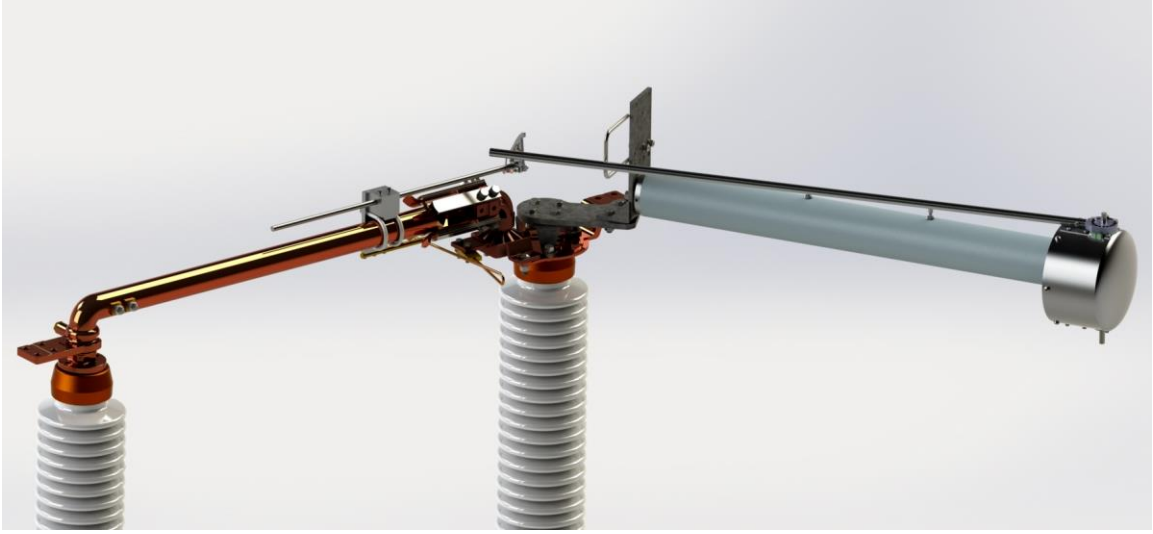
Document II-007-4
Revised April 4th, 2016

Installation Instructions for SEECO Multi-Bottle Interrupter For Use With Side Break Switches.



Thank you for purchasing a SEECO Monoruptr® vacuum interrupter. We are pleased to be able to provide this product to you, and we believe that it will meet or exceed your performance expectations. We appreciate all comments with regard to our product, and welcome any suggested modifications to the design or installation procedures which would better suit your future application needs.

The following pages provide a generalized, step-by-step descriptive procedure for the field installation and adjustment of SEECO-style multi-bottle vacuum interrupters onto side break switch gear. This procedure covers many of the most common configurations; however it cannot cover all details or every variation in equipment. As you review the installation instructions, please refer to the accompanying drawings for the complete bill of material with quantities, locations and adjustment parameters for the specific interrupter being installed. These instructions are intended to complement the drawings provided and are not a replacement or substitute for the drawings.

A word about safety: These instructions are general guidelines and should not supersede your organization's own work and safety procedures. These guidelines must always be interpreted in light of the specific workplace or site conditions, personnel experience and equipment capability.

If at any point during the installation process you have questions or need additional information or assistance, you are encouraged to call us at 704-392-1396. We welcome the opportunity to assist you.

I. SUGGESTED TOOLS AND EQUIPMENT

1. 5/16” Open-End Wrench
2. 7/16” Open-End Wrench
3. 9/16” Open-End Wrench
4. 3/4” Open-End Wrench
5. 7/16” Socket
6. 9/16” Socket
7. 3/4” Socket
8. 3/16” Allen Wrench
9. Tape Measure

II. RECEIVING, STORAGE AND UNCRATING

A. Receiving

Depending on customer needs, the three phase set of interrupters is either shipped in a single (large) crate or in up to three individual cardboard boxes per set. All material should be checked against the accompanying bill of lading when the interrupter set is received. Confirm that the number of shipping units (crates or boxes) received exactly matches the number of shipping units on the bill of lading.

All interrupter crates/boxes must also be visually inspected for physical damage. If physical damage is apparent or suspected, you must file a claim immediately with the transportation company and notify your SEECO representative. Physical damage is indicated by broken or bent trip arms, bent mounting brackets, or any other abrasions, scratches or deformation to the surface of the interrupter units. In the absence of visible damage to the interrupter units, hidden damage may be indicated by crating lumber that is broken or cracked, crating members that have pulled away from the main crate, missing members or torn shrink wrap, crushed or holes present in cardboard, all of which may be indications of rough or inappropriate handling by the transportation company. If you suspect hidden damage we advise you to note this on the bill of lading before the driver has departed your location.

Please note that the responsibility to determine if a shipment is complete and without damage rests with you and your organization. Failure to identify shortages or transit damage at the time the material is delivered may compromise your claim with the transportation company and result in the material being replaced at additional cost to your organization.

