RS4000 Setup

Before you install the RS4000 system, check to ensure that nothing was damaged or lost during shipping.

If anything is damaged or missing, contact your salesman immediately.

Mount Components

The Rail System 4000 is intended for use with several different models of equipment. Each piece of equipment will accommodate this system differently. This section of the manual is intended to be a general guide and is not specific to any one manufacturer.

RS4000 Panel

The Panel assembly is generally mounted on the large deployable buggy provided with the tamper. The Panel comes with a universal mounting kit that has multiple mounting positions. Choose the right location for your specific equipment that will allow easy access to the RS4000 Panel and will also allow the cables to be routed to the peripheral components without issue.

RS4000 Lightbar

The Lightbar assembly is generally mounted toward the front of the large deployable buggy provided with the tamper. It would be helpful to mount the Lightbar up high and as far forward on the buggy as possible. Ensure that nothing will be blocking the lights on either side of the Lightbar when the system is in operation. The five small round indicators should face the tamper operator when properly installed. Installation of the Universal Lightbar Mount, may not require all of the pieces provided.

IMPORTANT: Ensure that the rubber isolators used in the mounts are perpendicular with the Lightbar once everything is installed.

RS4000 Sensor and Servo

The RS4000 Sensor is mounted directly to the top of the Servo that is used with your specific brand tamper. Any questions regarding how or where the Servo is installed should be referred to the tamper manufacturer.

RS4000 Buggy

The RS4000 aluminum Buggy will need to unpacked and partially assembled. New from the factory the Buggy will not have the wheel/axel or the bias clamp assemblies installed. Those items, along with a Flag, Battery Box and Handle, will be located in the shipping box with the Buggy frame. (Buggy setup is laid out in the 'Setup' section of this manual.)

RS4000 Tripod

The Tripod assembly gets installed onto the RS4000 Buggy. Ensure that the Tripod is oriented on the Buggy so that the red pointer, located at the bottom rear of the front mount clamp, is on the same side of the Buggy as the offset scale. (Tripod setup is laid out in the 'Setup' section of this manual.)

<u>Route and Install Peripheral Cables</u>
Locate and un-box the cable set that was supplied with the RS4000 Panel.

Panel Power –Locate the power cable for the Panel. This will either be Part Number 40046 (3-Pin), Part Number 40255 (6-Pin) or Part Number 40295 (5-Pin) depending on how your system was configured. The connector end of the cable plugs into the bottom of the Panel in location "C" of the Panel Connection Diagram. Run the cable along the frame of the buggy back to the power source **(24VDC for Panel Part Number 40500 and 127-150VAC for Panel Part Number 40504)**.

40046 Pin Out	**40255/40295 Pin Out**
White = Power	Red = Power
Black = Ground	Black = Ground
	Yellow = Toggle Left
	Brown = Toggle Ground
	Blue = Toggle Right

Once the power cable is energized, turn the Panel on and ensure that it powers up. If the Panel does not turn on, troubleshoot before moving on to the next step.

IMPORTANT: If your system was configured with Power Cord Part Number 40255 or 40295 but you are NOT using an external pendant to control Servo position, DO NOT REMOVE THE INSULATORS FROM THE ENDS OF THE YELLOW, BROWN AND BLUE WIRES DURING INSTALLATION.

Limit Switches – Locate the two limit switch cables, Part Number 40047. Mount the limit switches to the mount plates on the servo using the hardware provided with the Servo assembly (located in cloth bag tied to the Servo). The connector ends of the limit switch cables plug into the bottom of the Panel in locations E and F of the Panel Connection Diagram.

Lightbar Cable – Locate the Lightbar cable, Part Number 40048. Plug the appropriate connector into the Lightbar. The connector on the opposite end of the cord plugs into the bottom of the Panel in location A of the Panel Connection Diagram. **NOTE**: This cable has similar 8 pin connectors on both ends. One is male and one is female. Ensure that the correct end is being connected to the intended components.

