

## SC-100 Circuit Controller Frequently Asked Questions

### Mounting and Connecting

**1. Question:** How is the SC-100 mount to the ties?

**Answer:** There are three basic methods used to mount the SC-100 to the ties. Unlike traditional circuit controllers that mount on the Head Tie with the connecting rods hanging off the side; the SC-100 is designed to mount between the Head Tie and the forward tie closest to the switch point. **(see figure 1,2,3).**

The unique attribute of the SC-100 circuit controller is that all three mounting methods can be performed on a **Short Head Tie**, eliminating the costly need to replace standard sized cross ties with longer cross ties, as required with the existing circuit controllers available today.

The three main mounting methods are:

**1. Tie Mount: (see figure 1)**

The Tie Mount is the method of choice for retrofitting existing installations. It allows the use of existing connecting rods and hardware to attach the SC-100 to the switch points. This method, although still mounted between ties mounts the SC-100 on steel plates between the cross ties.

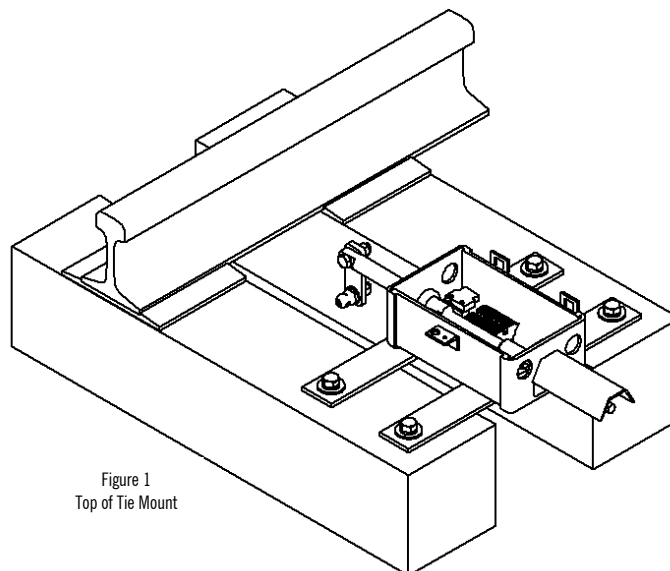


Figure 1  
Top of Tie Mount

2. **Saddle Mount: (see figure 2)**

This method allows the railroad to mount the SC-100 between the ties like the **Tie Mount** method, but flush with the top horizontal surface of the head tie and very close to the stock rail. In turn reducing the chance of damage to the SC-100 from trailing equipment.

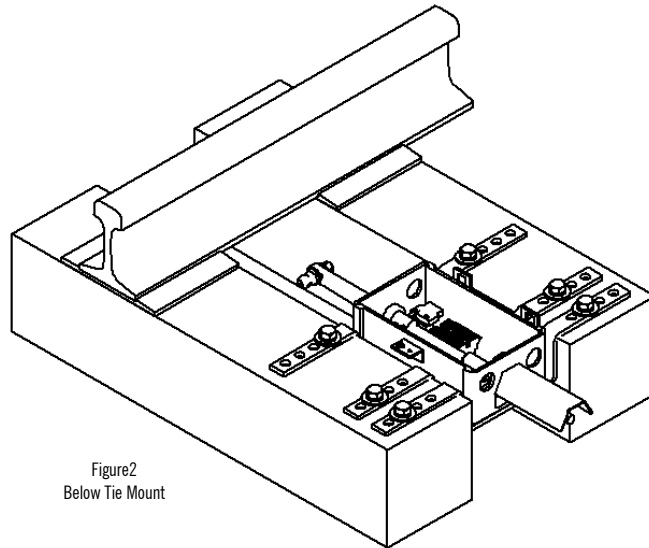


Figure2  
Below Tie Mount

3. **Stock Rail Mount: (see figure 3)**

This method firmly secures the SC-100 to the stock rail and provides an excellent reference point for detecting switch point position relative to the stock rail.

