


INSTRUCTION MANUAL

Crossarm Topper[®] group-operated switches (1,200 A)

Installation / check-out instructions
usa.siemens.com/disconnectswitches

SIEMENS

	! DANGER
	<p>Hazardous voltages and high speed moving parts.</p> <p>Will cause death, serious injury or property damage.</p> <p>Always de-energize and ground the equipment before maintenance. Read and understand this instruction manual before using equipment. Maintenance should be performed only by qualified personnel. The use of unauthorized parts in the repair of the equipment or tampering by unqualified personnel will result in dangerous conditions that will cause death, severe injury or equipment damage. Follow all safety instructions contained herein.</p>

Important

The information contained herein is general in nature and not intended for specific application purposes. It does not relieve the user of responsibility to use sound practices in application, installation, operation, and maintenance of the equipment purchased. Siemens reserves the right to make changes in the specifications shown herein or to make improvements at any time without notice or obligation. Should a conflict arise between the general information contained in this publication and the contents of drawings or supplementary material or both, the latter shall take precedence.

Qualified person

For the purpose of this instruction manual a **qualified person** is one who has demonstrated skills and knowledge related to the installation, construction, and operation of the equipment and the hazards involved. In addition, this person has the following qualifications:

- **Is trained and authorized** to de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.
- **Is trained** in the proper care and use of protective equipment, such as: rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc. in accordance with established safety practices.
- **Is trained** in rendering first aid.

Further, a qualified person shall also be familiar with the proper use of special precautionary techniques, personal protective equipment, insulation and shielding materials, and insulated tools and test equipment. Such persons are permitted to work within limited approach of exposed live parts operative at 50 volts or more, and shall, at a minimum, be additionally trained in all of the following:

- The skills and techniques necessary to distinguish exposed energized parts from other parts of electric equipment.
- The skills and techniques necessary to determine the nominal voltage of exposed live parts.
- The approach distances specified in NFPA 70E® and the corresponding voltages to which the qualified person will be exposed.
- The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely.

**Signal words**

The signal words "danger," "warning," and "caution" used in this instruction manual indicate the degree of hazard that may be encountered by the user. These words are defined as:

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.

Notice (without safety alert symbol) – Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Field service operation and warranty issues

Siemens can provide competent, well trained field service representatives to provide technical guidance and advisory assistance for the installation, overhaul, repair and maintenance of Siemens equipment, processes and systems. Contact regional service centers, sales offices or the factory for details, or telephone Siemens field service at +1 (800) 347-6659 or +1 (423) 262-5700 outside the U.S.

For medium voltage customer service issues, contact Siemens at +1 (800) 347-6659 or +1 (423) 262-5700 outside the U.S.

	⚠ CAUTION
	<p>The equipment described by this bulletin must be operated and properly maintained by qualified personnel who are thoroughly trained and who understand any and all hazards that may be involved. This bulletin is not intended to be a substitute for adequate training and experience in safety procedures for the equipment listed.</p>

NOTE: These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local sales office.

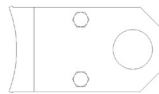
The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens Industry, Inc. The warranty contained in the contract between the parties is the sole warranty of Siemens Industry, Inc. Any statements contained herein do not create new warranties or modify the existing warranty.

A. Inspection of switch components:

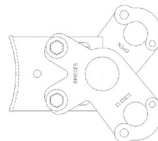
1. The palletized Crossarm Topper Switch system includes the following components and assemblies (see Crossarm Topper assembly drawing for exact Bill of Materials (BOM)):

- a. A completely assembled and factory adjusted three-phase switch.
- b. Pipe bundles including (consult BOM for exact quantities):
 - Vertical operating pipe, ten and one half (10.5) foot long sections
 - Universal joint assembly (steel pipe or fiberglass)
- c. Hardware box including (consult BOM for exact quantities):

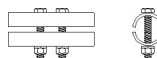
- Pipe guide assembly



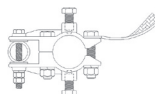
- Lock segment assembly



- Coupling assembly



- Handle assembly



- Insulator assembly (optional)



