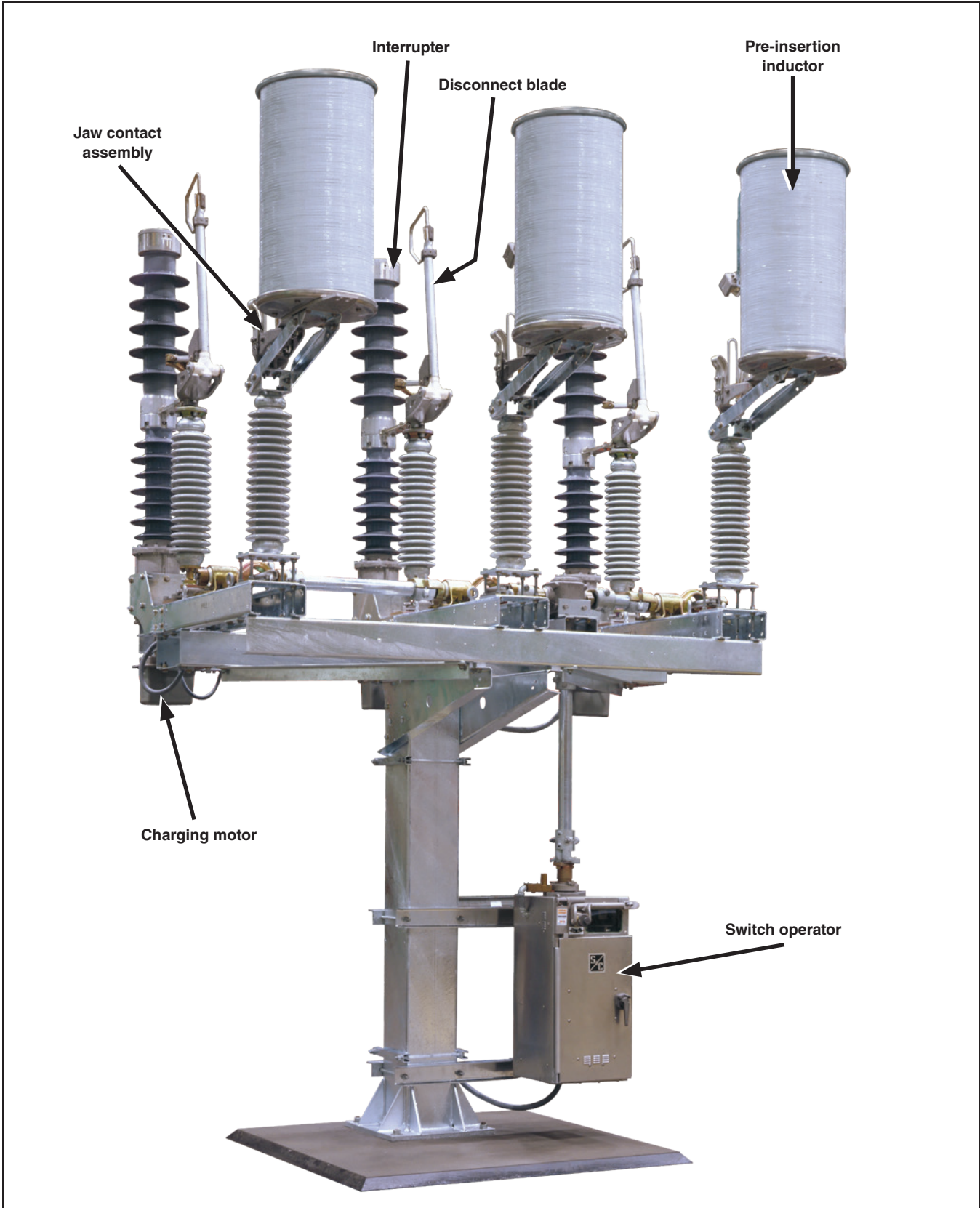


Figure 2. 69-kV Mark VI Circuit-Switcher with 51-inch phase spacing on S&C Mounting Pedestal.

Recommended Inspection Schedule

A mechanical-operations test value is indicated in Table 1 for the circuit-switcher components affected by the number of mechanical operations. It is a guideline to the number of **Open/Close** operations that might reasonably be expected before replacement is required.

Electrical-operations limits are listed in Table 1 for the interrupter and disconnect live parts because these components are affected by the number of electrical operations. These limits depend upon the circuit-switcher application and magnitude of current switched. For the interrupter and disconnect live parts, the electrical-operations limit may provide an overriding guideline to the number of **Open/Close** operations that can be expected before replacement is required.

The actual number of **Open/Close** operations for each component will depend upon the nature of the

application, the installation environment (e.g., whether subject to temperature or humidity extremes, or highly corrosive or dusty atmospheres), and the observance of the recommended inspection schedule.

