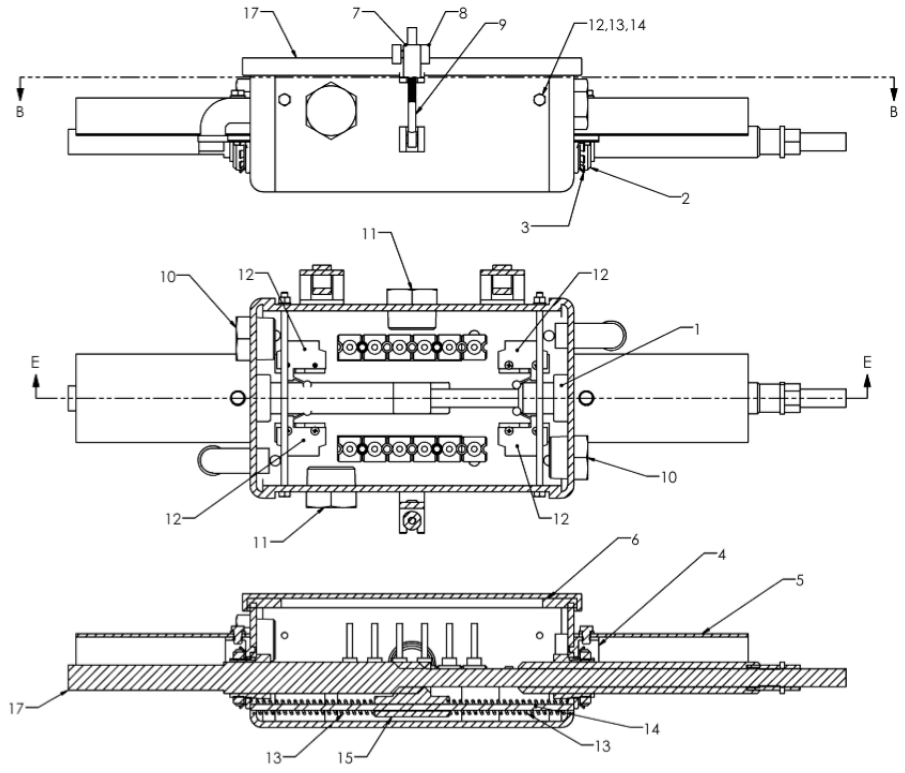
Installation & Maintenance Manual

SC-100
Switch Circuit Controller



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PROPRIETARY INFORMATION

NOTICE OF CONFIDENTIAL INFORMATION: Information contained herein is confidential and is the property of the Rail Development Group. Where furnished with a proposal, the recipient shall use this information solely to evaluate the proposal. Where furnished to a customer, it shall be used solely for the purpose of inspection, installation, or maintenance. Where furnished to a supplier, it shall be used solely for in the performance of the contract.

WARRANTY INFORMATION

Rail Development Group warranty policy is as stated in the current Terms and Conditions of Sale document. Warranty adjustments will not be allowed for products or components which have been subjected to abuse, alteration, improper handling or installation, or which have not been operated in accordance with Seller's instructions. Alteration or removal of any serial number or identification mark voids the warranty.

NOTES, CAUTIONS, AND WARNINGS

Throughout this manual, notes, cautions, and warnings are frequently used to direct the reader's attention to specific information. Use of the three terms is defined as follows:

NOTE
Generally used to highlight certain information relating to the topic of discussion.

CAUTION
Refers to proper procedure or practices, which if not strictly observed, could result in a potentially hazardous situation and/or possible damage to equipment. Cautions take precedence over Notes and all other information, except Warnings.

WARNING
INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.

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DEFINITIONS

AREMA- American Railway Engineering and Maintenance of Way Association.

INTRODUCTION

Product Overview

The SC-100 is a vital switch circuit controller. Depending on the configuration; it provides indication of both normal and reverse switch point position.

It uses enclosed limits switches to provide indication of the switch points. The limit switches have special force breaking capabilities to insure that they break in the event of frost or welding.

The unit uses a standard M-23 point detector rod and can be connected to the switch points using common switch point connecting rods, lugs, and methods.

The SC-100 is available with several mounting configurations. It can also be clamped to the stock rail in locations where the switch ties are not long enough for mounting on top of the tie. It can also be mounted on top of the cross ties using steel straps.

The SC-100 can be equipped with a spring loaded centering device which insures that point detection is broken in the event of a broken point detector rod.

The SC-100 has a standard wire entrance – 1 ¼ and 1 ½ threaded wire entrance openings which accept commonly used liquid-tite connections.