- Pins

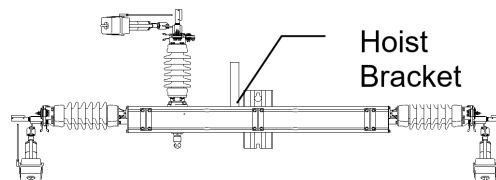
- Cotter pins

- d. Documentation package
 - Crossarm Topper assembly drawing
 - Crossarm Topper Switch unit drawing
 - Installation / check-out instruction (this document)
2. Uncrate the Siemens Crossarm Topper Switch and inspect carefully for shipping damage. Look closely for:
 - a. Insulators that are chipped, cracked, etc.
 - b. Bent and/or broken hot parts
 - c. Bent and/or broken interrupters
 - d. Any missing items. See Crossarm Topper assembly drawing for BOM.

B. Installation instructions:

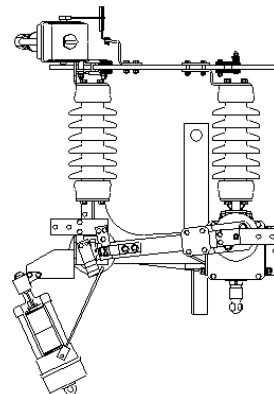
1. Drill two (2) mounting holes that are 11/16" in diameter located per customer construction standards and spaced per Siemens Crossarm Topper assembly drawing.
2. Install the mounting bolts in the holes (mounting bolts not furnished).
3. Use the hoist bracket to lift the switch approximately four (4) feet off the ground.


NOTE: Be very careful when handling the switch not to damage the interrupters or hot parts.



4. Cut the hinge ties.
5. If lightning arrestors (supplied by the customer) are required, some customers prefer to mount and make-up the arrestors at this point.
6. Lift the switch unit and mount it on the pole, over the previously installed mounting bolts and tighten bolts until the split washer is flattened. Keyhole slots for this purpose have been machined in the mounting channel. Remove blade ties from all three jaw assemblies so that the switch can be operated.

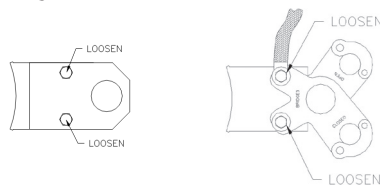
NOTE: Be very careful when lifting the switch unit not to damage the interrupters or hot parts.



	<p style="text-align: center;">⚠ CAUTION</p> <p>It is the customer's responsibility to adjust arrestor brackets, arrestors, ground lead wires and "Hot" lead wires to provide proper phase to ground and phase to phase clearance.</p>
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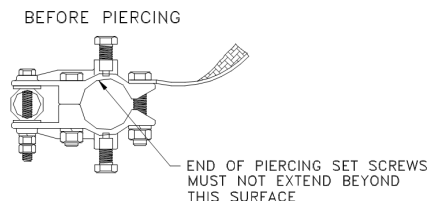
7. Remove hoist bracket.
8. Ground the switch unit (and lightning arrestors if required) using #2 or larger copper wire. A grounding point (1/2-13 tapped hole) is provided in the side of the mounting bracket.
9. Mount pipe guides and lock segment assemblies in position per customers construction standard or Siemens Crossarm Topper assembly drawing using one thru bolt and one lag bolt each. Tighten the thru bolt and lag bolt until the split washer is flattened.

NOTE: The pipe guides and lock segment are adjustable. Loosen the bolts such that the pipe guides and lock segment can slide in the slots.



10. Install Vertical operating shaft sections and universal joint as shown on Siemens Crossarm Topper assembly drawing using pins, cotter keys, coupling assemblies (if required) and insulator assembly (if required). Before placing bottom shaft section in the lock segment, place the operating handle assembly loosely in position.

NOTE: Make sure that the piercing set screws are backed out all the way before sliding the handle assembly on the bottom shaft section.