An inspection frequency is shown for each component listed. To maximize the operating life of the component, S&C recommends that the user perform the inspection procedures described in Table 2 on page 8 at the frequency indicated by a “●” as stated in Table 1—either in number of **Open/Close** operations or years, whichever occurs more often. If the inspection results indicate—or if dictated by the mechanical-operations test value or electrical-operations limit guideline—the component should be replaced. Each user’s own experience will determine whether more frequent inspections are required.

Table 1. Recommended Inspection Schedule for S&C Circuit-Switcher Components

Component	Mechanical-Operations Test Value ^① , Number of Open-Close Operations	Electrical-Operations Limit			Inspection Frequency ^②				
		Application	Maximum Current, Amperes	Number of Open-Close Operations	Number of Open-Close Operations			Number of Years	
					1 or 2	250	2 500	1	5
Switch operator and power train	5 000	—	—	—			●		●
Interrupter	5 000	Transformer or capacitor Switching	420	5 000			●		●■
		Fault interrupting	31 000	3	Not applicable				
			18 900	5					
			9 450	10					
3 150	30								
Interrupter charging motor	5 000	—	—	—			●		●
Disconnect live parts	5 000	Transformer or capacitor switching	420	5 000			●		●
		Fault closing	30 000	2	●				Not applicable
Pre-insertion inductor	—	—	—	—		●		●▲	
Grounding switch	—	—	—	—				●	

① Based on mechanical-operations tests performed by S&C using new circuit-switchers, with no intervening maintenance performed.

② Frequently operated circuit-switchers (typically 200 or more open-close operations per year) should be inspected after the first 250 operations; thereafter, they should be inspected at the frequency indicated. Frequently operated circuit-switchers also require annual lubrication of the disconnect live parts. See Table 2 on page 8.

● Recommended inspection frequency.

▲ Frequently operated circuit-switchers equipped with pre-insertion inductors require annual cleaning of the inductor windings. See Table 2 on page 8.

■ The gas-pressure gauge on the underside of each interrupter should be checked for low gas density during the user’s normal day-to-day operating routine.

Inspection Recommendations

Recommended Inspection Procedure List

The circuit-switcher inspection procedures to be followed are summarized below. The applicable S&C

instruction sheets for the circuit-switcher, pre-insertion inductor, grounding switch, etc., should be referenced for further details.

Table 2. Recommended Inspection Procedures for S&C Circuit-Switcher Components

Component	Inspection Procedures
General	<ol style="list-style-type: none"> 1. Check with your local S&C Sales Office for any outstanding field notifications for inspection, retrofit, or maintenance on your model switch. 2. Check the switch for overall cleanliness of the insulators, live parts, and operator. Power washing with water or a non-abrasive cleaning method should be performed for severe contamination. Reapply lubricant to the live parts after washing.
Switch operator	<ol style="list-style-type: none"> 1. Check for evidence of water ingress, damage, excessive corrosion, or wear. 2. Check ease of operation during slow, manual cranking using the switch operator manual operating handle. 3. Check electrical operation, coupled and decoupled. 4. Check for loose wiring inside enclosure and proper functioning of position-indicating lamps, operation counter, convenience lamp, etc. 5. Check operation of brake and readjust if necessary.
Power train	<ol style="list-style-type: none"> 1. Check for evidence of damage, excessive corrosion, or wear. 2. Check tightness of fasteners. 3. Observe operation during slow, manual cranking using the switch operator manual operating handle. Check for complete stroking of the various drive levers against their stops and for attainment of overtoggle positions, as required. 4. Check condition of seals.
Interrupter ^①	<ol style="list-style-type: none"> 1. Check gas-pressure gauge (on underside) for low gas density. 2. Check tightness of fasteners on current-carrying parts. 3. Check for discoloration, contamination, or other damage to the interrupter insulation. 4. Check for excessive corrosion at the terminal pad and interrupter-to-disconnect bus. 5. Check for evidence of excessive terminal-pad loading.
Interrupter charging motor	<ol style="list-style-type: none"> 1. Check for evidence of water ingress, damage, excessive corrosion, or wear. 2. Check tightness of fasteners—especially at the connection between the motor and the interrupter operating shaft. 3. Check alignment of the connection between the interrupter and the charging motor. The hook that secures the motor to the interrupter should move freely.
Disconnect live parts	<ol style="list-style-type: none"> 1. Check for evidence of damage, excessive corrosion, or wear—especially at the fault-closing contacts and current-carrying contacts. Replace current-carrying jaw contacts if the silver-alloy inserts on two or more contact fingers are worn to the extent that the blade tongue contact engages the full width of the contact finger. 2. Check tightness of fasteners on current-carrying parts. 3. Observe operation during slow, manual cranking using the switch operator manual operating handle. Check for proper contact alignment. 4. Lubricate the contact surfaces with an appropriate lubricant. Shell Gadus® S2 U1000 2 Lubricant Catalog Number 9999-043 is available in 1 oz. tubes from S&C. Shell Darina® SD2, Dow 33, or equivalent can be substituted. 5. Check for excessive corrosion at the terminal pad and interrupter-to-disconnect bus. 6. Check for evidence of excessive terminal-pad loading.
Pre-insertion inductor	<ol style="list-style-type: none"> 1. Clean the exterior finish of inductor windings using mild soap and water solution and a soft cloth. Inspect the fiberglass roving for damage or wear. Use a mild soap and water solution and a clean cloth to clean the exterior finish of the inductor winding. While cleaning the windings, inspect for damage or exposure of the fiberglass roving. 2. If the fiberglass roving is damaged, use the touch-up kit, S&C Catalog Number SA-42721, to refinish any damaged surfaces. First, thoroughly wire-brush the surface to be refinished. Then, sand with No. 1 sandpaper and No. 0 sandpaper to create a smooth surface. Brush on the paint according to the directions on the label and dry for six hours. If the coiled conductor beneath the fiberglass roving is exposed, remove the inductor from service and contact your nearest S&C Sales Office for a replacement. 3. Inspect the moving and stationary arcing rods to verify their proper setting. Replace the arcing rods if they show significant wear or erosion.
Grounding switch	<ol style="list-style-type: none"> 1. Check for evidence of damage, excessive corrosion, or wear—especially at the jaw contacts. 2. Check tightness of fasteners on current-carrying parts. 3. Observe operation using manual operating handle. Check for proper contact alignment. 4. Lubricate the contact surfaces with an appropriate lubricant. Shell Gadus® S2 U1000 2 Lubricant Catalog Number 9999-043 is available in 1 oz. tubes from S&C. Shell Darina SD2, Dow 33, or equivalent can be substituted.

