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MiniBreak

Load Interrupter Switch



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SQUARE D



INTRODUCTION

Square D **MiniBreak** Switches are designed for use on 5 kV power distribution systems. The switches are a prime component in the system, providing switching and short circuit protection for high voltage circuits. These switches are frequently used in service entrance equipment, unit substations, or for sectionalizing high-voltage feeder systems. The switch is single-throw and is rated for 200 amperes continuous current and 400 amperes maximum load break at 80% P.F.

INSPECTION AND STORAGE

Upon receipt, carefully inspect each switch to determine if any damage occurred during transit. If damage is evident or there is any indication of rough handling, immediately file a damage claim with the transportation company. Also notify your local Square D field sales office.

If the switch is stored for any length of time, take the following precautions to provide the best care until the switch is installed and put into service:

- Unpack the switch.
- Check for missing or damaged parts.
- Store the device in a clean, dry location.
- Cover to prevent deposits of dirt or other foreign materials on moveable parts and electrical contact surfaces.

To ensure proper operation of the switch, make sure there are no binding or misaligned parts. If the device is not properly aligned, the switch may be damaged during operation.

INSTALLATION OF REPLACEMENT PARTS

! DANGER

HAZARD OF ELECTRICAL SHOCK OR BURN

Hazardous voltages in electrical equipment can cause severe personal injury or death. Before installing, inspecting, performing preventive maintenance, or replacing parts, turn off all power to the switches. Ensure the switches are electrically isolated so no accidental contact can be made with energized parts. Only qualified persons familiar with the construction and operation of the switches should perform work described in this bulletin. Read this bulletin completely before working on switches.

Failure to observe these precautions will result in severe personal injury or death!

Arc Chute Assembly

1. De-energize the switch.
2. Open the switch blades (figure 1).
3. Remove the two 3/8-16 hex head bolts holding the arc chute assembly to the insulator.
4. Assemble the new arc chute assembly. Tighten the mounting bolts by hand until "finger-tight."
5. Disassemble the blade connector from the operating mechanism cross arm at point "C," figure 1.
6. Grasp the blade connector and slowly close the blade. The blade must be centered in the arc chute. After alignment is complete, retighten the mounting bolts.
7. Open the blade by pulling on the blade connector. Slowly reclose and recheck the alignment.
8. If alignment is correct, re-attach the blade connector to the operating mechanism cross arm. **NOTE: The 1/4-20 lock nut should be "snugged up" against the bottom of the blade connector and then "backed off" approximately 1/2 turn. When properly tightened, the 1/4-20 screw and locknut should be loose enough to turn by hand.**
9. Clean the blades (if necessary) and apply a very light coating of Shell Alvania #2 grease to the contact area only. *Never put grease in the arc chute assembly.*

Blade Assembly

1. The switch must be in the open position before removing any parts or assemblies.
2. Remove the blade connector from the blade by disassembling at points "A" and "C," figure 1.
3. Disassemble the 5/16-18 hinge bolt at point "B," figure 1, and remove the blade assembly.
4. Lubricate the ends of the blade as shown in figure 1 and reassemble. **NOTE: The silver tungsten arc contact tip on the blade must be positioned as shown in figure 1.**
5. Reinstall the blade bushing, hinge bolt, Belleville washers, and locknut as shown in figure 1.
6. Reassemble the blade connector at point "A," figure 1. Tighten the locknut until just snug; the blade connector must pivot freely on the blade (figure 2).
7. Tighten the hinge bolt until the blade just barely remains in the horizontal position, then tighten the locknut an additional 1/2 turn.