B. Storage

Material may be stored outdoors. All interrupter units should be left in their original shipping containers until ready for use. Please exercise care in handling and storage as

interrupter units may be damaged if mishandled. Damage due to rough handling is not covered under warranty and will be corrected at additional cost.

C. Uncrating materials at the job site

1. The mounting hardware for the interrupter units come in separate bags for ease of installation.

2. An installation drawing, with accompanying bill of material and adjustment dimensions, is provided in a sealed black plastic bag, which is secured in the same box as the hardware. The sealed bag also includes instructions for hi-potting the interrupter. Please locate the black plastic bag and review the drawing before proceeding with installation.

III. HI-POT PROCEDURE

A. Each interrupter unit is fully hi-pot tested prior to shipment.

1. It is not normally necessary to repeat this test unless you suspect that damage has occurred in-transit. If you suspect damage, we recommend that you hi-pot test prior to installation to confirm the condition of the interrupter unit. DO NOT EXCEED THE VALUES LISTED IN THE SEECO DOCUMENT II-007-1-HP.

   a. A copy of SEECO's suggested hi-pot test procedure (Document II-007-1-HP) is included in the sealed bag containing the installation drawing(s). Note: This procedure is offered as general guidance and should not supersede your organization's own work and safety procedures.

   b. In place of the complete hi-pot test, a continuity test of each of the vacuum bottles in both the closed and open contact position may be substituted if there is no visible external damage to the interrupter unit.

   c. A hi-pot test is the only absolute way to confirm the integrity of the vacuum bottles. Please contact SEECO for guidance if there is doubt about the appropriate use of a continuity test vs. the more complete and definitive hi-pot procedure

2. Each organization will differ on whether or not to perform routine hi-pot testing of newly received interrupter units. Please refer to your own policy for guidance on if this should be performed. DO NOT EXCEED THE VALUES LISTED IN THE SEECO DOCUMENT II-007-1-HP.

IV. INSTALLING INTERRUPTER UNITS

A. Mounting the Interrupter Units

1. The mounting hardware and appropriate spacers are located in crate/boxes. Line personnel will need the hardware to attach the interrupter unit to the mounting plate.

2. Consult the applicable drawing for the installation. If going on an existing switch, the mounting bracket is simply bolted to the Clip Cap on the stationary insulator.

3. Do not use the interrupter arm to prop or hold the unit up, this can cause damage to the unit.

V. BLADE CLAMP/PICK-UP ARM INSTALLATION

Blade pick-up arms are provided to engage the interrupter unit operating arm in the opening direction of switch operation. The resetting hook of the blade clamp assembly catches the operating arm attached to the interrupter and pushes the arm out to the required point of interruption.

For interrupter units ordered and shipped with switches, the blade clamp assemblies are shipped mounted to the blades and the interrupter arm will be set at the proper angle. For interrupter units ordered and shipped for addition to an existing switch, the blade clamp and auxiliary contact assemblies will need to be attached and assembled as needed per the drawing

A. Positioning the Assembly

1. If shipped mounted to the blade, the blade clamp assembly is located close to the correct position for proper operation. It may still need minor tweaks but only after checking the operation after all parts are installed.

2. If installing on a new application it is best to start with the blade in the closed position and out of toggle or even to not have the interphase pipe attached yet. This allows you to open and close each phase individually by hand without needing someone on the ground operating the swing handle to assist. Please refer to the picture sequence below for more details.

Step 1.

If put on an existing switch; install the formed plate to the three threaded holes in the Clip Cap (Image 1). Image 2 shows the formed plate attached. The Clip Assembly was removed from the image for better clarity.