^① Mark VI Circuit-Switcher interrupters should have resistance values under 200 micro-ohms when new and under 500 micro-ohms when in service. If an interrupter has a resistance value outside this range, contact your nearest S&C Sales Office.

Using the Manual Operating Handle to Operate the Disconnect During Inspection

Become familiar with the operation of the MANUAL OPERATING handle.

Note: The MANUAL OPERATING handle should only be used during installation, checkout, maintenance, and inspection of the circuit-switcher disconnect.

⚠ WARNING

Do not operate the Mark VI Circuit-Switcher with the manual operating handle while the switch is energized. The MANUAL OPERATING handle should only be used during installation, inspection, and checkout of the switch. **Manual operation of an energized Mark VI Circuit-Switcher could, in the event of a fault or loss of control power to the operator, cause serious injury or death as well as damage to the circuit-switcher.**

To operate:

- STEP 1.** Remove the two-pole pull-out fuseholders for the motor (and space heater, if furnished). See Figure 3.
- STEP 2.** Pull the latch knob on the hub of the MANUAL OPERATING handle and pivot the handle forward slightly from its **Storage** position. See Figure 3.
- STEP 3.** Release the latch knob while continuing to pivot the handle forward to lock it into the **Cranking** position. (As the handle is pivoted forward, the motor brake is mechanically released, both leads of the control source are automatically disconnected, and both the “opening” and “closing” motor contactors are mechanically blocked in the **Open** position.)
- STEP 4.** Crank the handle clockwise or counterclockwise respectively to move the operator between the **Open** and **Closed** positions. Visually inspect the blade on all three phases to confirm the circuit-switcher is **Open** or **Closed**. The switch operator position indicator, seen through the observation window, will also show when the approximate **Open** or **Closed** position has been attained.

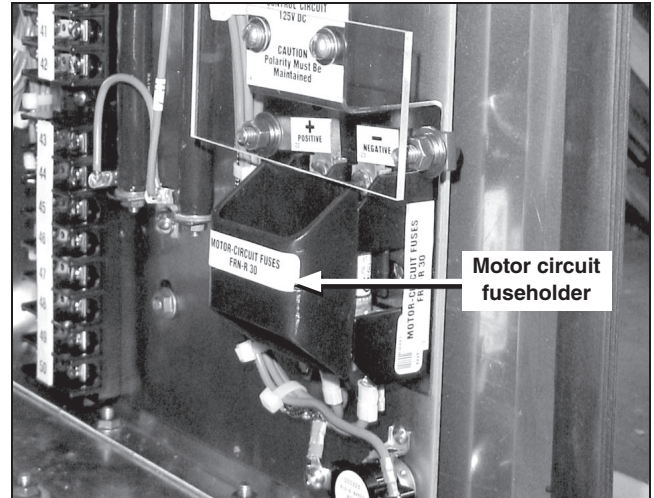


Figure 3. Remove the motor circuit fuseholder.

