INSTALLATION, OPERATIONS AND MAINTENANCE MANUAL

VersaRupter® medium voltage indoor switch

4.76–38 kV, 200–1200 A, 40 and 61 kA

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01. Introduction

Your safety first — always!
That's why our instruction manual begins with these recommendations:

- Fully comply with the legally recognized standards IEEE/IEC, the connection conditions of the local electrical utility and applicable work safety regulations.
- Pay special attention to the hazard notes in the instruction manual marked with warning symbols.
- Be sure that operational conditions do not exceed the performance specifications of the switchgear or switchboard.
- Electrical shock and burn hazards exist whenever working in or around electrical equipment. Turn off power before performing any inspection or maintenance operations. Check line terminals to verify that equipment is de-energized and grounded. Check terminals to ensure back-feed conditions do not exist.
- Keep the instruction manual accessible to all persons concerned with installation, operation and maintenance.
- The user's personnel are to act responsibly in all matters affecting safety at work and the correct handling of switchgear.

⚠ WARNING

Always follow the procedures outlined in this instruction manual and observe the rules of good engineering practices.

Hazardous voltage can cause electrical shock and burns.

Disconnect power, then earth (ground) and short-circuit before proceeding with any work on this equipment.

If you have any questions about this instruction manual, ABB is pleased to provide the required information.

In case of uncertainty or questions related to mounting and/or operation that are not covered in this manual, please contact ABB.

According to IEC 62271-1 p. 5.12, IEC 62271-102 p. 5.104.3.1, and IEEE C37.20.4-2013 p. 7.12, the position of the switch disconnector must be clearly indicated. VersaRupter® switches offer 100% certainty of position of the main contacts. ABB recommends verification of the position of the main knives before and after each operation.

ABB recommends installing switches in applications where it is possible to visually check the position of the main knives, e.g., through an inspection window.

Application
This manual describes the following for the VersaRupter® switch family:
- Operating features
- Function
- Installation
- Mounting options
- Repair
- Replacement of parts
- Maintenance

Personnel should be familiar with this instruction bulletin before installing or operating the switch.

The VersaRupter switch meets IEEE standard C37.20.4. Abnormal service conditions may require a de-rating of the VersaRupter switch or a modification to its application. For issues not covered in this instruction bulletin, contact ABB as indicated on the back cover.

Receiving, handling and storage
Perform an inspection of the shipping container and the VersaRupter switch upon receipt. Shipping damage must be reported to the shipper that delivered the switch.

Determine that all items on the purchase order have been delivered. VersaRupter switches and their various options are shipped in separate containers. These assemblies must be installed on the switch, as required, to complete the switch package. Contact ABB if items are missing or other field warranty authorization is required. Contact information for ABB can be found on the back cover of this manual.

VersaRupter switches assembled with K-mechanisms are shipped in the closed position. VersaRupter switches assembled with stored energy A-mechanisms are shipped with the drawbars disconnected from the mechanism-driven operating shaft to help prevent accidental opening during shipping and handling. See the paragraph entitled “test operations” for special handling instructions.

Never lift the VersaRupter switch by the switch blades, operating shaft or insulators; damage and misalignment will occur if lifted by these components.

Remove all packing materials, then use a carry strap secured around the upper cross bar of the switch frame to lift the switch from its container. Avoid lifting chains, which will damage the paint finish on the switch frame. Store the switch in its shipping container until installation. It is acceptable to stack switch shipping containers, but no more than four high.

02. Installation and mounting

Inspect the VersaRupter® switch for any obvious problems prior to installation. Check that the surfaces of the main stationary contact are covered with contact grease. Recommended grease is ISOFLEX TOPAS NCA 52.

Test operations
The switch can be operated several times with a removable handle once secured to a flat surface. Switches with a K-mechanism will open when the shaft is rotated clockwise and will close when rotated counter-clockwise (as seen from the mechanism side of the switch). In the closed position, the K-mechanism appears as shown in figure 1. Figure 2 shows the K-mechanism in the open position. Note the position of the cam in the center of the mechanism.

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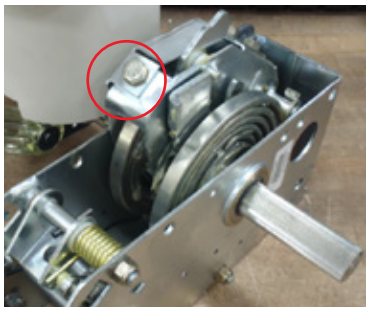
The drawbars are disconnected from the VersaRupter switch when shipped with an A-mechanism. After removing from the shipping container, gently pull the main contacts fully open by hand. Connect the drawbars onto the shaft of the eccentric bolt. Install the provided washer and cir-clip to secure the drawbar to the eccentric bolt. The proper contact penetration was set at the factory before removing the drawbars from the shaft.

To operate the switch with an A-mechanism, the shaft must be turned clockwise to first charge the opening spring. A charged A-mechanism can be identified by the opening spring assembly rotated and locked into position towards the rear of the mechanism as shown in figure 3. Compare this to the initial state in figure 4. Turning the shaft counter-clockwise will close the switch and a small clockwise rotation will open the switch.



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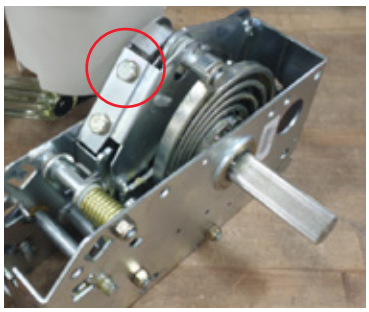

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⚠ WARNING

The VersaRupter® switch blades move rapidly with great force. Always stay clear of these moving parts to avoid serious bodily injury.

The A-mechanism is a stored-energy device that can release its energy with great force and speed after a very small rotation of the shaft.

K-mechanism closing operation

1. If the VersaRupter switch is equipped with a grounding switch, be sure that it is in the open position. See figure 103 (page 45).
2. Make sure all enclosure doors are closed.
3. Disengage any padlocks or key interlocks required to operate the VersaRupter switch (if equipped).
4. For HE handles, apply the removable handle on the splined shaft of the manual drive and pull the arrestor ring; see figure 93 (page 36). Rotate the handle in the closing direction until the arrestor ring snaps back into the locked position.
5. For HM handles, apply the removable handle on the splined shaft of the manual drive. HM handles do not have an arrestor ring, so the handle should be rotated in the closing direction until the rotation is stopped by the fixed tab on the front bearing.
6. For chain drive and side direct drive handles, rotate the handle in the closing direction until the full motion is completed. Motion range is indicated by the location of the padlock holes.
7. Visually check that all poles of the switch have closed properly; see figure 103 (page 45).
8. For HE and HM handles, remove the removable handle from the manual drive and secure with a padlock (if equipped). For all other handles, engage padlocks or key interlocks (if equipped).

K-mechanism opening operation

1. Make sure all enclosure doors are closed.
2. Disengage any padlocks or key interlocks required to operate the VersaRupter switch (if equipped).
3. For HE handles, apply the removable handle on the splined shaft of the manual drive and pull the arrestor ring; see figure 93 (page 36). Rotate the handle in the opening direction until the arrestor ring snaps back into the locked position.
4. For HM handles, apply the removable handle on the splined shaft of the manual drive. HM handles do not have an arrestor ring, so the handle should be rotated in the opening direction until the rotation is stopped by the fixed tab on the front bearing.
5. For chain drive and side direct drive handles, rotate the handle in the opening direction until the full motion is completed. Motion range is indicated by the location of the padlock holes.
6. Visually check that all poles of the switch have opened properly; see figure 103 (page 45).
7. For HE and HM handles, remove the removable handle from the manual drive and secure with a padlock (if equipped). For all other handles, engage padlocks or key interlocks (if equipped).
8. If the VersaRupter switch is equipped with a grounding switch, it may be closed after confirming the VersaRupter switch is open; see figure 103 (page 45).

A-mechanism closing operation

1. If the VersaRupter switch is equipped with a grounding switch, be sure that it is in the open position; see figure 103 (page 45).
2. If the VersaRupter switch is equipped with the fuse tripping system, ensure that none of the fuse striker pins have been activated. An activated striker pin will prevent the VersaRupter switch from closing.
3. Make sure all enclosure doors are closed.
4. Disengage any padlocks or key interlocks required to operate the VersaRupter switch (if equipped).
5. Before the VersaRupter switch can close, the A-mechanism must be charged; see figure 3 (page 6).
6. For HE handles, apply the removable handle on the splined shaft of the manual drive and pull the arrestor ring; see figure 93 (page 36). Rotate the handle in the closing direction until the arrestor ring snaps back into the locked position.
7. For HM handles, apply the removable handle on the splined shaft of the manual drive. HM handles do not have an arrestor ring, so the handle should be rotated in the closing direction until the rotation is stopped by the fixed tab on the front bearing.
8. Visually check that all poles of the switch have closed properly; see figure 103 (page 45).
9. For HE and HM handles, remove the removable handle from the manual drive and secure with a padlock (if equipped). For all other handles, engage padlocks or key interlocks (if equipped).

Installation and mounting (continued)

A-mechanism opening operation

1. Make sure all enclosure doors are closed.
2. Disengage any padlocks or key interlocks required to operate the VersaRupter® switch (if equipped).
3. For HE handles, apply the removable handle on the splined shaft of the manual drive and pull the arrestor ring; see figure 93 (page 36). Rotate the handle in the opening direction until the arrestor ring snaps back into the locked position. The VersaRupter switch will open after rotating the handle approximately 20° and the A-mechanism will recharge with the remaining rotation of the handle.
4. For HM handles, apply the removable handle on the splined shaft of the manual drive. HM handles do not have an arrestor ring, so the handle should be rotated in the opening direction until the rotation is stopped by the fixed tab on the front bearing. The VersaRupter switch will open after rotating the handle approximately 20° and the A-mechanism will recharge with the remaining rotation of the handle.
5. Visually check that all poles of the switch have opened properly; see figure 103 (page 45).
6. For HE and HM handles, remove the removable handle from the manual drive and secure with a padlock (if equipped). For all other handles, engage padlocks or key interlocks (if equipped).
7. If the VersaRupter switch is equipped with a grounding switch, it may be closed after confirming the VersaRupter is open; see figure 103 (page 45).

Preparation of the supporting structure

The VersaRupter switch can be applied in vertical or horizontal operations. The design of a supporting structure must consider the geometrical configuration of the VersaRupter switch and minimal clearances to both earthed and live parts. The supporting structure must be rigid enough to prevent deformation of the VersaRupter switch base. All mounting surfaces of the frame must remain in the same plane. Use of U-iron or angle iron components is recommended for construction of the supporting structure. The VersaRupter switch should be mounted using four M12 bolts through the mounting holes in the frame.

Installation of the VersaRupter switch

Use caution not to deform the base of the VersaRupter switch during installation. This could lead to the following problems:

1. Increased moment of force on the VersaRupter switch shaft.
2. Contacts not operating simultaneously. Contacts should not exceed 3 mm in normal conditions.
3. Deterioration of contacts in the closed position.
4. Displacement of the symmetry plane of moving contacts in relation to the pole symmetry plane, which results in asymmetrical contact of the fixed contacts and moving contacts.

To avoid these defects, ABB recommends only tightening three of the mounting bolts when installing the VersaRupter switch. The fourth bolt can be shimmed with additional washers if needed to prevent any deformation while tightening the fourth bolt.

Do not use the lower or upper insulators for support during mounting. This may cause misalignment in the insulators and catastrophic damage during operation.

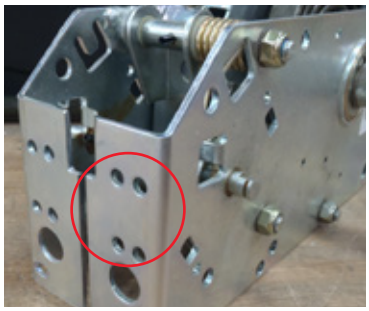
Note:

The VersaRupter switch should not be installed in an inverted vertical position with the hollow insulators at the bottom if it will be subject to water deposition or condensation on the switch or elements (bus or cable) connected to it. The VersaRupter switch should be protected against water dripping onto its insulating parts, which may cause a deterioration of its dielectric strength.

Mounting and wiring the shunt trip

The shunt trip can only be installed on the A-mechanism. Shunt trip coils are intermittent duty, requiring an auxiliary contact to be wired in series with the shunt trip. The auxiliary switch will open the shunt trip circuit when the VersaRupter switch opens. Refer to auxiliary switch installation for more details.

1. Ensure that the A-mechanism is not pre-charged prior to installing the shunt trip. The mechanism should appear as shown in figure 4. If not, rotate the shaft counter-clockwise to release the spring, and then return the shaft to its neutral position.
2. Locate the mounting holes in the A-mechanism for the shunt trip shown in figure 5. Loosely install a bolt, lock washer and nut into the lower hole, allowing the shunt trip to rest on the A-mechanism as shown in figure 6.



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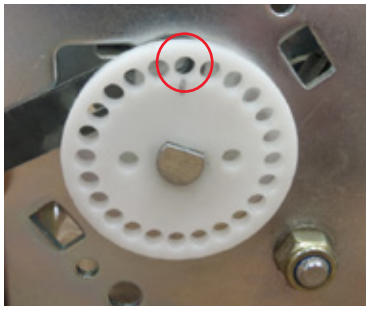
3. Place the white disk on the half-moon shaft located on the operating shaft side of the A-mechanism. Place the shunt trip linkage between the white disk and A-mechanism, and mark the hole that will provide the maximum rotation of the white disk if the linkage is pulled. An example is shown in figure 7.



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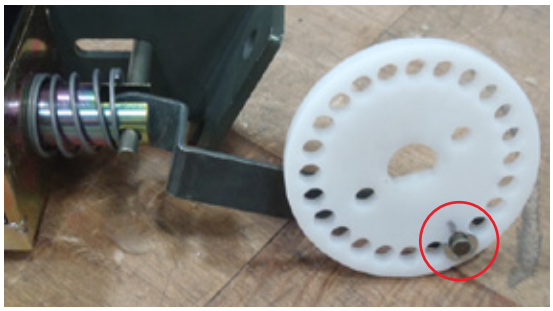
4. Remove the shunt trip and white disk from the A-mechanism, and install the pin and clamp into the marked hole. Keep in mind, the linkage should be between the white disk and A-mechanism when reinstalled, and the clamp should be on the outside face of the white disk as shown in figure 8.



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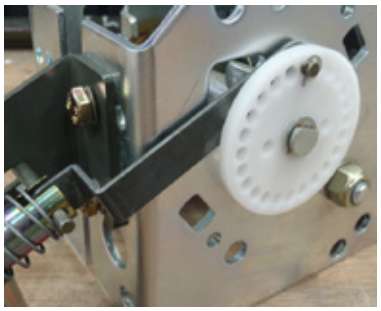
Mounting and wiring the shunt trip (continued)

5. Re-install the shunt trip permanently onto the A-mechanism with the two sets of bolts, lock washers and nuts using a 10 mm socket. Slide the white disk back onto the half-moon shaft and secure with a cir-clip as shown in figure 9.



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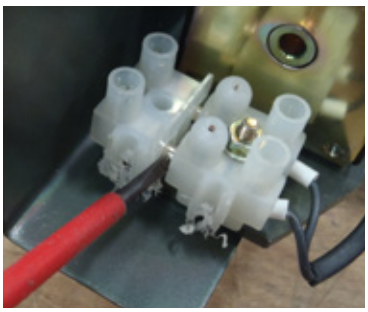
6. The shunt trip features a pull-apart wiring terminal that can be separated with a small flat head screw driver. Gently pry the white plastic housing away from the female housing, shown in figure 10, to which the coil wires are attached. The plug can be wired separately from the coil and plugged back in to complete the circuit.



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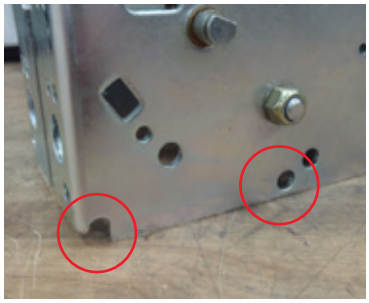
Mounting the open fuse auxiliary switch

The open fuse auxiliary switch can only be installed on the A-mechanism and a fuse base equipped with fuse tripping. This switch has two contacts, one normally open and one normally closed. It is actuated by the fuse tripping tie rod linkage connected to the type CEF fuse base.

1. Locate the mounting hole and slot on the side of the A-mechanism with the operating shaft, as shown in figure 11.



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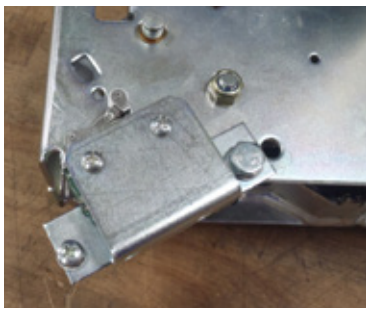
2. Bolt the open fuse auxiliary switch to the mounting hole on the A-mechanism and loosely install the screw hardware to allow the switch to rotate into the slot, as shown in figure 12.



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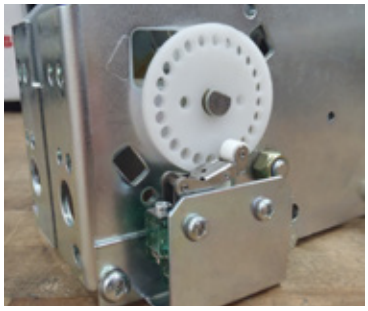
3. Place the white disk onto the half-moon shaft and rotate the switch into place as shown in figure 13.



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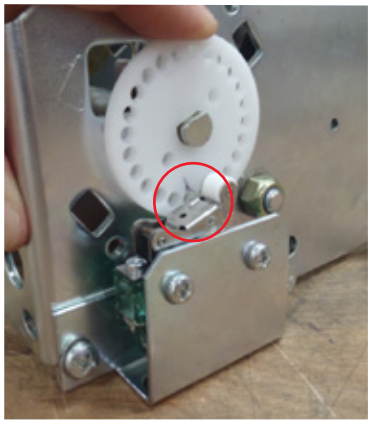
4. Rotate the white disk with your finger and mark the hole directly adjacent to the white roller on the switch as shown in figure 14.



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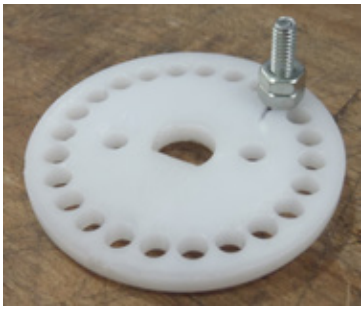
5. Rotate the switch out of position and remove the white disk. Install the long bolt and two nuts into the marked hole from the previous step, as shown in figure 15.



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Mounting the open fuse auxiliary switch (continued)

6. Re-install the white disk and switch back onto the A-mechanism. Rotate the white disk until it reaches its maximum rotation and contacts the switch as shown in figure 16. An audible click should be heard. If not, remove the white disk and move the long bolt and nuts to the appropriate hole. Once adjusted properly, secure the switch with a 13 mm socket and Phillips screw driver.

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7. Install the cir-clip onto the half-moon shaft to secure the white disk as shown in figure 17.

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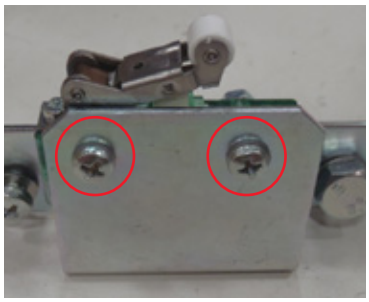
Mounting the open fuse auxiliary switch on motor bracket

Ensure that the A-mechanism is not charged.

1. Remove the two screws that secure the switch to the mounting bracket with a Phillips screw driver as shown in figure 18.



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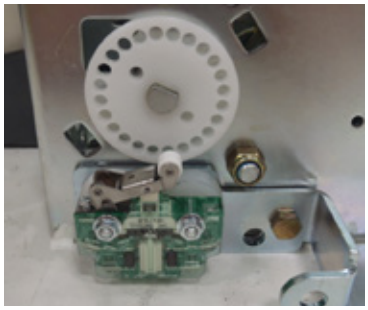
2. Slide the switch onto the studs located on the motor bracket and secure with the provided nuts. Place the white plastic disc onto the half-moon shaft as shown in figure 19.



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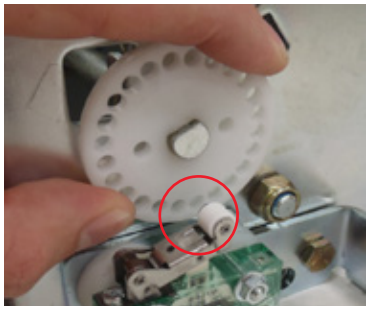
3. Rotate the white plastic disc to its maximum rotation and mark the hole adjacent to the white roller on the open fuse auxiliary switch as shown in figure 20.



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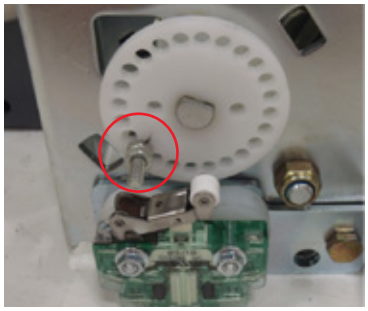
4. Install the provided screw and nuts into the marked hole from the previous step as shown in figure 21.



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5. Rotate the white plastic disc, shown in figure 22, to its maximum displacement and listen for a click. This indicates that the switch will make contact. If a click is not heard, relocate the screw to a closer hole. Ensure the white disc reaches its maximum rotation just as the click is heard to prevent over-rotation. If the setup is correct, secure the white disc with the provided cir-clip onto the half-moon shaft.

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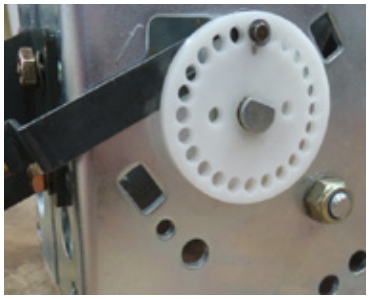
Mounting an open fuse auxiliary switch with a shunt trip

An open fuse auxiliary switch can be installed on the A-mechanism along with a shunt trip.

1. Follow the instructions for installing the shunt trip, but do not secure the clamp onto the half-moon shaft so the white disk can be removed as shown in figure 23.



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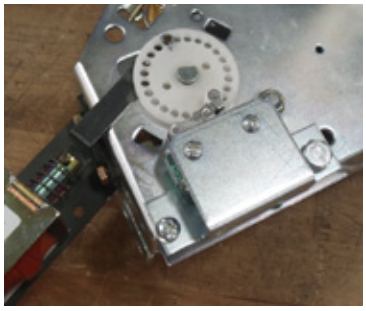
2. Bolt the open fuse auxiliary switch to the mounting holes as shown in figure 24.



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3. Rotate the white disk until it reaches its maximum displacement, and mark the hole adjacent to the white roller on the open fuse auxiliary switch as shown in figure 25.

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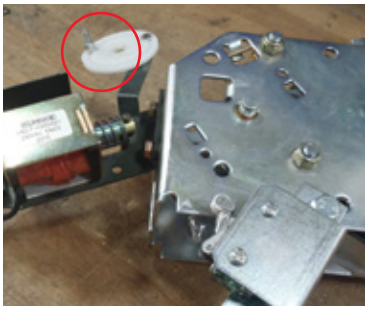
4. Rotate the open fuse auxiliary switch, remove the white disk from the half-moon shaft and rotate the shunt trip linkage away from the A-mechanism. Install the long bolt and two nuts on the marked hole on the white disk as shown in figure 26.



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5. Re-install the white disk back onto the A-mechanism and rotate the open fuse auxiliary switch back onto the A-mechanism as shown in figure 27.