Servo Power – Locate the Servo motor power cable, Part Number 40049. Connect the bare cables to the terminal block with one of each of the two wires located across from one of each the wires from the motor. The connector plugs into the bottom of the Panel in location D of the Panel Connection Diagram.

Sensor Cable – Locate the Sensor cable, Part Number 40050. Plug the appropriate connector into the Sensor. The connector at the opposite end of the cord plugs into the bottom of the Panel in location B of the Panel Connection Diagram. **NOTE**: This cable has similar 8 pin connectors on both ends. One is male and one is female. Ensure that the correct end is being connected to the intended components.
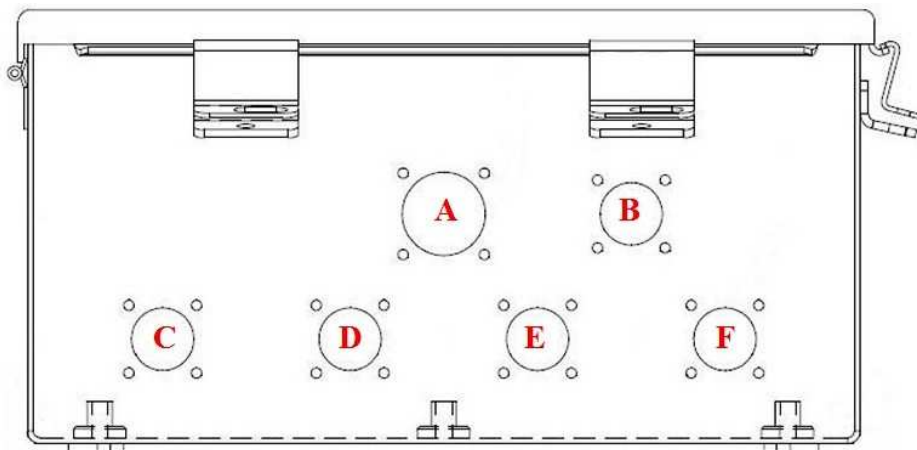
Panel Connection Diagram

System Functions Check

Lightbar – Turn the Panel on and observe that each of the three high output LED lights on the Lightbar flash in sequence. To check the red limit indicators, have someone activate each of the two limit switches located on the Servo assembly. If the Lightbar does not appear to turn on, troubleshoot before moving on to the next step.

Servo Motor – Check to ensure that the Servo motor is responding. To do this use the Left/Right motor control switch on the face of the Panel. Ensure that a response is received for both directions. If the Servo does not appear to turn on, troubleshoot before moving on to the next step.

Sensor – Check to ensure that the Sensor is watching for an input and communicating back to the Panel. To do this, use the Laser Simulator that was provided with the Sensor. Ensure that the Panel is in Standby mode. Place the Simulator up to the window of the Sensor (output Diode toward the window). Activate the Simulator by pressing the red button on the housing. Move the Simulator back and forth across the window of the Sensor and observe that both the lights on the Lightbar and the Panel are indicating an input from the Simulator. If the Panel and Lightbar do not respond to the sensor, troubleshoot this before moving on to the next step. Note: To ensure that the Simulator is functioning properly, simply look at the output diode while activating it. You should see a red flashing light being emitted from the diode.

Motor Lead Orientation – It is possible that the leads for the Servo motor were oriented backwards when the initial connections were made. It is simple and necessary to check.

Place the Panel in Automatic mode. Place the Laser Simulator in front of the window of the Sensor and move it to either of the outside edges. Activate the Simulator causing the Servo Assembly to start moving. DO NOT MOVE THE SIMULATOR WITH THE SERVO. Instead observe that the Sensor is trying to center on the Simulator. If you are holding the Simulator to the right side of the Sensor window, the Servo should be traveling to the right. If the Servo is traveling to the left, then the leads to the Servo motor are backwards and need to be reversed.