11. Excess pipe should be removed (if required). Leave at least one (1) foot of pipe extending below the lock segment assembly.

C. Operating handle adjustment procedure:

1. The next series of steps concern adjusting the position of the handle assembly and lock segment assembly so that the handle can be inserted into the open and closed slot correctly.

IMPORTANT NOTE

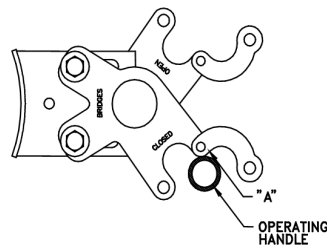
It is extremely IMPORTANT to adjust the handle position so that it is IMPOSSIBLE to place the operating handle in the closed slot unless the switch blades are fully closed. At night and/or under severe weather conditions an operator may not be able to check the blades visually to insure that the switch is fully closed.

THEREFORE, it should take considerable wind-up of the vertical pipe to get the handle in position to force it into the closed slot. Remember that as the switch gets older, it will become harder to operate and more force will be required on the operating handle to completely close the switch. **The operator must do whatever it takes to completely close the switch.**

2. On the lock segment assembly adjust the closed and open segments so that they are approximately 90°/100° apart but with adjustment still left in the slots in each direction and tighten down the bolts loosened in Step B.9 above until the split washer is flattened.

NOTE: Before tightening bolts put the end of the ground strap from the handle assembly under the flat washer on the bolt. Leave enough slack in the ground strap to allow the operating handle to travel fully from the open position to the close position with out any interference (see figure in C.5 below).

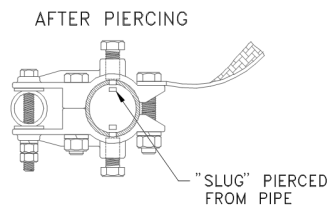
3. The handle casting should be mounted about four (4) to six (6) inches above the lock segment assembly. Position the handle casting so that with the switch closed (blades tight up against the spacer), the operating handle will strike point "A" on the lock segment assembly when the operating handle is lowered (see below). This will ensure that when the switch is fully closed, it will take considerable wind-up torque to get the operating handle into the closed slot on the lock segment assembly.
4. Tighten the four (4) clamp bolts until the split washer is flattened. **(DO NOT TIGHTEN THE PIERCING SET SCREWS YET)**. Open and close the switch slowly and then rapidly. Check for a smooth operation of the switch. Adjust the pipe guides for a smooth, non-binding operation and tighten down both bolts in each pipe guide assembly. Make sure that the switch can be fully opened and fully closed (blade tight up against the spacer on all three phases).
5. Make sure that the switch handle will strike point "A" of the lock segment assembly and that considerable wind-up torque is needed to get the switch operating handle into the closed slot of the lock segment assembly.



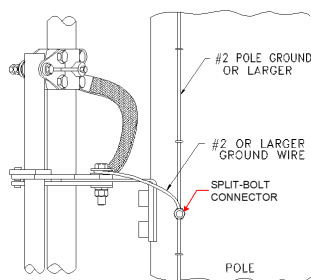
6. If needed, reposition the handle casting (by loosening and retightening the four (4) clamp bolts) until the operation of the switch meets the requirements explained in steps C.3, C.4 and C.5. Adjustments may also be made by moving the lock segment slightly on the lock segment assembly.

7. When the handle casting is in the final, properly adjusted position, make sure the four (4) clamp bolts are fully tightened. **Then tighten both piercing set screws until each set screw pierces through the wall of the pipe.**

NOTE: When tightening these set screws, the resistance will keep increasing and then drop off sharply when the pipe is pierced. Fully tighten the set screws until the shoulder of the set screw is firmly seated against the pipe.