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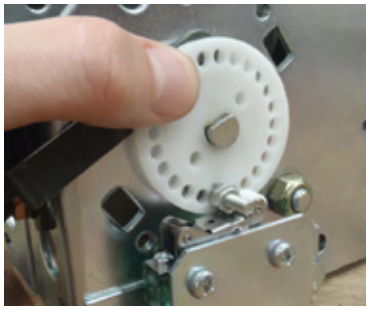
6. Rotate the white disk until it reaches its maximum rotation and makes contact with the open fuse auxiliary switch, shown in figure 28. An audible click should be heard from the switch. If not, relocate the long bolt and nuts to the appropriate hole. Pull the shunt trip linkage to its maximum displacement as shown in figure 29, and ensure the audible click is not heard on the open fuse auxiliary switch. If the click occurs, remove the white disk and move the long bolt and two nuts to the appropriate hole. Once adjusted properly, secure the switch with a 13 mm socket and Phillips screw driver.



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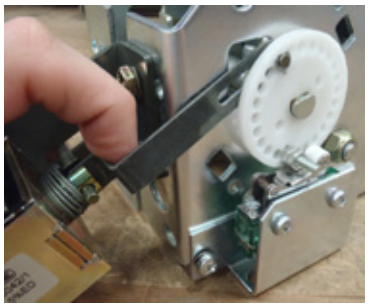

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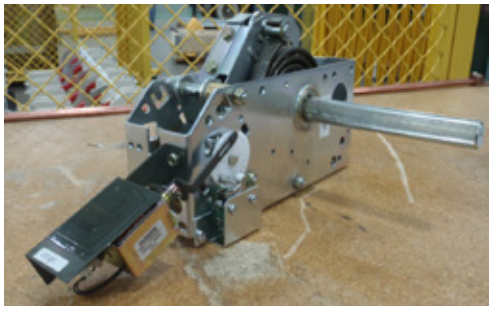
8. Install the clamp onto the half-moon shaft to secure the white disk to the A-mechanism.



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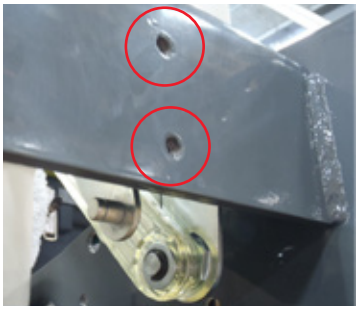
Mounting the auxiliary switch

The auxiliary switch contacts change state when the VersaRupter® switch contacts change state and have an equal number of normally open and normally closed contacts, which may be reconfigured in the field if necessary.

1. Locate the mounting holes on the back of the VersaRupter switch frame as well as the switch lever welded to the jack shaft shown in figure 31.



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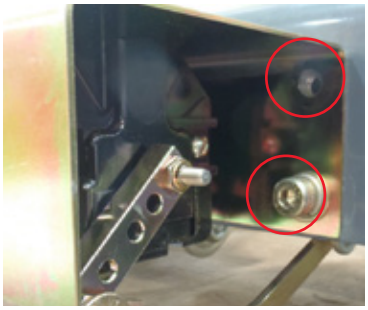
2. Install the auxiliary switch by bolting it with both provided bolts and lock washers to the pre-tapped mounting holes using a 6 mm Allen key as shown in figure 32.



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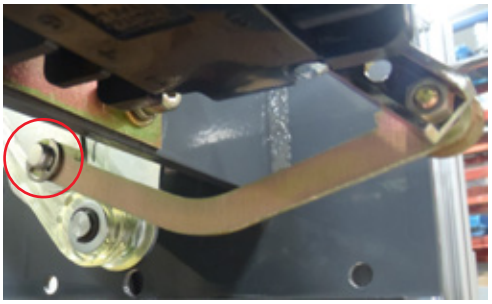
3. Connect the lever on the auxiliary switch to the lever on the jack shaft and secure it with the provided clamp as shown in figure 33.

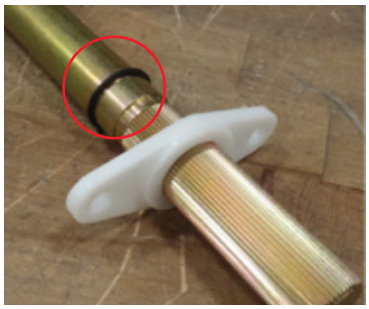


33

Installing the left-hand shaft extension

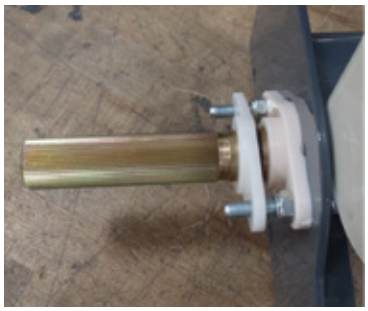
The left-hand shaft extension allows for the operation of the VersaRupter® switch from the left side of the switch. The operating mechanism is always mounted on the right side of the switch, so it is necessary to install a left-hand shaft extension if operation from the left side is desired or required. Applications for motor operation and mechanical interlocking with the grounding switch can also be used with the left-hand shaft extension. The extensions vary in length dependent upon VersaRupter pole spacing, but general installation is always the same.

1. Install the ring retainer onto the shaft extension and loosely slide the white plastic retainer onto the shaft as shown in figure 34.



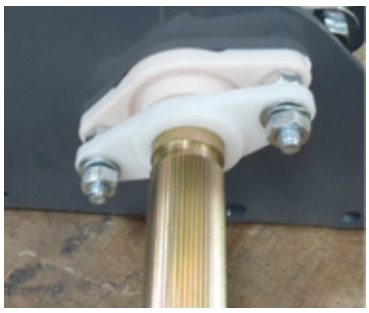
34

2. Slide the shaft extension through the hollow jackshaft located on the left side of the switch where a similar white plastic retainer is bolted to the switch frame as shown in figure 35. The loose white plastic retainer should align with the stationary bolt threads.



35

3. Slide the shaft extension through this opening until it reaches the operating mechanism located on the right side of the switch. Rotate the shaft while applying pressure until the key way drops into the slot of the mechanism and will not rotate any further.
4. Secure the white plastic retainer with the provided nuts and lock washers using a 13 mm socket as shown in figure 36. Use caution while tightening to prevent cracking the plastic.

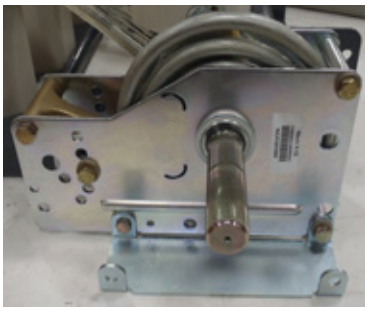


36

Mounting the NM motor operator on K-mechanism

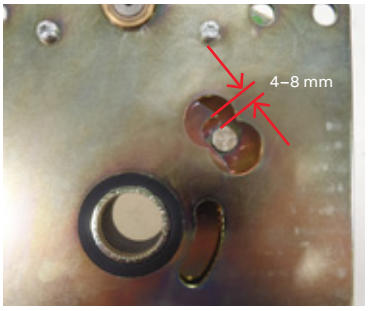
The NM motor operator can be installed on either the operating mechanism or a left-hand shaft extension. The installation instructions are similar for either application, but instructions can be found for installation on the left side of the VersaRupter switch. Further instructions can be found in the manual for the NM motor operator supplied with the motor concerning wiring and other data. Use M8 or 5⁄16" bolts and hardware to secure mounting bracket and motor.

1. Ensure that the VersaRupter® switch is in the open position. Locate the mounting holes for the motor bracket on the K-mechanism. The bolt in the lower right corner of the K-mechanism must be removed and reinstalled to secure the motor mounting bracket. See figure 37.



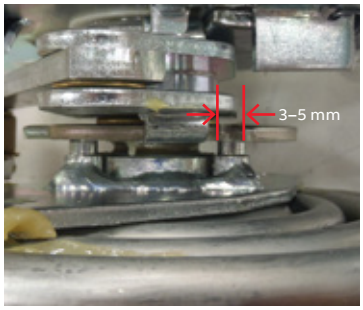
37

2. Rotate the spline on the NM motor until the spacing is within 4–8 mm as shown in figure 38.



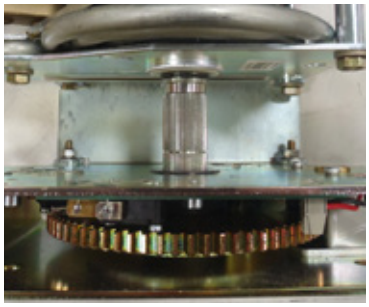
38

3. Rotate the splined shaft on the K-mechanism until the spacing is within 3–5 mm as shown in figure 39. This can be done by hand and does not require an operating handle.

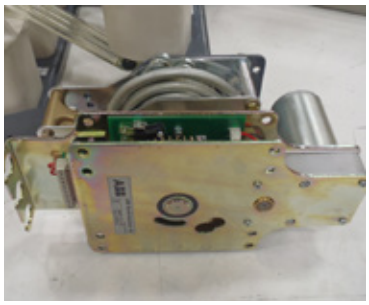


39

4. Slide the NM motor onto the splined shaft of the K-mechanism and secure it with bolts, washer, lock washers and nuts as shown in figure 40.



40



41

Troubleshooting motor installation
If the motor is not properly opening and closing the switch after following the steps for motor installation, further adjustment may be required. If the switch can be opened electrically but cannot be closed electrically, see step (a) below. If the switch cannot be opened electrically but can be closed electrically, see step (b) below.

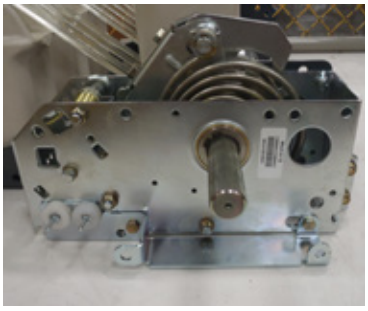
Note: It may be necessary to open/close the switch manually to determine whether to proceed to steps (a) or (b).

a. If the switch can be opened electrically but cannot be closed electrically: Rotate the splined tube on the motor one to two teeth to decrease the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to decrease the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.
b. If the switch cannot be opened electrically but can be closed electrically: Rotate the splined tube on the motor one to two teeth to increase the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to increase the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.

Mounting the NM motor operator on A-mechanism

The NM motor operator can be installed on either the operating mechanism or a left-hand shaft extension. The installation instructions are similar for either application, but instructions can be found for installation on the left side of the VersaRupter® switch. Further instructions can be found in the manual for the NM motor operator supplied with the motor concerning wiring and other data. Use M8 or 5⁄16" bolts and hardware to secure mounting bracket and motor.

1. Ensure that the VersaRupter switch is in the open position and the A-mechanism is not charged. Locate the mounting holes for the motor bracket on the A-mechanism. See figure 42.



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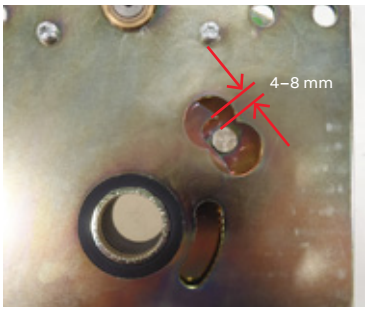
42

2. Rotate the spline on the NM motor until the spacing is within 4–8 mm as shown in figure 43.



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43

3. Rotate the splined shaft on the A-mechanism counter-clockwise to remove the rotational variability in the shaft as shown in figure 44. This can be done by hand and does not require an operating handle.

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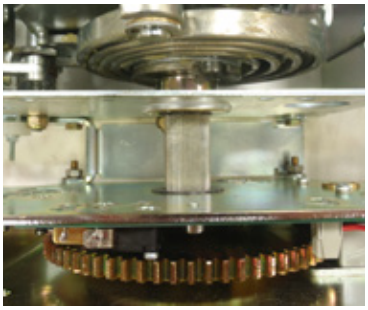
44

4. Slide the NM motor onto the splined shaft of the A-mechanism and secure it with bolts, washer, lock washers and nuts as shown in figure 45.



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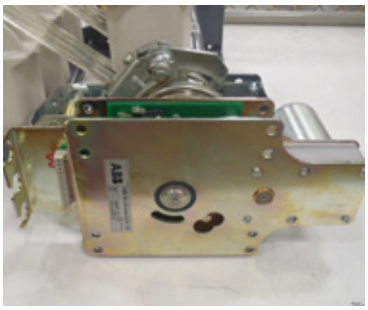
45



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46

Troubleshooting motor installation
If the motor is not properly opening and closing the switch after following the steps for motor installation, further adjustment may be required. If the switch can be opened electrically but cannot be closed electrically, see step (a) below. If the switch cannot be opened electrically but can be closed electrically, see step (b) below.

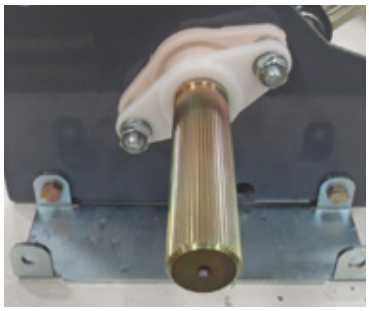
Note: It may be necessary to open/close the switch manually to determine whether to proceed to steps (a) or (b).

a. If the switch can be opened electrically but cannot be closed electrically: Rotate the splined tube on the motor one to two teeth to decrease the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to decrease the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.
b. If the switch cannot be opened electrically but can be closed electrically: Rotate the splined tube on the motor one to two teeth to increase the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to increase the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.

Mounting the NM motor operator on left side of VersaRupter® A-mechanism

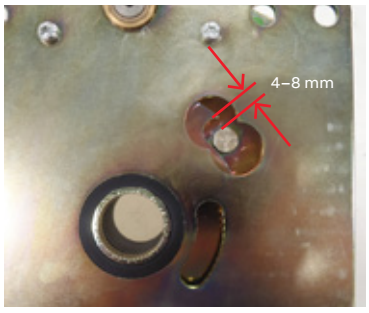
A left-hand shaft extension is supplied if the NM motor is ordered for left-side applications. Use M8 or 5/16" bolts and hardware to secure mounting bracket and motor.

1. Follow the instructions for installing the left-hand shaft extension. Once complete, locate the mounting holes for the motor bracket on the left side of the switch and bolt the bracket to the frame as shown in figure 47. Make sure the switch is in the open position.



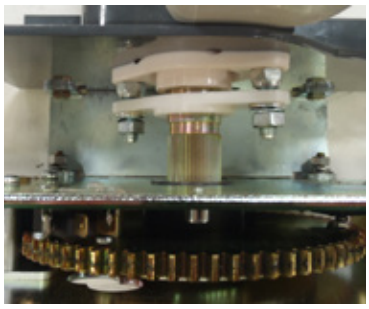
47

2. Rotate the splined tube on the motor to achieve a 4–8 mm spacing as shown in figure 48.

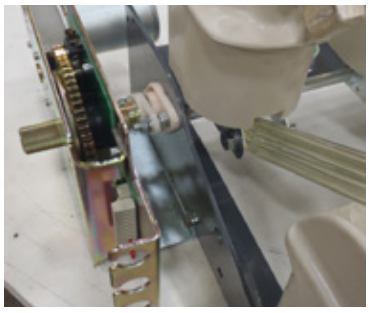


48

3. Adjust the spacing on the operating mechanism to match the required spacing found in figure 44 located in the instructions to mount the motor to an A-mechanism.
4. Slide the motor onto the left-hand shaft extension and secure to the motor bracket with bolts, washers, lock washers and nuts as shown in figure 49.



49



50

Troubleshooting motor installation
If the motor is not properly opening and closing the switch after following the steps for motor installation, further adjustment may be required. If the switch can be opened electrically but cannot be closed electrically, see step (a) below. If the switch cannot be opened electrically but can be closed electrically, see step (b) below.

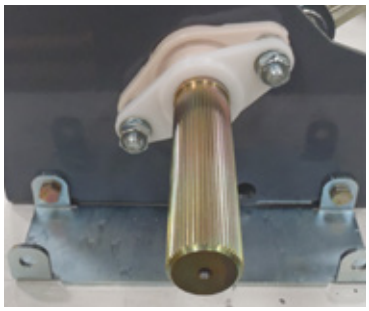
Note: It may be necessary to open/close the switch manually to determine whether to proceed to steps (a) or (b).

a. If the switch can be opened electrically but cannot be closed electrically: Rotate the splined tube on the motor one to two teeth to decrease the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to decrease the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.
b. If the switch cannot be opened electrically but can be closed electrically: Rotate the splined tube on the motor one to two teeth to increase the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to increase the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.

Mounting the NM motor operator on left side of VersaRupter® K-mechanism

A left-hand shaft extension is supplied if the NM motor is ordered for left-side applications. Use M8 or 5/16" bolts and hardware to secure mounting bracket and motor.

1. Follow the instructions for installing the left-hand shaft extension. Once complete, locate the mounting holes for the motor bracket on the left side of the switch and bolt the bracket to the frame as shown in figure 51. Make sure the switch is in the open position.



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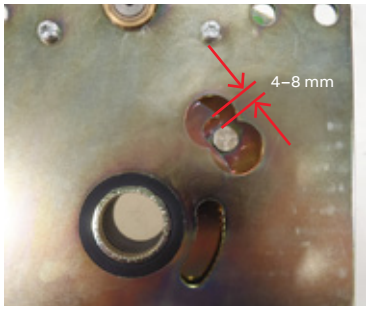
51

2. Rotate the splined tube on the motor to achieve a 4–8 mm spacing as shown in figure 52.



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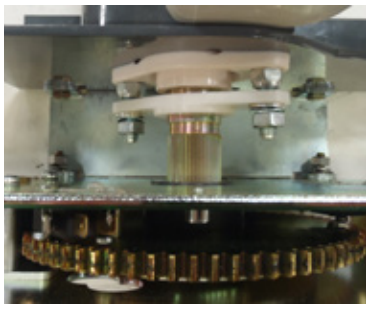
52

3. Adjust the spacing on the operating mechanism to match the required spacing found in figure 39 located in the instructions to mount the motor to a K-mechanism.
4. Slide the motor onto the left-hand shaft extension and secure to the motor bracket with bolts, washers, lock washers and nuts as shown in figure 53.



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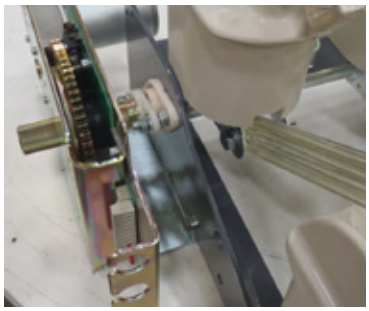
53



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54

Troubleshooting motor installation
If the motor is not properly opening and closing the switch after following the steps for motor installation, further adjustment may be required. If the switch can be opened electrically but cannot be closed electrically, see step (a) below. If the switch cannot be opened electrically but can be closed electrically, see step (b) below.

Note: It may be necessary to open/close the switch manually to determine whether to proceed to steps (a) or (b).

a. If the switch can be opened electrically but cannot be closed electrically: Rotate the splined tube on the motor one to two teeth to decrease the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to decrease the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.
b. If the switch cannot be opened electrically but can be closed electrically: Rotate the splined tube on the motor one to two teeth to increase the spacing conducted in step 2 between the half-moon clutch and the pin. Retest the open/close operation of the switch. If the same error persists, again rotate the splined tube on the motor one tooth to increase the spacing achieved in step 2, and retest. Continue with this step until the switch will electrically open and close properly.

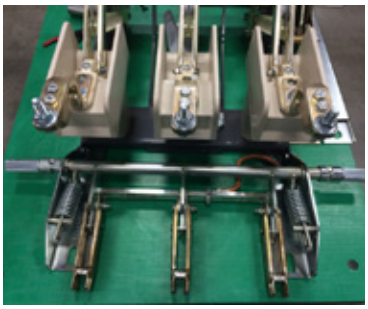
Installing the Type E grounding switch on VersaRupter® switch

The grounding switch allows the lower terminals of the VersaRupter switch (or fuse base) to be grounded. The grounding switch must be mechanically interlocked with the VersaRupter switch so that it cannot be closed at the same time the VersaRupter switch is closed. Separate operating handles must be provided for the VersaRupter switch and the grounding switch. Grounding switches are specified in accordance with the pole spacing of the VersaRupter switch to which they are attached. Left- and right-hand splined shafts are provided with the grounding switch. The VersaRupter switch must have a left-hand shaft extension installed for either the mechanical interlock or operating handle.

1. The three bus pieces supplied with the grounding switch must be installed on the lower contacts of the VersaRupter switch. Each of these pieces has a clearance hole for the Allen head screw and a bolt hole that aligns with the bolt hole of the lower terminal. The 1200 A switches have a clearance hole and two bolt holes. Do not fully tighten the nuts and bolts. See figure 55.

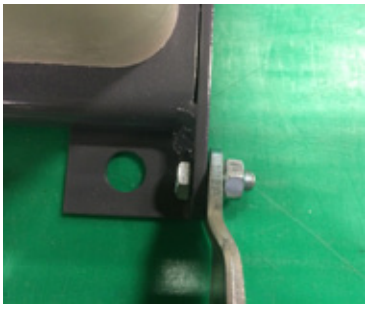
55

2. Visually align the contacts as shown in figure 56 and lubricate the stationary contacts with the provided lubricant in the kit.



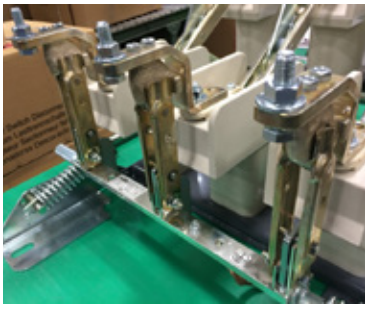
56

3. Secure the Type E grounding switch to the lower portion of the VersaRupter frame using a 13 mm socket as shown in figure 57.



57

4. Close the grounding switch, as shown in figure 58, with a removable handle to align the stationary contacts and tighten the bolts using a 19 mm socket, securing the stationary contacts.



58

5. Open the grounding switch to prepare for mechanical interlock installation.

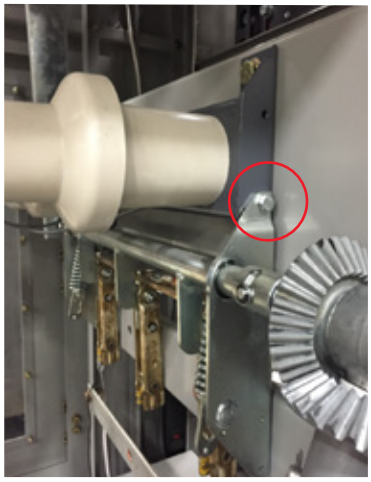
Installing the Type E grounding switch on VersaRupter® switch fuse base

The grounding switch allows the lower terminals of the fuse base to be grounded. The grounding switch must be mechanically interlocked with the VersaRupter switch so that it cannot be closed at the same time the VersaRupter switch is closed. Separate operating handles must be provided for the VersaRupter switch and the grounding switch. Grounding switches are specified in accordance with the pole spacing of the VersaRupter switch to which they are attached. Left- and right-hand splined shafts are provided with the grounding switch. The VersaRupter switch must have a left-hand shaft extension installed for either the mechanical interlock or operating handle.

1. The three bus pieces supplied with the grounding switch must be installed on the contacts of the fuse base. Do not fully tighten the nuts and bolts. See figure 59.

59

2. Visually align the contacts and lubricate the stationary contacts with the provided lubricant in the kit.
3. Secure the Type E grounding switch to the fuse base frame using a 13 mm socket as shown in figure 60.



60

4. Close the grounding switch, as shown in figure 61, with a removable handle to align the stationary contacts and tighten the bolts using a 19 mm socket, securing the stationary contacts.

61

5. Install the tension bushings shown in figure 62.

62

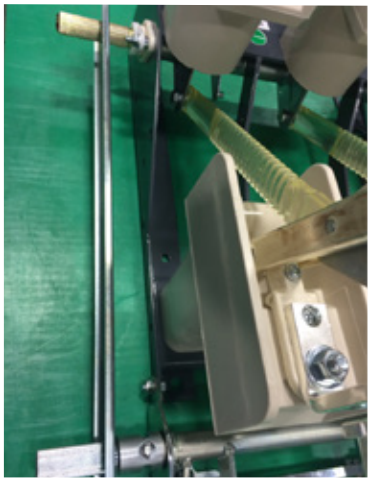
6. Open the grounding switch to prepare for mechanical interlock installation.