SPECIFICATIONS

Housings & Cover:	Cast ductile iron
Contacts:	4 independent normally open and normally closed contacts Positive opening operation per IEC 60947-5-1 Annex K Sealed per IP40
Contact Rating	10 A continuous,
Temperature Range:	-40 C to 85 C
Point Opening:	3 to 6 inches
Shipping Weight:	SC-100 only - 55 lbs. Rail Mount only - 40 lbs. Layout Components only - 30 lbs

BASIC OPERATION

The SC-100 is a vital switch circuit controller. It provides indication of both normal and reverse switch point position.

It uses enclosed limits switches or snap action switches to provide indication of the switch points. The limit switches have special positive breaking capabilities to insure that they break in the event of frost or welding.

The unit uses a standard M-23 point detector rod and can be connected to the switch points using common switch point connecting rods, lugs, and methods.

Use of the M-23 point detector rod insures that the limit switches are not in contact with the point detector rod when typical switch point pumping action occurs.

When the switch points are properly closed and indicating; the SC-100 rod is positioned so that the limit switch is in the "released" position (Figure 1). As the switch points move; the roller on the limit switch travels and is compressed by the moving point detector rod and actuates to open the contacts and break the switch point indication circuits (Figure 2).

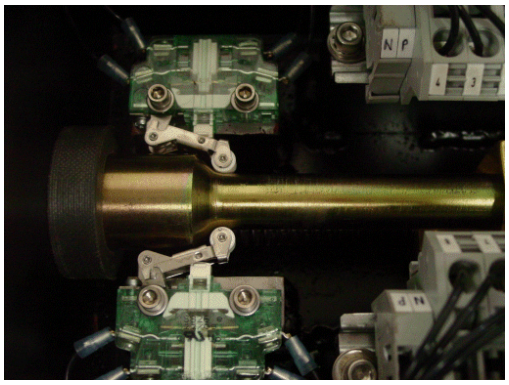


Figure 1: Limit Switch indicating

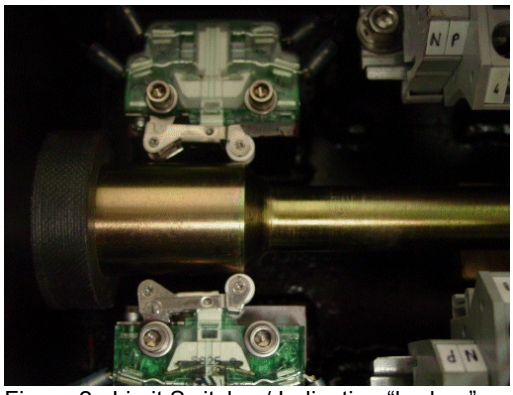


Figure 2: Limit Switch w/ Indication "broken"

CENTERING DEVICE

The SC-100 can be equipped with a spring loaded centering device. This device uses strong springs to force the point detector rod to a position where the indication contacts are open.

This is to insure that point detection circuits are broken or open in the event of a broken or extremely loose connecting rod or lug. (Figure 3)

MOUNTING

The SC-100 is available with multiple mounting configurations:

Rail Mounting: It can be clamped to the stock rail. This mounting helps to maintain a very accurate relationship between the circuit controller, the stock rail, and the switch points. This will insure that that movement and shifting of the cross ties will not affect circuit controller adjustments. In addition; the rail mounting can be used in locations where the switch ties are not long enough for mounting on top of the tie (Figure 5).

Top of Tie: It can also be mounted on top of the cross ties using steel straps (Figure 4). This configuration is common when the SC-100 is used in conjunction with a Model 9B or similar style electric switch lock.

WIRE ENTRANCE

The SC-100 is equipped with several threaded holes for wire entry. The 1 ¼ and 1 ½ pipe threaded wire entrance openings accept commonly used liquid-tite connections.

FIELD WIRING DIAGRAM

Factory wiring of the SC-100 circuit controller is shown in Figure 6 below.

The SC-100 can be equipped with up to 4 limit switches. Each switch has one normally open and one normally closed contact.

The switches are factory wired to AAR posts in a heel, front, and back configuration to easy wiring and correlation to existing control circuits.