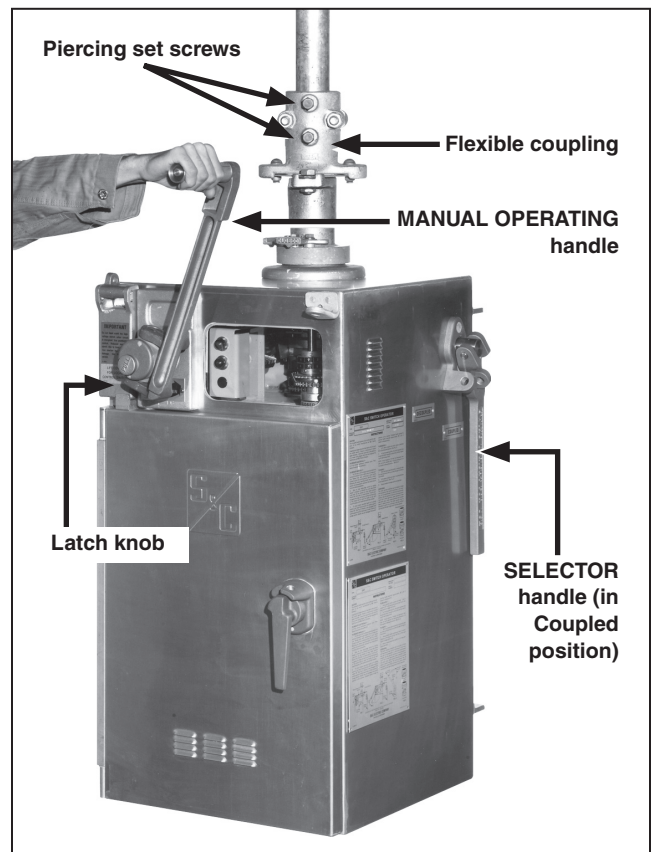


Figure 4. Use the manual operating handle to operate the disconnect.

Inspection Procedures

STEP 5. After performing inspection or maintenance, manually operate the circuit-switcher disconnect blade to its starting position (**Open** or **Closed**). The switch operator position indicator, seen through the observation window, will show when the approximate **Open** or **Closed** position of the disconnect has been attained.

To return the manual operating handle to its storage position:

STEP 1. Pull the latch knob and pivot the handle approximately 90 degrees. The handle will disengage from the switch operator and can be rotated freely in either direction.

STEP 2. Complete handle storage by pivoting the operating handle backward approximately 90° until it latches in the **Storage** position.

Replace the two-pole pull-out fuseholders for one motor (and space heater if furnished).

Using the Selector Handle (Coupling and Decoupling) for Inspection

The SELECTOR handle is used to **Couple** and **Decouple** the motor from the operating shaft. Decoupling the motor allows the user to install and configure control schemes and inspect the operation of the motor without opening and closing the interrupters or disconnect.

The integral external SELECTOR handle used to operate the built-in internal decoupling mechanism is located on the right-hand side of the switch operator enclosure.

To Decouple:

NOTICE
<p>While the decoupling mechanism is in use, the motor-circuit source leads are momentarily disconnected and both the opening and closing motor contactors are mechanically blocked in the Open position.</p>

- STEP 1.** Swing the SELECTOR handle upright and slowly rotate it clockwise 50 degrees to the **Decoupled** position. See Figure 5.
Note: During SELECTOR handle operation, which includes the position at which actual disengagement (or engagement) occurs, the motor-circuit source leads are momentarily disconnected and both the opening and closing motor contactors are mechanically blocked in the **Open** position.

- STEP 2.** Lower the SELECTOR handle to engage the locking tab. The switch operator may now be operated either manually or electrically without operating the circuit-switcher. The trip circuit and charging motor circuit are disabled, and the switch operator output shaft is prevented from moving by a mechanical locking device located within the switch operator enclosure.

- STEP 3.** Look through the observation window to verify whether the internal decoupling mechanism is in the **Decoupled** position. See Figure 6.

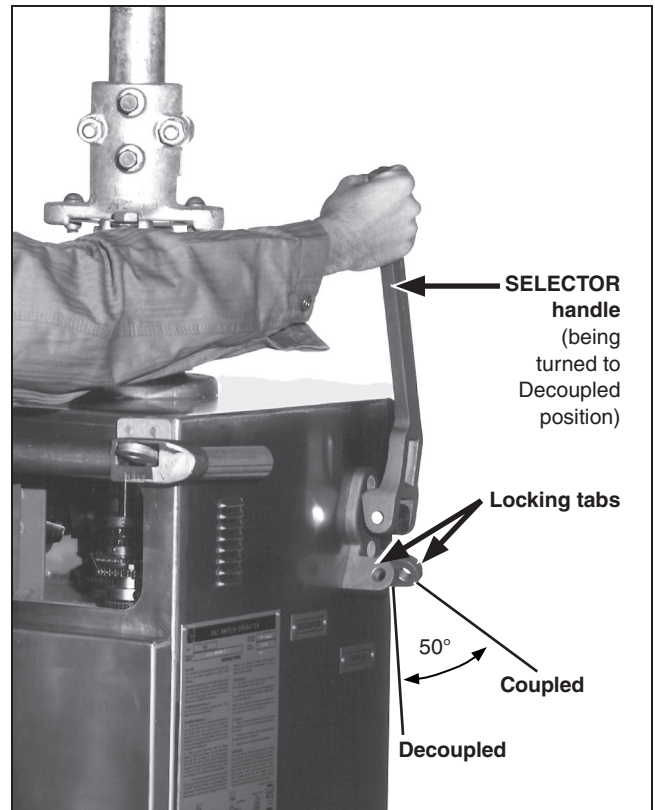


Figure 5. Selector handle operation.