Installing the mechanical interlock

The mechanical interlock spans the distance between the VersaRupter® switch left-hand shaft extension and the left shaft of the grounding switch. The mechanical interlock may also be installed on the right side of the switch, allowing the operating handle to be operated from the left side of the switch. Different lengths are available to accommodate different switch ratings and fuse-mounted applications.

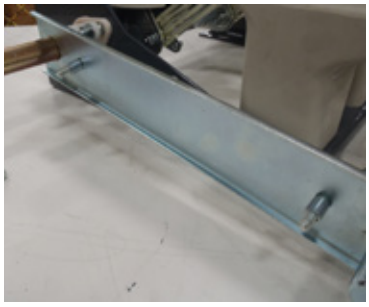
Note: The grounding switch is normally set for the mechanical interlock to be installed on the left side and operating handle to be installed on the right side. This can be determined by checking the pin connecting the splined shaft to the grounding switch, shown in figure 63. Ensure that the side on which the interlock will be installed has the pin installed in the normal hole as opposed to the slotted hole. The slotted hole is used for the side with the operating handle. The pin can be removed and re-installed to accommodate either the mechanical interlock or operating handle on either side of the switch. This is done by removing the cir-clips and washers securing the pin, rotating the splined shaft to line up with desired holes and reinstalling the washers and cir-clips.

1. Ensure the VersaRupter switch is open and the A-mechanism is charged if applicable.
2. Slide the provided clamps onto the splined shafts and slide one half of the interlock guide plate onto the shafts as shown in figure 63.



63

3. Place the two bolts through the interlock guide plate and slide the guide bushings onto the bolts as shown in figure 64.

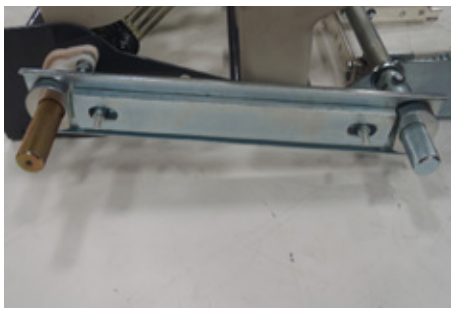


64

4. Place the interlock slider onto the guide bushings and bolts. See figure 65.

65

5. Slide an interlock cam onto each splined shaft with the flat portion facing the interlock slider as shown in figure 66.



66

6. Slide the other half of the interlock guide plate onto the splined shafts and install the nuts to tighten the assembly together using a 13 mm socket. Install the remaining clamps onto the splined shafts to secure the mechanical interlock. See figure 67.

—
67

7. Positively ground the braided ground connection found on the ground switch to the enclosure grounding system.

Note:
For A-mechanism applications, the A-mechanism must be charged to close the grounding switch.

Installing the bottom-mounted fuse base with fuse tripping

⚠ WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

The fuse base features a welded frame on which the insulators and live parts are mounted. Bases are available to be mounted on either the top (line side) or bottom (load side) of the VersaRupter® switch. The terminals of the switch provide the mounting points for the fuse clips and the optional fuse trip accessories. The frame for the three stand-off insulators and remaining fuse clips is mounted the proper distance (based on fuse length) from the fuse clips mounted on the VersaRupter switch terminals.

Fuse tripping installation

1. Install the provided fuse clips to the lower terminals of the VersaRupter switch using a 19 mm socket as shown in figure 68.

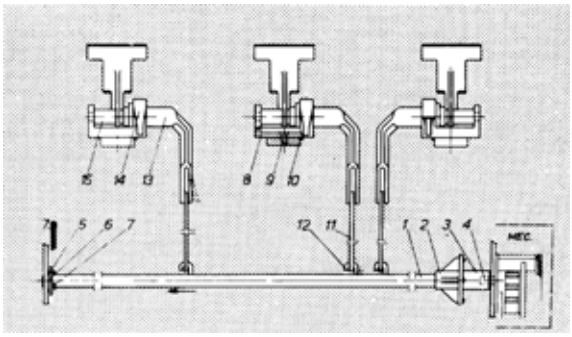
68

2. Referring to figure 71, fix the lower bearing mount (8) to the fuse clip (10) installed on the lower terminals of the VersaRupter switch using the provided screws and washers as shown in figure 69.

69

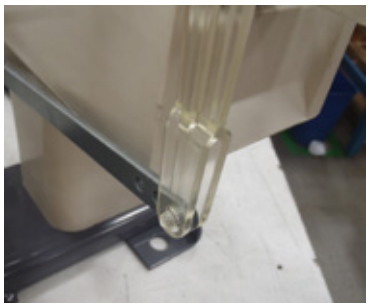
3. Combine the lever (13) with the fuse trip flap (15) and install the assembly onto the lower bearing mount (8). Secure it with the bearing clip (14) as shown in figure 70.

70



71

4. Install the release rod (11) in the lever (13) as shown in figure 72.



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72

5. Mount the drive ring (2) to the release shaft (1) on the right-hand side as shown in figure 73.

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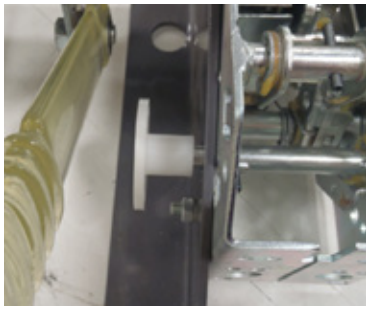
73

6. Mount the disk (3) onto the A-mechanism shaft (4) found on the operating mechanism as shown in figure 74.



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74

7. Slide the bearing (5) and washer (6) onto the left side of the release shaft (1), engage the release shaft (1) with the disk (3) and place the left side of the release shaft (1) into the hole found on the left side of the VersaRupter frame. Refer to figure 75.

—
75

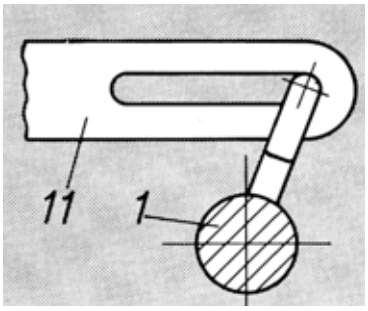
⚠ WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

Adjusting the fuse tripping

Charge the A-mechanism as described on the following page under “fuse tripping control.”

1. Adjust the release shaft to a position similar to that found in figure 76 so that the distance from the fuse trip flap to the fuse is within the limits of figure 79, shown on the following page.



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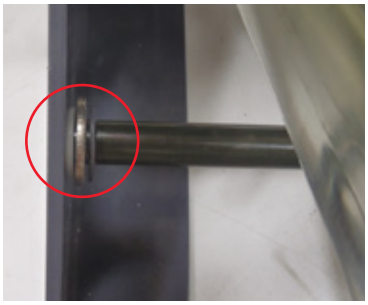
76

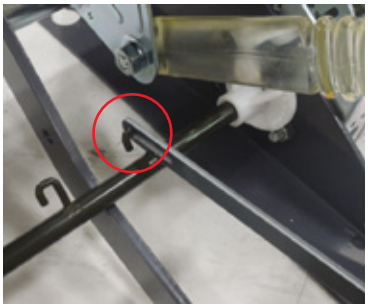
Installing the bottom-mounted fuse base with fuse tripping (continued)

2. Secure the washer and bearing on the left side of the release shaft with the provided cir-clip as shown in figure 77.

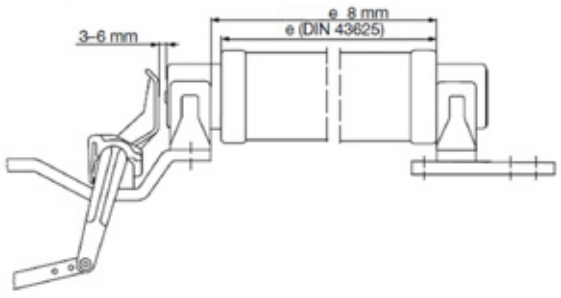


77

3. Secure the end of the release rod (11) to the release shaft (1) as shown in figure 78.



78



79

Notes:

1. Check the distance between the fuse trip flap and the fuse to match that of figure 79 once installation is complete. Adjustments can be made at the release rod (11) and lever (13) connection point.
2. The hooks (12) on the release shaft (1) should have the same position as shown in figure 76 on the previous page when the VersaRupter® switch is in the open position with the A-mechanism opening spring charged.

Fuse tripping control

1. Turn the operating shaft of the mechanism a maximum of 60° clockwise and return the handle back to the neutral position (opening spring housing must not be latched).
2. Mount a new fuse link, or test fuse in accordance with DIN 43625, in one of the phases.
3. If the distance between the fuse clips is longer than shown in figure 79, max e + 8 mm, the adjustment must be made with the fuse link resting on the fuse clips on the fuse base.
4. The distance between the striker pin and the fuse trip flag (15) must be between 3–6 mm. The fuse link is allowed to sag, but the distance between the striker pin and fuse trip flag must not exceed 12 mm.
5. If the VersaRupter switch does not open when adjusted as mentioned above, the adjustment must be repeated.

Installing the top-mounted fuse base with fuse tripping

WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

The fuse base features a welded frame on which the insulators and live parts are mounted. Bases are available to be mounted on either the top (line side) or bottom (load side) of the VersaRupter® switch. The terminals of the switch provide the mounting points for the fuse clips and the optional fuse trip accessories. The frame for the three stand-off insulators and remaining fuse clips is mounted the proper distance (based on fuse length) from the fuse clips mounted on the VersaRupter switch terminals.

Fuse tripping installation

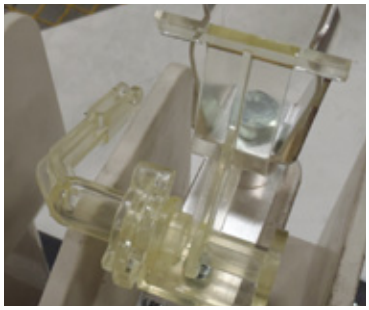
1. The fuse clip must be assembled on the upper terminal of the VersaRupter switch. Locate the fuse clip parts and install according to figure 80.

80

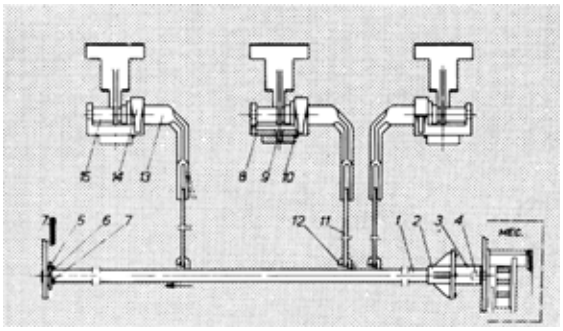
2. Referring to figure 83, fix the lower bearing mount (8) to the fuse clip (10) installed on the lower terminals of the VersaRupter switch using the provided screws and washers as shown in figure 81.

81

3. Combine the lever (13) with the fuse trip flap (15) and install the assembly onto the lower bearing mount (8). Secure it with the bearing clip (14) as shown in figure 82.



82

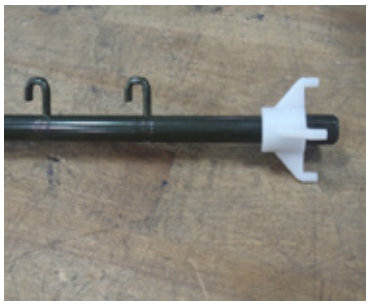


83

Installing the top-mounted fuse base with fuse tripping (continued)

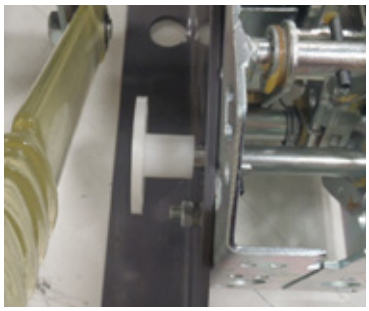
4. Install the release rod (11) in the lever (13) as shown in figure 84.

— 84



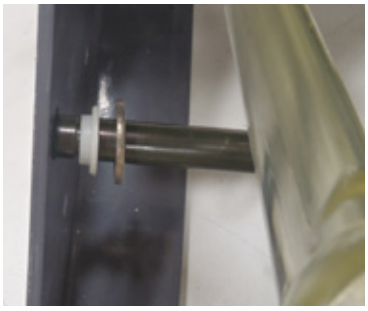
— 85

5. Mount the drive ring (2) to the release shaft (1) on the right-hand side as shown in figure 85.
6. Mount the disk (3) onto the A-mechanism shaft (4) found on the operating mechanism as shown in figure 86.



— 86

7. Slide the bearing (5) and washer (6) onto the left side of the release shaft (1), engage the release shaft (1) with the disk (3) and place the left side of the release shaft (1) into the hole found on the left side of the VersaRupter switch frame. Refer to figure 87.



— 87

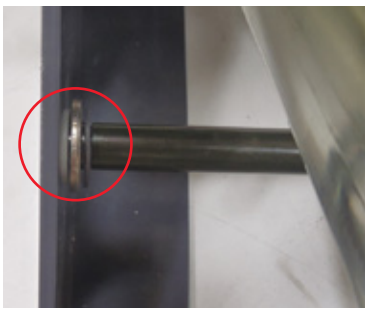
⚠ WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

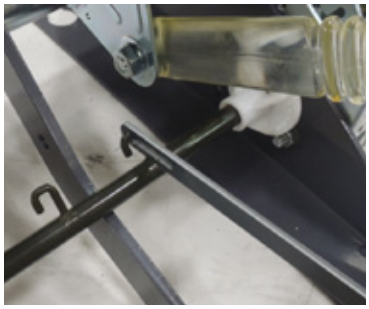
Adjusting the fuse tripping

Charge the A-mechanism as described on the following page under “fuse tripping control.”

1. Adjust the release shaft to a position so that the distance from the fuse trip flap to the fuse is within the limits of figure 90, shown on the following page.
2. Secure the washer and bearing on the left side of the release shaft as shown in figure 88.
3. Secure the end of the release rod (11) to the release shaft (1) as shown in figure 89 on the following page.



— 88



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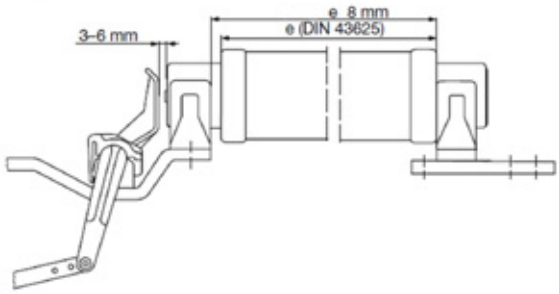
89



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90

Notes:

1. Check the distance between the fuse trip flap and the fuse to match that of figure 90 once installation is complete. Adjustments can be made at the release rod (11) and lever (13) connection point.

Fuse tripping control

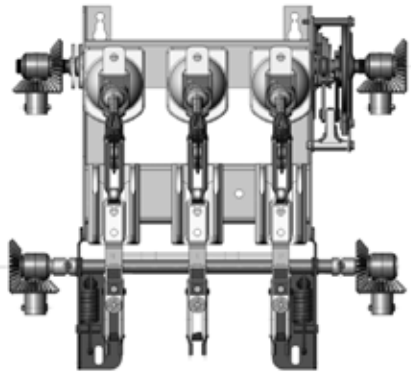
1. Turn the operating shaft of the mechanism a maximum of 60° clockwise and return the handle back to the neutral position (opening spring housing must not be latched).
2. Mount a new fuse link, or test fuse in accordance with DIN 43625, in one of the phases.
3. If the distance between the fuse clips is longer than shown in figure 90, max e + 8 mm, the adjustment must be made with the fuse link resting on the fuse clips on the fuse base.
4. The distance between the striker pin and the fuse trip flag (15) must be between 3–6 mm. The fuse link is allowed to sag, but the distance between the striker pin and fuse trip flag must not exceed 12 mm.
5. If the VersaRupter® switch does not open when adjusted as mentioned above, the adjustment must be repeated.

Mounting the HE/HM operating handles

The HE and HM operating handles include a bevel gear and front-mount universal joint. The HE handle has an arrestor ring that must be pulled out as the removable handle is rotated to open or close the switch. The HM handle must be used if manual operation is desired with use of the NM motor operator. The HM handle does not have an arrestor ring.

Ensure the opening spring is not charged if an A-mechanism is installed.

1. Install the bevel gear onto the operating shaft of the mechanism or grounding switch with 3 Nm torque. This is most easily done before the VersaRupter® switch is installed into an enclosure. See figure 91 for proper orientation of the bevel gear.



91

2. Install the front-mounted universal joint onto the enclosure using a 17 mm socket. Fabricate a ¾" pipe to connect the bevel gear and front universal joint. The bolt holes should not exceed 10 mm. Refer to drawing S-20361 at the end of this document for fabrication instructions.

For HE handles:

3. Remove the Seeger ring, spring and nut. See figure 92.

92

4. Slide the arrestor ring off the splined shaft. See figure 93. The splined shaft should be free to rotate.

93

5. If paired with an A-mechanism, use the removable handle to charge the A-mechanism.
6. Test the installation by opening and closing the switch.
7. Slide the arrestor ring back onto the splined shaft.
8. Slightly pull the arrestor ring out so it clears the locking tab on the front universal joint.

9. Close the VersaRupter® switch and ensure the front universal joint indicates the switch is closed as shown in figure 94.

—
94

10. If not, remove the arrestor ring and reinstall it, positioned 2–3 teeth rotated to the right.
11. Once in the correct position, reinstall the spring, nut and Seeger ring.
12. Warning! Be sure to apply the information label supplied with the HE/HM handle during installation. Labels must be close to the body of the handle for proper notification during service.

Installing the chain drive handle

Refer to the drawing for “chain drive assembly.”

1. Secure the sprocket to the operating shaft of the mechanism and secure it with the setscrew.
2. Bolt the chain drive housing to the switchgear enclosure using 4⅜"–16 x ¾" hex head bolts and ⅜" lock washers. If installing on the right-hand side, install the angle bracket from the chain guard along with bolting on the chain drive housing. Reference drawing “chain drive assembly” for details.
3. Ensure that the switch is closed and the handle is in the up position.
4. Bolt the angle from the chain guard to the angle bracket. Slide the angle assembly onto the sprocket and bolt it to the angle that was previously installed. The angle is slotted to allow for depth adjustment. The chain guard assembly is not required if the chain drive is installed on the left-hand side.
5. Install the chain onto the sprockets, securing them with the turnbuckles and chain guard. If the switch is mounted upright, the chain must be crossed as shown in the referenced drawing. If the switch is inverted, the chain does not need to be crossed. Ensure that the turnbuckles are not closer than 6" to either sprocket while the switch is in the closed position with the handle up. Do not exceed a 1" misalignment within the sprocket-to-sprocket plane.
6. Adjust the chain between the switch and handle until the top and bottom of the chain are snug. Open and close the switch 10 times using the handle and make final adjustments to the turnbuckles. If properly adjusted, the handle should be approximately ¾" to ⅞" from the handle stop in either position when the switch trips.

Installing the direct drive handle

Refer to the drawings “direct drive handle right side/left side” for details.

1. Ensure that the VersaRupter® switch is closed and the handle is in the closed position.
2. Mount the direct drive handle to the switchgear enclosure using a 9⁄16" socket, making sure the hub assembly slides onto the operating shaft of the VersaRupter switch.
3. Check that the VersaRupter switch opens and closes when the handle is operated.

Installing the interphase barriers

Interphase barriers are included and must be used with VersaRupter® switches rated to 15.5 kV, 600/1200 A, 110 kV BIL. Interphase barriers must also be used with 15 kV, 1200 A, 95 kV switches with 40 kA momentary rating; however, they are not supplied.

The VersaRupter switch interphase barrier kit comes with a barrier, a barrier spacer, 6 nylon nuts, 6 nylon screws and 2 pine-tree clips.

1. Mount the barrier using the nylon hardware (nuts and screws). There are 6 holes in the frame for the 6 nuts and screws.
2. Mount the barrier spacer between the barrier walls using the 2 pine-tree clips.

Installing the back connect kit

These instructions apply for top and bottom mounting of the back connect insulated bus bars. Reference back connection kit outline drawings found toward the end of this manual to identify the components.

1. When mounting the back connect kit, first secure the brackets to the frame with the same bolts used to secure the VersaRupter® switch frame to its enclosure.
2. Attach the stand-off insulators to the brackets provided using ½" bolts.
3. Mount the insulated bus bars to the stand-off insulators using one ⅜" bolt, a steel ⅜" washer and two red washers.
4. Install the GPO-3 washers so that they are positioned on each side of the back connect bus bar to protect the bus bar insulation. The steel ⅜" washer should be between the GPO-3 washer and the head of the ⅜" bolt.
5. The back connect bus bar is attached to the VersaRupter switch terminals with the hardware provided with the VersaRupter switch. The back connect bus bars may be connected to cabling or bus work as needed. For dielectric purposes, bus boots may be installed at the termination of the back connect bus bar and the field connections.
6. Torque all hardware in accordance with standard torque guidelines per the bolt sizes.

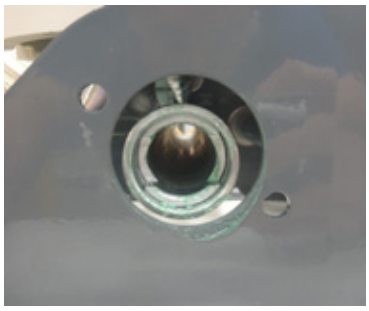
Installing the K-mechanism

WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

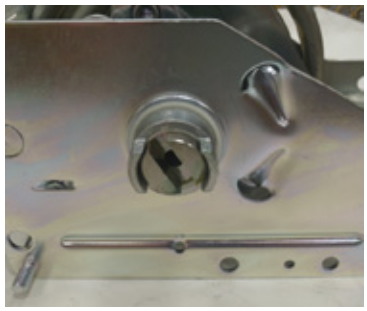
Ensure that the VersaRupter® switch is in the open position.

1. The jack shaft should appear as shown in figure 95 when looking at it from the right side, where the mechanism will be installed.



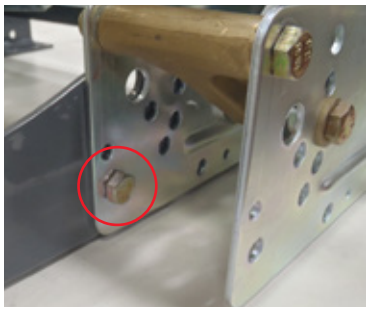
95

2. Place the mechanism up against the frame of the VersaRupter switch while sliding the jack shaft connection point, shown in figure 96, into the jack shaft and the studs into the mounting holes of the frame. The jack shaft may need to be wiggled for the mechanism to engage.



96

3. Secure the mechanism with the provided loose bolt as shown in figure 97, and the other two studs as shown in figure 98. Tighten nuts to 25 Nm torque using a 13 mm socket.



97

98

4. Check that the mechanism properly opens and closes the VersaRupter switch.

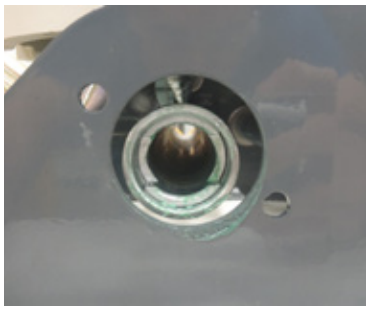
Installing the A-mechanism

WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

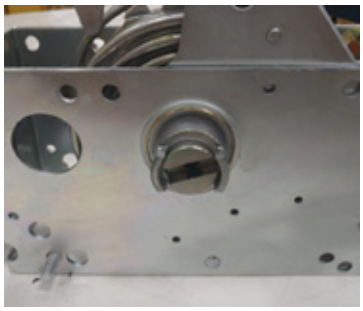
Ensure that the VersaRupter® switch is in the open position.

1. The jack shaft should appear as shown in figure 99 when looking at it from the right side, where the mechanism will be installed.