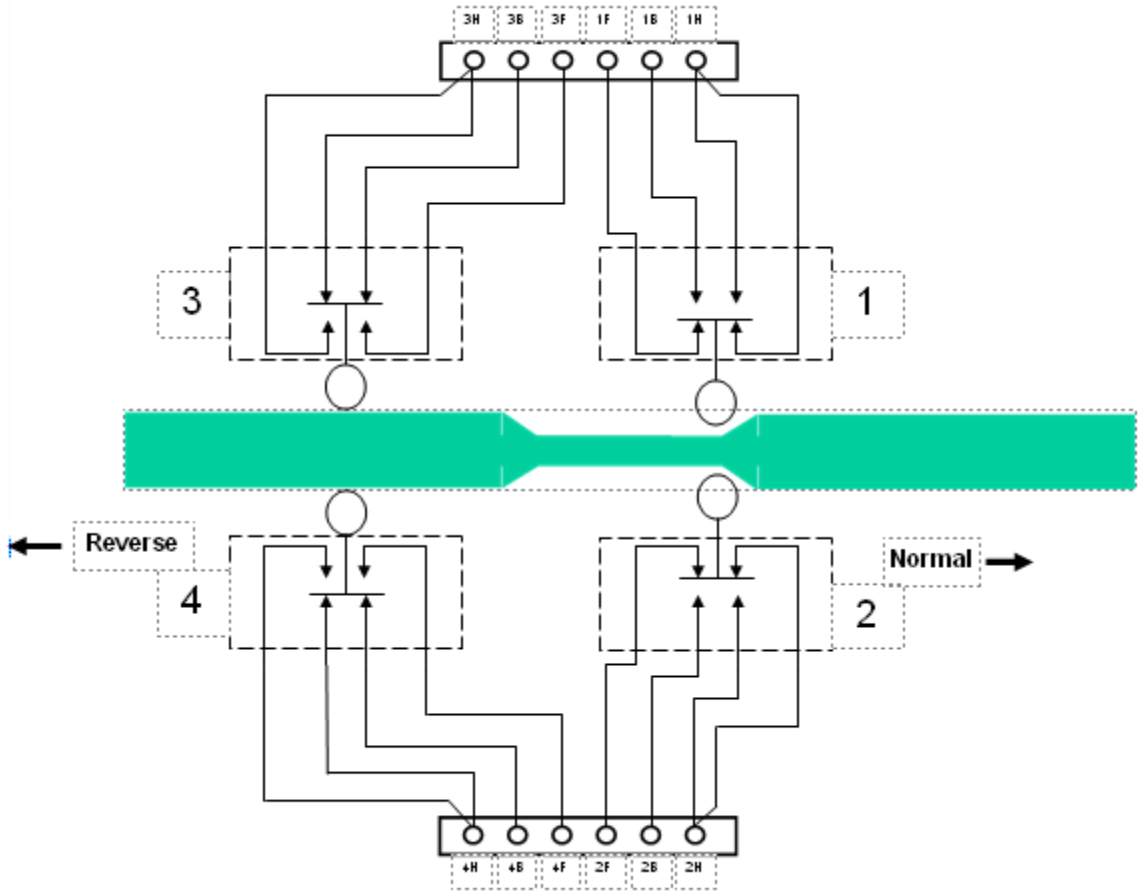


Figure 6: SC-100 Wiring Diagram: Shown with 4 limit switches and with normal side indicating

INSTALLATION & ADJUSTMENT

NOTE
If your railroad has a layout standard for circuit controllers; be sure to follow the requirements and dimensions on the layout drawings.

NOTE
The SC-100 has 6 holes on the bottom of the unit for mounting it to the tie or to the rail mount bracket. Only use 4 of the holes. The remaining 2 holes are to allow for drainage of water than may accumulate inside the unit. If the operating environment is extremely wet or prone to flooding, then the two drain holes should be plugged.

WARNING
THE POINT DETECTOR ROD MAY SLIDE WHILE THE UNIT IS BEING CARRIED AND PLACED INTO POSITION. IT MAY PRESENT A PINCH HAZARD.
USE CARE WHEN LIFTING AND CARRYING THE UNIT.

PRE INSTALLATION

1. Remove old circuit controller if equipped.
2. Check to insure that the cross ties are reasonably square to the stock rail, and approximately lined up with the tip of the switch point.
3. Check to insure that there is at least 9 inches of space between the two ties where the unit will mount.
4. Check to insure that the switch stand or switch machine operates smoothly, that the switch points close tightly, and that there is adequate point pressure.

RAIL MOUNT INSTALLATION

1. If the circuit controller is ordered with the rail mount bracket; the unit is pre-assembled and bolted to the bracket. If the bracket was ordered separately; then the circuit controller should be mounted to the rail mount bracket. There are 6 threaded holes for ½ inch hex bolts. Use 4, ½-13 x 1.0 inch long bolts and lock washers to secure the unit.
2. Spread the rail mount clamps by loosening the bolts so that the clamps will fit around the base of the stock rail.
3. Position the frame so that the following requirements are met:
   - Clamps are clear of the switch point.
   - It is centered so that there is room for point run. Depending on present conditions and run; position the unit to allow for additional expansion of contraction of the switch point.