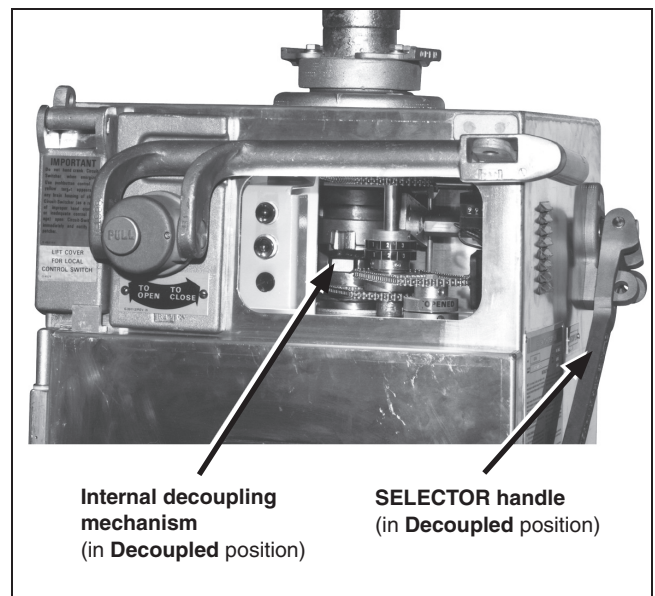


Figure 6. Mark VI CS-1A Switch Operator in the Decoupled position.

Inspection Procedures

To Couple:

- STEP 1.** Manually operate the manual operating handle to bring the disconnect to the same position (**Open** or **Closed**) as the Mark VI CS-1A Switch Operator disconnect blades. See “Using the Manual Operating Handle to Operate the Disconnect During Inspection” on page 9 for instructions on using the MANUAL OPERATING handle. The switch operator position indicator, seen through the observation window, will show when the approximate **Open** or **Closed** position has been attained.
- STEP 2.** Turn the MANUAL OPERATING handle slowly until the position-indexing drums are numerically aligned. See Figure 7.
- STEP 3.** Swing the SELECTOR handle upright and rotate it counterclockwise to the **Coupled** position.
- STEP 4.** Lower the handle to engage the locking tab. The SELECTOR handle is now in the **Coupled** position.

NOTICE

The SELECTOR handle may be padlocked in either position.

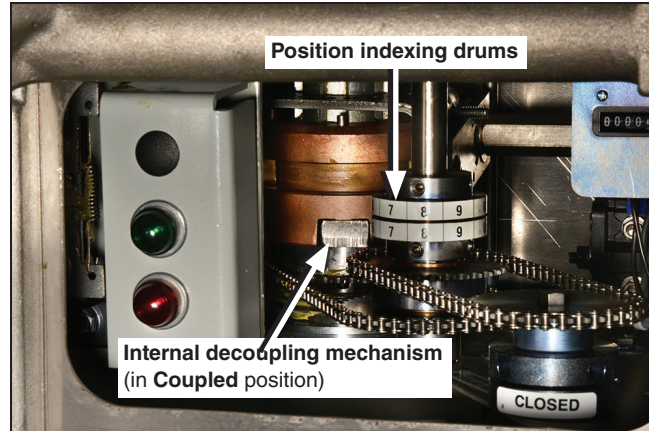


Figure 7. Mark VI CS-1A Switch Operator in Coupled position.

Inspecting the Operation of Circuit-Switcher Disconnect Blades and Blade Contacts

The operation of the circuit-switcher blades and the condition of the blade contacts should be inspected every 2500 operations, or every 5 years, whichever occurs first.

⚠ DANGER

When access to the Mark VI Circuit-Switcher is required for inspection, service, or repairs, always de-energize the Mark VI Circuit-Switcher, ground it at all six terminals, and test for voltage before performing the inspection procedures. **Failure to de-energize the circuit-switcher before inspection and maintenance will result in serious personal injury or death.**

⚠ WARNING

Do not operate the Mark VI Circuit-Switcher with the manual operating handle while the switch is energized. The manual operating handle should only be used during installation, checkout, and inspection of the circuit-switcher. **Manual operation of an energized Mark VI Circuit-Switcher could, in the event of a fault or loss of control power to the operator, cause serious injury or death as well as damage to the circuit-switcher.**

The following procedure can be used to inspect the operation of the circuit-switcher blades and blade contacts:

- STEP 1.** Remove the pullout motor and heater circuit fuseholders to disconnect control power to the circuit-switcher.
- STEP 2.** With the circuit-switcher de-energized and grounded and in the **Coupled** position, firmly hand-crank the disconnect to its fully **Open** position.

