TYPE AST

Grounding Switch

ALL Ratings

INSTALLATION &

INSTRUCTION

MANUAL

Safety Information

⚠DANGER

IMPROPER HANDLING, INSTALLATION, OPERATION OR MAINTENANCE OF THIS EQUIPMENT MAY CAUSE IMMEDIATE HAZARDS WHICH WILL LIKELY RESULT IN SERIOUS PERSONNEL INJURY OR DEATH.

⚠WARNING

The equipment covered by this publication must be handled, installed, operated and maintained by qualified persons who have direct knowledge and experience dealing with the hazards involved and are thoroughly trained in the handling, installation, operation and maintenance of high voltage transmission and distribution equipment. These instructions are meant for only such **Qualified Persons**. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

A **Qualified Person** is one who is trained in and has skills necessary:

- to read and comprehend this instruction book – understanding that these instructions are general in nature
- to accept personal responsibility to prepare and maintain an intrinsically safe work environment and maintain control of the work site to safeguard all persons present
- to develop and implement a proper rigging, lifting, and installation plan along with all safety precautions required to insure safe and proper lifting and installation of the equipment.
- to distinguish between energized and non energized parts
- to determine proper approach distances to energized parts
- to properly work with and around energized or de-energized equipment that may be pressurized with gas
- for proper use of personal protective equipment, insulating and shielding materials, insulated tools for working near energized and /or pressurized electrical equipment
- to recognize and take necessary precautions for the unique and dynamic conditions of site and specialized equipment to maintain a safe work environment during handling, installation, operation, and maintenance of high voltage switching equipment

The instructions in this manual are general guidelines for this type of equipment and not specific to the equipment supplied. Portions of it may not be applicable or may not have complete instructions for your specific equipment.

If you do not understand any part of these instructions or need assistance, contact Southern States Service Division at 770-946-4562 during normal business hours (EST) or 770-946-4565 after normal business hours.

LIMITED WARRANTY

Southern States, LLC ("SSLLC") warrants only to the Warranty Holder (hereinafter defined as the "End User" or the "Immediate Purchaser", as applicable, pursuant to the terms and conditions of this Limited Warranty as set forth below), that the Product identified below will, upon shipment, be free of defects in workmanship and material for the applicable Warranty Period. The "Warranty Period" is that period of time during which this Limited Warranty is effective, and such period begins on the invoice date issued by SSLLC for the Product, and continues until the earlier to occur of (1) the expiration of the Warranty Duration period, or (2) the Number of Operations, both as specified in the table below. If the Product is both purchased and installed within the United States or Canada, this Limited Warranty is granted to each end user of the Product who acquired the Product for its own use during the Warranty Period ("End User"). In all other situations, this Limited Warranty is granted only to the first purchaser of the Product ("Immediate Purchaser") from SSLLC. No primary or remote purchaser or owner of the Product who is not a Warranty Holder may claim any benefit under this Limited Warranty, or any remedial promise included in this Limited Warranty. SSLLC shall, upon prompt written notice from the Warranty Holder, correct a nonconforming Product by repair or replacement at the sole discretion of SSLLC of the nonconforming Product or any part or component of a nonconforming Product necessary in SSLLC's discretion to make such Product conforming. Any transportation charges, labor for removing, reinstalling the Product or part, and/or costs related to providing access to the Product shall be the responsibility of the Warranty Holder. Correction in this manner will constitute the Warranty Holder's exclusive remedy and fulfillment of all SSLLC's liabilities and responsibilities hereunder. SSLLC's duty to perform under this limited warranty may be delayed, at SSLLC's sole option, until SSLLC has been paid in full for all products purchased by the Warranty Holder. No such delay will extend the Warranty Period. If SSLLC does not make such repair or replacement, SSLLC's liability for damages on account of any claimed nonconformity will in no event exceed the purchase price of the Product in question. This Limited Warranty does not apply to any Product that has been disassembled, repaired, or altered by anyone other than SSLLC. This Limited Warranty will not apply to any Product that has been subjected to improper or abnormal use of the Product. SSLLC has no responsibility to repair or replace any Product or component thereof manufactured by another party, but SSLLC will assign, to the extent assignable, to the Warranty Holder any manufacturers' warranty that applies to products and components not manufactured by SSLLC.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES. THERE ARE NO OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES. ALL IMPLIED WARRANTIES WHICH MAY ARISE BY IMPLICATION OF LAW, OR APPLICATION OF COURSE OF DEALING OR USAGE OF TRADE, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OR OTHERWISE ARE EXPRESSLY EXCLUDED. SSLLC SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, EXEMPLARY, SPECIAL, OR PUNITIVE DAMAGES, EVEN IF SSLLC HAS BEEN ADVISED OF THE POSSIBILITY OF SAME. THE WARRANTY HOLDER IS SOLELY RESPONSIBLE FOR THE SUITABILITY OF THE PRODUCT FOR ANY PARTICULAR APPLICATION.