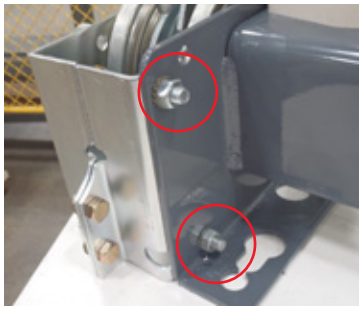
99

2. Place the mechanism up against the frame of the VersaRupter switch while sliding the jack shaft connection point, shown in figure 100, into the jack shaft and the studs into the mounting holes of the frame. The jack shaft may need to be wiggled for the mechanism to engage.



100

3. Secure the mechanism with the provided nuts and washers as shown in figures 101 and 102. Tighten nuts to 25 Nm torque using a 13 mm socket.



101

102

4. Check that the mechanism properly opens and closes the VersaRupter switch.

03. Service and maintenance

⚠ WARNING

Do not use any type of alcohol-based cleaners. This results in weakening of the mechanical properties of tension rods and can cause them to crack.

Cleaning

After maintenance, the VersaRupter® switch must be cleaned before being put into service. Strong solvents and alcoholic fluids must not be used. For cleaning, use water with soap. After cleaning, the contact area of the main blades and the fixed contacts must be greased with ISOFLEX TOPAS NCA 52. If the VersaRupter switch is placed in a very humid and polluted area, which will reduce the tracking resistance, ABB recommends polishing the insulators and insulated components with silicon type DC200 fluid 100 cst.

VersaRupter switches in service

The VersaRupter switch should be checked at least once a year by conducting a number of operations to check all the functions. The frequency of maintenance depends on the service and environmental conditions.

- Moving and fixed contacts are greased with ISOFLEX TOPAS NCA 52.
- Mechanisms do not need any greasing under normal conditions.

Overall quality checks (mechanical and electrical) should be conducted after possible short circuit events. Replacement of damaged parts or complete replacement of the VersaRupter switch should be performed in accordance with conditions observed.

Special attention should be focused on the main contacts. A continuous layer of coating material should be present on the silver-plated contacts. Affected components should be replaced. Fuses must be replaced if present. The proper fuses may be found in the VersaRupter switch catalog.

Note!

The arcing knives, piston and cylinder must not be greased.

Mechanical overhaul

For the newer design (referred to as "NAL New Design"), maintenance can be performed at 15-year intervals if the following service conditions are met:

1. VersaRupter switch must be transported and stored in a genuine box.
2. Installation service conditions:
   a. VersaRupter switch must work in indoor application under normal service conditions according to IEEE C37.20.4.
   b. VersaRupter switch must be installed by staff who have read this manual and installed according to manufacturer's recommendation.
   c. Maximum number of mechanical cycles of 1000 must not be exceeded.
   d. Maximum values and numbers of the making and breaking capacity must not be exceeded.
   e. Safe distanced to earthed parts or to other live parts must be maintained.
   f. In special cases (fault in circuit where VersaRupter switch is installed or the apparatus will be overloaded), the VersaRupter switch should be inspected.
   g. VersaRupter switch should not be installed vertically with hollow insulators at the bottom, which could cause condensation in the hollow insulators and arc extinguishing system.

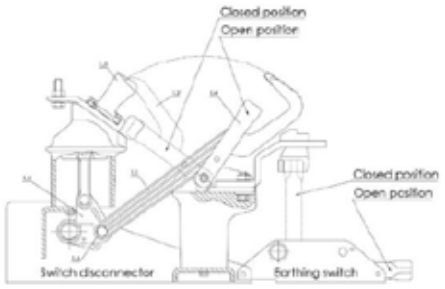
Complete overhaul of the VersaRupter switch should be carried out after 1000 operations or 5 years (15 years for new switch versions) in service, preferably by ABB staff.

Electrical overhaul
The frequency of overhaul depends on the number of operations and the magnitude of the breaking current. After about 100 operations at rated current or about 500 operations at half the rated current, the main contacts, the arcing contacts and the arc extinguishing chamber should be inspected and replaced if necessary.

Replacement should take place when:
- The tip of the arcing contact knives has diminished approximately 3 mm (minor damage might only cause polishing of the arcing tip).
- The fixed arcing fingers are burned or do not make any contact.
- The width of the slot in the arcing chamber is more than 8 mm.
- If copper is visible on any current-carrying bus part, this part should be replaced with a new one.

Control of the VersaRupter® knives after mounting
Due to differences in the straightness of the wall and support frame, it is necessary to check the position of the main knives on the fixed contact.

1. VersaRupter switches with A-mechanisms are delivered with the draw bars (1.1) detached. Refer to figure 103.
   a. Test that each arcing knife (1.2) moves freely in the arc chamber (1.3) by hand.
   b. Pull the main contacts (1.4) by hand to open the VersaRupter switch. Attach the draw bars to the main shaft (1.5) near the eccentric bolt (1.6) and secure them with the washer and cir-clip.



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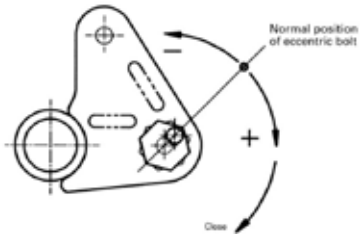
103

2. VersaRupter switches with K-mechanisms are delivered with the draw bars connected.
3. Before operating the VersaRupter switch, check that the surfaces of the main contacts are covered by contact grease in the contact area. The grease type ISOFLEX TOPAS NCA 52 must be used if additional grease is required.
4. Operate the VersaRupter switch several times. Check the main contact position while closed. After all adjustments, this position must be in accordance with the specifications shown in Figure 105a. In the case where the fixed contacts are 38 mm in height, the main contact should not exceed 2 mm above or 4 mm below the top surface of the fixed contact. In the case where the fixed contacts are 46 mm in height, the main contact should not exceed a depth of 10 mm below the top of the fixed contact and should not rest below the bottom edge of the fixed contact. Contact height may be adjusted with the eccentric bolt, shown in figure 104. The contact position may change throughout service due to wear, but it should not exceed the range shown in figure 105b. All four contact points on the main contacts must be in touch with the fixed contacts.



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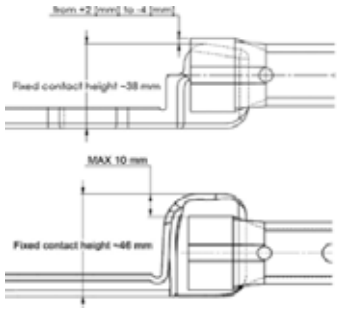
104



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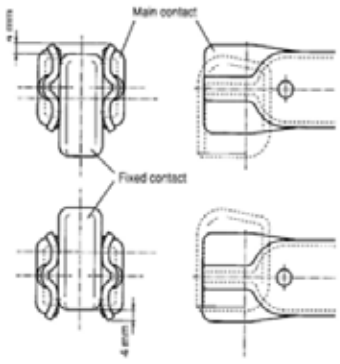
105a



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105b

Replacement of parts 5–27 kV

WARNING

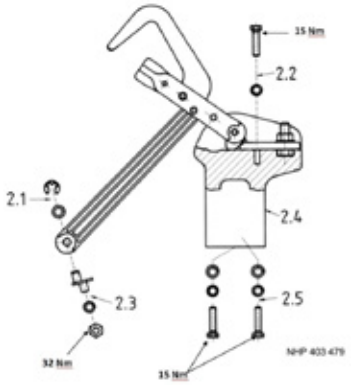
These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

The VersaRupter® switch is equipped with DMC insulators (glass fiber-reinforced polyester) with self-tapping screws to secure the insulators and contacts.

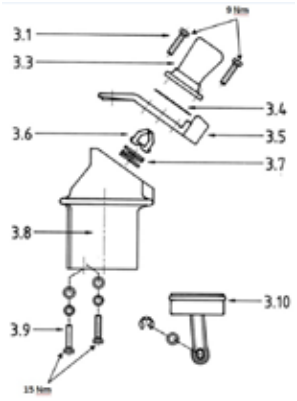
The following procedure must be followed if the same insulators and screws are to be used after replacing parts:

1. Carefully unscrew the self-tapping screws using a T40 Torx socket and brush them clean. Blow out any small particles in the threaded holes while wearing proper eye protection.
2. The screw must be reinstalled carefully into the threads of the insulator and tightened with care. See correct torque values in “Torque values for self-tapping screws.”

If a new insulator is being installed, the holes in the insulator should be threaded about 10 mm deep by the self-tapping screw before mounting. Remove the screw and blow the threaded holes clean. Refer to the procedures outlined on the following pages for installation.



106



107

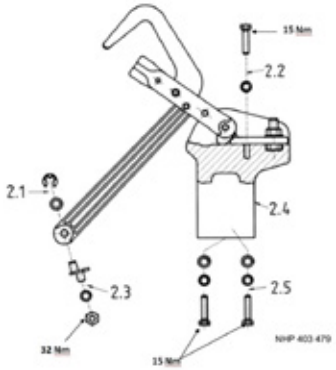
Replacement of contact knife with draw bar

WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

Ensure the VersaRupter® switch is in the open position and both operating springs discharged.

1. Remove the cir-clip and washer (2.1) attaching the draw bar to the main shaft. Eccentric bolt does not need to be loosened. See figure 109.



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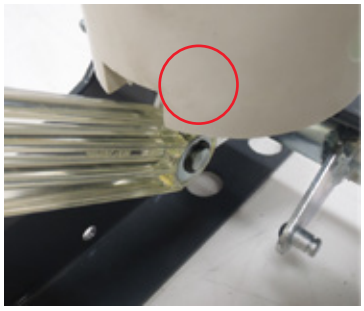
108



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109

2. Unscrew the screw(s) (2.2) attaching the main contact to the insulator using a T40 Torx socket. See figure 110. Remove the fixed contact with the contact knife and draw bar shown in figure 111.

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110

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111

3. Attach the new main contact with the contact knife and draw bar to the insulator as shown in figure 112.

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112

Replacement of contact knife with draw bar (continued)

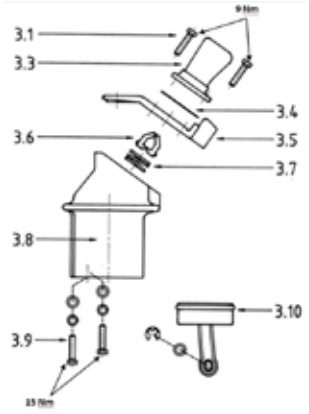
4. Grease the new contact knife with ISOFLEX NCA 52 and check that it enters the fixed main contact correctly. Verify also that the arcing knife moves freely in the arcing chamber when closing and opening. The arcing knife does not have the same position related to the contact knife during the closing and opening movement. The contact knife must rotate firmly at the pivot point without jerking.
5. Attach the draw bar to the main shaft near the eccentric bolt (2.3) and secure with the washer and cir-clip (2.1).
6. The depth of the engagement between the fixed and the moving contact can be adjusted with the eccentric bolt (2.3), shown in figure 113, or by moving the insulator (2.4). The eccentric bolt should be torqued to 32 Nm.

113

Replacement of fixed contact and arcing chamber

Ensure the VersaRupter® switch is in the open position and both operating springs discharged.

1. Using a T40 Torx socket, unscrew the two screw (3.1) and lift up the arcing chamber and the thermal disc (3.4 / 600 A) while pressing the main contact (3.5) firmly against the hollow insulator. See figure 115.



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114

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115

2. Lift up the main contact (3.5) by the arcing contacts (3.6), which penetrate the main contact. Remove the pressure spring (3.7) and clean the top of the insulator and the hole. Blow out the threaded holes. See figure 116.

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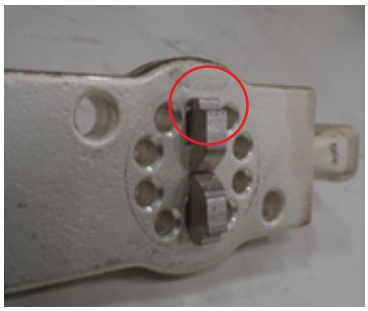
116

3. Replace the pressure spring in the hole and place the contact onto the insulator, making sure the cut-outs in the arcing tips (see figure 117) are seated on the pressure spring.



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117

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118

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119

Replacement of fixed contact and arcing chamber (continued)

4. Replace the thermal disc (600 A) and arc chute and screw the assembly down to secure it. See the correct torque values in the “torque values for self-tapping screws” section.

Note:
Damaged parts must be replaced.

The arcing contacts (3.6) must be seated correctly on the pressure spring (3.7).

When mounting the thermal disc (3.4) and the arcing chamber (3.3), the main contact (3.5) must be pressed firmly against the hollow insulator (3.8). Attach the whole assembly by screws (3.1). For correct torque values, see the “torque values for self-tapping screws” section.

Check correct position of the arcing contacts and test for correct functionality. Grease the contact area with ISOFLEX TOPAS NCA 52.

Replacement of hollow insulators with arcing chamber

WARNING

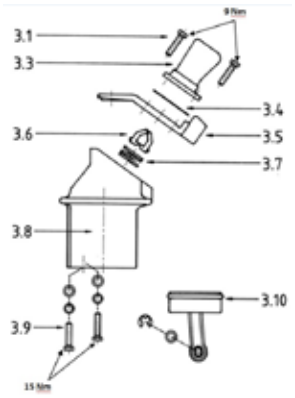
These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

1. Using a T40 Torx socket, unscrew screws (3.9) and detach the insulator.
2. Attach the new insulator to the frame by the two self-tapping screws (3.9)

Notes:
Remember to mount the piston with piston rod (3.10).

For correct torque values, see the “torque values for self-tapping screws” section.

Do not forget to install the washer and spring washer for the self-tapping screws.



120

Replacement of pivot side support insulator

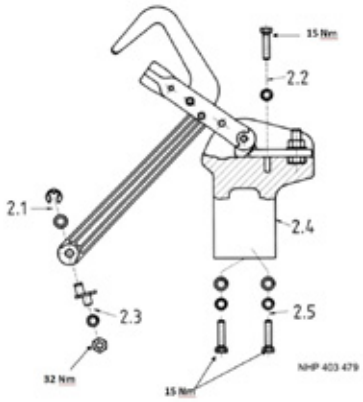
WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

1. Follow procedures from replacement of contact knife with draw bar to remove the knife assembly.
2. Using a T40 Torx socket, unscrew screws (2.5) and detach the insulator.
3. Attach the new insulator to the frame by the two self-tapping screws (2.5).
4. Attach the main contact with the contact knife to the top of the insulator and adjust according to procedures from “replacement of contact knife with draw bar.”

Notes:
For correct torque values, see the “torque values for self-tapping screws” section.

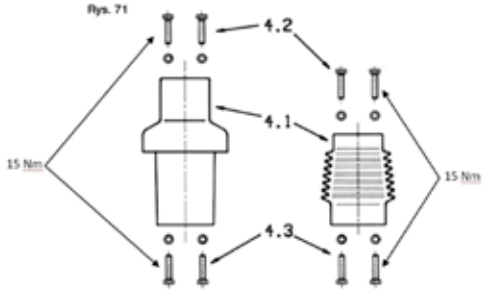
Do not forget to install the washer and spring washer for the self-tapping screws.



121

Replacement of insulator on fuse base and quick-make earthing switch

1. Using a T40 Torx socket, unscrew screws (4.2) and detach the fuse clips and contact blocks respectively.
2. Unscrew screws at the base (4.3) of the insulator and detach the insulator.
3. Attach the new insulator to the frame by the two self-tapping screws (4.3).
4. Attach the fuse clips and contact block to the top of the insulator and secure with screws (4.2).



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122

Replacement of parts 38 kV

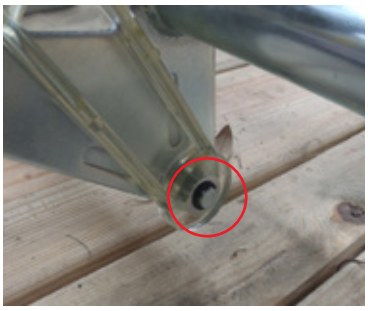
WARNING

These operations must be carried out by specialists only! Improper installation may result in serious injury or death.

Contact knives

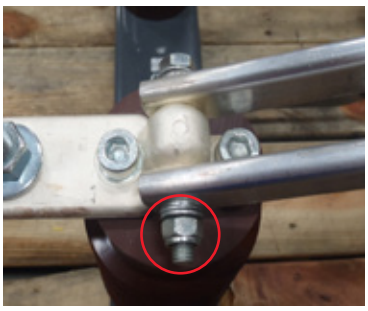
Ensure the VersaRupter® switch is open and the A-mechanism (if equipped) is not charged.

1. Detach the draw bar from the jack shaft by removing the cir-clip and washer as shown in figure 123.



123

2. Remove the contact screw shown in figure 124, allowing the contact knives to be removed.



124

3. Lubricate the new contact blades with ISOFLEX TOPAS NCA 52 and attach them back to the lower terminal with the contact screw from the previous step.
4. Ensure that the contact knives can easily move and operate while making connection with the stationary contacts when closing.
5. Check the alignment of the arc blades when entering the arc chute.
6. Connect the draw bar to the jack shaft and secure it with a cir-clip.
7. Put contact grease on the main contacts before testing. The contact position is adjusted with the eccentric bolt on the operating shaft. It can also be adjusted by moving the lower insulator.

Draw bars

Ensure the VersaRupter switch is open and the A-mechanism (if equipped) is not charged.

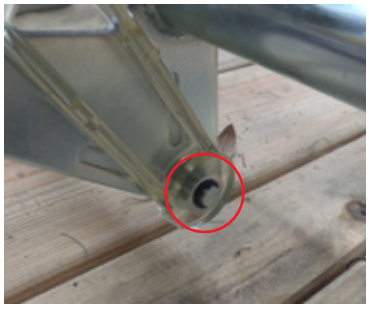
1. Remove the bolt shown in figure 125.

125

2. Push the top of the arcing blade so that the draw bar bolt, shown in figure 126, will be exposed and can be pushed out, freeing the upper end of the draw bar.

126

3. Remove the lower end of the drawbar by removing the cir-clip securing the draw bar to the jack shaft shown in figure 127.



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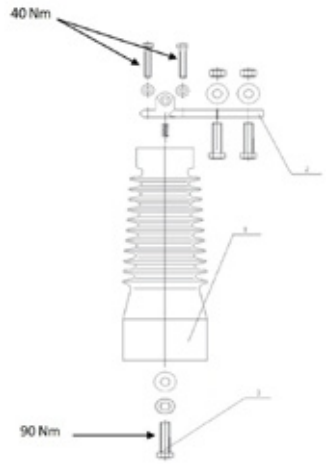
127

4. Reinstall the new draw bar by attaching the upper part of the draw bar first, then the lower.

Replacing the lower insulator

Ensure the VersaRupter® switch is open and the A-mechanism (if equipped) is not charged.

1. Remove the contact, item 2 in figure 128, from the lower insulator.



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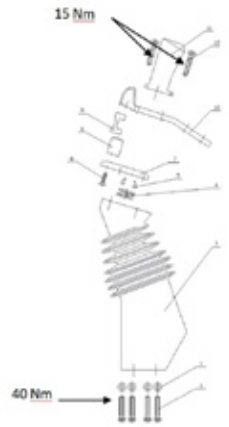
128

2. The insulator can be removed by unscrewing bolt 3 as identified in figure 128.
3. Screw the new insulator back onto the frame with bolt 3.
4. Replace the contact, item 2, with the bolts removed from step 1.
5. Ensure the contact blades align properly.

Replacing the upper insulator

Ensure the VersaRupter switch is open and remove its operating mechanism.

1. Detach all of the draw bars from the jack shaft.
2. Rotate the jack shaft as if the switch was closing.
3. Disconnect the piston rod from the jack shaft by removing the cir-clip.
4. Remove the screws, identified as item 3 in figure 129, to remove the upper insulator.



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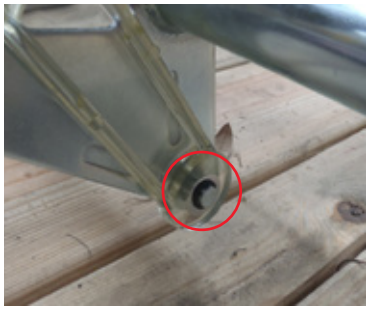
129

5. If contact blocks and arc extinguishing chambers are to be used again, they must be installed on the new upper insulator before the insulator is installed on the frame.
6. Replace the operating mechanism and attach all the drawbars and pistons to the jack shaft with cir-clips.
7. Check the alignment of the contact and arcing blades. Adjustments can be made by moving the upper insulator.

Changing the piston

Ensure the VersaRupter switch is closed and remove its operating mechanism.

1. Disconnect the lower part of the draw bar from the jackshaft by removing the cir-clip in figure 130.



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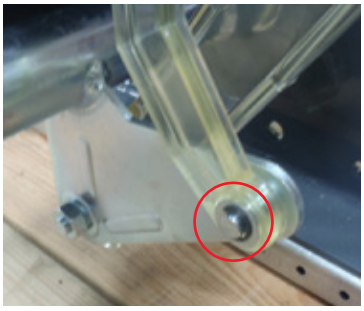
130

Replacement of parts 38 kV (continued)

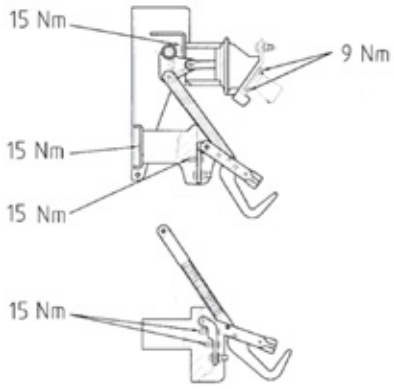
2. Disconnect the piston rod from the jack shaft by removing the cir-clip, shown in figure 131, and the piston can be removed.



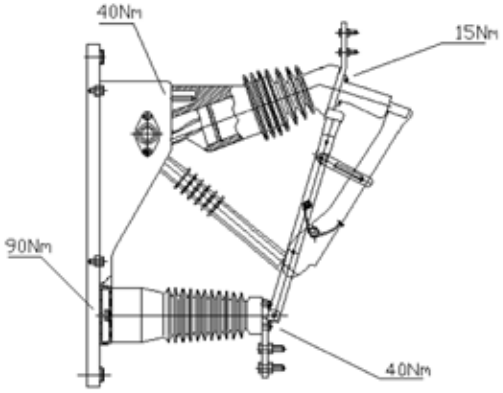
131

3. Insert the new piston into the insulator and connect it to the draw bar with a cir-clip.
4. Do not grease or lubricate the new piston or cylinder!
5. Connect the lower part of the draw bar back onto the jack shaft with a cir-clip.