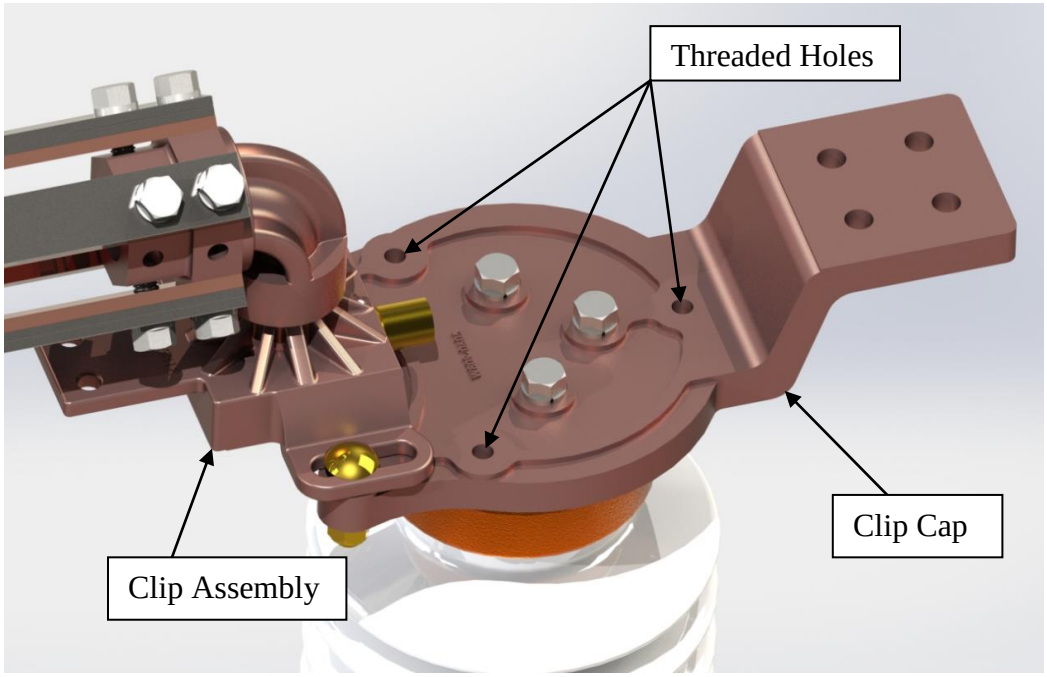


Image 1

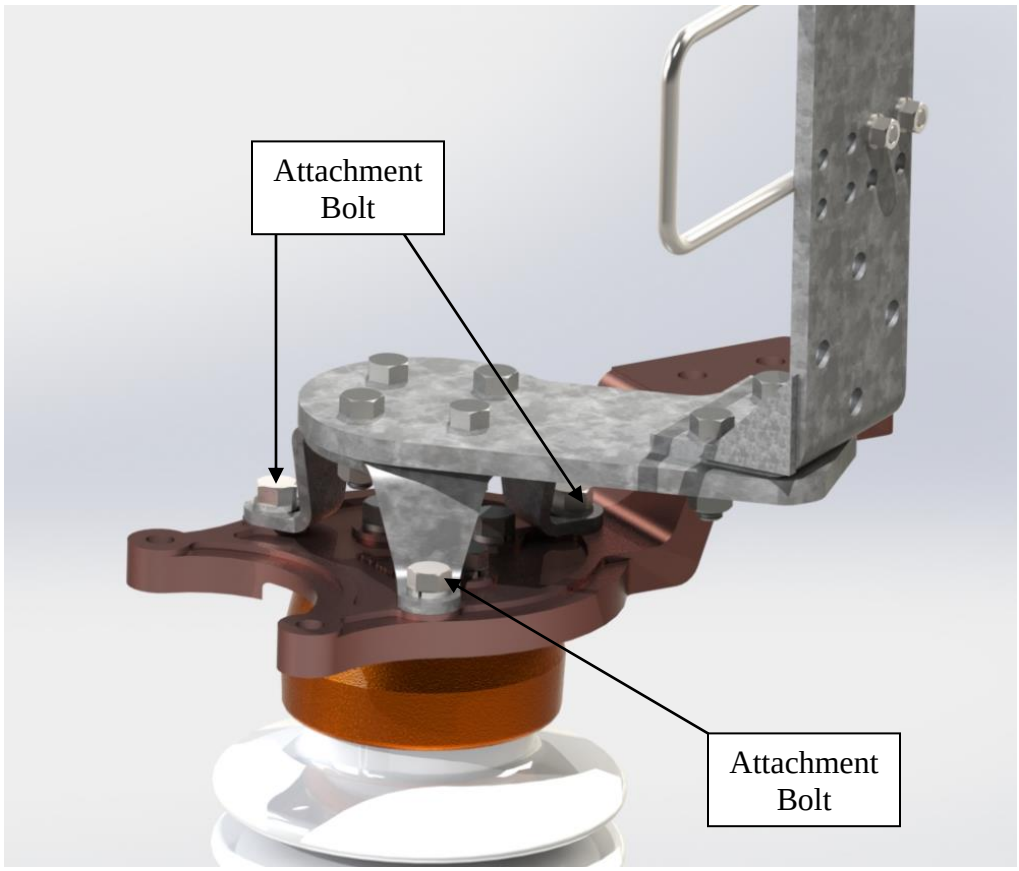


Image 2

Step 2.

With the bracket now secured, use the remaining bolts and lock washers to attach the interrupter unit to the upright plate (Image 3). Make sure that the interrupter is attached so that the attachment clamp is facing up towards the sky (Image 4).