Product Purchased Region	Product Installed Region	Warranty Holder	Warranty Duration
U.S and Canada	U.S and Canada	End User	Five (5) Years
All Other Conditions		Immediate Purchaser	Earlier of 1 year from installation or 18 months from shipment

Type AST

Table of Contents

List of Tables and Figures

Tables **Page**

Figures **Page**

Summary & Introduction

Summary

These instructions do not intend to cover all details or variations in equipment, or provide for every possible contingency to be met in connection with installation, operation or maintenance. Should information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Southern States Representative.

The contents of this instruction manual should not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligations of Southern States. The Warranty contained in the contract between the parties is the sole warranty of Southern States. Any statements contained herein do not create new warranties or modify the existing warranty.

Important

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

Introduction

Southern States Type AST Grounding Switch may be used on the jaw end, hinge end, or both ends of a disconnect switch. On a center break switch, the jaw is attached to either (or both) disconnect switch blades. The switch configuration may be a single pole or group operated multi-pole arrangement, with or without an associated air disconnect switch. Poles can be mounted in a horizontal upright or vertical position. Switch operation may be achieved with a manual operator.

The installation procedure for all mounting positions and operating schemed is simple. A system of pipes, bearings, and adjustable length arms are utilized to open and close the switch from the ground.

Mechanical Interlocks are commonly used in conjunction with the grounding switch to ensure personnel and equipment safety. Interlocks (mechanical and/or electrical) prevent the disconnect switch and the grounding switch from being closed at the same time. Refer to Section E for Mechanical Interlock Installation Instructions.

The instructions contained within this manual are necessary for the safe installation, maintenance, and operation of the Type AST switch. A qualified person, familiar with this of type equipment, should carefully read and follow the instructions.

These instructions are intended to provide a general guideline for the installation, adjustment, and maintenance of the Type AST switch. All details, equipment variations, and potential conditions may not be covered in this manual. Contact Southern States, LLC in the event conditions associated with a specific application are not sufficiently addressed.

All photographs and sketches in this manual are for illustration purposes only and may not be to scale. Refer to the Unit Assembly drawing or the Operating Mechanism drawing provided with each disconnect switch for specific details. During installation, it may be necessary to make adjustments other than those described in this manual. Contact your local representative or the factory if questions should arise.

Southern States After Sales and Service Department is available for field installation assistance along with providing parts support for all Southern States products.

> Contact After Sales and Service at 770-946-4562, 7:30am-4:00pm EST Monday-Friday.
> After Hours: 770-946-4565

Distinctive signal words are used to indicate the degree of hazard that may be encountered by the user. Identification of the signal words and their definition follow:

⚠ DANGER	Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
⚠ WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

Ratings

Table 1: Ratings Table

AVAILABLE RATINGS			
MAXIMUM VOLTAGE (kV)	BIL (kV)	MOMENTARY (kA*)	MOMENTARY (kA*)
15.5	110	70	100
25.8	150	70	100
38	200	70	100
48.3	250	70	100
72.5	350	70	100
121	550	70	100
145	650	70	100
169	750	70	100
242	900	70	100