4. The clamps have slotted holes. While tightening; position the rail clamps as much in-board as possible on the frame. This will allow for more clearance and point run.
5. After final tightening is performed on the bolts; bend the retaining washers over to secure the bolts. Bend one tab over the side of the bolt head and the other down over the frame.

TOP OF TIE INSTALLATION

1. The top of tie mounting configuration consists of securing tie straps to the bottom of the circuit controller and then mounting it across the two switch ties nearest the switch point. Use 4, ½-13 x ½ inch long bolts and lock washers to secure the unit.
2. Temporarily place the circuit controller on the cross ties and determine the best position based on the location of the switch point, position of the ties, and the length of the connecting rod.
3. Mark and bore holes in the ties. Secure the unit with bolts or threaded rod (not included) as required by your railroad.

ASSEMBLE CONNECTING RODS AND LUGS

1. Assemble and connect the connecting rod assembly, switch point lug, and drop lug. These parts will vary from installation to installation depending on the requirements of the railroad.
2. The drop lug on the point detector rod in the circuit controller should be approximately centered on the threaded portion of the rod when the switch is in the normal position. This will insure that there is adequate thread for adjustment in both directions
3. Be sure to tighten all nuts and bolts that securely and retain them with cotter pins if required.

ADJUSTING THE NORMAL POINT

1. Close the switch points completely.
2. Adjust the point detector rod so that the normal side limit switches are indicating (Figure 1) and are at least ¼ inch from the ramp on the rod.
3. Open the switch points and install the appropriate obstruction gage (Usually ¼ Inch). Close the switch points on this gage.
4. Adjust the point detector rod to the position where the normal side limit switches operate and open their front contacts. Note that there may be a slight difference in the operating point for each switch. Adjust until they both operate.
5. Tighten the adjusting nuts. Verify this adjustment using a meter.

NOTE

When adjusting the controller; always adjust from the narrow part of the rod to the larger part or from a position where the switch is indicating to a point where it is not.

ADJUSTING THE REVERSE POINT

1. Close the reverse switch points completely.
2. Adjust the point detector rod so that the reverse side limit switches are indicating (Figure 1) and are at least ¼ inch from the ramp on the rod.
3. Open the switch points and install the appropriate obstruction gage (Usually ¼ Inch). Close the switch points on this gage.
4. Adjust the point detector rod to the position where the reverse side limit switches operate and open their front contacts. Note that there may be a slight difference in the operating point for each switch. Adjust until they both operate.
5. Tighten the adjusting nuts. Verify this adjustment using a meter.

ADJUSTING THE CENTERING DEVICE

If both the normal and reverse switch points are wired into the indication circuits; then there is no need to adjust the centering device. The action of adjusting both normal and reverse sides of the unit is enough to compress the springs and enable the centering device.

If the reverse side switch point detection is not used; adjust the centering device by turning the threaded sleeve on the reverse side of the point detector rod.

With the switch points closed and indicating on the normal side; adjust the sleeve on the rod so that it contacts the brass centering block. Then turn it in an additional 3/8 of an inch.

MAINTENANCE

TOOLS REQUIRED FOR MAINTENANCE AND REPAIR

- #2 Phillips head screw driver
- AREMA terminal wrench
- ½ inch open end wrench
- ¾ inch wrench
- 1 inch wrench