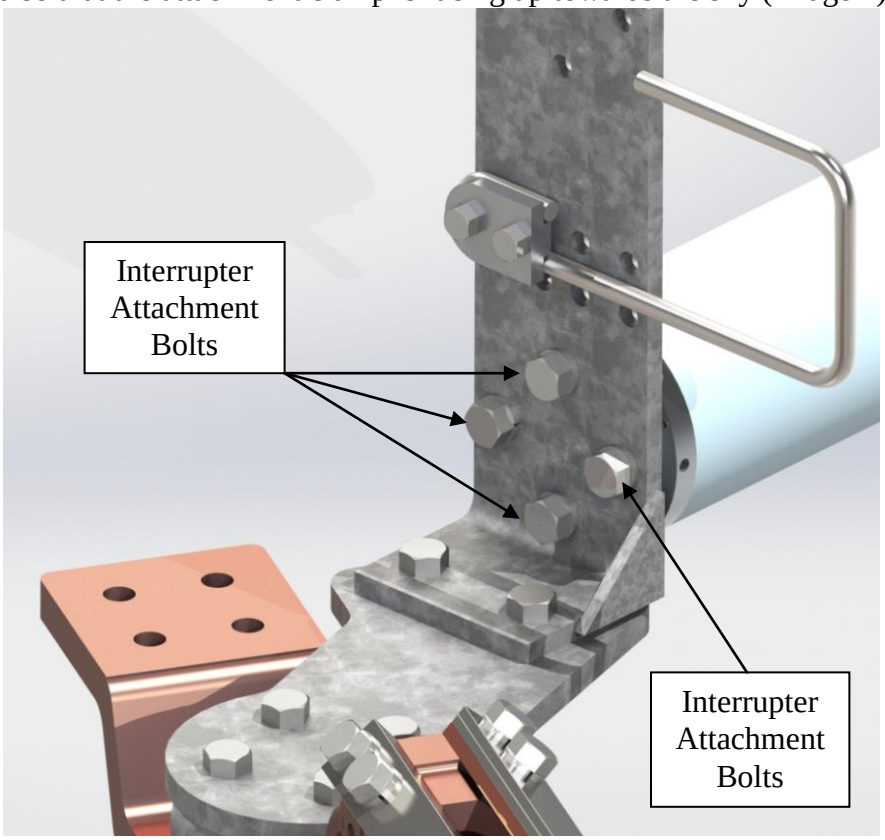


Image 3

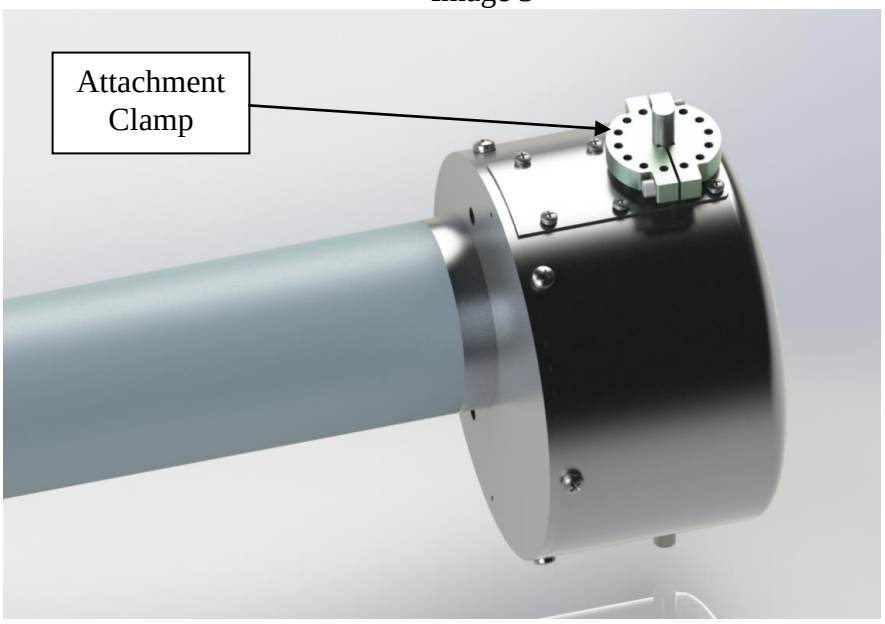


Image 4

Step 3.

Install the pick-up arm on to the blade. The front edge of the arm clamp should be 6 inches from the tip of the blade (Image 5).

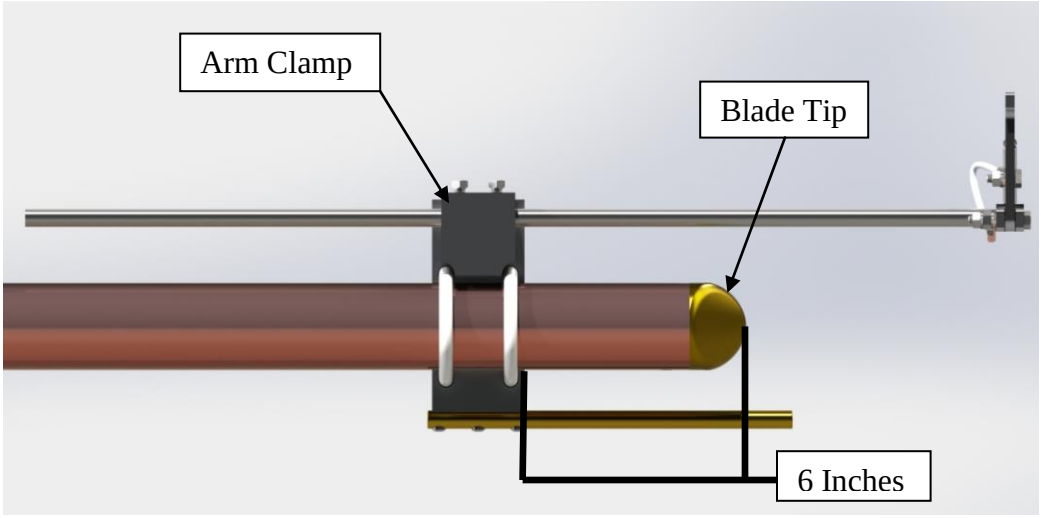


Image 5

Step 4.

