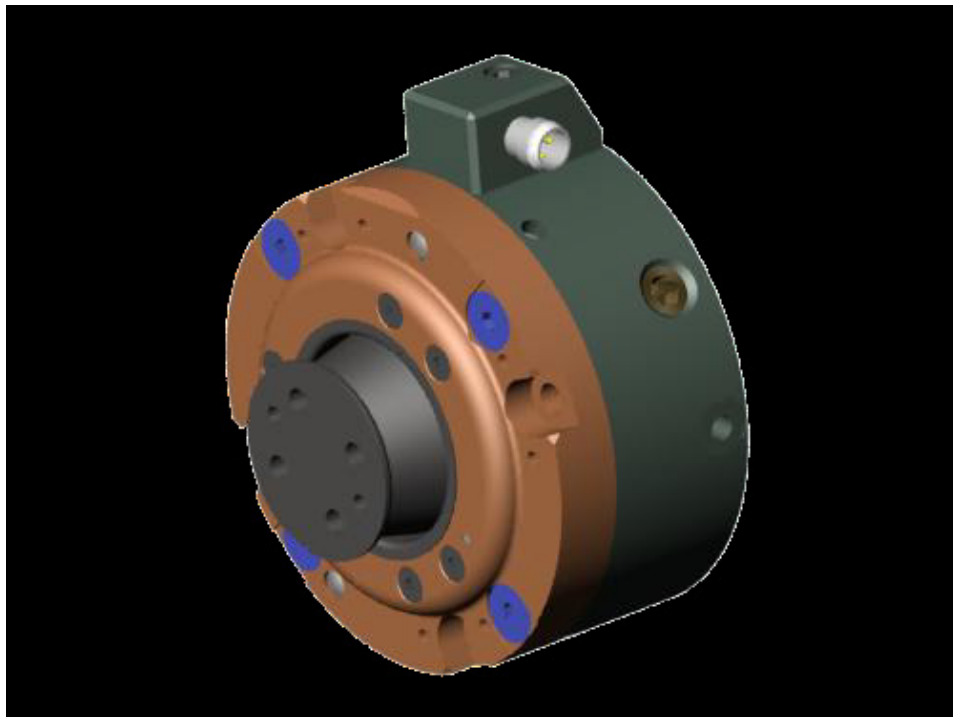




Robotic Collision Sensor SR-82 Switch Replacement Manual

U.S. Patent Nos. 6069415 and 6690208



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1. Safety

The safety section describes general safety guidelines to be followed with this product, explanation of the notifications found in this manual, and safety precautions that apply to the product. More specific notifications are imbedded within the sections of the manual (where they apply).

1.1 Explanation of Notifications

The notifications included here are specific to the product(s) covered by this manual. It is expected that the user heed all notifications from the robot manufacturer and/or the manufacturers of other components used in the installation.



DANGER: Notification of information or instructions that if not followed will result in death or serious injury. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.



WARNING: Notification of information or instructions that if not followed could result in death or serious injury. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.



CAUTION: Notification of information or instructions that if not followed could result in moderate injury or will cause damage to equipment. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.

NOTICE: Notification of specific information or instructions about maintenance, operation, installation, or setup of the product that if not followed could result in damage to equipment. The notification can emphasize specific grease types, good operating practices, or maintenance tips.

1.2 General Safety Guidelines

The Collision Sensor is not designed for, nor should it be used in, situations involving the safety of humans or animals. The Collision Sensor is designed as a safety device to protect industrial components and machinery from damage resulting from collisions and impacts. In all situations the user is responsible for insuring that applicable safety practices are followed as outlined by the manufacturer of the equipment on which the Collision Sensor is used.

The routing of electrical and pneumatic lines must minimize the possibility of stress, pullout, kinking, rupture, etc. Failure of critical electrical and/or pneumatic lines to function properly may result in injury to personnel and damage to equipment.



CAUTION: The customer should lock out and discharge all energy to the work cell prior to working on any Collision Sensor system. Failure to do so may result in damage to equipment or injury to personnel.