Torque values for self-tapping screws



132

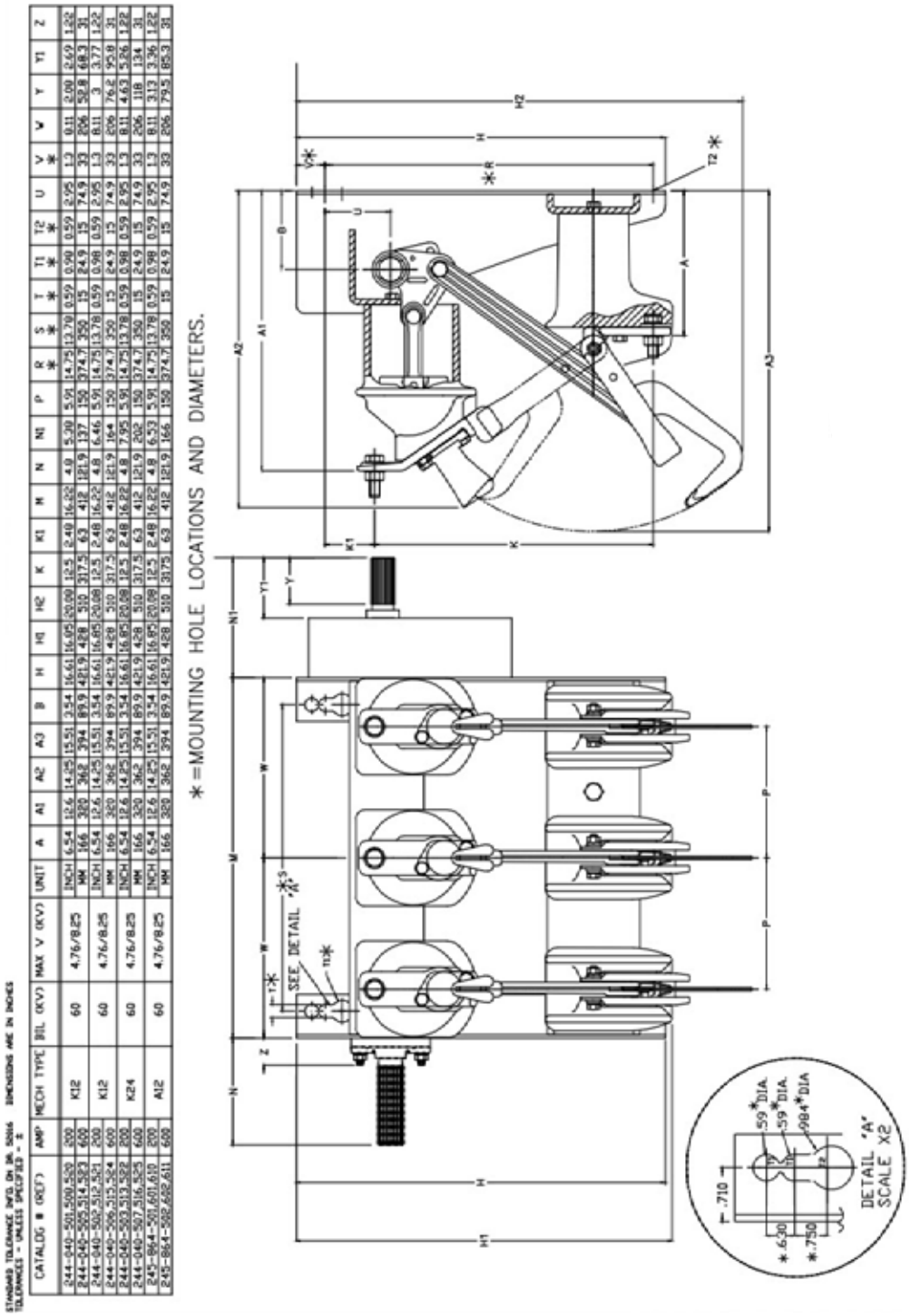


133

04. Drawings

Outline drawings

4.76 kV, 200/600 A, 40 kA

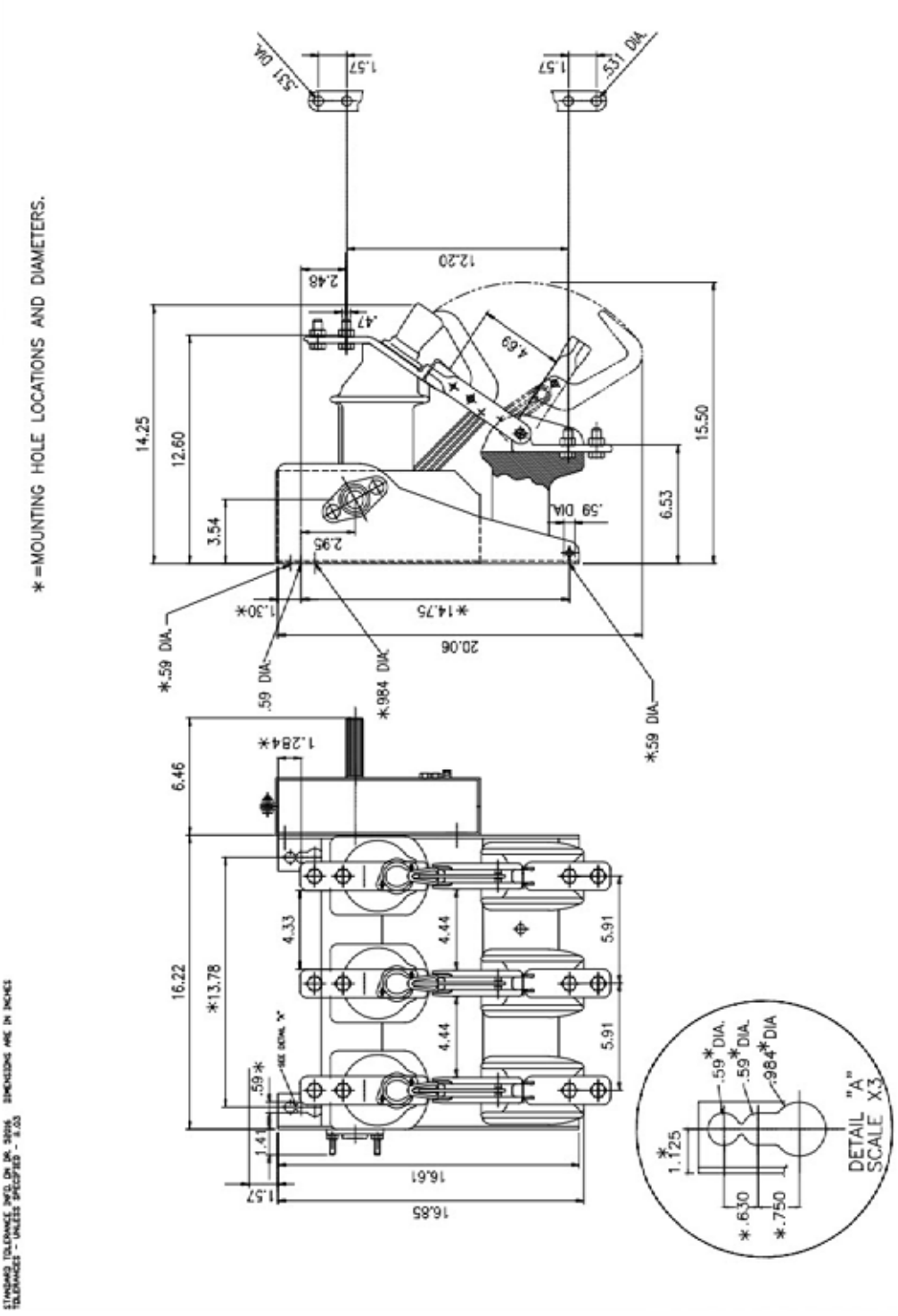


CATALOG # (REF)	AMP	MECH TYPE	BIL (KV)	MAX V (KV)	UNIT	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	R ✱	S ✱	T ✱	T1 ✱	T2 ✱	U	V ✱	V	Y	Y1	Z
244-040-501,509,502	200	K12	60	4.76/825	INCH	6.54	12.6	14.25	15.51	3.54	16.61	16.69	20.08	12.5	2.48	16.22	4.8	5.39	5.91	14.75	13.78	0.59	0.98	0.59	2.95	1.3	0.11	2.09	2.69	1.22
244-040-505,514,503	600				MM	166	320	362	394	89.9	421.9	428	510	317.5	63	412	121.9	137	150	374.7	350	15	24.9	15	74.9	33	206	52.8	68.3	31
244-040-506,512,504	200	K12	60	4.76/825	INCH	6.54	12.6	14.25	15.51	3.54	16.61	16.69	20.08	12.5	2.48	16.22	4.8	6.46	5.91	14.75	13.78	0.59	0.98	0.59	2.95	1.3	0.11	3	3.77	1.22
244-040-509,515,524	600				MM	166	320	362	394	89.9	421.9	428	510	317.5	63	412	121.9	164	150	374.7	350	15	24.9	15	74.9	33	206	76.2	95.8	31
244-040-503,513,522	200	K24	60	4.76/825	INCH	6.54	12.6	14.25	15.51	3.54	16.61	16.69	20.08	12.5	2.48	16.22	4.8	7.95	5.91	14.75	13.78	0.59	0.98	0.59	2.95	1.3	0.11	4.63	5.26	1.22
244-040-507,516,525	600				MM	166	320	362	394	89.9	421.9	428	510	317.5	63	412	121.9	202	150	374.7	350	15	24.9	15	74.9	33	206	118	134	31
245-864-501,601,610	200	A12	60	4.76/825	INCH	6.54	12.6	14.25	15.51	3.54	16.61	16.95	20.08	12.5	2.48	16.22	4.8	6.53	5.91	14.75	13.78	0.59	0.98	0.59	2.95	1.3	0.11	3.13	3.36	1.22
245-864-502,602,611	600				MM	166	320	362	394	89.9	421.9	428	510	317.5	63	412	121.9	166	150	374.7	350	15	24.9	15	74.9	33	206	79.5	85.3	31

✱=MOUNTING HOLE LOCATIONS AND DIAMETERS.

Outline drawings

4.76 kV, 1200 A, 40 kA



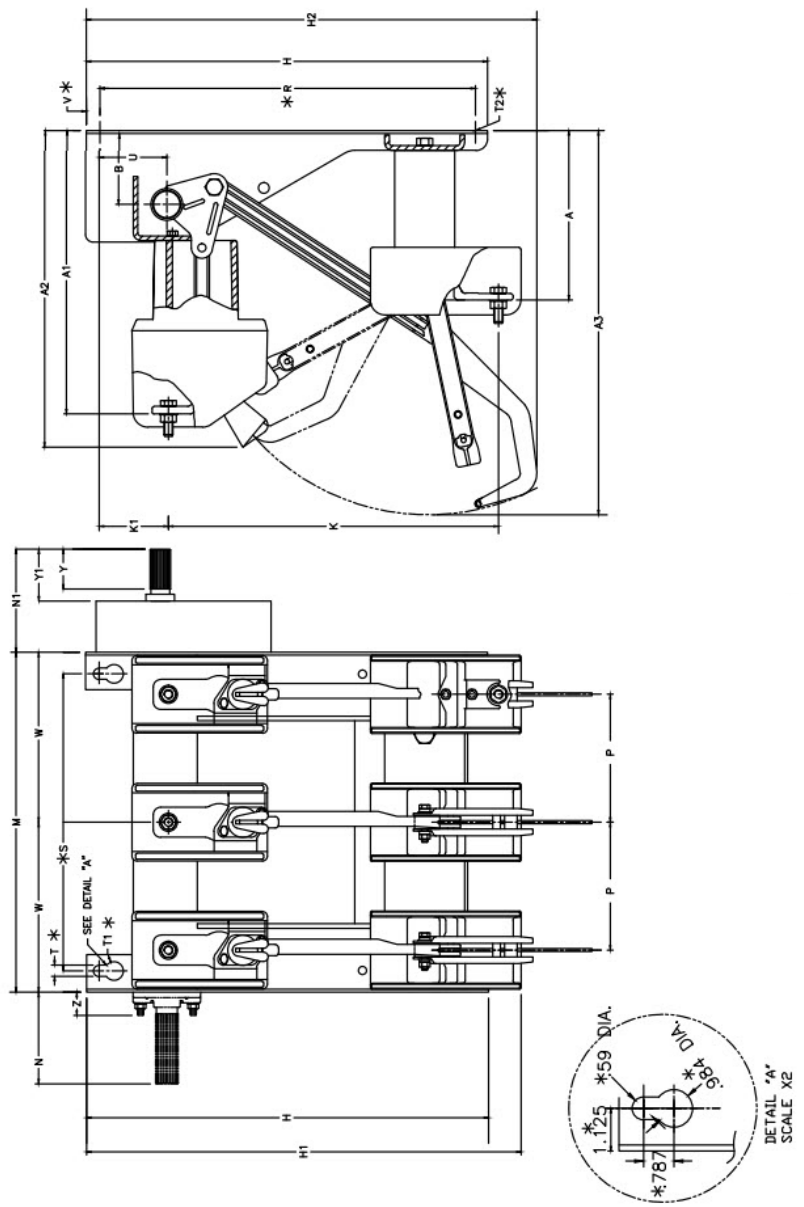
Outline drawings

15 kV, 200/600 A, 40 kA

STANDARD TOLERANCE INFO. (DN DR. 52016 TOLERANCES - UNLESS SPECIFIED - ± DIMENSIONS ARE IN INCHES

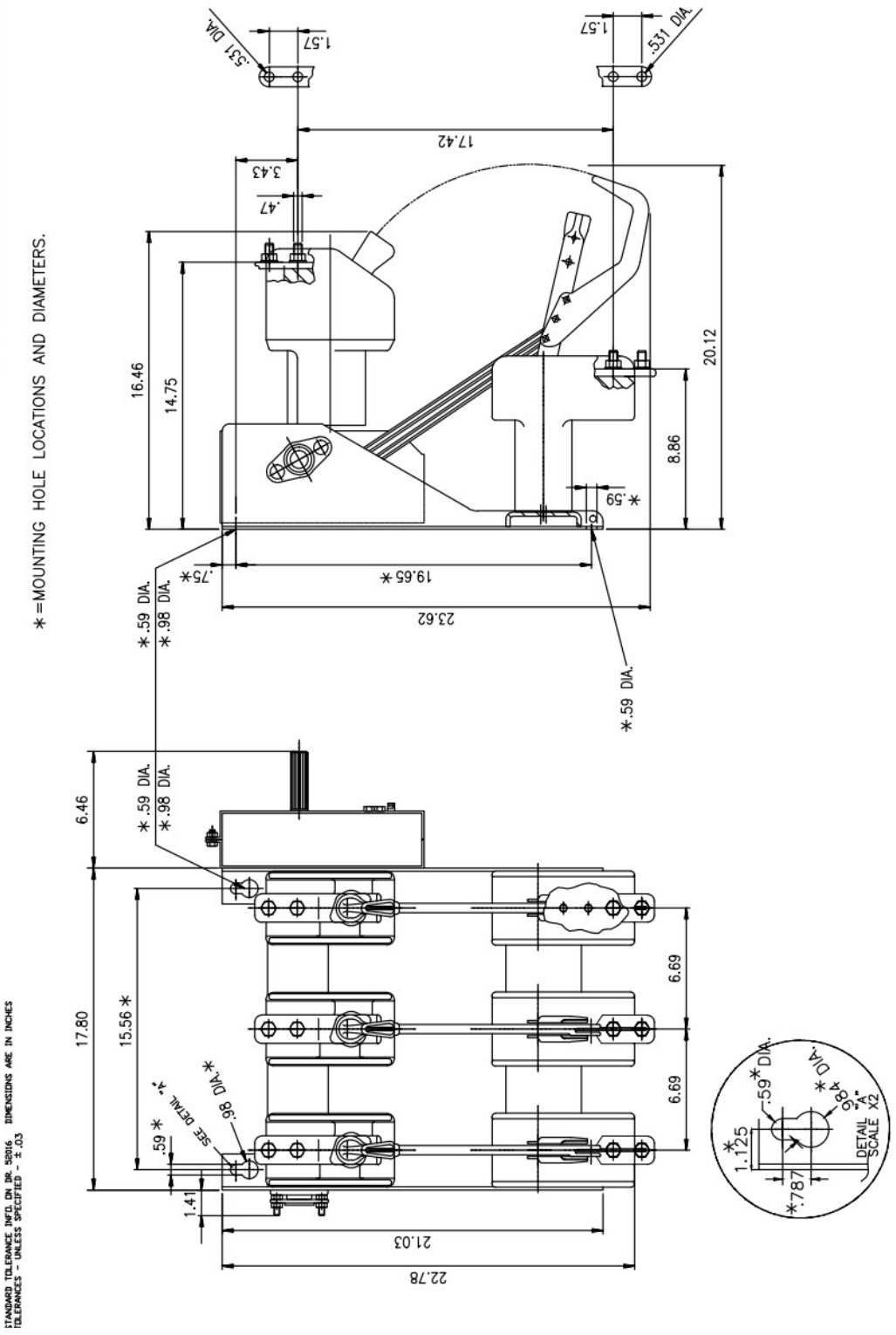
CATALOG # (REF)	AMP	MECH TYPE	BIL (KV)	MAX V (KV)	UNIT	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	R ✱	S ✱	T ✱	T1 ✱	T2 ✱	U	V ✱	W	Y	Y1	Z
244-041-501,508	200	K12	95	15	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	17.79	4.8	5.38	6.69	19.69	15.55	0.59	0.98	0.59	3.54	0.7	8.9	2.08	2.69	1.22
					MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	451.9	121.9	137	170	500.1	395	15	24.9	15	89.9	18	226	52.8	68.3	31
244-041-505,514	600																													
244-041-502,512	200	K12	95	15	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	17.79	4.8	6.46	6.69	19.69	15.55	0.59	0.98	0.59	3.54	0.7	8.9	3	3.77	1.22
					MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	451.9	121.9	164	170	500.1	395	15	24.9	15	89.9	18	226	76.2	95.8	31
244-041-506,515	600																													
244-041-503,513	200	K24	95	15	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	17.79	4.8	7.95	6.69	19.69	15.55	0.59	0.98	0.59	3.54	0.7	8.9	4.63	5.26	1.22
					MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	451.9	121.9	202	170	500.1	395	15	24.9	15	89.9	18	226	118	134	31
244-041-507,516	600																													
245-864-504,604	200	A17	95	15	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	17.79	4.8	6.53	6.69	19.69	15.55	0.59	0.98	0.59	3.54	0.7	8.9	313	3.36	1.22
					MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	451.9	121.9	166	170	500.1	395	15	24.9	15	89.9	18	226	79.5	85.3	31
245-864-505,605	600																													

✱=MOUNTING HOLE LOCATIONS AND DIAMETERS.



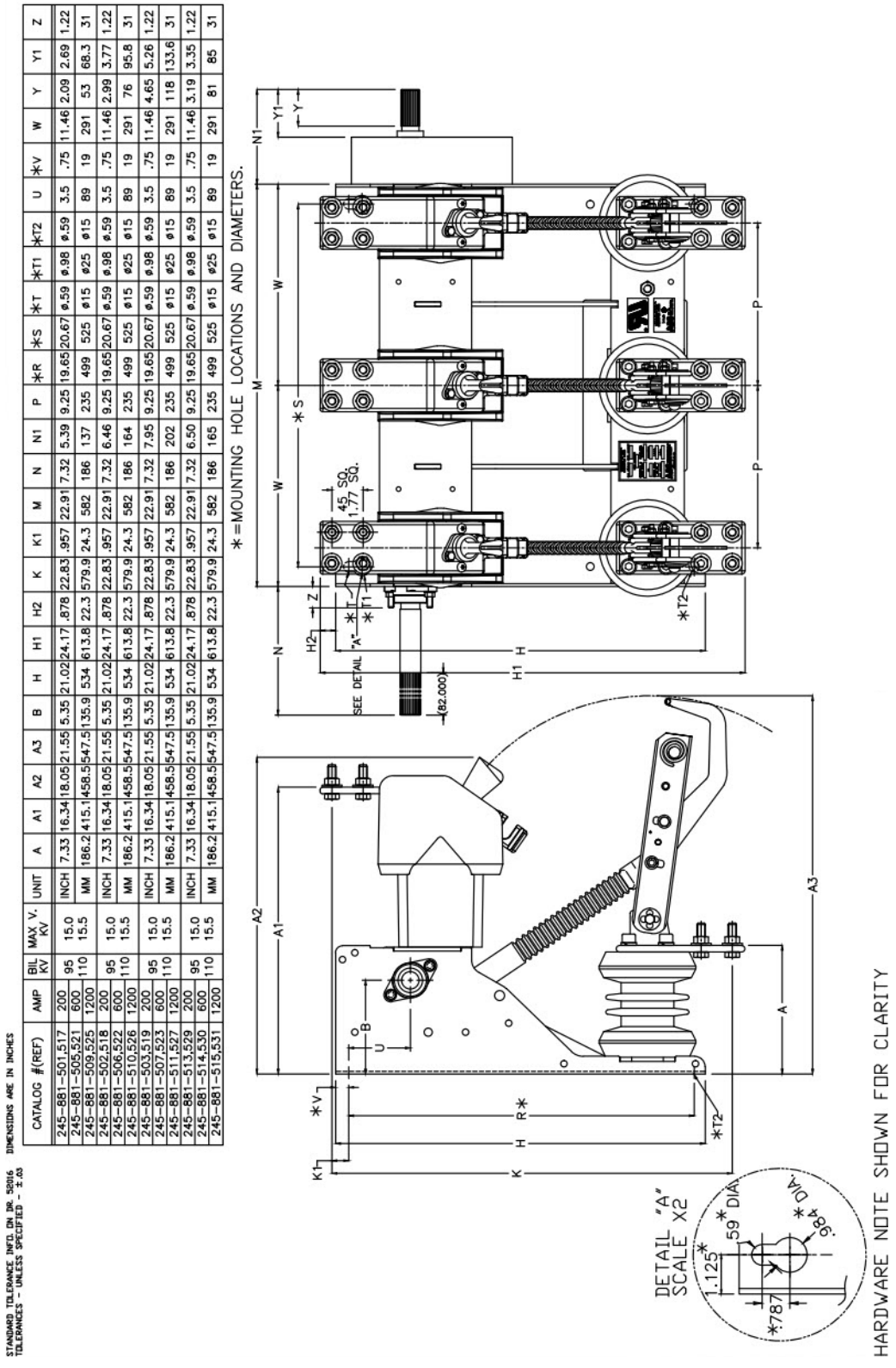
Outline drawings

15 kV, 1200 A, 40 kA



Outline drawings

15/15.5 kV, 600/1200 A, 61 kA



CATALOG #(REF)	AMP	BIL KV	MAX V. KV	UNIT	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	*R	*S	*T	*T1	*T2	U	*V	W	Y	Y1	Z
245–881–501,517	200	95	15.0	INCH	7.33	16.34	18.05	21.55	5.35	21.02	24.17	.878	22.83	.957	22.91	7.32	5.39	9.25	19.65	20.67	ø.59	ø.98	ø.59	3.5	.75	11.46	2.09	2.69	1.22
245–881–505,521	600	110	15.5	MM	186.2	415.1	458.5	547.5	135.9	534	613.8	22.3	579.9	24.3	582	186	137	235	499	525	ø15	ø25	ø15	89	19	291	53	68.3	31
245–881–509,525	1200																												
245–881–502,518	200	95	15.0	INCH	7.33	16.34	18.05	21.55	5.35	21.02	24.17	.878	22.83	.957	22.91	7.32	6.46	9.25	19.65	20.67	ø.59	ø.98	ø.59	3.5	.75	11.46	2.99	3.77	1.22
245–881–506,522	600	110	15.5	MM	186.2	415.1	458.5	547.5	135.9	534	613.8	22.3	579.9	24.3	582	186	164	235	499	525	ø15	ø25	ø15	89	19	291	76	95.8	31
245–881–510,526	1200																												
245–881–503,519	200	95	15.0	INCH	7.33	16.34	18.05	21.55	5.35	21.02	24.17	.878	22.83	.957	22.91	7.32	7.95	9.25	19.65	20.67	ø.59	ø.98	ø.59	3.5	.75	11.46	4.65	5.26	1.22
245–881–507,523	600	110	15.5	MM	186.2	415.1	458.5	547.5	135.9	534	613.8	22.3	579.9	24.3	582	186	202	235	499	525	ø15	ø25	ø15	89	19	291	118	133.6	31
245–881–511,527	1200																												
245–881–513,529	200	95	15.0	INCH	7.33	16.34	18.05	21.55	5.35	21.02	24.17	.878	22.83	.957	22.91	7.32	6.50	9.25	19.65	20.67	ø.59	ø.98	ø.59	3.5	.75	11.46	3.19	3.35	1.22
245–881–514,530	600	110	15.5	MM	186.2	415.1	458.5	547.5	135.9	534	613.8	22.3	579.9	24.3	582	186	165	235	499	525	ø15	ø25	ø15	89	19	291	81	85	31
245–881–515,531	1200																												