With the pick-up arm attached, install the stationary contact on to the jaw assembly. Adjust the stationary contact in or out as necessary to ensure that the moving contact has 1 ½”-2” of overhang (Image 6). This ensures that the moving contact cannot get stuck behind the stationary contact. Also make sure that the moving contact is hitting the upper portion of the stationary contact (Image 7). This will make sure that the moving contact cannot go underneath the stationary contact.

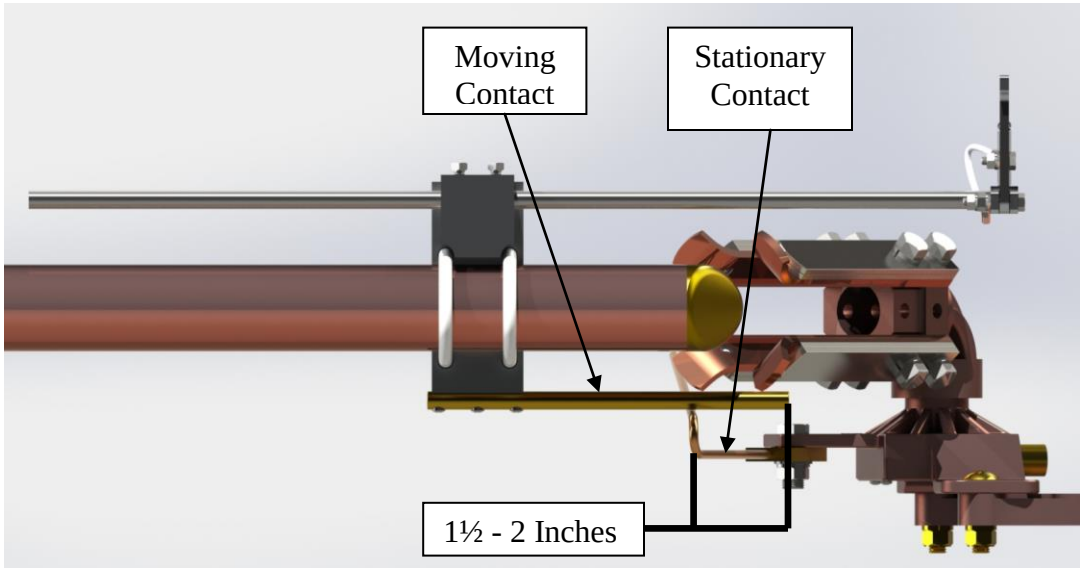


Image 6

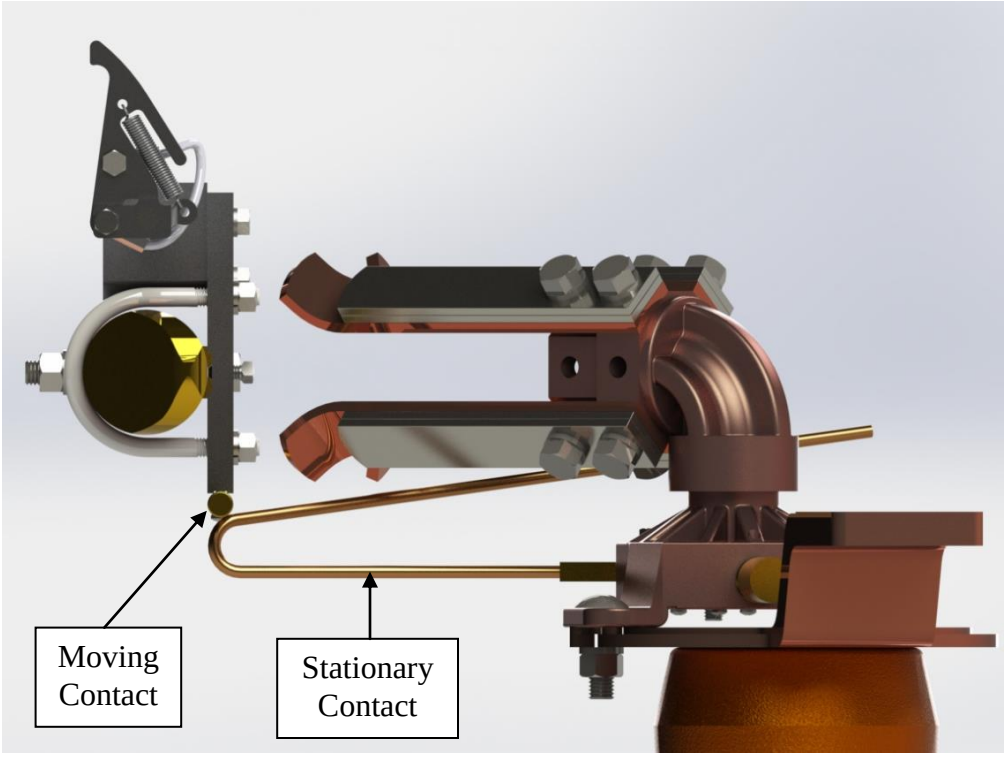


Image 7

Step 5.