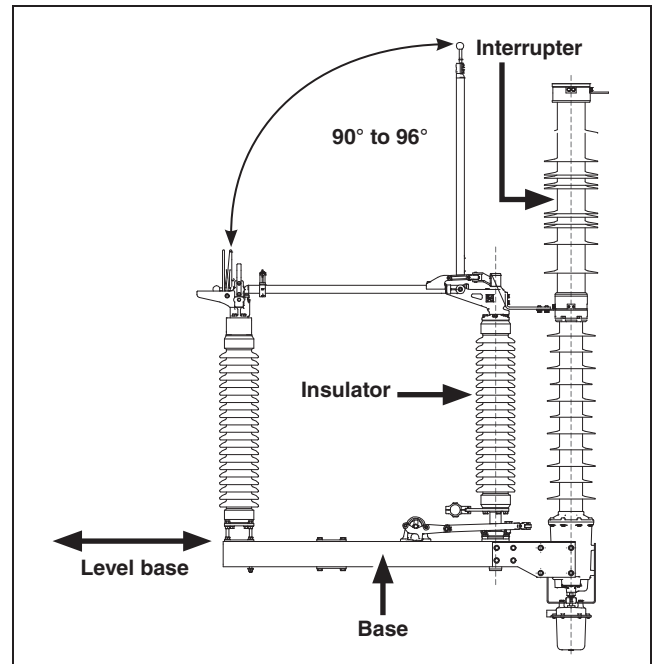


Figure 8. Check the angle of the disconnect blades.

Inspection Procedures

STEP 3. Check that the blades open to between 90° and 96°. See Figure 8 on page 13.

If the blade does not open 90° to 96°, make sure the cross base and pole-unit bases are level and no shifting of the mounting structure has occurred. Shim the pole-unit base or readjust the height of the support structure as required to level the structure. Make sure the fasteners on the hinge end of the blade are tight and in good condition. See the applicable S&C Installation Instruction Sheet for the model of Mark VI Circuit-Switcher being inspected.

NOTICE

If the blades do not make the correct angle or the contacts are not properly aligned after leveling the base, halt the inspection and contact the local S&C Sales Office.

STEP 4. After inspecting the angle of the blades, check the operation of the disconnect for proper alignment of the blade with the jaw-contact assembly as follows:

- (a) As the disconnect is closed, the fault-closing tongue contact should engage each of the fault-closing jaw contacts with equal pressure, and the current-carrying tongue contact should enter the current-carrying jaw contacts with equal clearance on each side.
- (b) The silver-surfaced area of the current-carrying tongue contacts should center laterally with the silver-surfaced current-carrying jaw contacts, and the blade should rotate with slight pressure against the blade bumper stop and come to rest either on the stop or slightly above it. See Figure 9.

NOTICE

If the blades do not make the correct angle or the contacts are not properly aligned after leveling the disconnect bases, halt the inspection and contact the local S&C Sales Office.