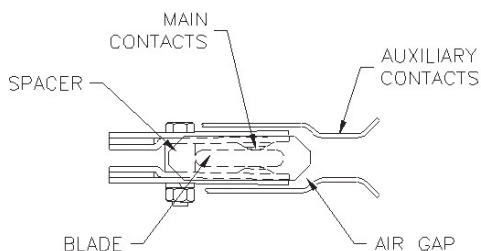


8. The set screws help to ensure that when the switch handle is thrown open or closed, the vertical pipe will definitely rotate along with the handle.
9. Ground the lock segment/handle assembly to the pole ground using a #2 or larger copper wire (see below).



D. Operational check-out instructions

1. **SWITCHES ARE FULLY ADJUSTED AND INSPECTED**, before they leave the factory. There should not be any need to adjust the switch unit.
2. Check the rotation of the hinge terminals. They should rotate approximately 180° with slight resistance.
3. Insert the interrupters into the sockets and turn clockwise to lock in place.
4. The following checks should be performed on all three phases, independently, to verify proper operation of the switch and interrupters. This will be done manually.
 - a. Close the switch fully and lock the operating handle into the close position of the Lock Segment. Bounce the blade toward the open position. The blade should stay tight up against the spacer. If the blade does not stay up against the spacer readjust the handle/lock segment assembly per Section C (above).



- b. With the switch still fully closed and the interrupter installed in the socket, the interrupter lever should stick above the switch blade contactor bar at least 1/8". There should be no metal-to-metal contact between the interrupter's lever and the contactor bar. The lever should rest in the air just outside of the switch jaw. Raise the interrupter lever and make sure the lever clears without touching any metal.
- c. Slowly open the switch and be sure that the following operations occur:
 - As the blade opens, the bottom of the blade touches the auxiliary contacts before the blade leaves the main contacts (see Figure 1 below). This transfers the load from the main contacts to the auxiliary contacts. As the switch continues to open, the main contacts will part and no longer carry the load, while the auxiliary contacts carry the full load (see Figure 2 below).

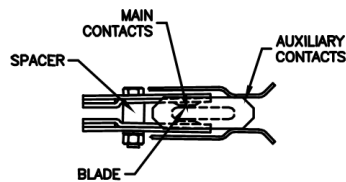


Figure 1

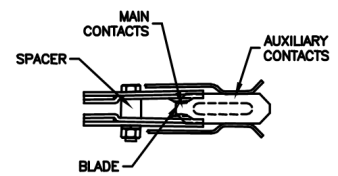
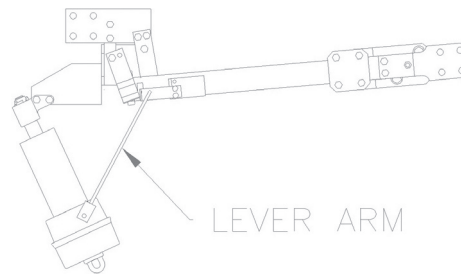
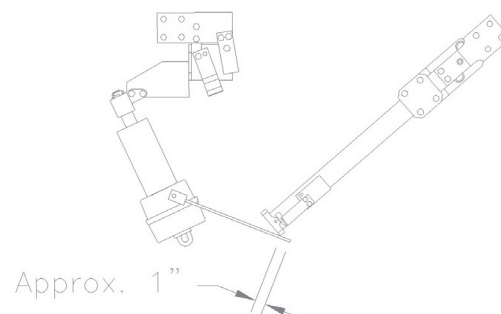


Figure 2

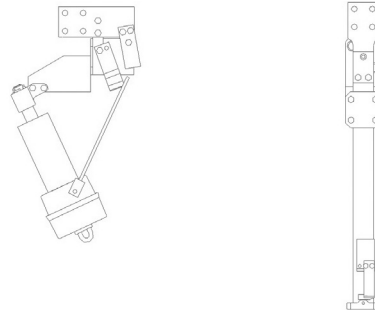
- As the blade continues to rotate open, the interrupter lever must make full metal-to-metal contact with the contactor. At this point the load then transfers from the auxiliary contacts to the interrupter's lever arm so that the interrupter now carries the full load.