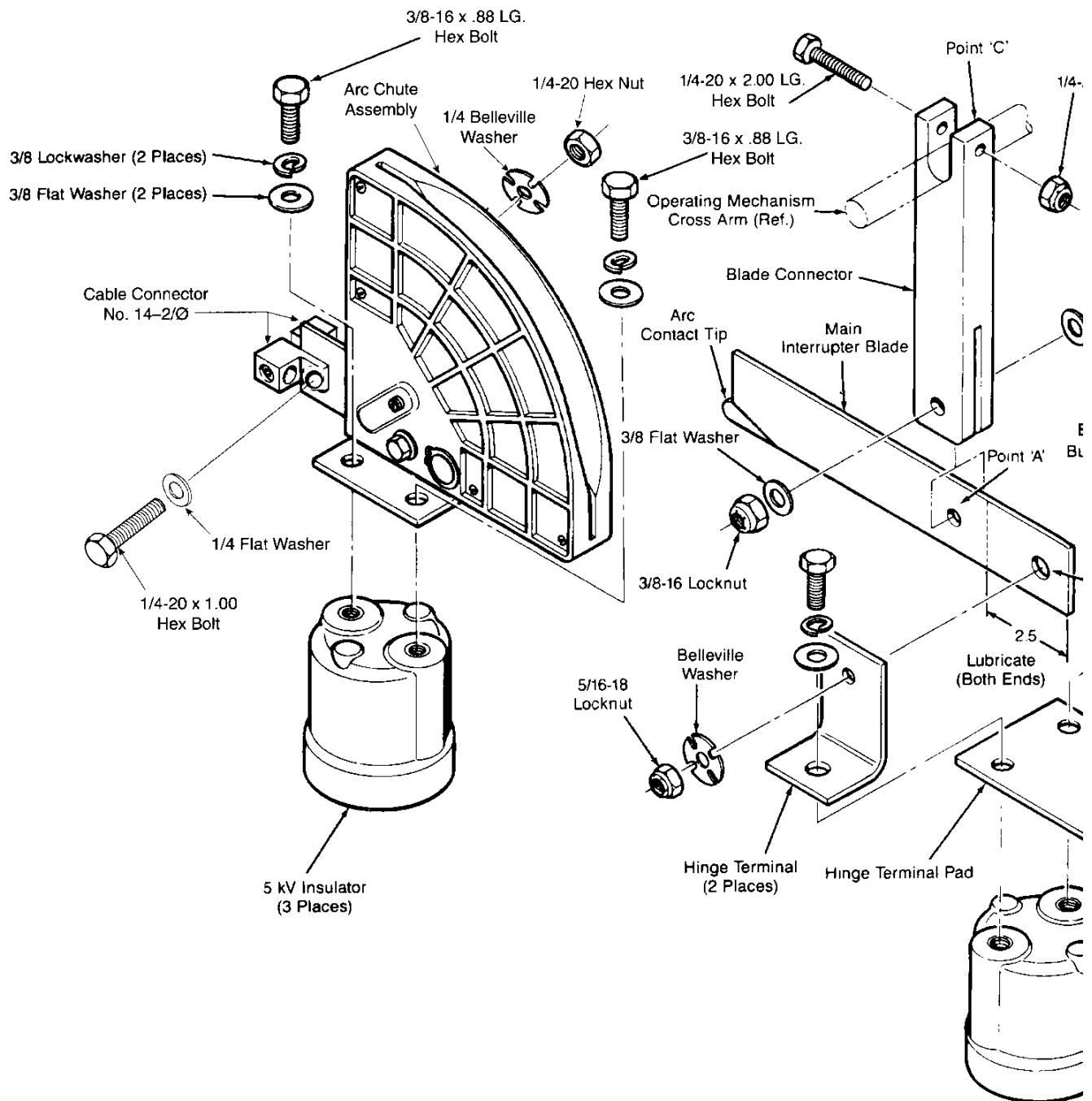
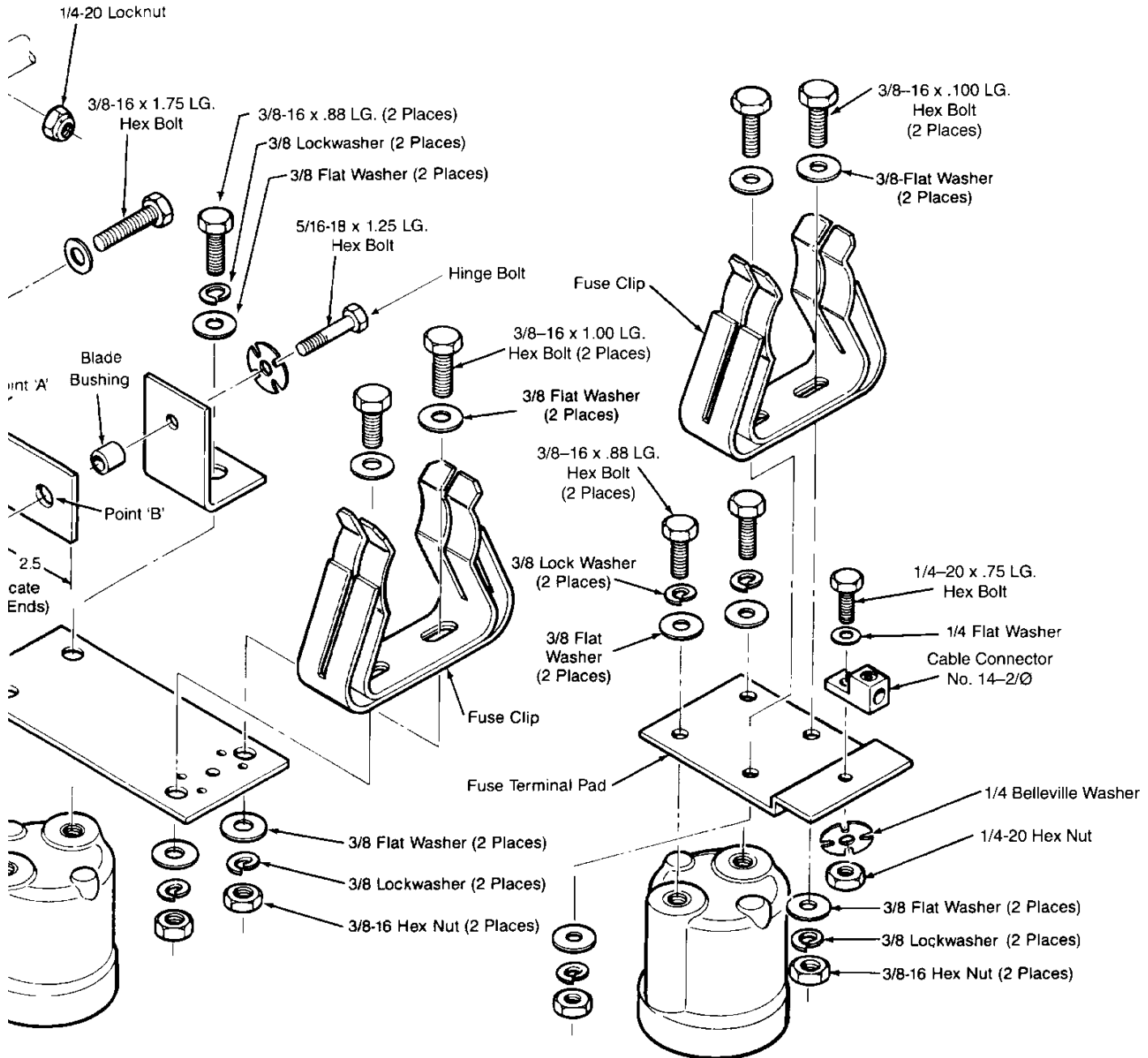