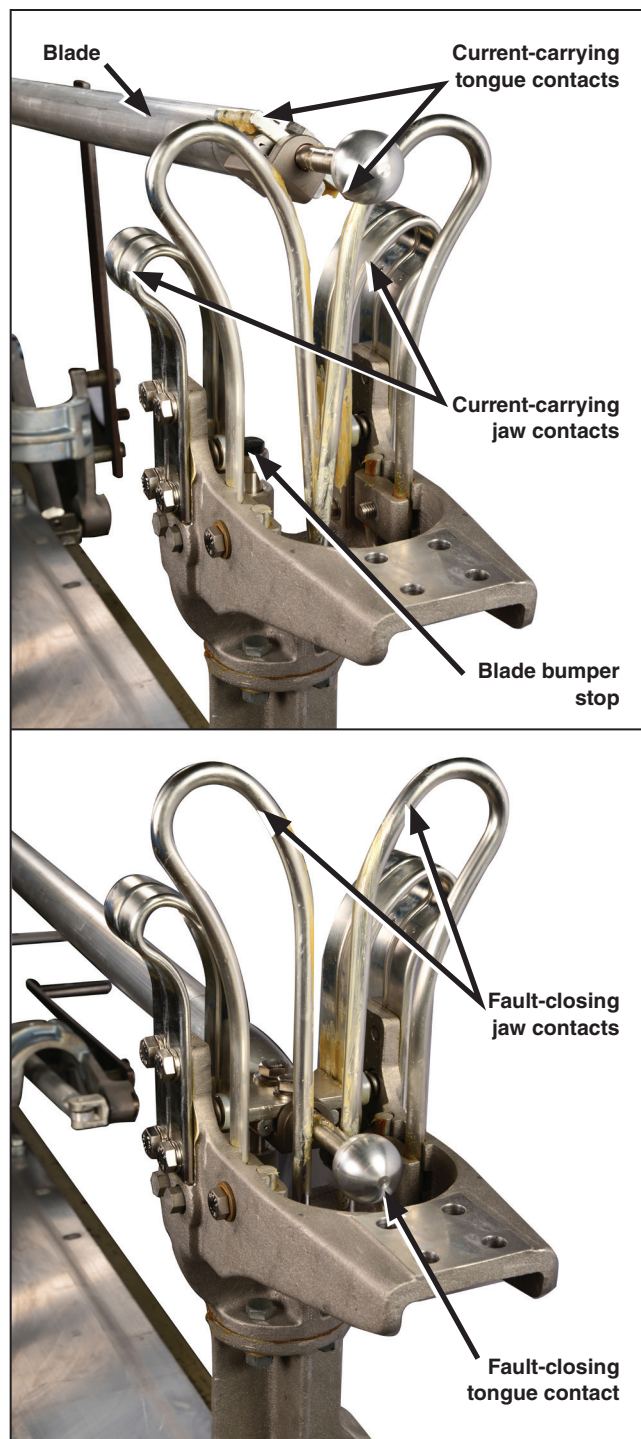


Figure 9. Check penetration of the blade as it lowers into the jaw contact during closing.

STEP 5. Manually close the circuit-switcher disconnect and return the manual operating handle to its **Storage** position. Replace the motor and heater circuit fuseholders.

Guidelines for Interrupter Resistance Values

Mark VI Circuit-Switcher interrupters should have resistance values less than 200 micro-ohms for a new unit and less than 500 micro-ohms for a unit that has been in service. If a Mark VI Circuit-Switcher interrupter is outside these values, contact the nearest S&C Sales Office.

Inspecting the Mark VI CS-1A Switch Operator Motor Brake

Should the user wish to perform elective exercising of the complete circuit-switcher installation, the Mark VI CS-1A Switch Operator may be conveniently decoupled from the circuit-switcher, permitting elective exercising of the operator at any time without requiring an outage or switching to an alternative source. When the switch operator is in the **Decoupled** position, the interrupters are rendered inoperative, permitting checkout of the system protective scheme.

The brake in the Mark VI CS-1A Switch Operator should be inspected every 2500 operations, or every 5 years, whichever occurs more often.

The inspection procedure is as follows; refer to Figure 10 on page 17:

- STEP 1.** Place the selector handle in the **Decoupled** position.
- STEP 2.** Remove the two-pole pull-out fuseholders for the motor and space heater.
- STEP 3.** Disconnect the linkage rod by removing the $\frac{1}{4}$ -20 \times $1\frac{1}{4}$ -inch hex-head screw, lockwasher, flatwasher, and spacer-bushing from the end of the brake lever, as shown in Detail A. Be careful not to lose these parts.

Raise the brake lever and measure the vertical free play, as shown in Detail B. This dimension should be $\frac{5}{8}$ to $\frac{3}{4}$ inch (16 to 19 mm). Should the measurement be outside this range, brake-wear compensation is required; proceed to Step 4. If the measurement is within the range, reattach the linkage rod and tighten the $\frac{1}{4}$ -20 \times 1 $\frac{1}{4}$ -inch hex-head screw securely, proceed to Step 9.

STEP 4. If the measurement is out of range, remove the four $\frac{5}{16}$ -18 \times 1 $\frac{1}{4}$ -inch screws used to attach the motor, withdraw the motor, and carefully rest its shaft on the floor of the enclosure. Be careful not to lose the square key or tubular spacer (if furnished), which may remain on the motor shaft.

Note: 115-volt ac motors use a $\frac{1}{4}$ -20-inch socket-head set screw on the side of the brake disc hub, as shown in Detail C. Loosen this setscrew approximately one-half turn using a $\frac{1}{8}$ -inch Allen wrench before removing the motor.

- STEP 5.** Using a $\frac{3}{32}$ -inch Allen wrench, loosen the pad assembly socket-head set screw on the side of the caliper assembly approximately one-half turn. See Detail A.
- STEP 6.** Then, using a $\frac{5}{16}$ -inch Allen wrench, rotate the pad assembly clockwise until the free play at the end of the brake lever is $\frac{5}{8}$ to $\frac{3}{4}$ inch (16 to 19 mm), as shown in Detail B. Now, tighten the $\frac{1}{4}$ -20-inch pad assembly socket-head set screw.
- STEP 7.** Insert the spacer-bushing through the angle bracket and brake lever, and reattach the linkage rod using the $\frac{1}{4}$ -20 \times 1 $\frac{1}{4}$ -inch hex-head screw, lockwasher, and flat washer. Tighten the screw securely.
- STEP 8.** Insert the square key in the keyway, as shown in Detail A. Slip the tubular spacer (if furnished) over the motor shaft and reinstall the motor. Position the motor so the two weep holes on the side of the housing face downward.

Inspection Procedures

Replace the four $\frac{5}{16}$ -18 \times 1 $\frac{1}{4}$ -inch screws used to attach the motor and tighten them securely. On 115-volt ac motors, further, retighten the $\frac{1}{4}$ -20-inch socket-head set screw on the side of the brake disc hub.