1.3 Safety Precautions



WARNING: Do not perform maintenance or repair on the Collision Sensor with air pressure applied, current supplied to the sensor, or the robot not in a safe condition. Injury or equipment damage can occur if this is not observed. Always ensure that air pressure has been vented from the unit, that electrical current is not supplied to the Collision Sensor's signal circuit, and that the robot is in a safe, locked-out condition consistent with local and national safety standards before performing maintenance or repair on the Collision Sensor.



WARNING: The Collision Sensor is only to be used for intended applications and applications approved by the manufacturer. Using the Collision Sensor in applications other than intended will result in damage to Collision Sensor or end-of-arm tooling and could cause injury to personnel.



CAUTION: Do not adjust or remove either of the (2) set screws installed in the wall of the body. Doing so may result in damage to the unit or failure of the switch to operate.

1.4 Electrical Connection

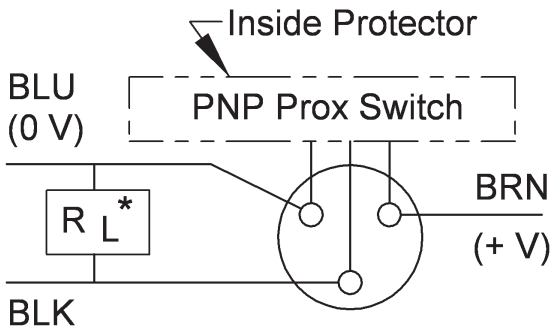
The Collision Sensor is connected to the user's control wiring as a normally-open PNP or NPN proximity switch. The following sketch details the connections between the internal switch and the pins in the connector block assembly. Optional mating cables, available from ATI, utilize the brown-black-blue color code indicated.



CAUTION: The user is responsible for connecting the collision sensor to their controls and providing an "electrical load" in series with the collision sensing switch. The switch is rated for instrument level signals of 100mA (max.) at 10–30VDC.

Figure 1.1—Switch Wiring

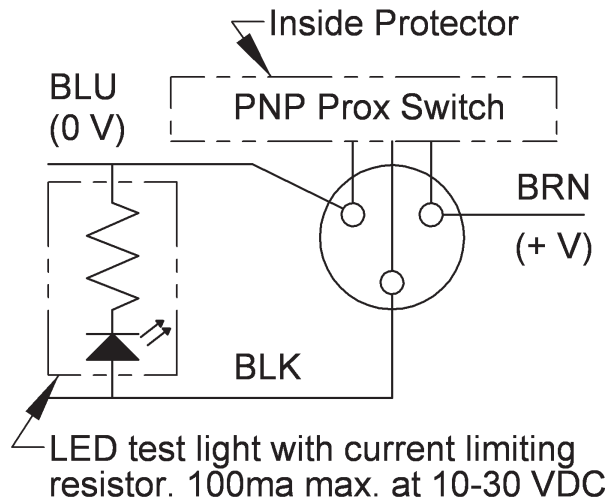
Switch Wiring:



SWITCH RATING: 100mA (Max.)
at 10-30 VDC

* Provided by customer.

Switch Test Circuit:



LED test light with current limiting resistor. 100ma max. at 10-30 VDC

1.4.1 Test Switch Functionality

Once the Collision Sensor has been installed and connected as described in the preceding paragraphs, proper electrical operation of the unit may be confirmed.

Supply the Collision Sensor with approximately 15 psi (1 bar) and ensure that the unit is electrically connected to the user's control circuit or to a test box per *Figure 1.1*. The switch should appear closed.

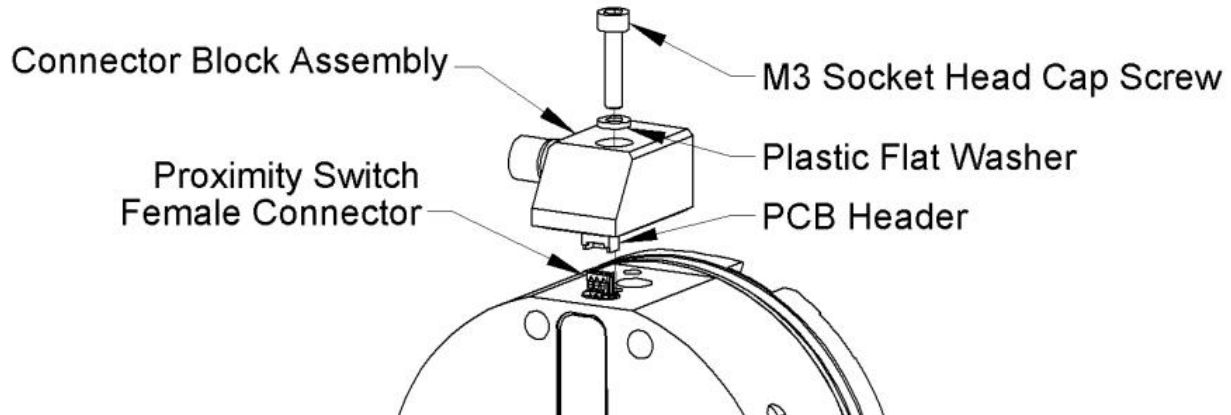
Manually push the Collision Sensor to simulate a collision while observing the switch output. When the collision occurs the switch will open and the test light will turn off.