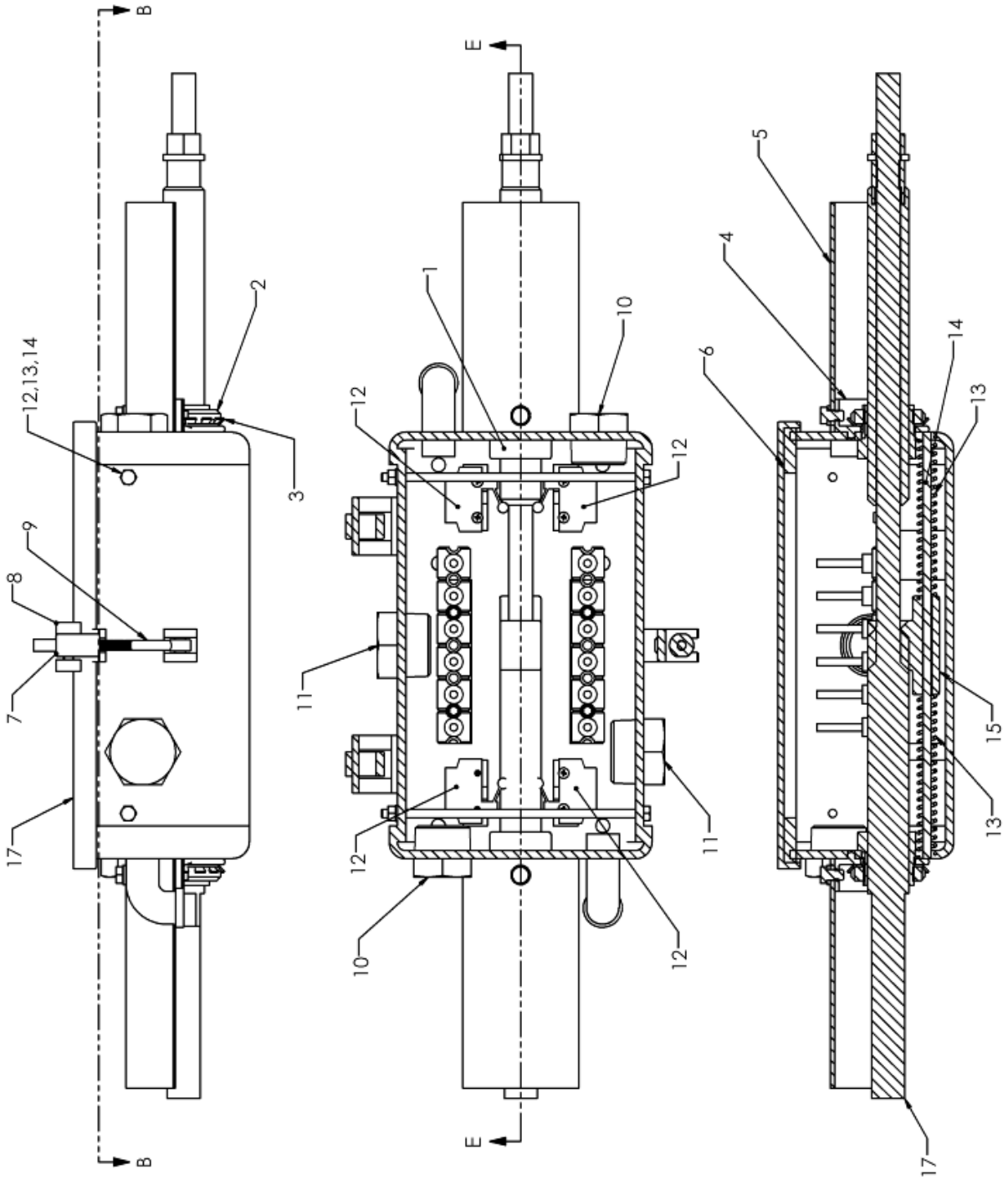
PERIODIC MAINTENANCE/LUBRICATION

The SC-100 circuit controller requires very little maintenance. There are a few lubrication points that are to be lubricated twice per year as follows:

Component	Lubrication/Maintenance Required
Point Detector Rod Bushings	Grease using all purpose grease such as Mobil SCH 220
Limit Switches	Lubricate the hinge points with light oil
Centering Block and Guide Rod	Lubricate the block and guide rod with light oil
Hasp Pins	Lubricate the hinge points with light oil
Screened Ventilator	Be sure it is free from debris and not obstructed

REPLACEMENT PARTS

Item	Description	Part Number
	Common Parts	
1	Bushings	8035-004-00
2	Nut, Spanner	8060-095-00
3	Lock Washer	8060-094-00
4	Cover, mounts to case	8035-037-00
5	Shield, mounts to cover	8035-038-00
6	Gasket, Cover	8035-008-00
7	Latch Nut	8035-034-00
8	Latch	8035-035-00
9	Eye Bolt	8035-039-00
10	Hex Head Plug, 1-1/4 NPT	8035-045-00
11	Hex Head Plug, 1-1/2 NPT	8035-046-00
	Snap Action Switches	
12	Switch, Positive Opening 1NC/1NC	8035-005-00
	Centering Device	
13	Spring,	8035-017-00
14	Guide Rod	8035-019-00
15	Centering Block	8035-018-00
	Point Detector Rods	
16	Lug End	8060-191-01
17	Thread End	8060-245-01
	Rail Mount Assembly	
18	Tie Strap	8035-022-00
19	Rail Mount Assembly	8035-033-01



Replacement Parts – Refer to Table Above

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