Limit Switch Orientation – **(Do this step only after you have completed the Motor Lead Orientation check above.)** It is possible that the limit switches were oriented backwards during the initial setup. It is simple and necessary to check.

Place the Panel in Automatic mode. With the Laser Simulator in hand, orient yourself around the Servo assembly so that you can reach the front of the Sensor and both limit switches. Place the Laser Simulator against the window of the Sensor and move it to either of the outside edges. Activate the Simulator causing the Servo Assembly to start moving. Active which ever limit switch the Servo is moving **toward** and ensure that the Servo travel stops.

When the limit switch is released, the Servo travel should start again. If the limit switch that the Servo is traveling toward does not stop the Servo when it is activated, then the switches are probably REVERSED. Quickly check to see if the other switch causes the Servo to stop. If the switches are backward, simply disconnect the connections on the bottom of the panel in locations E and F and reconnect them in the opposite locations.

Servo/Sensor Setup

IMPORTANT: Find and mark a section of level track with good gauge. Place the front of the Buggy with the Servo on that section of track. This same section of track will be used to setup the laser cart in a later step.

Turn on the power to the Rail System 4000.

Remove the vandal cover from the RS4000 Receiver and place it out of harms way (not on top of the Receiver for this process).
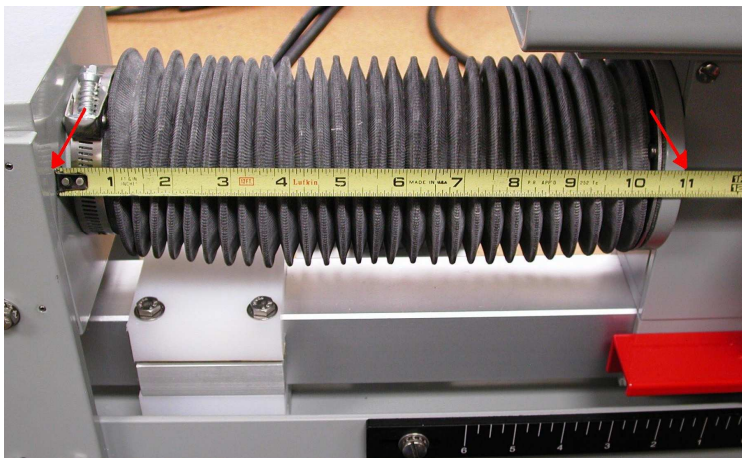
Center the Servo assembly by using the Left/Right toggle switch on the RS4000 Control Panel. Using the mounting points for the flexible shields (indicated by the Red arrows in the picture to the left) on the servo as a reference, measure to verify that the distance on both sides is equal. The measurement should be roughly 10 7/8" – 11" on both the left and right side of the Servo assembly.

Next, set pre-load tension spring or the reference/bias wheel for which ever rail you are going to start with.
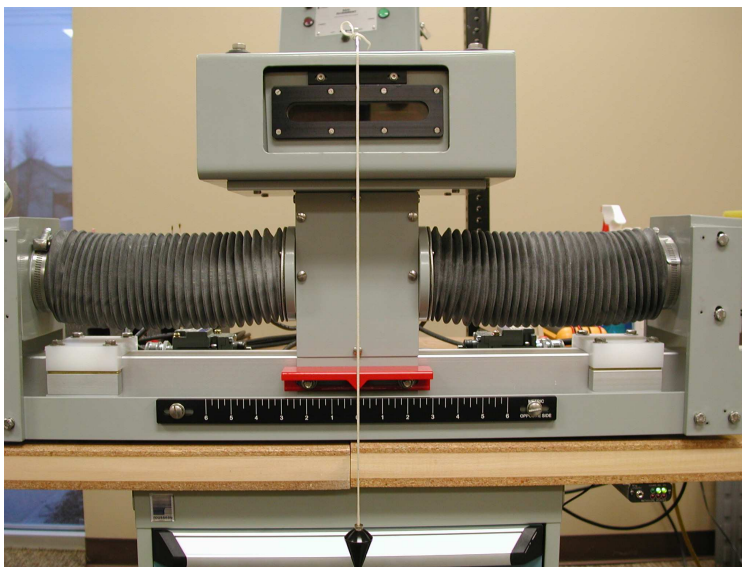

Next, tie a plumb bob to the lock stable on the top of the sensor mount. Align the string so that it is hanging directly through the center of the calibration plate on the face of the Sensor assembly as pictured to the left. Ensure that the string hangs far enough down to align the pointer and scale also.