Figure 1: MiniBreak Lo





MiniBreak Load Interrupter Switch



DANGER: Hazard of electrical shock or burn. Be sure to *turn off power supply* before working on equipment.

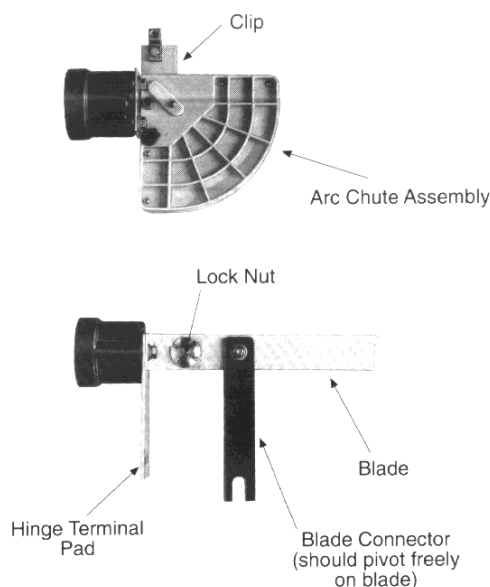


Figure 2: Pole Assembly

8. Check the alignment between the blade and arc chute assembly. Grasp the blade connector and slowly close the blade. The blade must be centered in the arc chute.
9. If necessary, loosen the two mounting bolts on either the arc chute assembly or the hinge terminal to realign the blade. Retighten the bolts.
10. Repeat step 8.
11. After the switch is properly aligned, re-attach the blade connector to the mechanism cross arm. See step 8 under "Arc Chute Assembly," page 2.

Fuse Clip Alignment

1. Align the fuse clips as follows:
 - A. Loosen the mounting bolts securing the fuse clips to the terminal.
 - B. Install the correct size fuse in the fuse clips.
 - C. Retighten the mounting bolts.

Insulator Replacement

Replacement of the insulators under the arc chute assembly or under the hinge and blade assembly requires realignment of the switch. Refer to alignment instructions under the appropriate section ("Arc Chute Assembly" or "Blade Assembly").

MAINTENANCE AND ADJUSTMENT

Inspection

With normal use, the switch should require minimal maintenance. Inspect the blade after approximately every 100 operations. If approximately one-third of the blade arcing tip is burned away, replace the blade and the arc chute assembly.

Adjustment

Correct adjustment of the arc chute assemblies is very important for proper switch operation.

Check the adjustment as follows:

1. Disconnect the blade connector from the operating mechanism crossarm (point "C," figure 1).
2. Attach a spring scale to the blade connector (figure 3).
3. Keeping the scale straight and level, pull on the scale with a smooth, steady motion as shown in figure 3. A properly-adjusted arc chute will register 50 to 70 lb. on the scale when the blade disengages from the arc chute.
4. If blade disengagement from the arc chute does not occur within the 50–70 lb. range, replace the arc chute assembly.
5. Repeat steps 1–4 on all three phases.