If not done from the factory, install the horizontal interrupter arm assembly to the interrupter. The arm bolts to the attachment clamp shown in Image 4 with three (3) bolts (Image 8). When the arm is attached, make sure that it is sitting flush against the bent arm stop or with only a small gap (Image 9).

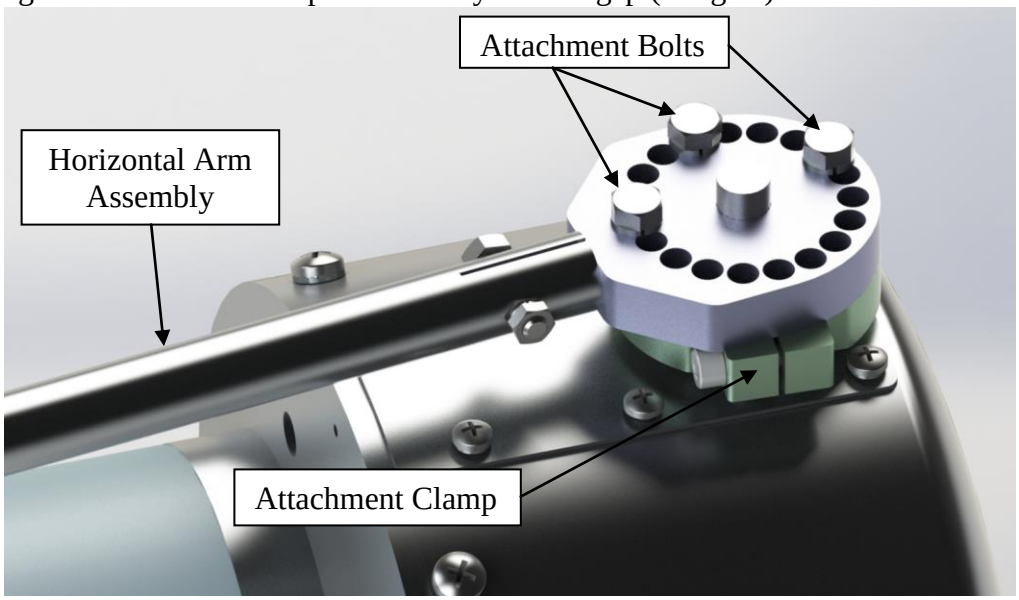


Image 8

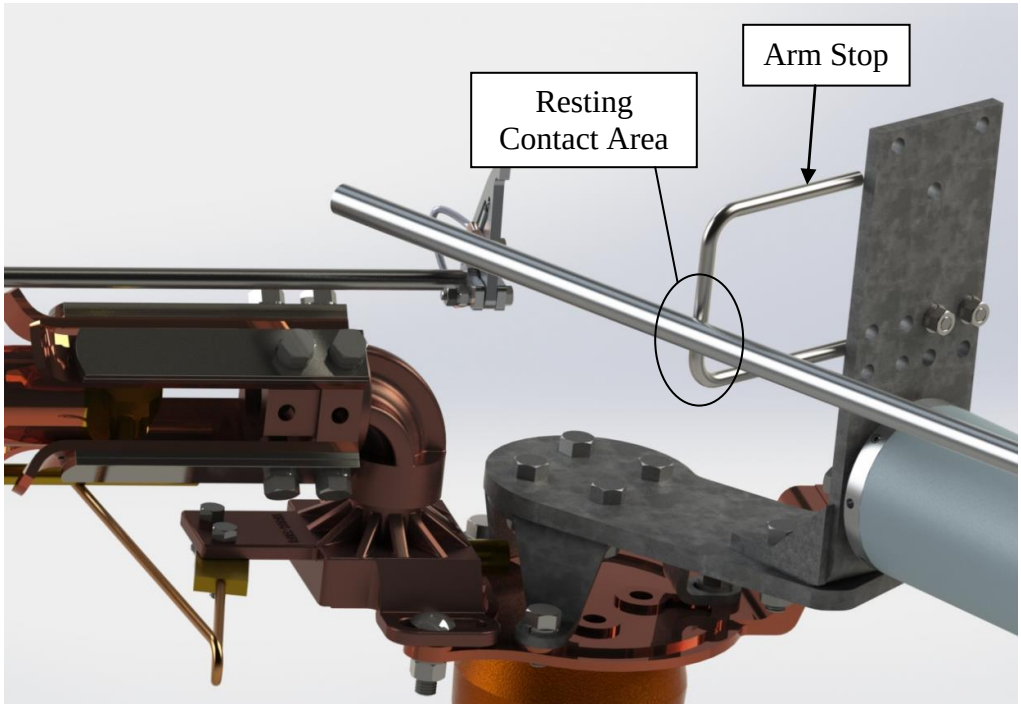


Image 9

Step 6.