NOTE: If you have not chosen level track, the measurement off of the plumb bob may not be accurate. <u>Level track is critical for this process.</u>

Measure from the Reference Rail to the string and record the measurement. Next move the Servo Platform to the opposite rail and ensure that the string is above center mark. Measure from the gauge side of the opposite Reference rail to the string and record the second measurement. The two measurements should be the same, if not split the difference.
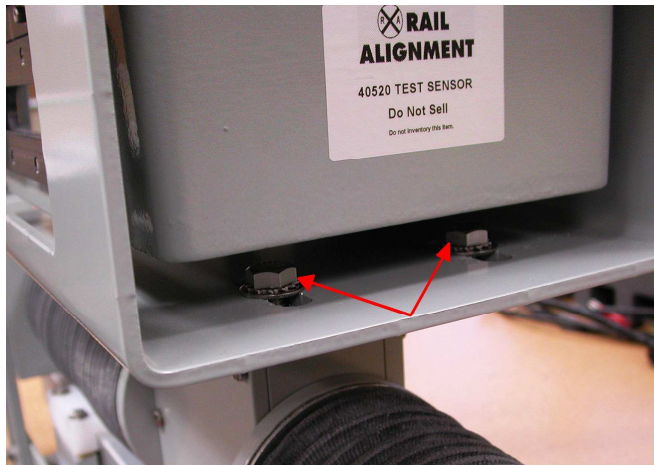
For example, if one side is 28" and the other is 27 ¾", then you would move the whole Sensor assembly in its mount in the proper direction to achieve a measurement of 27 7/8" from the plumb bob to either rail. Photo to the left shows the location of two of the four bolts that hold the Sensor Mount.
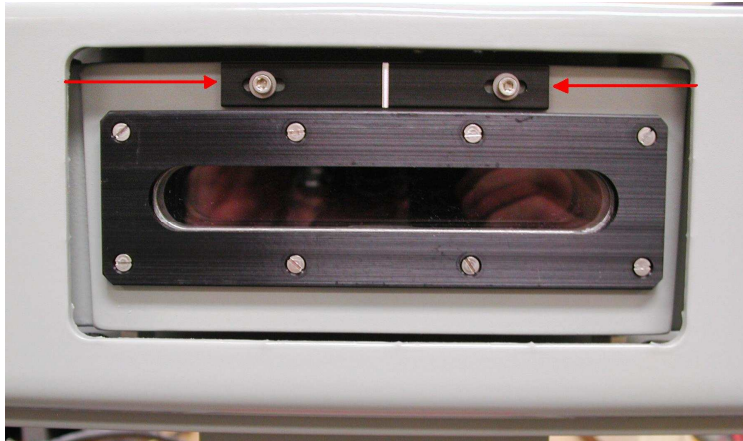
NOTE: In this example, record the '<u>final measurement</u>' of 27 7/8" as it will be used to set up the laser cart later.
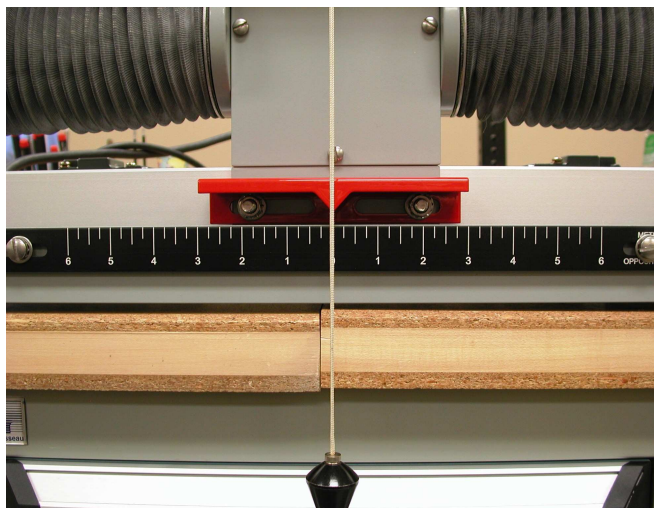
Adjust the pointer and scale so that the string runs through the center (Zero) of both pieces.