*10 Cycle RMS Asymmetrical Rating

Product Description

Typical Disconnect Switch

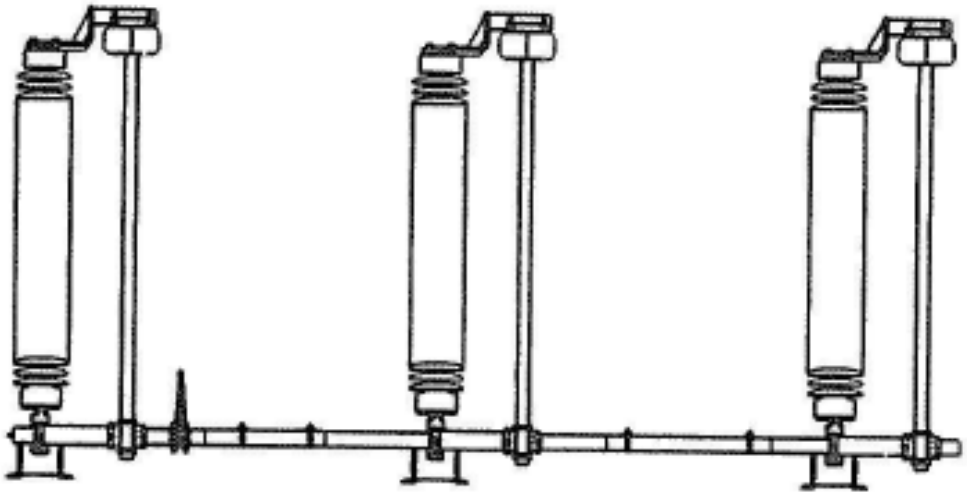

Figure 1: Typical AST Switch Pole Assembled

Receiving, Handling & Storage

Unpacking

Unpack the equipment and check for damages or material shortages immediately. The bill-of-material from the Unit Assembly (switch) and Operating Mechanism drawings should be used for this purpose. If damage or a shortage is noted, file a claim immediately with the carrier and contact the factory.

Storage

All components of the Cole Type P center break disconnect switch are suitable for outdoor use. Keep bearings out of standing water. Keep upright and support live parts with base. If a motor operator is furnished, be sure to connect the heater circuit using the provided external wiring, while the unit is in storage. Discard the wiring upon installation.

Typical crating is intended for storage less than 1 year. If long term storage is required please notify factory at time of order placement so that special crating can be used.

Installation & Adjustment Procedures

Recommended Tools & Values

Table 2: Recommended Tools and Torque Values

Recommended Tools	
Type	**Sizes**
Hand Wrenches and/or Sockets	15/16”, 3/4", 5/8”, 9/16”
Drill Bit	1/4”

Recommended Torque Values	
Bolt/Nut size	**Torque (Ft-lb)**
1/2”	50 (S. Steel) 40 (All Others)
5/8”	92
3/4"	127
1”	286

Preferred Switch Assembly Method:

If Disconnect switch is shipped assembled on insulators Skip this section and continue to Live Part Installation & Contact Adjustment.

1. Install the Grounding Switch Jaw Mounting Adapter to the top of the Insulator during installation of the Disconnect Switch Live Parts - **Figure 2**. When both a Jaw Mounting Adapter and Spacer are used, the Spacer mounts **above** the Jaw Mounting Adapter.

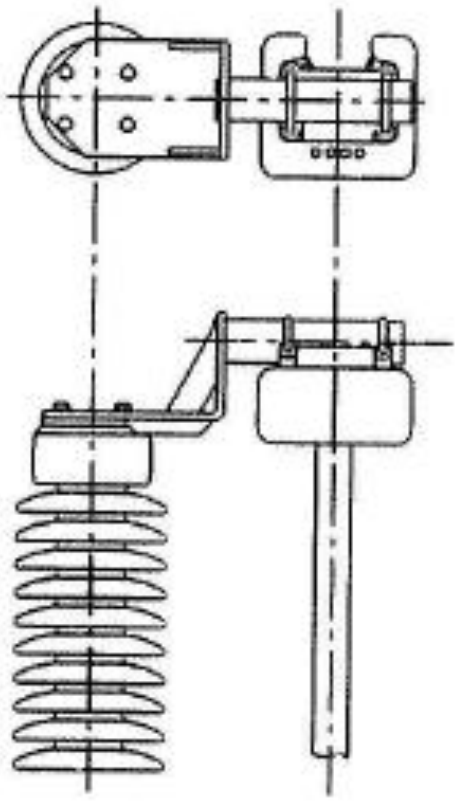

Figure 2: Jaw Mounting Adapter Installation

2. **Do not install the remainder of Grounding Switch components prior to installation and full adjustment of the Disconnect Switch.**