Position the pick-up arm on the blade so that the interrupter trips between 1” and 3” from the end of the interrupter arm (Image 10). Rotate the interrupter assembly towards the rotating insulator to cause the unit to trip earlier. Rotate the interrupter assembly away from the rotating insulator to cause the unit to trip later. This can also be accomplished by moving the blade pick-up arm. Loosen the two set screws (Image 11) and move the blade pick-up arm towards the jaw which will cause the unit to trip sooner; moving the arm down away from the jaw will cause the unit to trip later. If you move the pick-up arm towards the jaw assembly, make sure you check that it will still clear the bent arm stop before fully operating the switch phase.

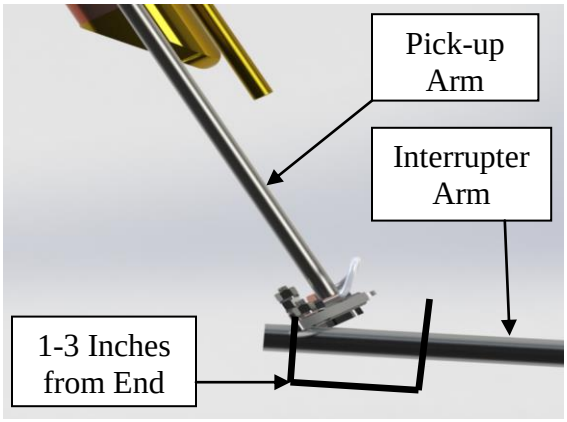


Image 10

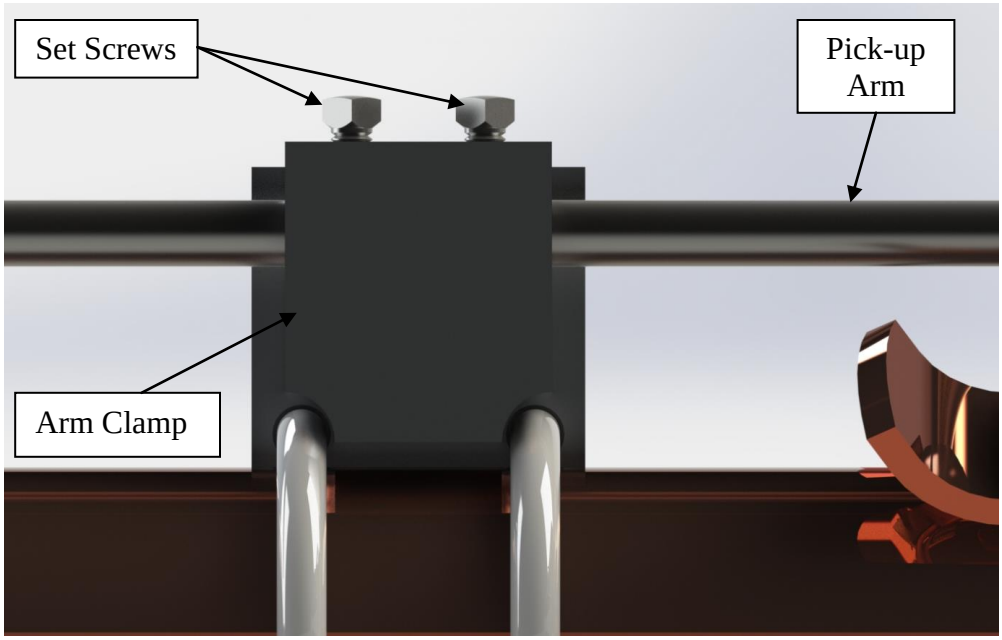


Image 11

Step 7.

It is the intent that the adjustment be such that when the unit “trips” (audible click) the blade, pickup arm, operating arm are clear from any hot part that will now be at the opposite potential. (Image 12)