Release the Collision Sensor and it will return to its working position. The test light will illuminate.

1.4.2 Replacement of Connector Block Assembly

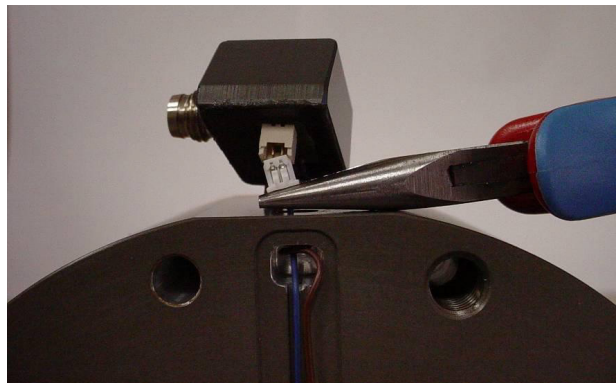
1. Remove the mounting screw using a 2.5 mm hex key (see *Figure 1.2*).
2. Pull the connector block away from the Collision Sensor just enough to ensure that the gasket is free from the body.
3. Unplug the PCB Header from the proximity switch connector in the body of the Collision Sensor.

Figure 1.2—Removal of Connector Block Assembly from the Collision Sensor



4. Hold the proximity switch connector protruding from the Body with needle nose pliers while plugging it into the PCB Header of the Connector Block Assembly. Position the Connector Block Assembly so that the dowel pin in the Connector Block Assembly is aligned with its mating hole in the Body.

Figure 1.3—Removal of Connector Block Assembly from the Collision Sensor



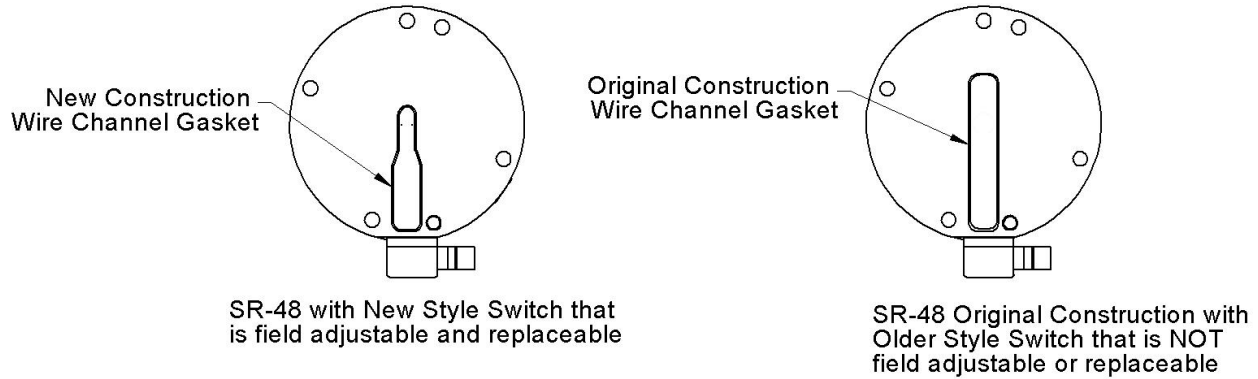
5. Carefully push the Connector Block Assembly into position. Check to see that the connector parts have properly mated by letting the Connector Block Assembly fall away from the Collision Sensor body.