- STEP 9.** Check the operation of the brake linkage as follows:
- (a) Pull the latch knob on the hub of the manual operating handle and slowly pivot the handle forward from its **Storage** position toward its **Cranking** position until the brake disc can be rotated by hand. Be careful not to get grease on the brake disc.
 - (b) Measure the distance the end of the brake lever travels from the point of initial brake release to the bottom of its stroke, which occurs when the handle locks into the **Cranking** position. This dimension should be $\frac{1}{8}$ to $\frac{1}{4}$ -inch (3 to 6 mm). See Detail D. Should the measurement be outside this range, refer to the nearest S&C Sales Office.
- STEP 10.** Check the functioning of the brake, decouple the operator, and then open and close the operator, electrically. After each operation, check the position of the indicator on the appropriate travel-limit disc; it should stop between numbers 2 and 8. Should the indicator on the travel-limit disc stop outside this range, refer to the nearest S&C Sales Office.

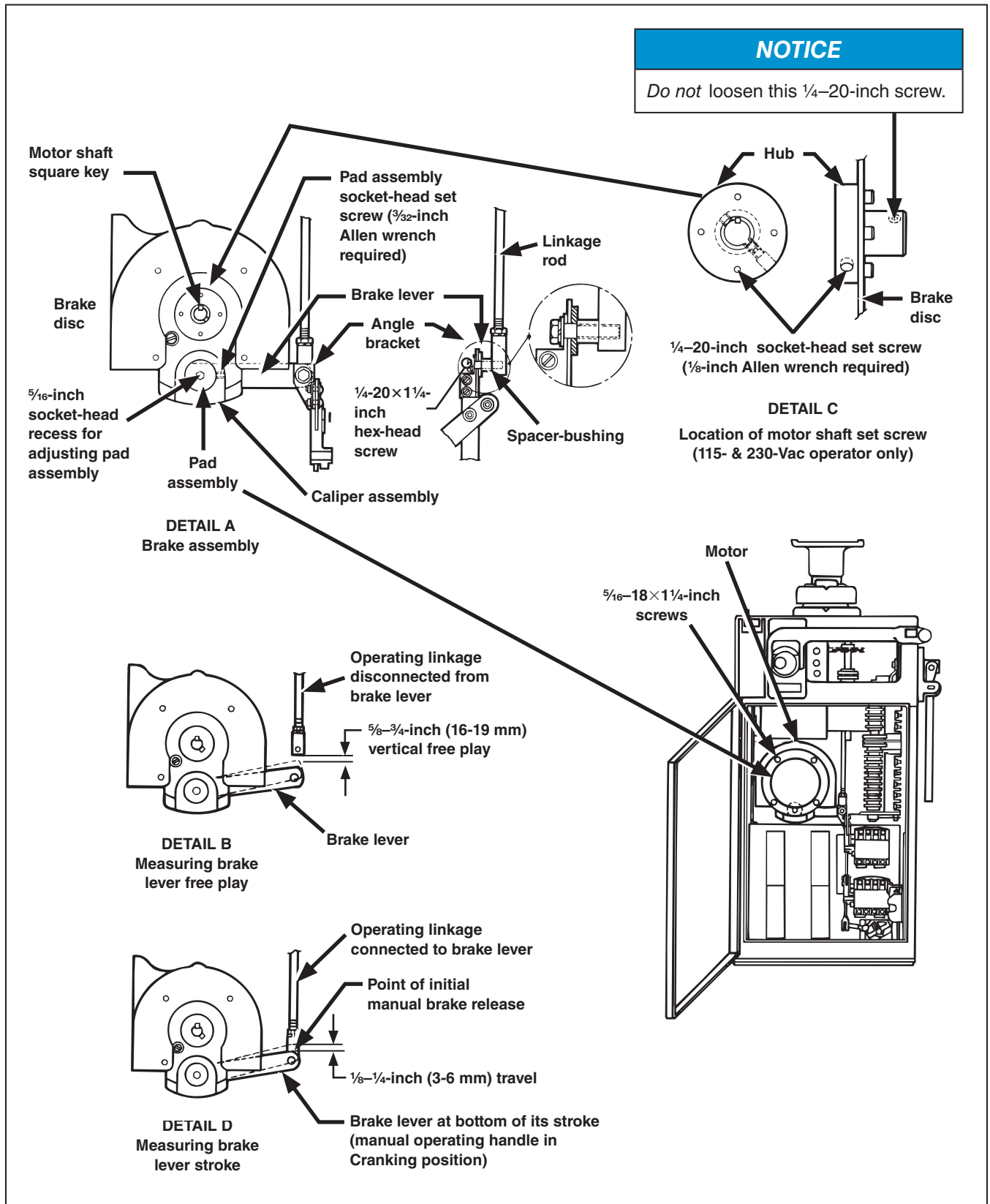


Figure 10. Brake inspection procedure.