- As the blade continues to rotate open, the interrupter will trip thus interrupting the load. The interrupter must trip while the lever arm is in metal-to-metal contact with the contactor. The interrupter should trip (fire) before the contactor gets within 1" of the end of the lever and have a minimum 5" metal-to-metal clearance.

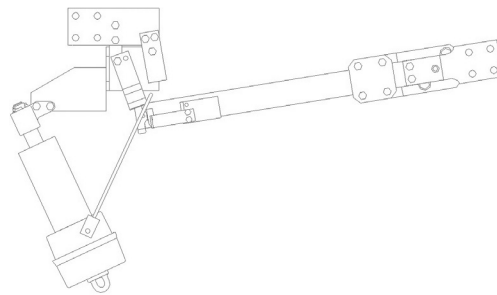


- Continue to open switch until the interrupter lever has cleared the end of the contactor assembly. Once the lever has cleared the contactor assembly, the lever will spring back. Continue to open the switch to its complete, open position.

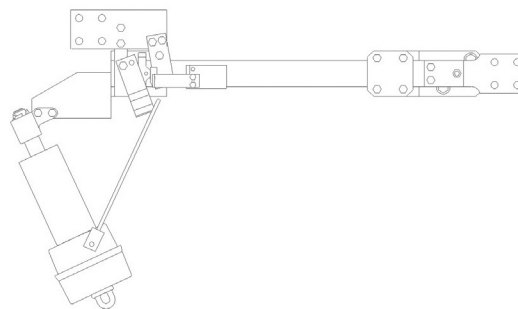


5. Now, close the switch slowly. The following operations and checks should be made:

- As the blade rotates closed the contactor should slide past the end of the interrupter lever arm.



- Continue to close the blade until the switch is in the fully closed position. At the fully closed position, the blade should rest fully in the jaw contacts of the switch, and the lever arm should not be in contact with the contactor arm.
- The contactor arm should be in a position to engage the interrupter lever arm during the next open operation.



- These adjustment checks should be repeated on each independent switch blade/phase.
6. The switch is now ready for installation of the conductors.

E. Maintenance

1. Periodically operate the switch and check for actions described in Section D. Lubricate the jaw, auxiliary contacts and the end of the blade with factory approved grease.
2. With the handle in the closed position of the lock segment, verify that the switch is fully closed and there is wind-up torque on the operating pipe. If not, readjust the operating handle and/or the lock segments (per Section C).

Refer to ANSI C37.35 for additional recommendations. C37.35 is "IEEE Guide for the Application, Installation, Operation and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches."



Disposal



Siemens equipment is environmentally friendly product predominantly consisting of recyclable materials. For disposal, some disassembly, separation, and professional services handling may be required.

Materials to be handled include but are not limited to:

- **Metals:** Should be transferred and recycled as mixed scrap metals.
- **Plastics:** Plastic containing a recycle symbol should be recycled. Plastic lacking the recycle symbol should be discarded as industrial waste.
- **Small electronics, insulated cables, and motors:** Should be recycled via electronics scrap disposal companies specialized in separating and sorting as described above.
- **Batteries:** Should be recycled via a recycling company.

Disposal regulations vary from locality to locality and may be modified over time. Specific regulations and guidelines should be verified at the time of waste processing to ensure that current requirements are being fulfilled. For specific assistance in understanding and applying regional regulations and policies or manufacturer's recommendations, refer to the local Siemens service representative for additional information.

	<div style="background-color: orange; color: black; padding: 5px; text-align: center;">  WARNING </div> <p>Stored energy. Can cause death, serious injury, or property damage.</p> <p>Mechanisms contain stored energy, which may be released during disassembly.</p> <p>Wear suitable protection and take appropriate precautions when disconnecting and removing moving parts.</p>
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	<div style="background-color: orange; color: black; padding: 5px; text-align: center;">  WARNING </div> <p>Heavy objects. Can cause death or serious injury.</p> <p>Disassembly may cause an unbalanced load, and could result in falling objects.</p> <p>Take appropriate precautions in a properly designated workspace to maximize support and stability.</p>
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Notes

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Legal Manufacturer

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