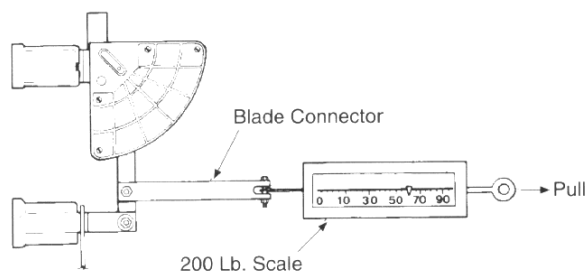


Figure 3: Checking For Proper Adjustment

Lubrication

Using Shell Alvania #2 grease, lubricate the switch between the blade and the hinge and between the blade and arc chute (figure 1).

Lubricate sparingly, particularly on the arc end of the blade. If grease accumulates on the inside of the arc chute, the switch may fail to interrupt properly. *Never put grease directly in the arc chute assembly.*

Apply a thin coat of grease to both sides of the blade with a finger or brush. Then, using a dry finger, wipe off excess grease until only a very thin film remains.



DANGER: Hazard of electrical shock or burn. Be sure to **turn off power supply** before working on equipment.



SEQUENCE OF OPERATION

In the closed position, the switch blade is engaged in the arc chute (figure 4). The circuit current flows through the main blades.

As the switch operating handle is moved toward the open position, the springs are charged. After the springs become fully charged, they toggle over the dead center position, discharging force to the switch operating mechanism.

The action of the switch operating mechanism forces the blade out of the stationary main contacts.

The resulting arc, drawn between the stationary and movable interrupting contacts, is elongated and cooled as the arc chute absorbs heat and generates an arc-extinguishing gas to break up and blow out the arc. The combination of arc stretching, arc cooling, and extinguishing gas causes a quick interruption with only minor erosion of the contacts and arc chutes.

The blades continue to the fully-open position (figure 5) and are maintained there by spring pressure.

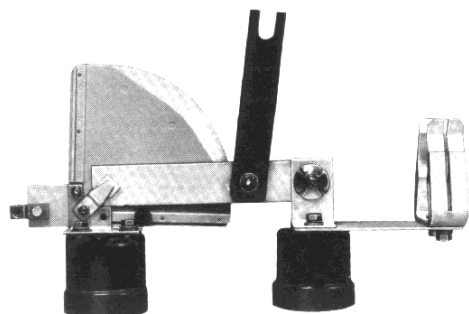


Figure 4: Switch Blades Closed

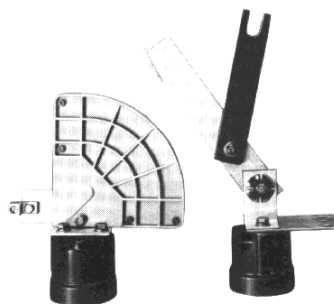


Figure 5: Switch Blades Open

REPLACEMENT PARTS FOR MiniBreak LOAD INTERRUPTER SWITCH

Description	Part Number	Recommended Spares For Number Of Switches Installed			
		1-4	5-10	11-15	16-25
Arc Chute Assembly	D44070-499-50	1	3	6	9
Main Interrupter Blade Assembly	C44070-541-50	1	3	6	9
Hinge Terminal	B44070-542-01	0	0	6	12
Blade Bushing	A44070-631-01	0	0	3	6
Belleville Washer	A44035-247-01	0	0	6	12
Blade Connector	B44070-455-01	0	0	3	6
Hinge Terminal Pad	A44036-216-01	0	0	0	0
5 kV Insulator	29903-01920	0	0	0	0
Fuse Terminal Pad	B44070-496-01	0	0	0	0
Barrier—Top	C44070-511-01	0	0	0	0
Barrier—Bottom	B44070-509-01	0	0	0	0
Barrier Brace	B44070-512-01	0	0	0	0
Barrier Clip	29450-15190	0	0	0	0
Mechanism Cross Arm	C40512-009-03	0	1	2	3
Mechanism Housing Assembly	C44010-826-50	0	0	0	0
Cam Assembly	B44070-440-50	0	0	0	0
Operating Handle Assembly	T40512-172-50	0	0	0	0
Mechanism Operating Spring	B44050-045-01	0	1	2	3
Fuse Clip Kit, 3" Dia., "D" Size	44070-622-50	0	0	0	0

Ordering Information

When ordering parts, provide the following information:

- Description of part
- Quantity desired
- Serial number of switch
- Original order information shown on switch nameplate