6. Reposition the Connector Block Assembly for final attachment.
7. Slide the plastic flat washer onto the mounting screw and apply a drop of Loctite 222MS to the end of the threads.
8. Install the mounting screw and plastic flat washer.
9. Press the Connector Block Assembly firmly against the body of the Collision Sensor while tightening the screw. When tightened securely, the Connector Block Assembly should rest parallel to its mounting surface.
10. Confirm the integrity of the circuit between the 3-pole Nano connector and the internal switch by following the instructions in [Section 1.4—Electrical Connection](#).

1.5 Switch Adjustment

There are (2) styles of switch/connector block assemblies for the SR-82 Collision Sensor. The original style has a larger connector body than the current style. The current style has an adjustment set screw in the side of the connector body, refer to [Figure 1.6](#).

Figure 1.4—Determine the Switch/Connector Block Assemblies Style



If adjusting an original style switch, it is necessary to return the unit to ATI for servicing.

If adjusting a current style switch, refer to [Section 1.5.1—Current Style Switch Adjustment](#)

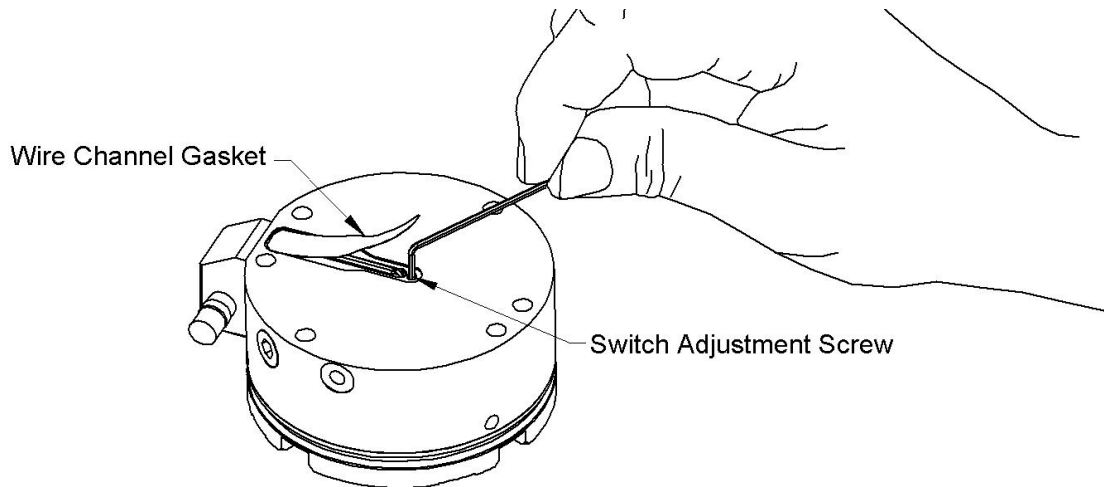
1.5.1 Current Style Switch Adjustment

Note: The switch is factory adjusted to open after the stem has traveled .025” in the axial direction. Adjustments should only be made if replacing the switch.

1. De-energize all electrical and pneumatic power supplied to the Collision Sensor. Drain all stored air and electric power in compliance with standard (OSHA) safety practices and standards.
2. Disconnect the air lines and signal wires connected to the Collision Sensor.