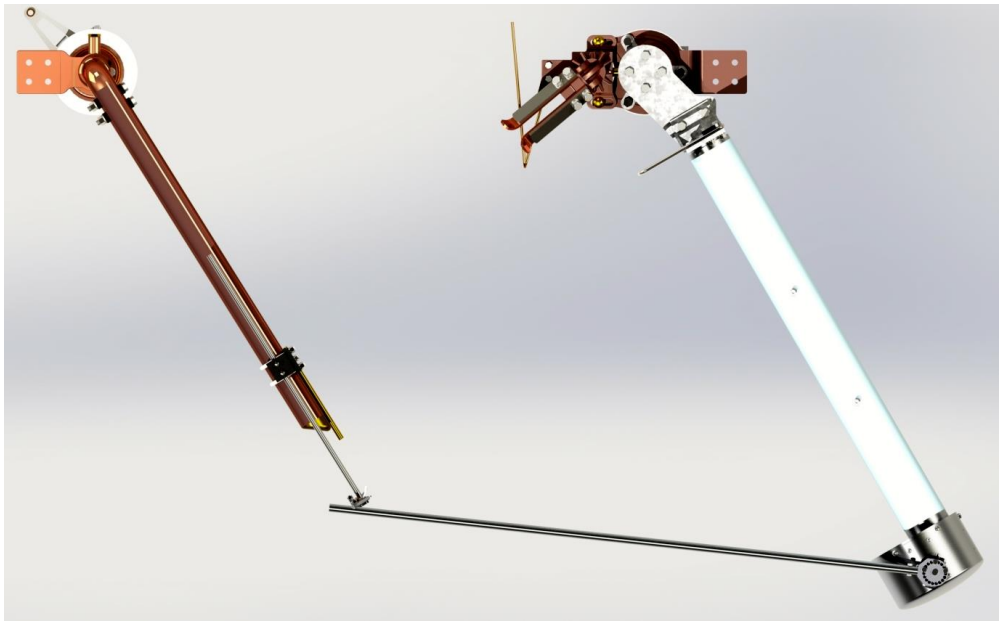


Image 12

VI. OPERATION AND RE-SET

After all adjustments have been completed, it is recommended that the switch be opened and closed several times so the sequence of operation among interrupters, switch auxiliary contacts and blade clamp assemblies can be observed. All components should operate in a similar and consistent fashion when compared across all three different phases. It is nice for all three phases to trip at the same time, but is not critical for successful interruption.

Operate the switch at different speeds. A slower speed initially will allow for easier confirmation of proper sequence. Increase the speed to simulate the normal operating speed used by field personnel, usually about a 5 second process. Do not slam the switch and interrupter with violent force and high speed. SEECO's interrupters (and switches) are to be operated with a smooth, continuous motion. No slamming is required.

A. Opening Sequence

1. Operate the switch in the open direction. The main contacts will separate and the current path will be carried for a brief interval by the auxiliary contacts until the blade clamp pick-up arm engages the interrupter operating arm.

2. Continue in the open direction pulling the operating arm until an audible "click" can be heard. This is the point where the vacuum bottle contacts have opened inside the interrupter unit.

    a. This distance is pre-set in the factory; no field adjustment to the unit is required to attain the correct distance. If adjustment is necessary, use the adjustable components referenced in the above images and instructions.

    b. If you have questions about the trip point, refer to the installation drawing for the required switch open gap distance. If your questions are not resolved by the drawing, please contact SEECO for guidance.

3. Continue in the open direction until the interrupter trip arm is released by the blade clamp pick-up rod. The operating arm will return to its' original rest position on the arm rest. Proper re-set of the trip arm must occur consistently at every speed of operation. If the operating arm does not return to the original position, contact SEECO for guidance.

B. Closing Sequence

1. Operate the switch in the closing direction. As the switch closes, the auxiliary contacts will be the first to engage in closing.

2. Continue in the closing direction until the blade clamp pick-up arm makes contact with the interrupter operating arm. The pick-up arm has a one directional knuckle (hinge) that will allow the pick-up arm to pass under the arm as the switch continues to close. Confirm that the pick-up rod passes under consistently at every speed of operation.

3. Continue in the closing direction until the blade and jaw fully close and the switch toggles over. Confirm that everything has reset and that the switch will readily and correctly operate the next time it is used.

4. If you are satisfied with the operation of the open and closing sequence, you have successfully installed and adjusted the interrupter.

C. Utility Personnel

After all adjustments are complete and proper operation is verified, we recommend that the utility personnel responsible for operation of the switch be allowed to exercise it several times to become familiar with how the switch feels as well as how it should operate.

VII. TROUBLESHOOTING

A. If at any point in the previous procedure (section VI), the operation of the interrupter unit, auxiliary contacts or blade clamp assemblies does not provide the described result, refer back to the original adjustment procedure and repeat the adjustment.

B. The interrupter mounting plate, auxiliary contacts, blade clamps and pick-up rods are the sole adjustment mechanisms provided for all field installation procedures described in this document.

   1. All installation procedures and adjustments can be accomplished with these components alone.

   2. The interrupter unit is factory adjusted for proper trip arm opening and closing travel and for interruption at the required switch open gap dimension. No field adjustment to the interrupter unit is required for any procedure in this document. Any attempt to change the original factory settings without permission will void the warranty and may require the unit to be returned to SEECO.

C. Please contact SEECO if you are not able to troubleshoot a problem through the adjustment procedures of this document. Do not attempt to improvise or freelance

a solution to an adjustment problem. Contact us if you have any questions or concerns and we will provide you with immediate assistance.

VIII. MAINTENANCE

A. Interrupter units do not require regular, scheduled maintenance.

B. Both the switch and interrupters should be visually inspected for external signs of damage whenever the line is removed from service for other line maintenance considerations. External indications that an interrupter unit may have been damaged include:

1. Tracking or burning on the surface of the fiberglass tubes, which indicates possible failure of the vacuum bottles. The integrity of the vacuum bottles must be confirmed through hi-pot testing.

2. Interrupter trip arms that have broken off.

3. Auxiliary contacts that have significantly burned or are deformed.

C. If you recognize any of the above conditions or if you have any doubts or concerns about the ability of the interrupter units to perform their function, please contact SEECO for immediate assistance.