<u>Confirm that the string is still running through the center of the calibration plate on the Sensor as you do this process.</u>

WARNING:

The calibration plate between the two red arrows in the picture to the left is set at the factory for each specific Sensor assembly. This plate may not be in the same exact position for each individual Sensor. However, unless someone has changed the position of the plate or the Sensor is malfunctioning, it correctly indicates the true center for that specific Sensor and should not be changed.

Do not attempt component calibration. Calibration should be performed only by a qualified individual that understands basic calibration principles.

If you feel that your Sensor is not correctly calibrated, send it in for adjustment.

Replacement Sensor Installation and Adjustments

When installing a secondary/replacement sensor into a system, it is necessary to double check the alignment of the replacement Sensor to the center of the Servo assembly.

The process is simple. String a plumb bob through the center line on the calibration plate. If the plumb bob and string line up through the center of the pointer (bottom of Servo directly above the scale), then no adjustments are needed.

If the plumb bob and string do not line up through the center of the pointer, *then you must move the whole Sensor Mount in the necessary direction to align the pieces*.
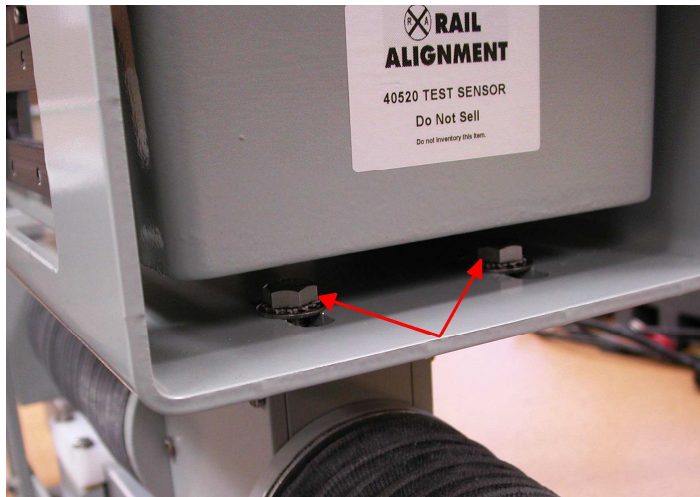
Loosen the four hex head bolts located on the bottom of the sensor mount directly below the Sensor. You can access two from each end of the mount opening as pictured to the left. With the bolts loose, move the sensor mount left or right as required to properly align the Sensor to the system. A 9/16" wrench is required to make the adjustment. Once the Sensor is properly centered, tighten the four hex head bolts.

The RS4000 Sensor and Servo are properly set up and ready for use.

Ground Straps

In early 2011 we determined that our electronics would benefit from the addition of a ground strap on both the Panel and Sensor. We have been providing ground straps with our systems since Mar of 2011. If you system doesn't currently have ground straps on it, you can purchase them as a spare part and install them if desired. Below is all the information that you will need.