3. Bolt the Grounding Switch Hinge Assembly to the switch base - **Figure 3**.

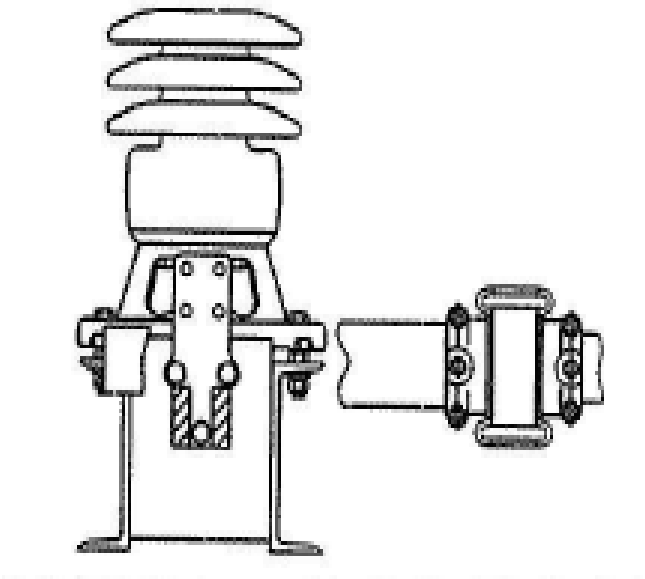

Figure 3: Hinge Assembly Bolted to Switch Pole

4. Install the pre-cut Interphase Pipe through the Hinge Mechanisms. Secure “U” bolts.

5. Wire brush mating parts of the Blade and Blade Clamp. Apply a coating of “No-Ox-Id” electrical joint compound. Wire brush through coating prior to assembly.

6. With the Hinge Assembly positioned as shown in **Figure 4** (Aluminum Pipe Clamp should rest against the Hinge Terminal Pad), install the Blade into Blade Clamps.

⚠ DANGER	**Blade must be held securely in position to avoid injury to personnel and/or equipment damage.**

7. Rotate Blade Tip to the horizontal position. Blade Tip Rib and Drain Hole should face down.

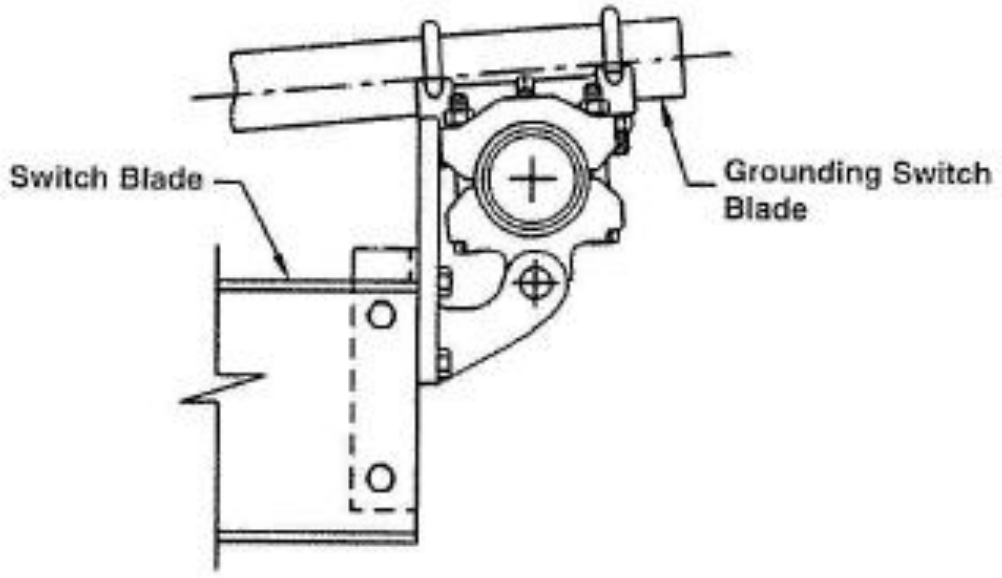

Figure 4: Blade Installed in Blade Clamp

8. Wire brush mating parts of the Jaw Assembly and Jaw Mounting Adapter. Apply coating of "No-Ox-Id" electrical joint compound. Wire brush through this coating prior to assembly.

9. Mount Jaw Assembly to the Jaw Adapter. Refer to Grounding Switch Unit Assembly Drawing for proper Jaw Assembly location.