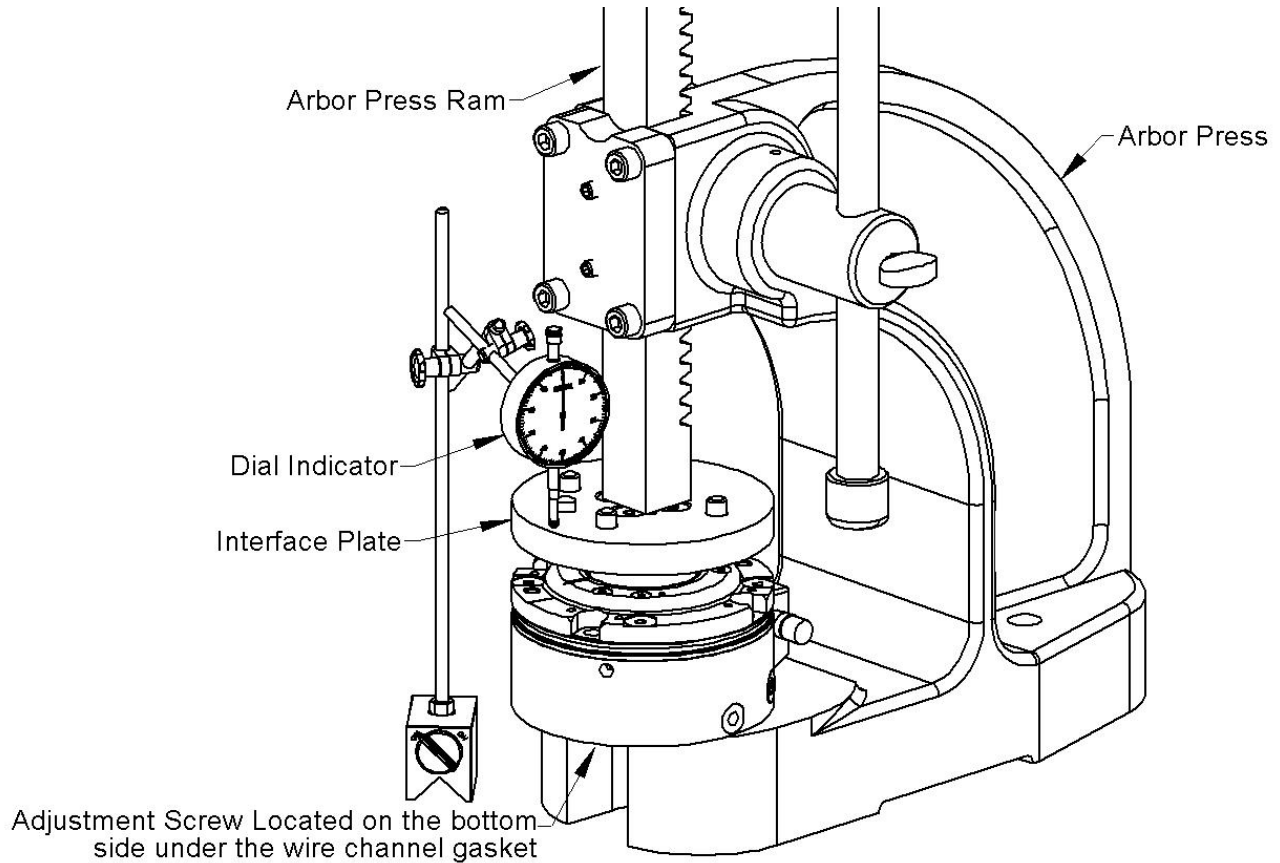
3. Remove the user-installed mounting hardware from the Collision Sensor and remove the unit. Take the unit to a test bench equipped with a clean working surface and compressed air.
4. Ensure that the Collision Sensor returns to its reset or working position with the stem fully extended and the alignment mark on the stem in line with the alignment mark on the cover plate (Temporarily supply approximately 15 psi (1 bars) to the unit).
5. Peel back the gasket at the bottom center of the Collision Sensor body and locate the switch adjustment screw.

Figure 1.5—Switch Adjustment Screw Location



6. Connect a test box per [Figure 1.1](#).
7. Attach an interface plate to the stem of the Collision Sensor.
8. Center the Collision Sensor under the press ram (see [Figure 1.6](#)).
9. Set a dial indicator in contact with the interface plate and adjust it so that the probe is vertical. Set the dial indicator height so that it can read at least .06" (1.5 mm) stroke. Set the dial ring to zero.
10. Push on the press handle until the switch circuit opens and check the distance traveled on the dial indicator.
11. If the distance traveled is greater than desired turn the adjustment screw counterclockwise. If the distance traveled is less turn the adjustment screw clockwise.
12. Repeat steps (10) and (11) as necessary to obtain the desired switch setting.

Figure 1.6—Checking Switch Height Adjustment



13. Re-install the Collision Sensor using the user-installed mounting hardware.



CAUTION: Before putting the Collision Sensor back into operation, confirm that the switch is functioning properly. See [Section 1.4.1—Test Switch Functionality](#).

14. Connect the air lines and signal wires connected to the Collision Sensor.

15. Energize all electrical and pneumatic power supplied to the Collision Sensor.