Sensor Ground strap kit includes:
Qty 1, 9" Braided Ground Strap (Part # 40288)
Qty 1, 5/16-18 x 1 ¼" Hex Cap Screw
Qty 1, 5/16" Internal Tooth Lock Washer

Tools needed for install:
1/2" and 9/16" Wrenches

If you are installing a ground strap onto an existing system, you will need to remove the sensor from its mount first (1/2" wrench). Then remove the right rear (as you are facing the servo and sensor) bolt and washers from the inside of the sensor mount (9/16" wrench). Remove the flat washer from the bolt, leaving the ext. tooth lock washer. Put the bolt through one end of the ground strap and then reinstall the flat washer. Install the bolt through the mount and back into the servo. Tighten the bolt with a 9/16" wrench ensuring that the strap is hanging straight out of the side of the sensor mount.

Next, install the sensor into the mount. Use the 5/16-18 x 1 ¼" Bolt provided with the kit to hold the strap in right rear position of the sensor as pictured above. Install the 5/16" internal tool lock washer onto the bolt, then the strap, then the flat washer that was originally provided. Tighten all four mounting bolts using a 1/2" wrench.

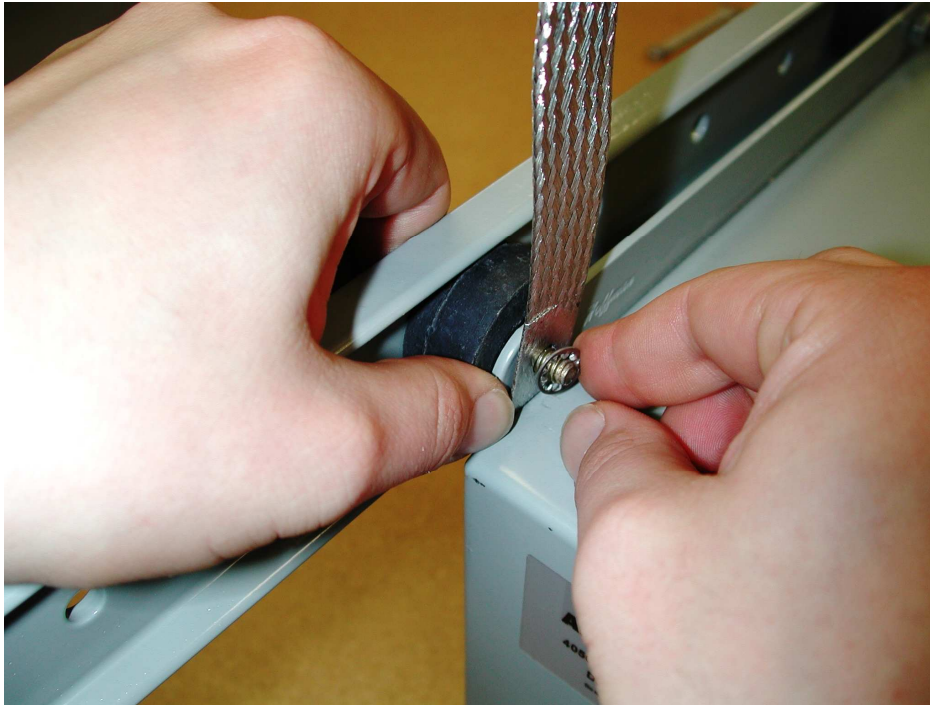Once the strap is installed correctly, the assembly should look like the photo to the left.