10. Raise Grounding switch Blade and insert into Jaw Assembly as shown in **Figure 5**.

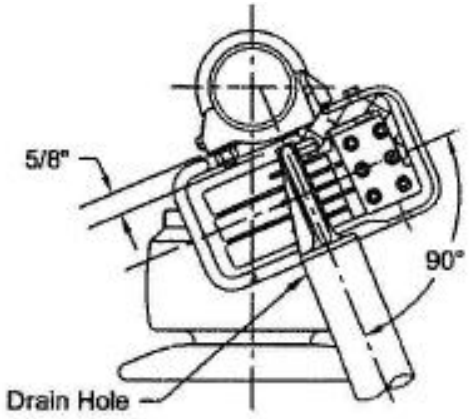

Figure 5: Switch Blade Inserted in Jaw

11. Reset the Blade Tip against the Jaw Assembly Stop. The Blade Tip must fit flat (not cocked) between the contact leaves. Space the top of the Blade Tip approximately 5/8" below the casting - **Figure 5**. Tighten the Blade to the Clamp with "U" bolts.

12. Align Blade Tip and Jaw Contacts as shown in **Figure 5**.

⚠ DANGER **Blade must be held securely in position to avoid injury to personnel and/or equipment damage.**

13. Tighten the Jaw Assembly to the Jaw Adapter with "U" bolts. Tighten setscrews to securely grip the pipe. **Do not drive any screws through the pipe wall at this time.**

Operating Mechanism

1. Lay out all parts and check each one against the bill of materials on the Operating Mechanism Drawing (Op-Mech).

2. Use the Op-Mech Drawing to install mounting brackets, bearings, bushings, pipe clevises, manual operating device, Adjustable Arm, and other components - **Figure 6** and **Figure 7**.

⚠ CAUTION **The Pipe Collar must support the entire weight of the Vertical Operating Pipe. Do not allow the manual operating housing to bear any of the Vertical Pipe weight.**

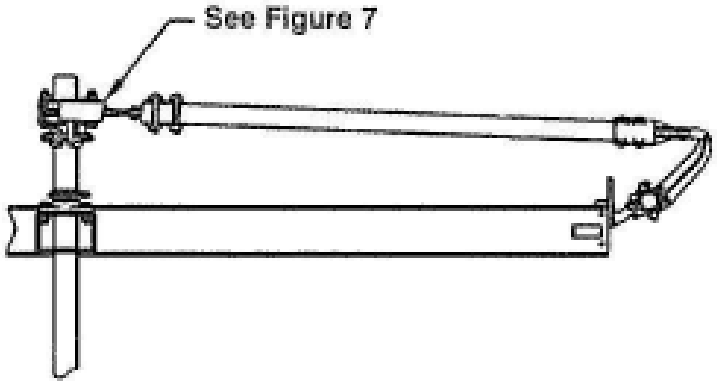

Figure 6: Typical Operating Pipe Arrangement

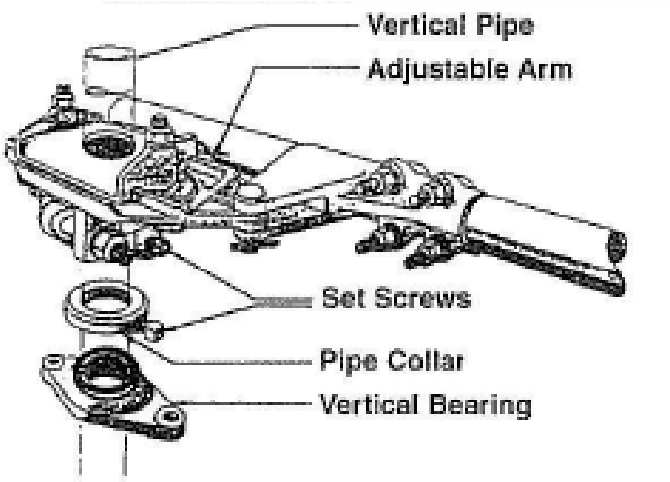

Figure 7: Exploded View – Adjustable Arm

3. Tighten all setscrews to securely grip the pipe. **Do not drive any screws throught the pipe wall at this time.**

4. If furnished with a Counterweight, refer to the Grounding switch Unit Assembly and **Figure 8** for installation details.

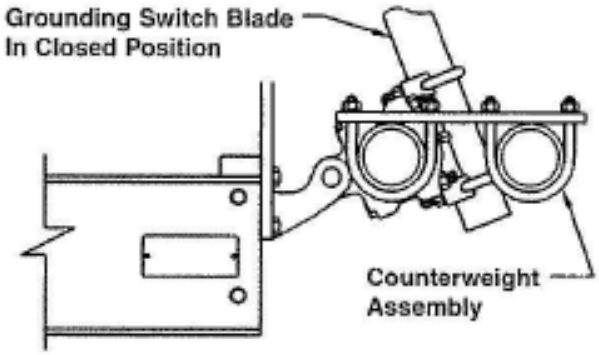

Figure 8: Counterweight Assembled

5. After mounting all operating mechanism components, use any convenient means to match-mark all clevis connections, Adjustable Arm, and manual operator attachemnts to check for slippage during trial operations.