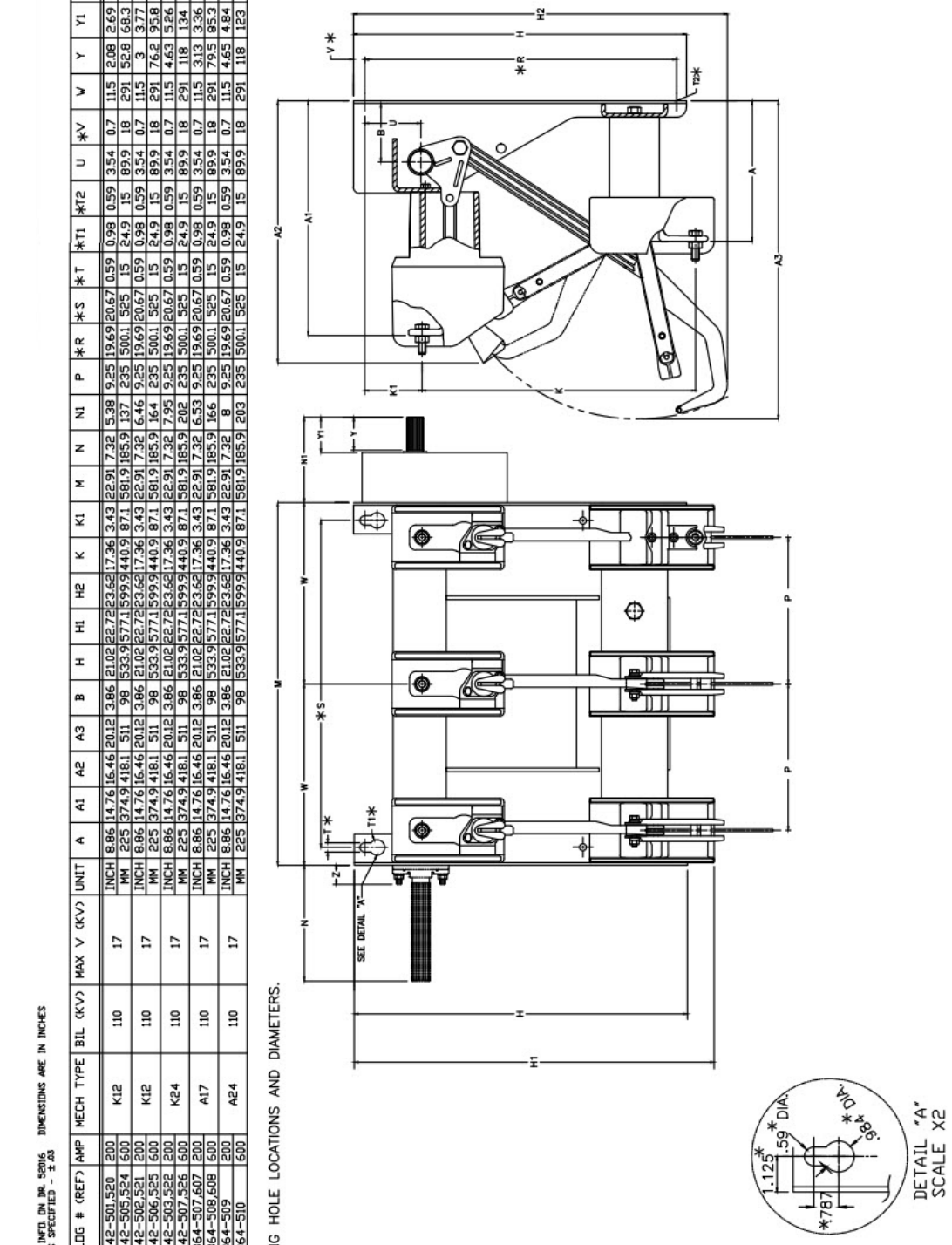
Outline drawings

17 kV, 200/600 A, 40 kA

STANDARD TOLERANCE INFO ON DR. 52016 DIMENSIONS ARE IN INCHES
TOLERANCES - UNLESS SPECIFIED - ±.03

CATALOG # (REF)	AMP	MECH TYPE	BIL (KV)	MAX V (KV)	UNIT	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	*R	*S	*T	*T1	*T2	U	*V	W	Y	Y1	Z
244-042-501,520	200	K12	110	17	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	22.91	7.32	5.38	9.25	19.69	20.67	0.59	0.98	0.59	3.54	0.7	11.5	2.08	2.69	1.22
					MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	581.9	185.9	137	235	500.1	525	15	24.9	15	89.9	18	291	52.8	68.3	31
244-042-505,524	600				INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	22.91	7.32	6.46	9.25	19.69	20.67	0.59	0.98	0.59	3.54	0.7	11.5	3	3.77	1.22
244-042-502,521	200	K12	110	17	MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	581.9	185.9	164	235	500.1	525	15	24.9	15	89.9	18	291	76.2	95.8	31
244-042-506,525	600				INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	22.91	7.32	7.95	9.25	19.69	20.67	0.59	0.98	0.59	3.54	0.7	11.5	4.63	5.26	1.22
244-042-503,522	200	K24	110	17	MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	581.9	185.9	202	235	500.1	525	15	24.9	15	89.9	18	291	118	134	31
244-042-507,526	600				INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	22.91	7.32	6.53	9.25	19.69	20.67	0.59	0.98	0.59	3.54	0.7	11.5	3.13	3.36	1.22
245-864-507,607	200	A17	110	17	MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	581.9	185.9	166	235	500.1	525	15	24.9	15	89.9	18	291	79.5	85.3	31
245-864-508,608	600				INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	22.91	7.32	8	9.25	19.69	20.67	0.59	0.98	0.59	3.54	0.7	11.5	4.65	4.84	1.22
245-864-509	200	A24	110	17	MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	581.9	185.9	203	235	500.1	525	15	24.9	15	89.9	18	291	118	123	31
245-864-510	600																													

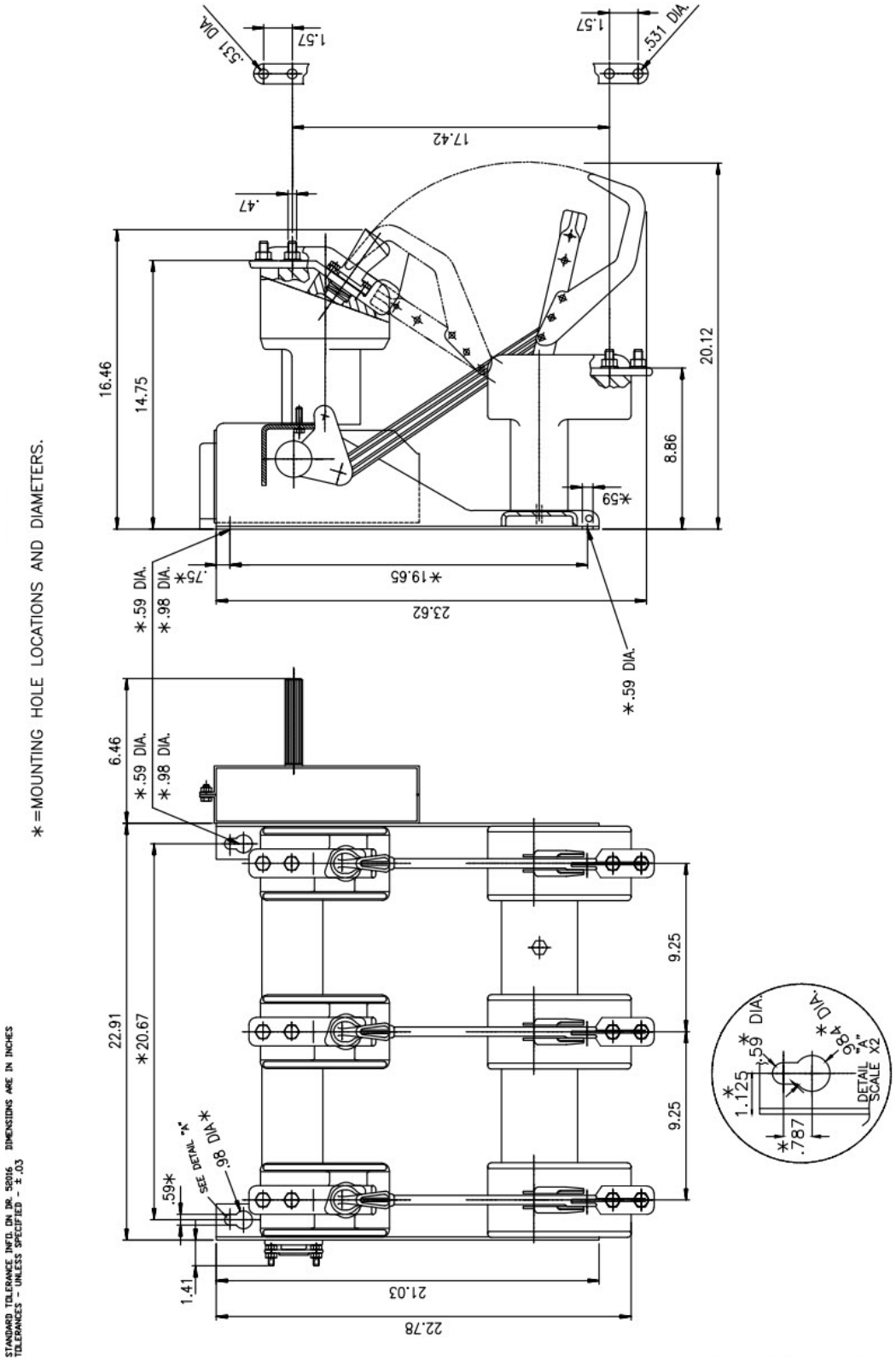
*=MOUNTING HOLE LOCATIONS AND DIAMETERS.



04

Outline drawings

17 kV, 1200 A, 40 kA

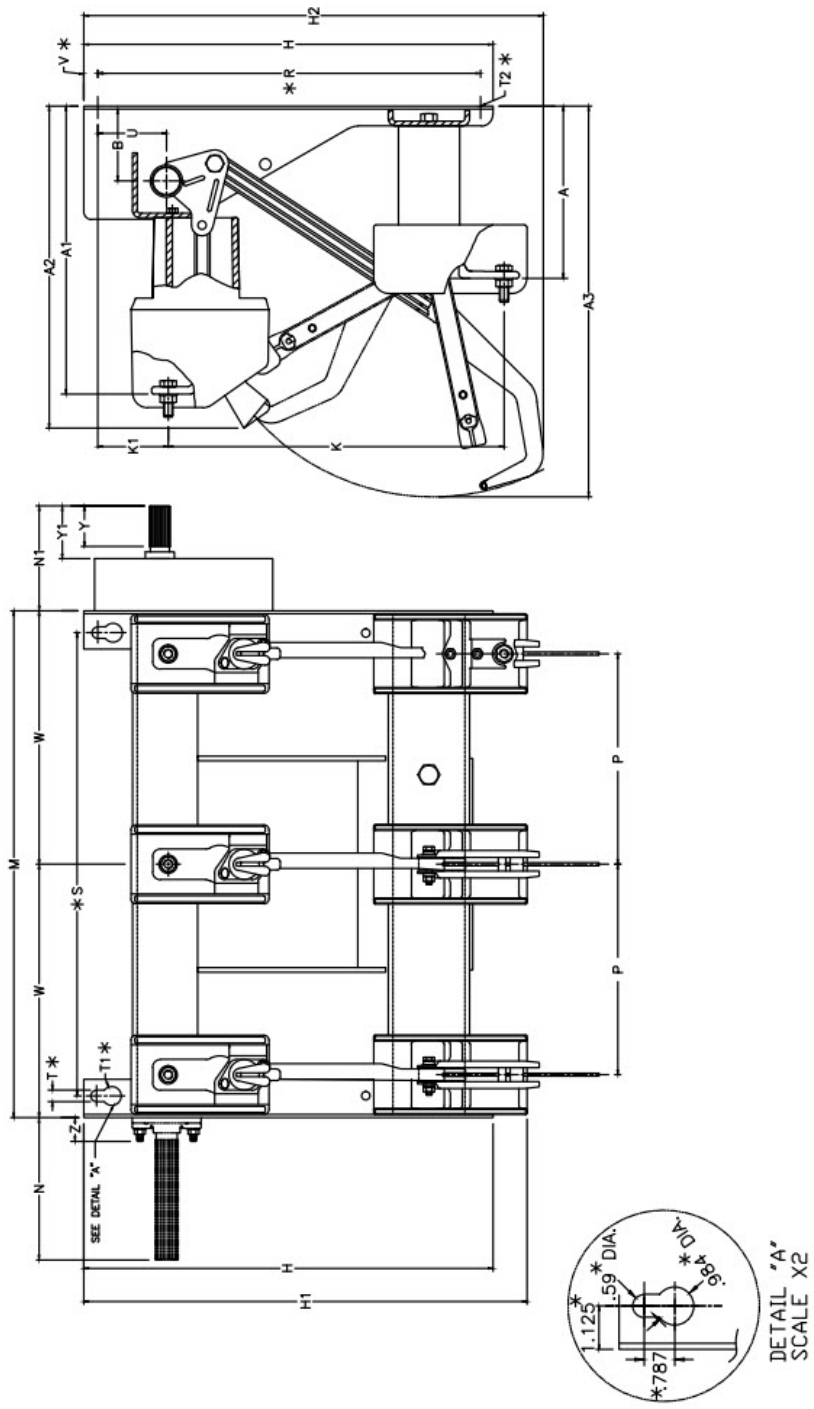


Outline drawings

27 kV, 200/600 A, 40 kA

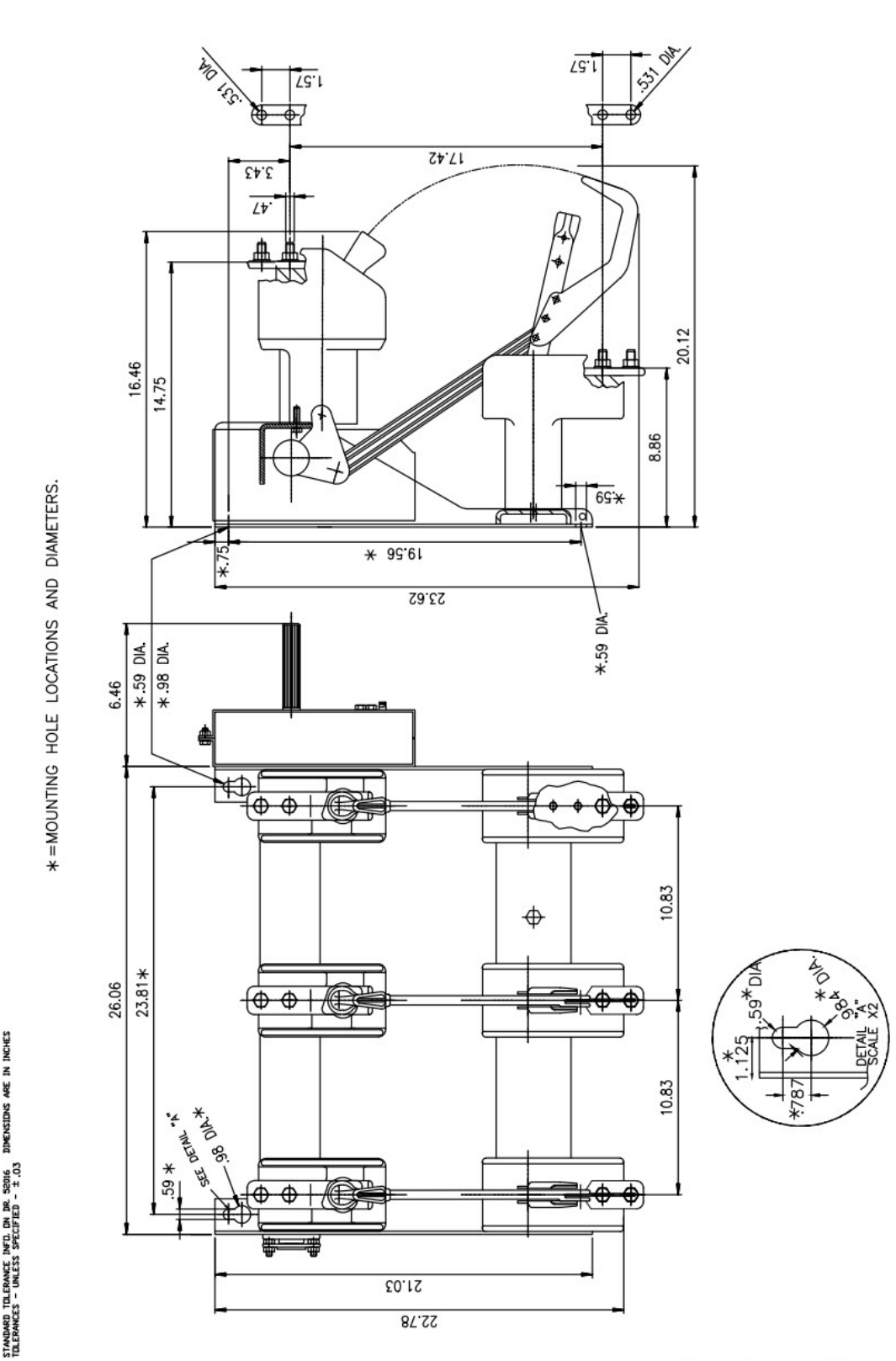
STANDARD TOLERANCE INFO ON DR. 52016 DIMENSIONS ARE IN INCHES
TOLERANCES - UNLESS SPECIFIED - ± .03

CATALOG # (REF)	AMP	MECH TYPE	BIL (KV)	MAX V (KV)	UNIT	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	R *	S *	T *	T1 *	T2 *	U	V *	W	Y	Y1	Z
244-043-501	200	K12	125	27	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	26.06	7.32	5.38	10.83	19.69	23.82	0.59	0.98	0.59	3.54	0.7	13.03	2.08	2.69	1.22
244-043-505	600				MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	661.9	185.9	137	275	500.1	605	15	24.9	15	89.9	18	331	52.8	68.3	31
244-043-502	200	K12	125	27	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	26.06	7.32	6.46	10.83	19.69	23.82	0.59	0.98	0.59	3.54	0.7	13.03	3.00	3.77	1.22
244-043-506	600				MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	661.9	185.9	164	275	500.1	605	15	24.9	15	89.9	18	331	76.2	95.8	31
244-043-503	200	K24	125	27	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	26.06	7.32	7.95	10.83	19.69	23.82	0.59	0.98	0.59	3.54	0.7	13.03	4.63	5.26	1.22
244-043-507	600				MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	661.9	185.9	202	275	500.1	605	15	24.9	15	89.9	18	331	118	134	31
245-864-515	200	A24	125	27	INCH	8.86	14.76	16.46	20.12	3.86	21.02	22.72	23.62	17.36	3.43	26.06	7.32	8	10.83	19.69	23.82	0.59	0.98	0.59	3.54	0.7	13.03	4.65	4.84	1.22
245-864-516	600				MM	225	374.9	418.1	511	98	533.9	577.1	599.9	440.9	87.1	661.9	185.9	203	275	500.1	605	15	24.9	15	89.9	18	331	118	123	31