Panel Ground strap kit includes:
Qty 1, 5" Braided Ground Strap (Part # 40287)
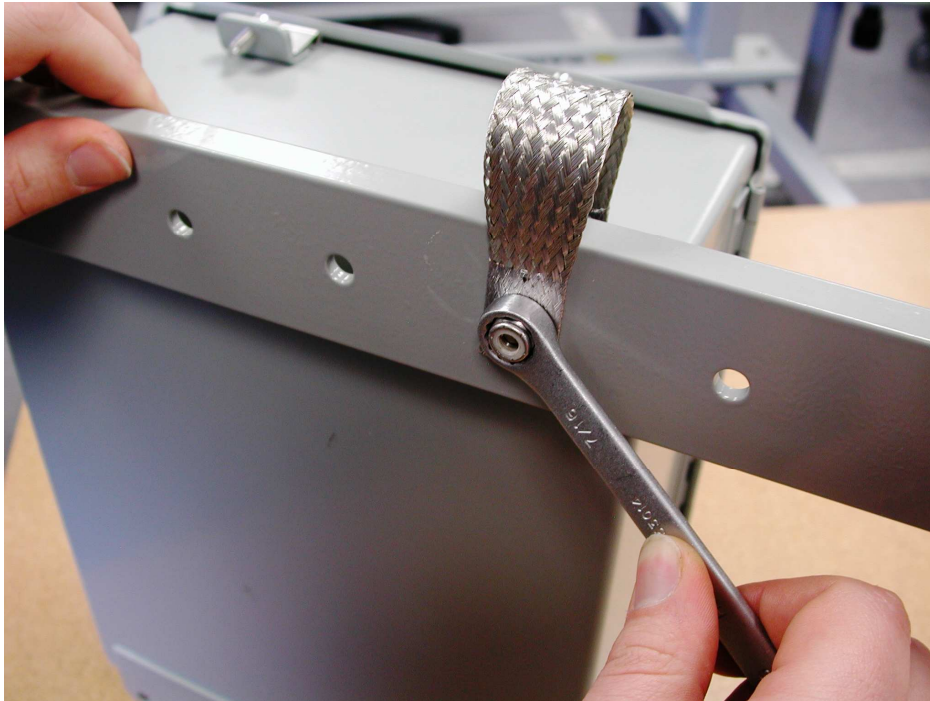Qty 2, 1/4" Internal Tooth Lock Washer
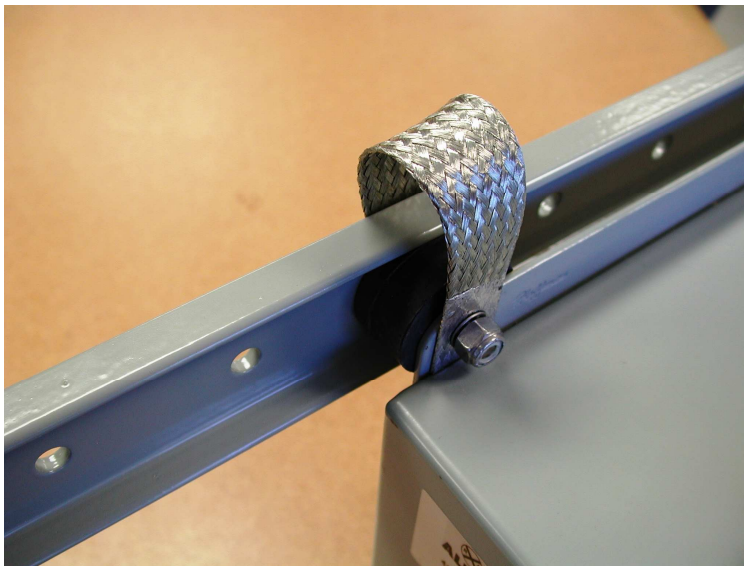
Tools needed for install:
7/16" Wrench

The ground strap for the panel is meant to ground the metal case of the panel to the metal mount that is attached to the front buggy of the tamper. It is recommended that any paint underneath where the strap will be installed be removed for best results. Choose any rubber mount in the corners of the panel. Remove the nylon lock nut from the panel side. Place the ground strap on the stud, then the 1/4" int. tooth lock washer and then replace the lock nut. Tighten the nut with a 7/16" wrench.

Next, remove the nylon lock nut off the back of the mount bar. Loop the ground strap over the bar from the front of the panel and land it on the stud. Place the second 1/4" internal tooth lock washer on the stud and then reinstall the nylon lock nut. Tighten the nut with a 7/16" wrench.

Once the strap is installed correctly, the assembly should look like the photo to the left.