Adjustment/Operating Mechanism (Three Phase Installation)

1. Position all Grounding Switch poles closed and all Disconnect Switch poles open.

2. The Adjustable Arm setting on the Op-Mech Drawing is a calculated dimension. Adjust as required for exact setting.

3. The Adjustable Arm radius is **too short** if the Grounding Switch does not open fully (Blade in horizontal position). To correct:
   - Check for slippage
   - Return the switch to the closed position.
   - Operate the switch toward the open position to remove pressure on the linkage.
   - Loosen Adjustable Arm and Clevis Bolts - **Figure 9**.

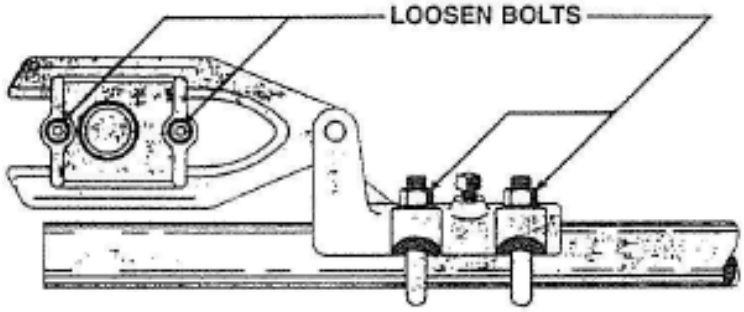

Figure 9: Top View of Adjustable Arm Assembly

   - Lengthen the Adjustable Arm radius approximately ¼". Shorten the pipe to allow the Clevis to reposition itself the same distance.
   - Re-tighten the Adjustable Arm and Clevis Clamping Bolts.
   - Test Operate. Re-adjust as necessary.

4. The Adjustable Arm radius is **too long** if the Grounding Switch reaches the fully open position (Blade in horizontal position) before the switch operator reaches the open position. To correct:
   - Check for slippage
   - Return the switch to the closed position.
   - Operate the switch toward the open position to remove pressure on the linkage.
   - Loosen Adjustable Arm and Clevis Bolts - **Figure 9**.
   - Shorten the Adjustable Arm radius approximately ¼". Lengthen the pipe to allow the Clevis to reposition itself the same distance.
   - Re-tighten the Adjustable Arm and Clevis Clamping Bolts.
   - Test Operate. Re-adjust as necessary.

5. All poles of the fully adjusted switch should close completely and operate together. Slight adjustment of the Hinge Assembly Clamping Bolts may be necessary to coordinate all three poles. Rapid operation of the manual handle may be necessary to achieve full closing of all three poles.

6. No adjustment of the Grounding Switch Blade closest to the Operating Arm is necessary.

7. The Grounding Switch Blade on the remaining two poles will require "lead" (Blade movement in advance of the Blade on the pole closest to the Operating Arm):
   - With the Grounding Switch in the open position, match-mark the Hinge Clamp and pipe.
   - Adjust "lead" by elevating the Blade slightly - **Figure 10**.

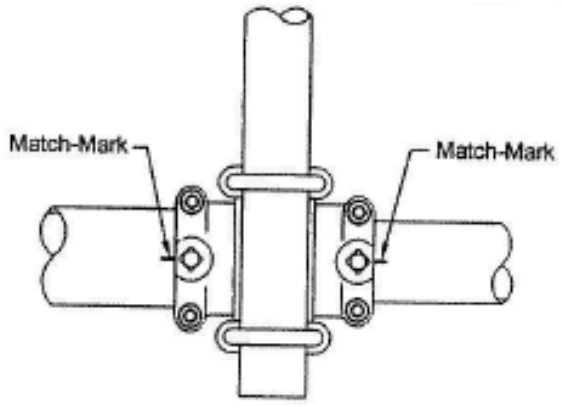

Figure 10: Match-Marked Hinge Clamp and Pipe

   - Be sure the Blade Tip rests against the Blade Stop when the Blade is in the closed position.
   - Test Operate. Re-adjust as necessary.