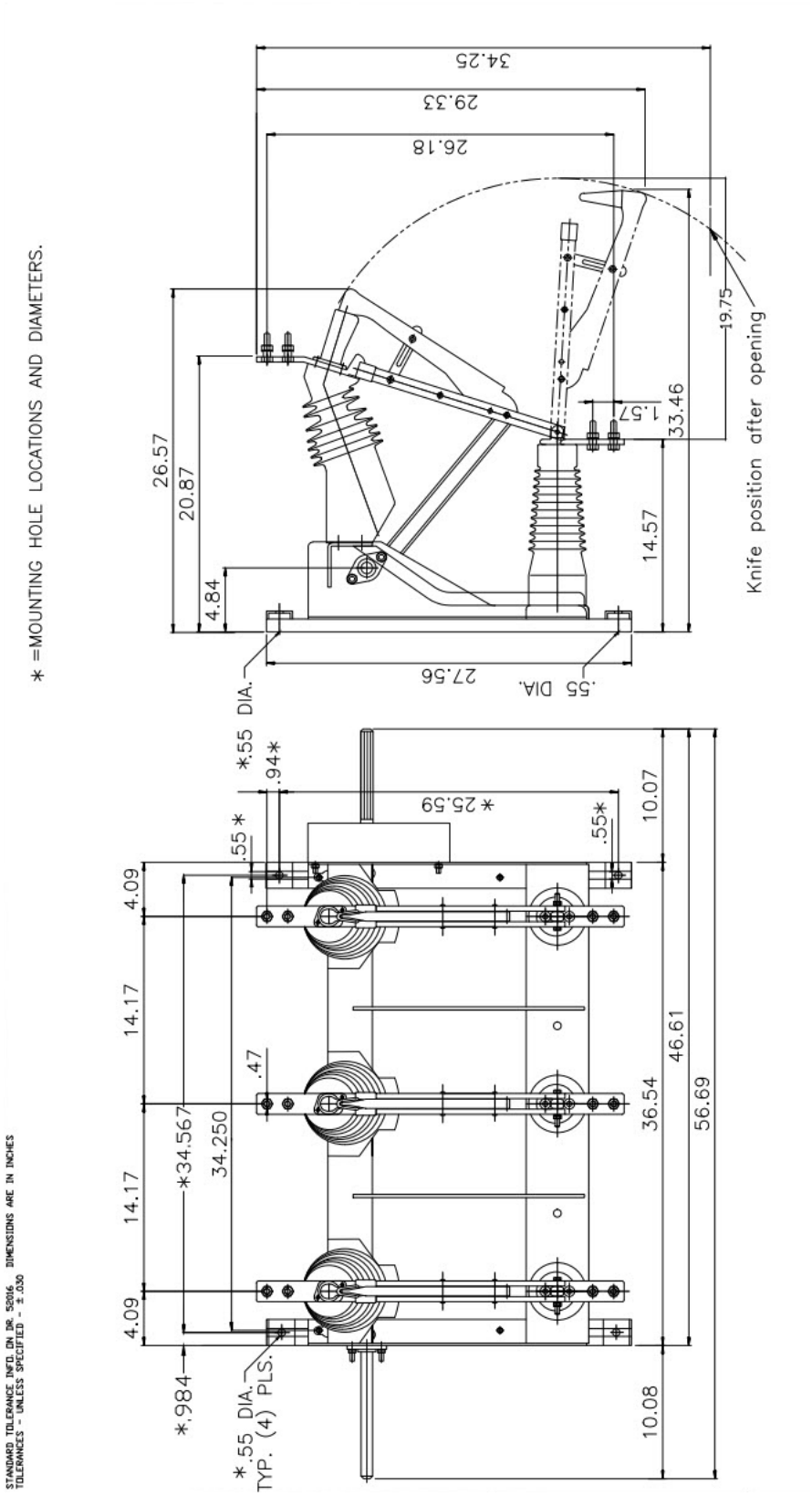
Outline drawings

27 kV, 1200 A, 40 kA



Outline drawings

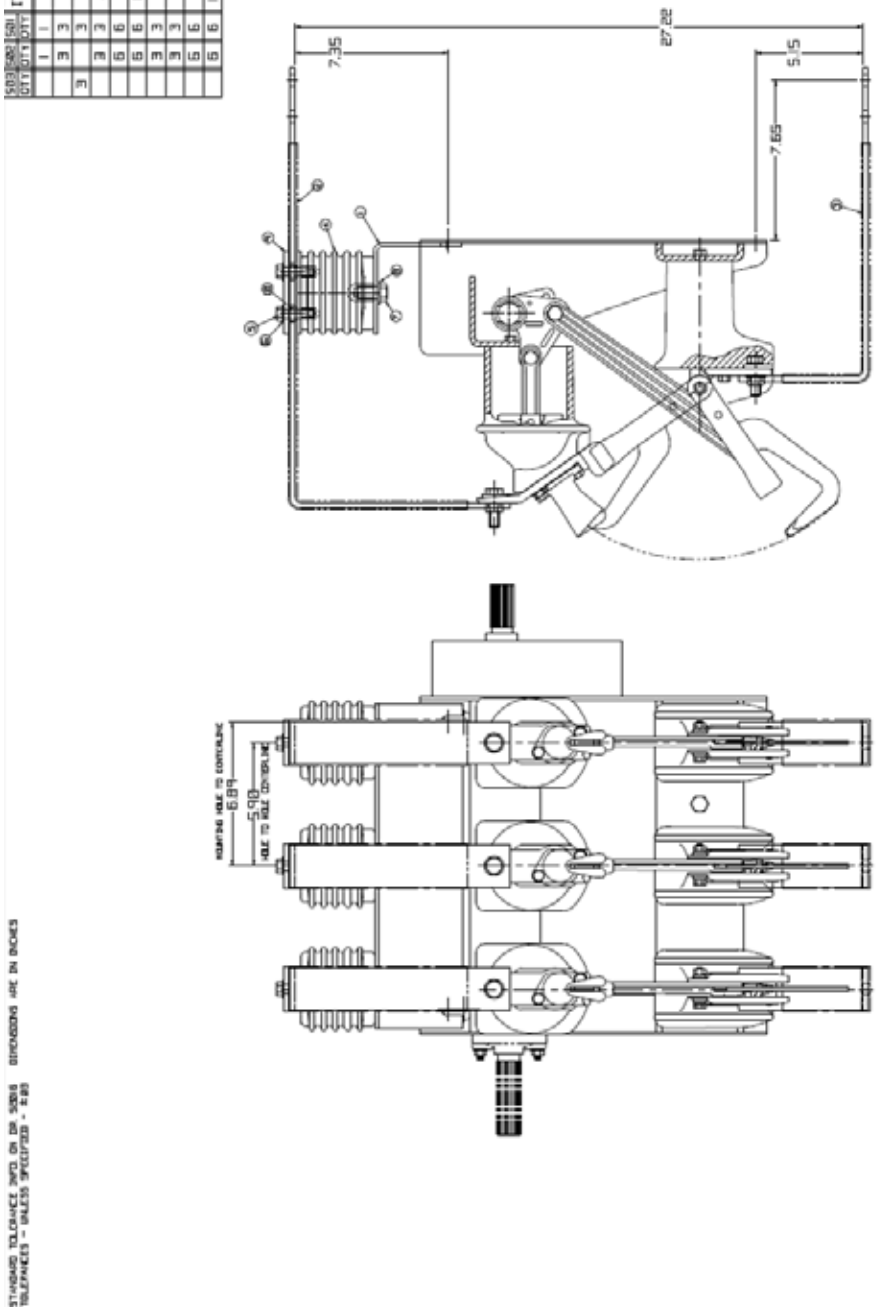
38 kV, 600/800 A



Back connect kit

5 kV, 200/600 A, 40 kA

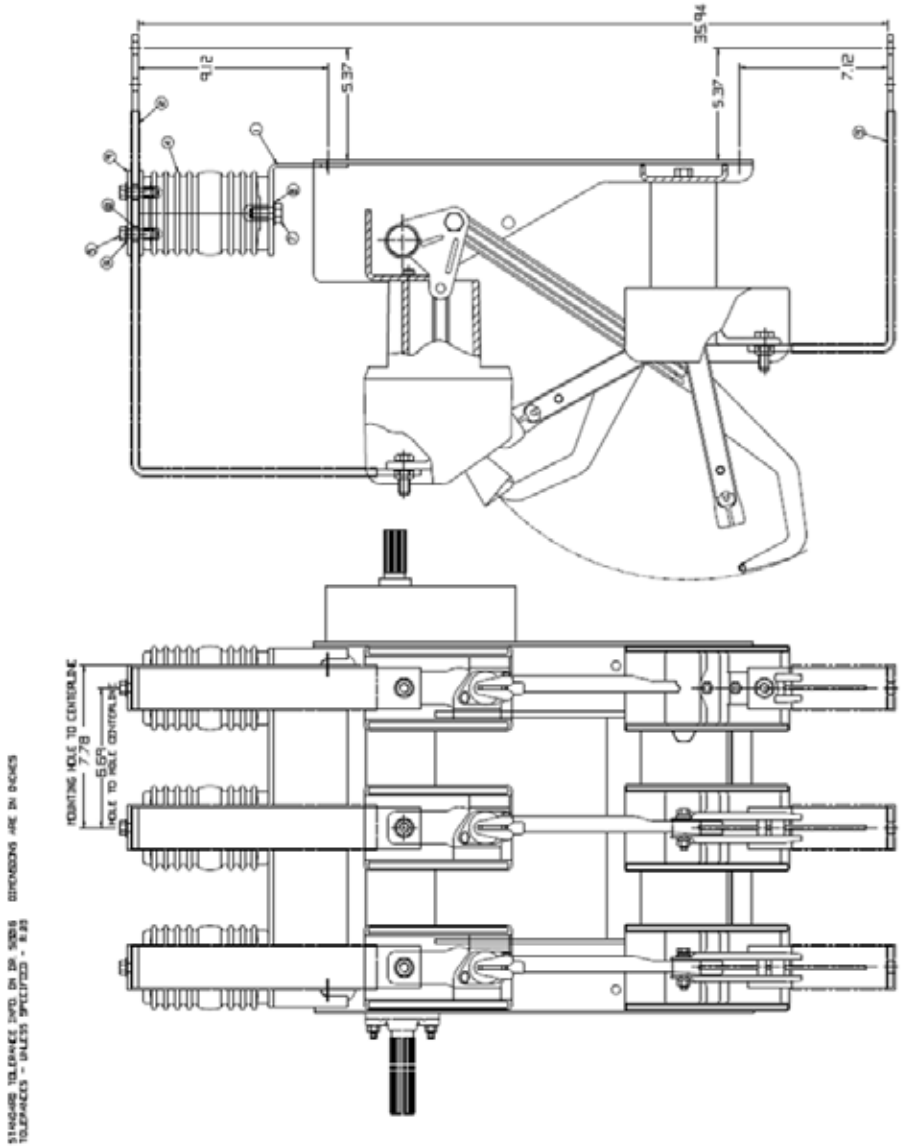
50[3] QTY	50[1] QTY	ITEM	PART No.	DESCRIPTION
	1	1	244-094-001	UPPER BUS BRACE
	3	2	244095-K01	UPPER BUS
3		3	244096-K01	LOWER BUS
	3	4	245-497-001	STANDOFF INSULATOR
	6	5	54398-C06	3/8-16 1.50" LONG BOLT
	6	6	54500-H01	3/8" WASHER
	3	7	54398-002	1/2-13 .53" LONG BOLT
	3	8	54500-J01	1/2" WASHER
	6	9	245-498-001	SPACER
	6	10	245-499-001	WASHER



Back connect kit

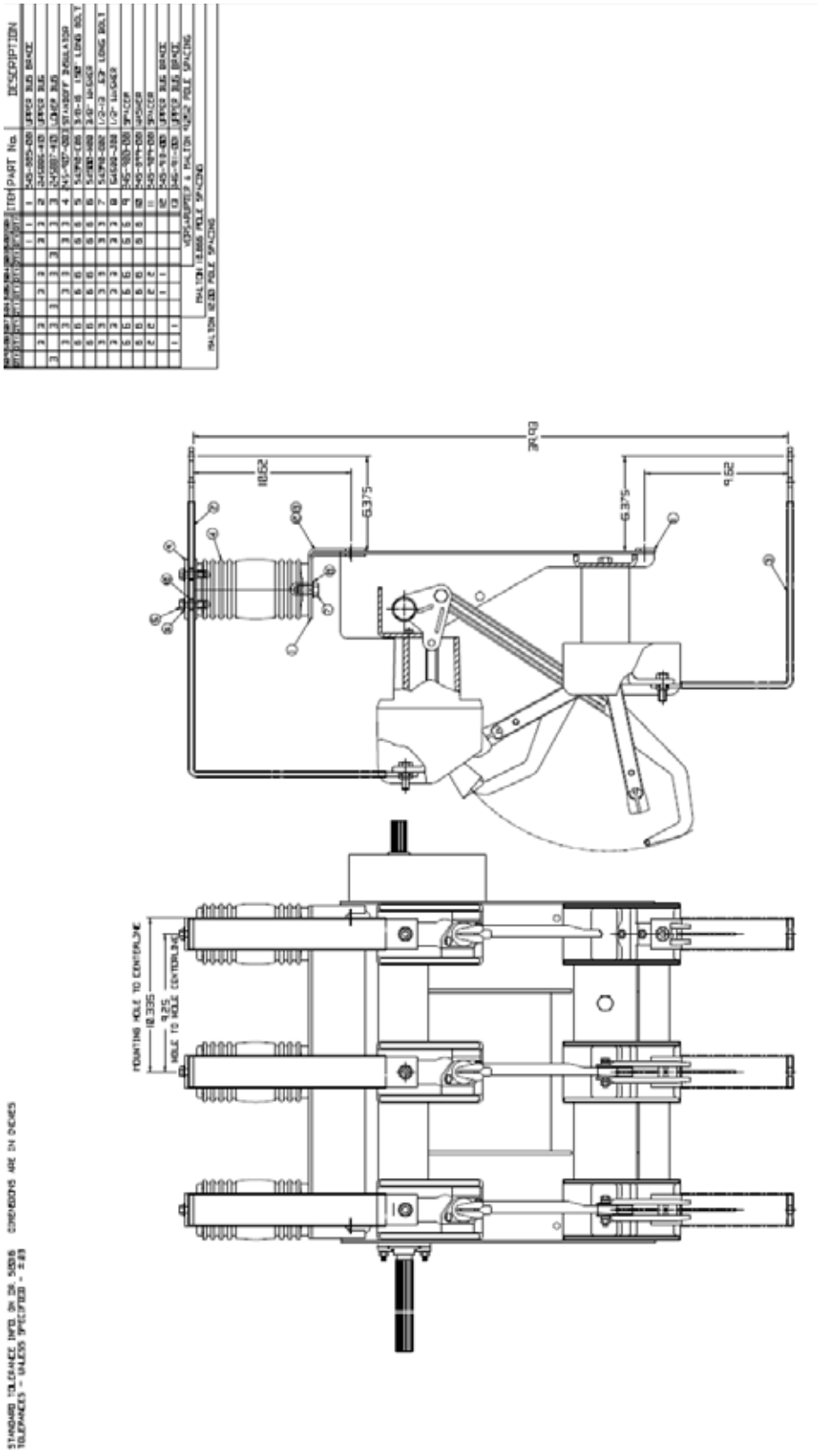
15 kV, 200/600 A, 40 kA

DESIGNED QTY	DRAWN QTY	ITEM	PART No.	DESCRIPTION
	1	1	245-847-001	UPPER BUS SPACE
	3	2	245898-K01	UPPER BUS
3		3	245894-K01	LOWER BUS
	3	4	245-907-002	STANDOFF INSULATOR
	6	5	54390-C06	3/8-16 1.50" LONG BOLT
	6	6	54500-H08	3/8" WASHER
	3	7	54390-002	1/2-13 .63" LONG BOLT
	3	8	54500-J00	1/2" WASHER
	6	9	245-900-001	SPACER
	6	10	245-899-001	WASHER



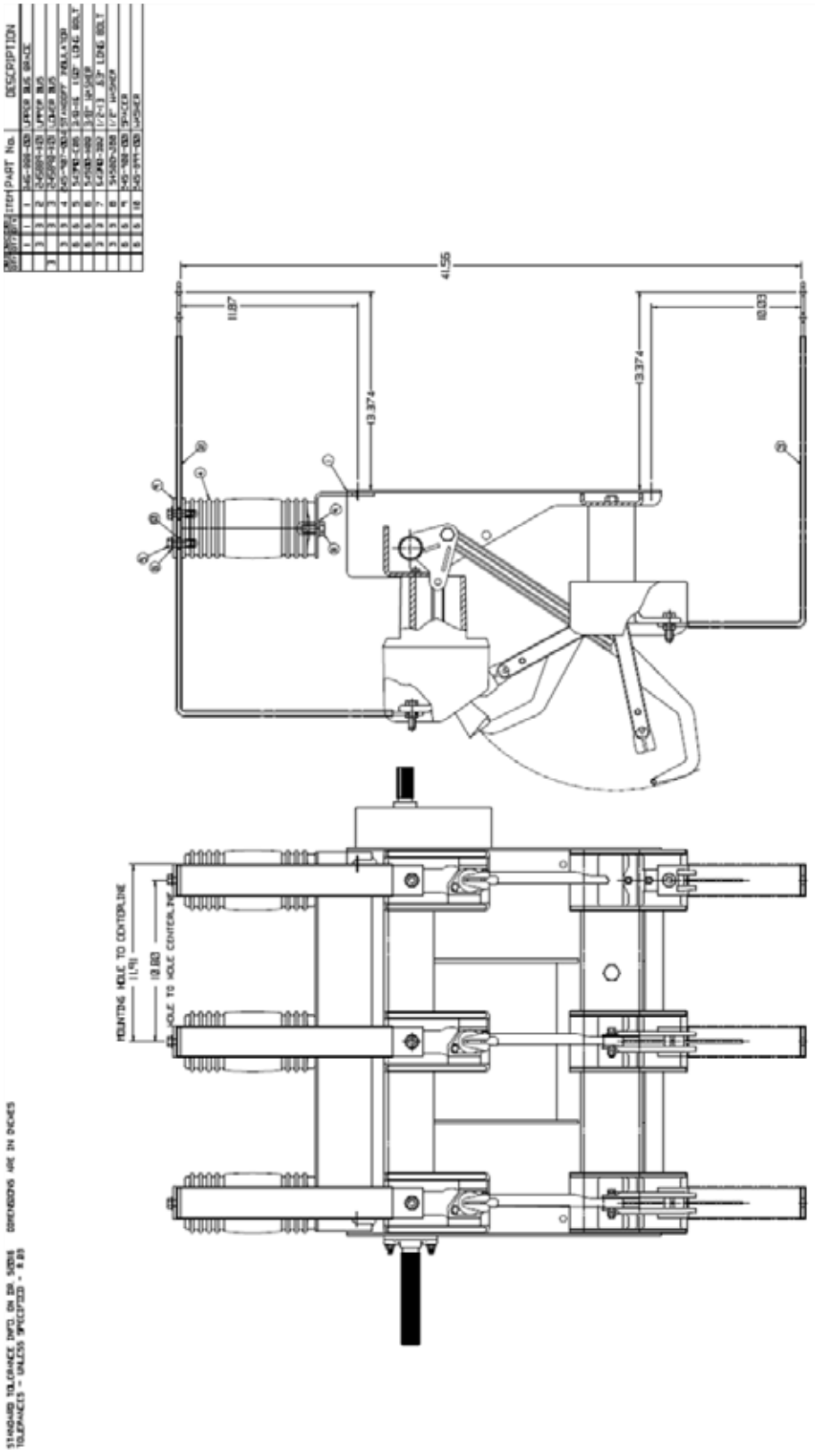
Back connect kit

17 kV, 200/600 A, 40 kA



Back connect kit

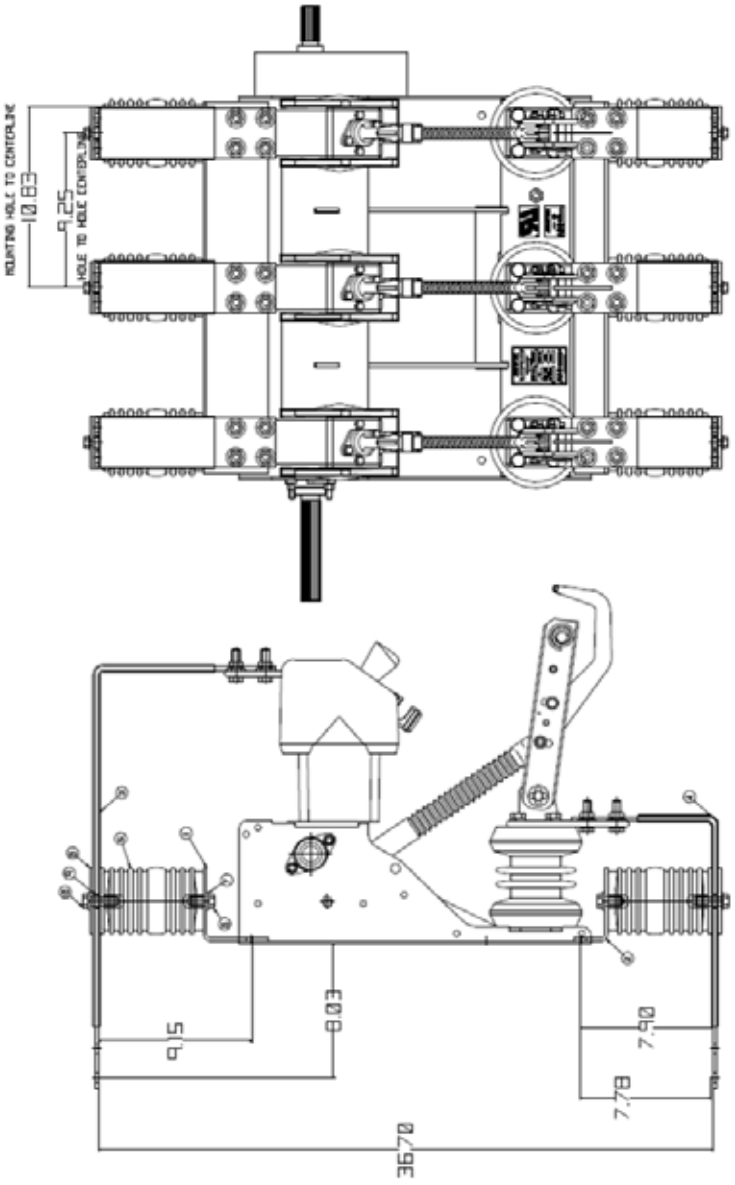
27 kV, 200/600 A, 40 kA



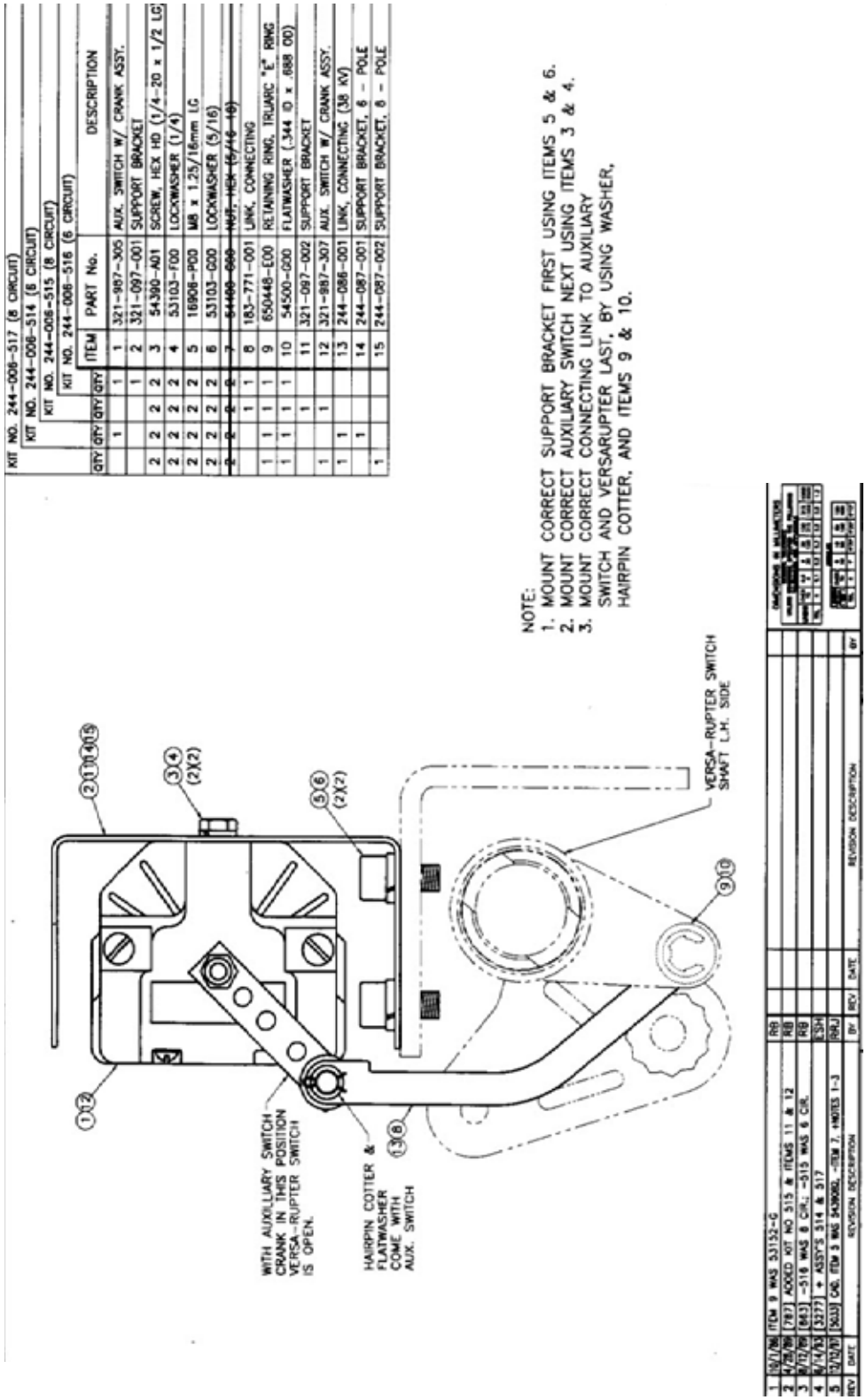
Back connect kit

15 kV, 600 A, 61 kA

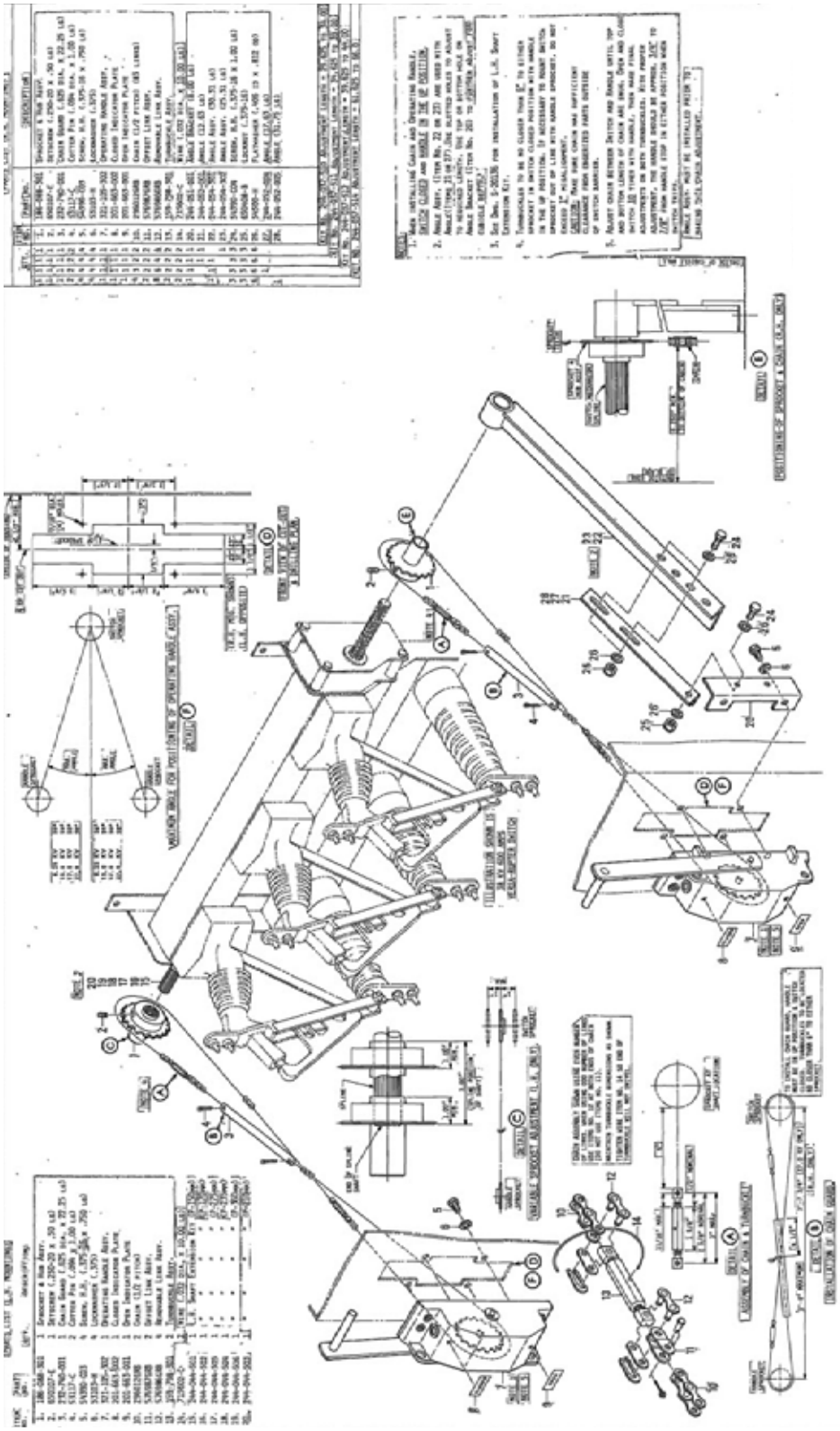
583 QTY	582 QTY	581 QTY	ITEM	PART No.	DESCRIPTION
	1	1	1	245-BPA-001	UPPER BUS BRACE
1		1	2	245915-001	LOWER BUS BRACE
	3	3	3	245942-C01	UPPER BUS
3		3	4	245943-C01	LOWER BUS
3	3	6	5	245-C00-B01	STANDOFF INSULATOR
3	3	6	6	54398-002	1/2-13 .63" LONG BOLT
6	6	6	7	54500-J00	1/2" WASHER
6	6	6	8	245-C00-002	SPACER
6	6	12	9	245-BPA-002	WASHER
3	3	6	10	54398-005	1/2-13 X1.25 LONG BOLT