Contrast this with other circuit controller designs which rely solely on the position and security of tie plates and lag screws to maintain the relationship between the stock rail and the switch point and circuit controller.

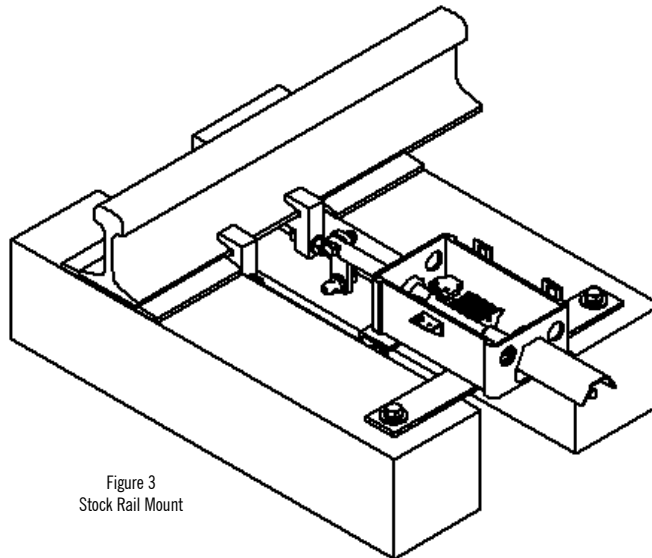


Figure 3  
Stock Rail Mount

**2. Question:** Once the mounting method has been chosen, how is the SC-100 attached to the switch point?

**Answer:** There are two common ways to connect the SC-100 to the switch points, both methods use existing layout material. This attribute reduces the cost of installation to the railroad's Signaling Department by eliminating training and the need to stock additional parts.

**1. Method #1:**

Using a drop lug on the point detector rod and a ball stud, the SC-100 can be attached using the same point detector connecting rod design as your existing U5 or 7J/K circuit controllers use.

**2. Method #2:**

This method uses the same detector rods, lugs and connecting rods used with your M-23 switch machine installations.

**3. Question:** How does the SC-100 handle the effects of switch point pumping?

**Answer:** The SC-100 reduces switch point pumping by employing an M23 Style detector rod and positive opening switches.

First, by using a "M23 style", non-contacting detector rod design, the detector rod does not come into contact with the indication contact limit switches until the switch points begin to move. As a result; the contacts do not move when minute movements of the point detector rod occur.

Second, the vital nature of the indication limit switches with their "positive opening operation" provides a certain level of immunity to switch point pumping. The switches allow for a small range of movement both in the open and closed position before the contacts make or open.

Contrast this with current circuit controller products where even the most minute movement of the switch points is directly transferred to the indication contacts which can lead to a loss of indication under a train and excessive wear.

**4. Question: How will the SC-100 handle low temperatures and condensation?**

**Answer:** The limit switches used in the SC-100 are rated from -40 to +85 degrees Celsius. They have been field proven in vital train control applications throughout the world, including the coldest regions in the Swiss Alps and the hottest and most humid regions of the Pacific Rim countries. Further; the limit switches are provided with an extra heavy spring which increases their reliability even under frost and ice conditions.