8. When the switch is fully adjusted:
   - Pre-drill pipe for setscrews with the Threaded Drill Guides supplied and a ¼" drill.
   - Securely tighten all bolts.

   Tighten setscrews until pipe wall is pierced - **Figure 11**.

⚠ CAUTION	**Penetrate the aluminum pipe only with setscrews. Forcing setscrews into the steel pipe can result in casting breakage.**

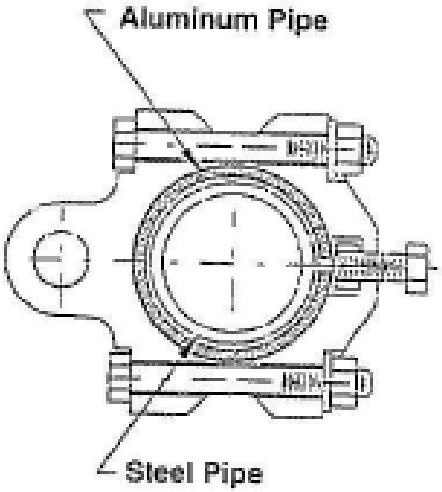

Figure 11: Piercing Pipe Wall

Installation & Adjustment / Mechanical Interlock

1. If Mechanical Interlocks are furnished, refer to the Mechanical Interlock Drawing referenced on the Operating Mechanism Drawing.

2. Place the Disconnect Switch in the fully open position, and the Grounding Switch in the fully open position – **Figure 12**

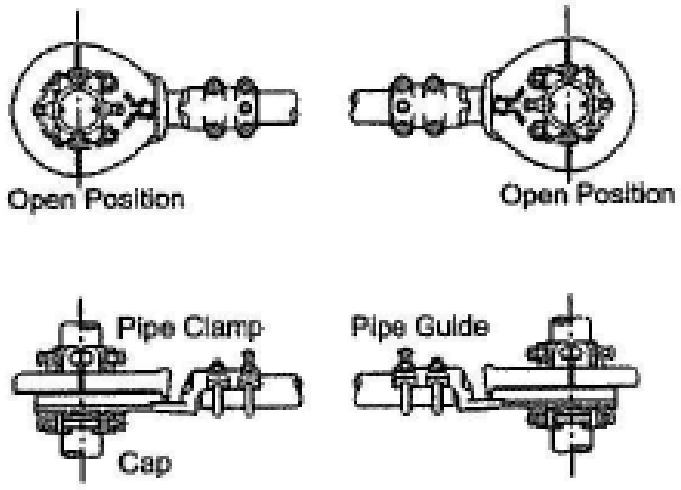

Figure 12: Typical Mechanical Interlock Arrangement

3. Mount the Pipe Clamps approximately 2” below the location shown on the Op Mech Drawing. **IMPORTANT: Clamps must be on the same elevation – check dimensions closely. Do not pierce pipe with setscrews.**

4. Install Pipe Guides and Connecting Pipe to rest on top of the Pipe Clamps. Be sure roller is located on the top. Tighten U-bolts on each end. **Do not pierce pipe with setscrews.**

5. Mount Operating Cam Assemblies above the Pipe Guide. The high point of the Cam should be against the Roller. The Cam Openings must be aligned precisely, facing each other. **Do not pierce pipe with setscrews.**

6. **Test with Manual Operator**:
   - Open the Grounding Switch
   - Close the Disconnect Switch
   - Check to ensure the Cam Follower on the Operating Pipe of the Grounding Switch moves into the Cam Opening to prevent operation of the Grounding Switch.
   - Open the Disconnect Switch
   - Close the Grounding Switch.

- Check to Ensure the Cam Follower on the Operating Pipe of the Disconnect Switch moves into the Cam Opening to prevent operation of the Disconnect Switch.

7. The Operating Pipe must rotate a minimum of 60° to achieve **full lockout.**

Recommended Inspection Maintenance

Periodic inspection is important for satisfactory operation. Frequency of inspection and maintenance depends upon the installation site, weather and atmospheric conditions, experience of operating personnel, and special operation requirements.

Maintenance should be conducted in accordance with ANSI Standards C37.35.

30 Georgia Avenue
Hampton, Georgia 30228
Phone: 770-946-4562
Fax: 770-946-8106
E-mail: support@southernstatesllc.com
http://www.southernstatesllc.com

IB-305-AST- R2 110315 Printed U.S.A.