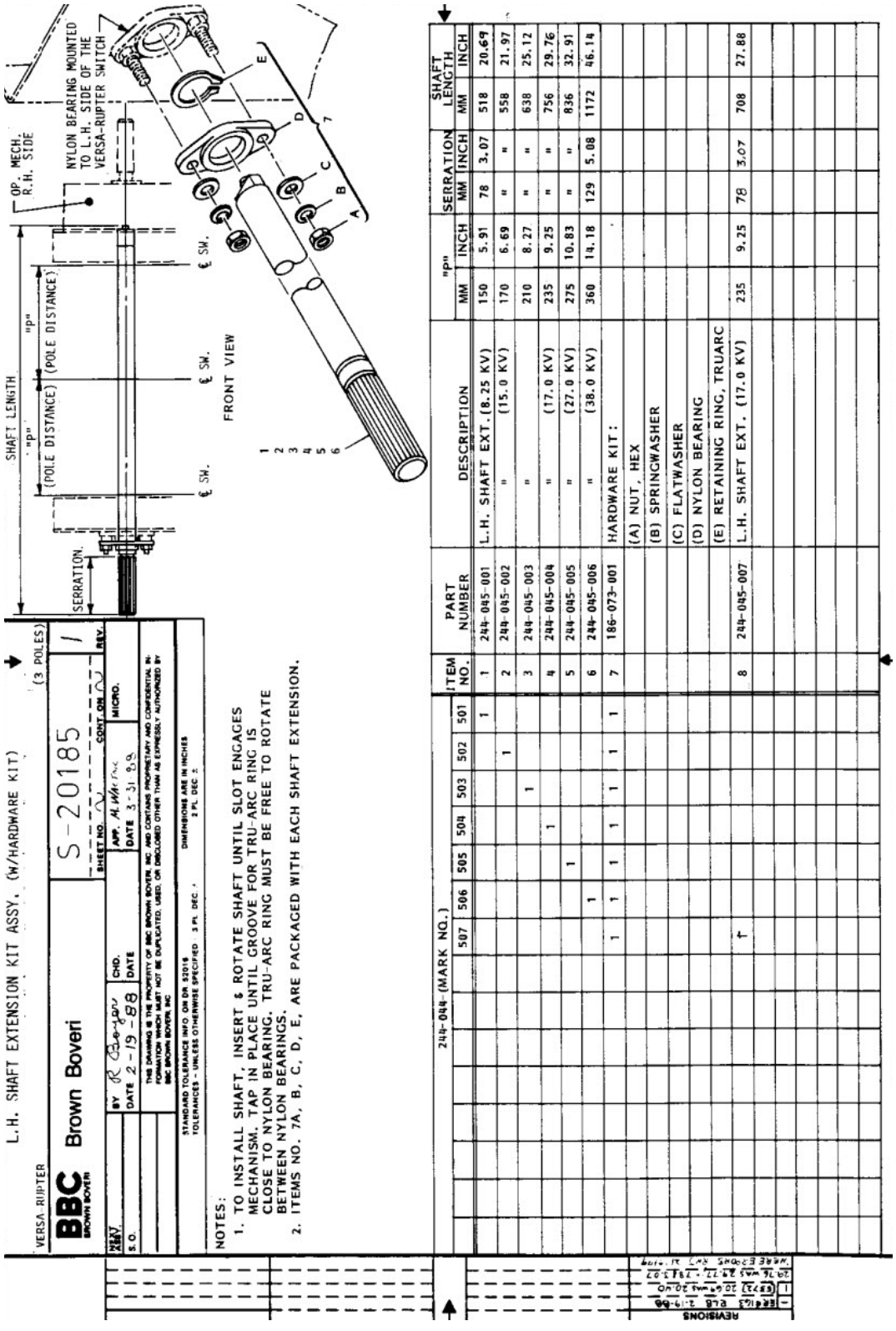
Auxiliary switch kit



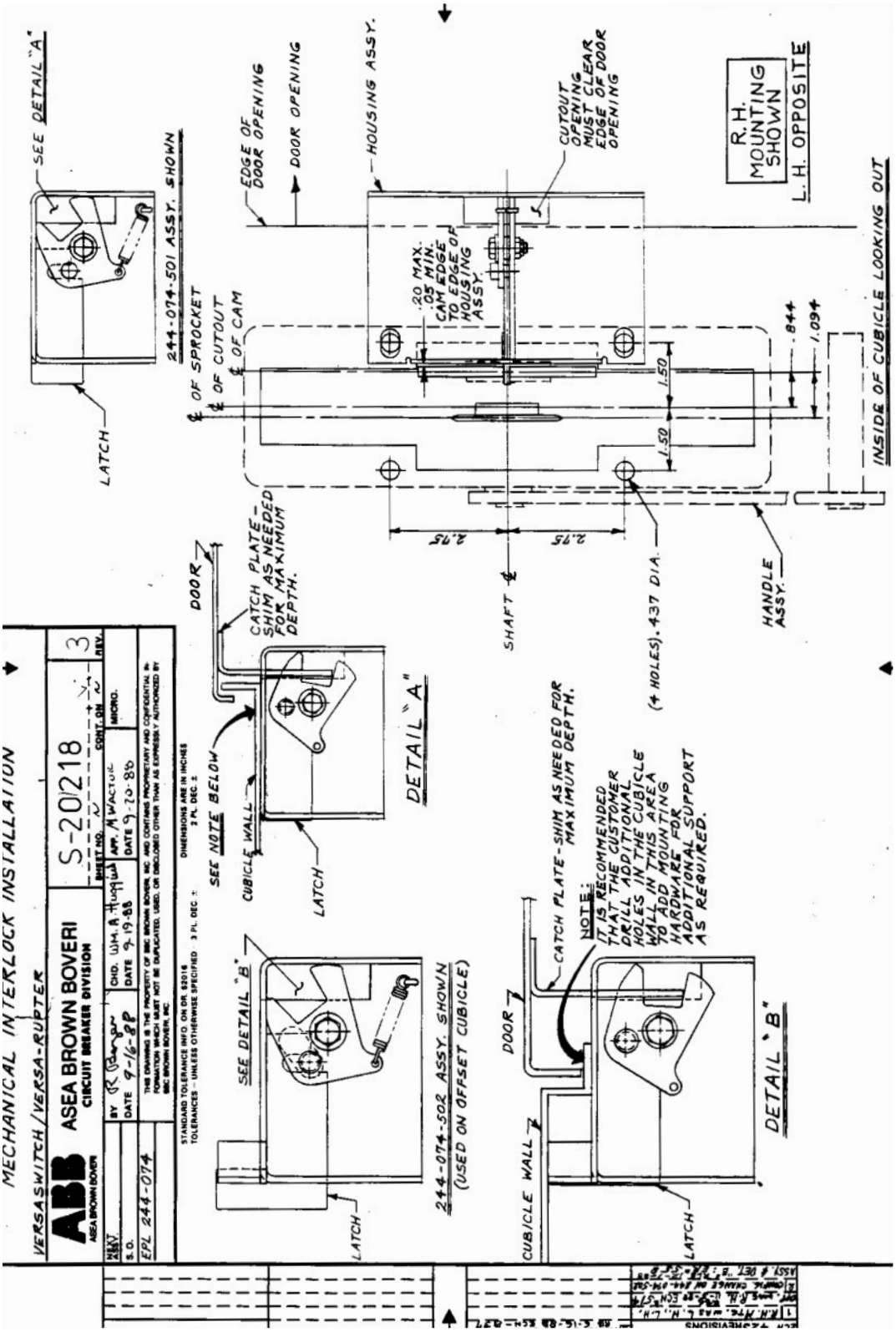
Chain drive assembly



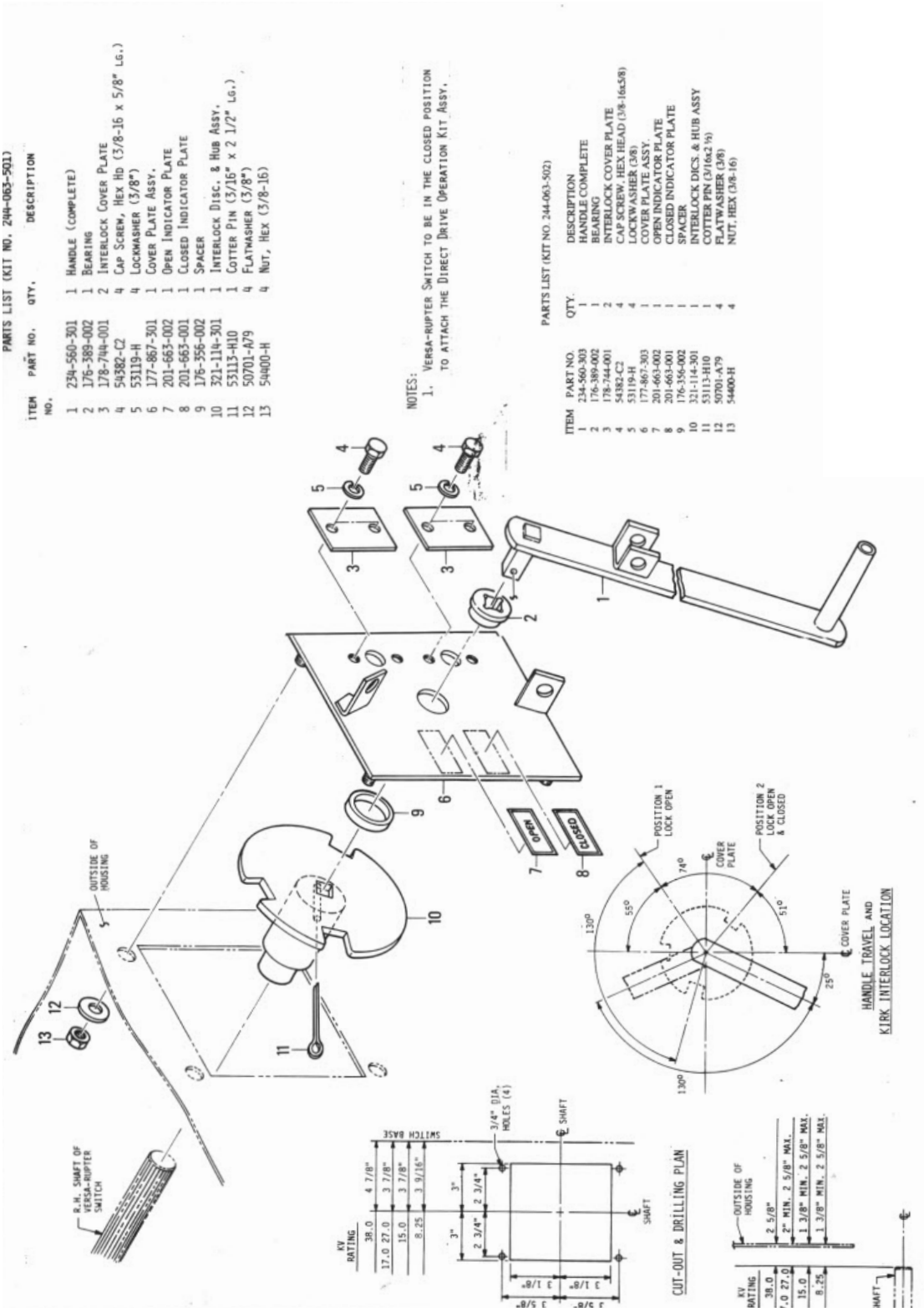
Left-hand shaft extension



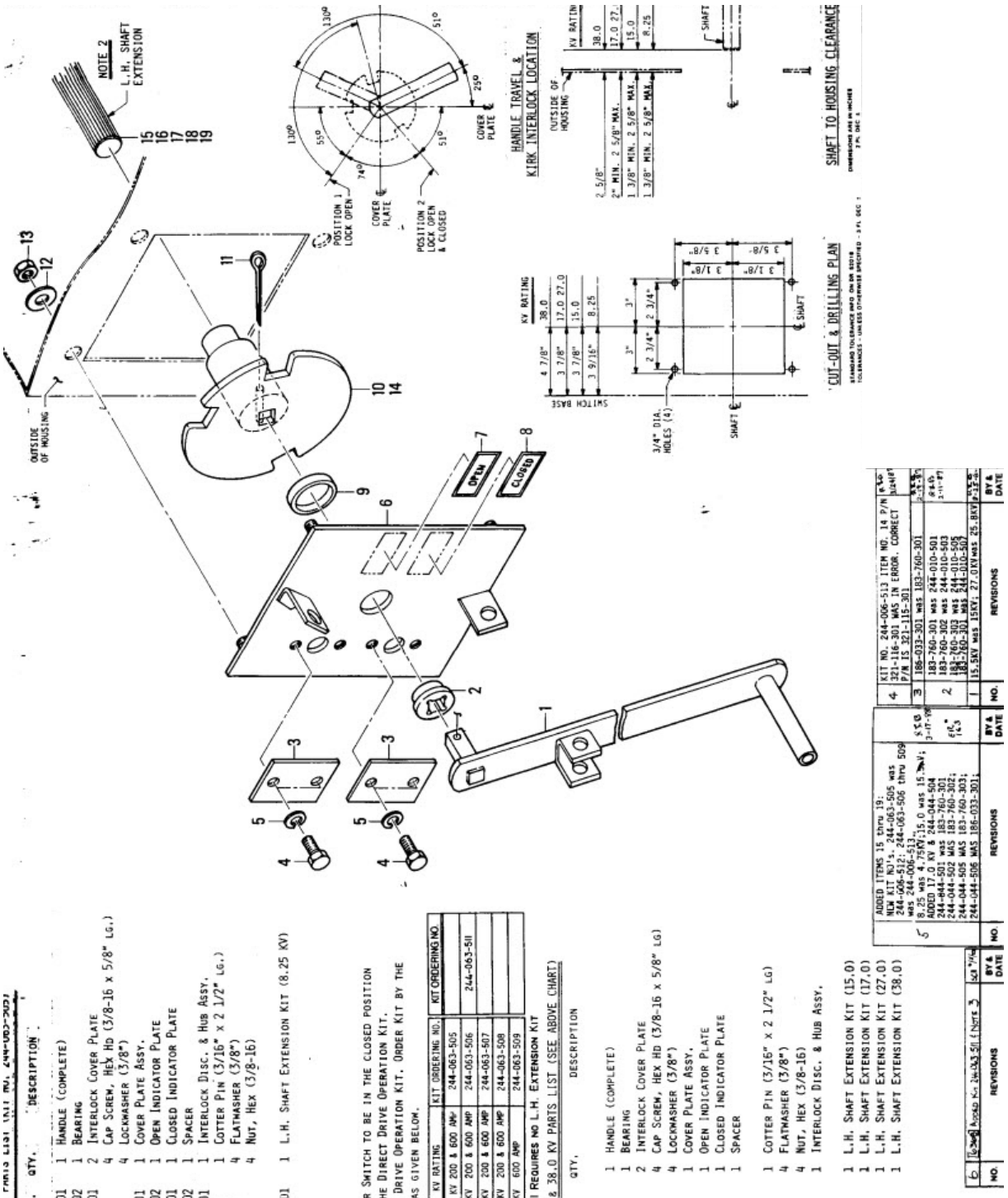
Mechanical door interlock



Direct drive handle right side



Direct drive handle left side



ITEM NO.	PART NO.	QTY.	DESCRIPTION
1	234-560-301	1	HANDLE (COMPLETE)
2	176-389-002	1	BEARING
3	178-744-001	2	INTERLOCK COVER PLATE
4	54382-C2	4	CAP SCREW, HEX HD (3/8-16 x 5/8" LG.)
5	53119-H	4	LOCKWASHER (3/8")
6	180-332-301	1	COVER PLATE ASSY.
7	201-663-002	1	OPEN INDICATOR PLATE
8	201-663-001	1	CLOSED INDICATOR PLATE
9	176-356-002	1	SPACER
10	321-116-301	1	INTERLOCK DISC. & HUB ASSY.
11	53113-H10	1	COTTER PIN (3/16" x 2 1/2" LG.)
12	50701-A79	4	FLATWASHER (3/8")
13	54400-H	4	NUT, HEX (3/8-16)
14			
15	244-044-501	1	L.H. SHAFT EXTENSION KIT (8.25 KV)

NOTES:

1. VERSA-RUPTER SWITCH TO BE IN THE CLOSED POSITION TO ATTACH THE DIRECT DRIVE OPERATION KIT.
2. L.H. DIRECT DRIVE OPERATION KIT. ORDER KIT BY THE KV RATINGS AS GIVEN BELOW.

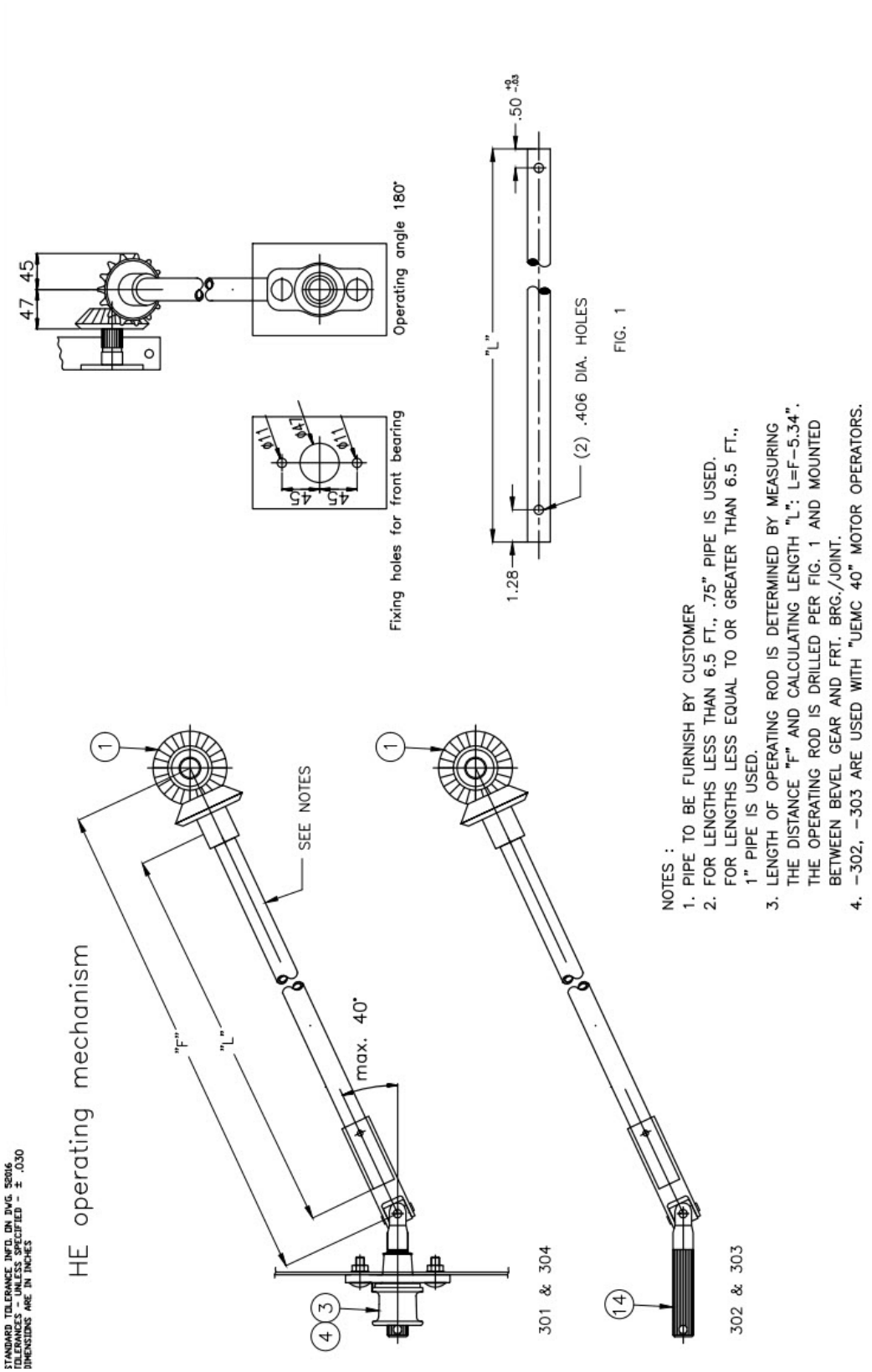
KV RATING	KIT ORDERING NO.	KIT ORDERING NO.
8.25 KV 200 & 600 AMP	244-063-505	
15.0 KV 200 & 600 AMP	244-063-506	244-063-511
17.0 KV 200 & 600 AMP	244-063-507	
27.0 KV 200 & 600 AMP	244-063-508	
38.0 KV 600 AMP	244-063-509	

3. 244-063-511 REQUIRES NO L.H. EXTENSION KIT

15.0, 17.0, 27.0 & 38.0 KV PARTS LIST (SEE ABOVE CHART)

ITEM NO.	PART NO.	QTY.	DESCRIPTION
1	234-560-301	1	HANDLE (COMPLETE)
2	176-389-002	1	BEARING
3	178-744-001	2	INTERLOCK COVER PLATE
4	54382-C02	4	CAP SCREW, HEX HD (3/8-16 x 5/8" LG)
5	53119-H	4	LOCKWASHER (3/8")
6	180-332-301	1	COVER PLATE ASSY,
7	201-663-002	1	OPEN INDICATOR PLATE
8	201-663-001	1	CLOSED INDICATOR PLATE
9	176-356-002	1	SPACER
10			
11	53113-H10	1	COTTER PIN (3/16" x 2 1/2" LG)
12	50701-A79	4	FLATWASHER (3/8")
13	54400-H	4	NUT, HEX (3/8-16)
14	321-115-301	1	INTERLOCK DISC. & HUB ASSY.
15			
16	244-044-502	1	L.H. SHAFT EXTENSION KIT (15.0)
17	244-044-504	1	L.H. SHAFT EXTENSION KIT (17.0)
18	244-044-505	1	L.H. SHAFT EXTENSION KIT (27.0)
19	244-044-506	1	L.H. SHAFT EXTENSION KIT (38.0)

HE/HM handles



Renewal parts list

Description	Catalog number
Contact blade assemblies	
4.76 kV 200/600 A	245-823-501
4.76 kV 1200 A	245-823-502
15/17/27 kV 200/600 A (40 kA)	245-847-501
15/17/27 kV 1200 A (40 kA)	245-845-502
38 kV 600/800 A	245-945-501
15/15.5 kV 600/1200 A (61 kA)	245-879-501
Chain drive handles	
Chain kit, 29.625 to 34	247-100-501
Chain kit, 34.625 to 39	247-100-502
Chain kit, 39.625 to 44	247-100-503
Chain kit, 61.625 to 66	247-100-504
Chain sprocket, mounted on switch and set screw	247-120-301 (sprocket and set screw), 2RGA024432A0001 (sprocket), 650107C00 (set screw)
Closed and open indicator labels	2RGA024746P0002 (Closed), 2RGA024746P0001 (Open)
Caution labels, English and French	2RGA024120P0001 (English), 2RGA024126P0001 (French)
Removable link assembly	576986GRB
Offset link assembly	576987GRB
Turn buckle	159798301

Notes

Additional information
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB Inc. does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

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abb.com/mediumvoltage

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