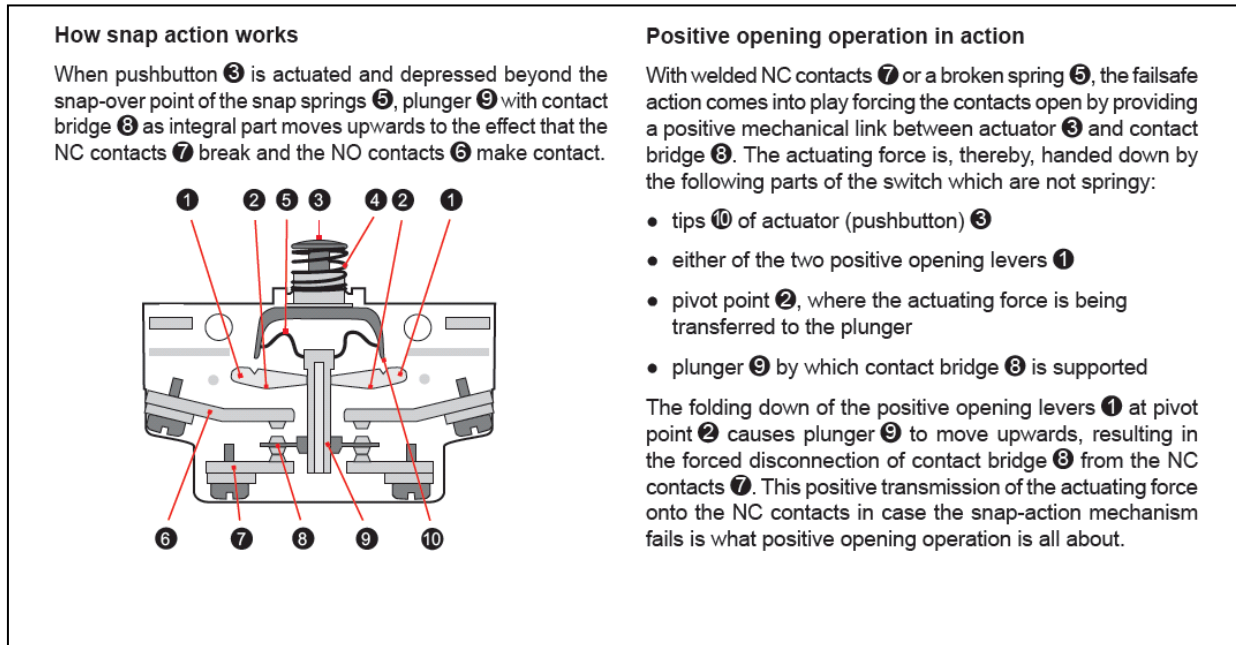
In addition; the SC-100 housing is equipped with state of the art ventilators. They allow air to freely circulate in and out of the controller, all while maintaining a NEMA 4 rating and preventing water intrusion.

If further protection from the effects of condensation and frost are desired the SC-100 has a heater option that is available in several voltages and wattages.

**5. Question:** What makes the contacts vital?

**Answer:** The contacts/limit switches in the SC-100 have unique positive opening operation. This operation insures that there is enough leverage and force to open the normally closed contact (see illustration below).

In addition; the contact wiping action and double breaking characteristics help to improve reliability and the life of the contacts.



**6. Question:** How well does the unit handle the high shock and high vibration environment of rail or tie mounted equipment?

**Answer:** The SC-100 uses only the highest quality components which have time tested in environments where harsh shock and vibration, such as the rail industry exists.

The limit switches used in the SC-100 were chosen based on their extensive use throughout European and Asian railroads for decades.

**7. Question:** How do you adjust the SC-100 Circuit Controller to provide ¼ inch detection?

**Answer:** The SC-100 is adjusted very much like an M-23 switch machine circuit controller. SC-100 ¼ inch detection is achieved by the following procedure:

- Operate the switch points to the reverse position against a ¼ inch obstruction gage. Start with the rod in a position where it is indicating. Turn the adjusting nuts on the connecting rod until the far point far point limit switch contacts operate (open or close).
- Next; operate the switch machine to the normal or near side with a quarter inch gage in place on the switch point. Start with the rod in a position where it is in indication. Turn the threaded end of the point detector rod until the limit switch contacts operate.
- Be sure to follow the specific rules in place on your railroad.

**8. Question:** Do the bearings require any lubrication? How long will they last?

**Answer:** The bearings are made of synthetic bearing material that is self lubricating and designed for moist environments. The bearings are made of a bearing grade polyester/graphite composite material. Due to their self lubricating properties the SC-100 bearings performs and wears better than traditional bronze bushings. (The bearings do not require any secondary lubrication.)