

# Paving Applications

What type of controls you should use for paving depends on what result is required for the finish product. Some projects are looking for smoothness and improved rideability. Others are concerned with mat thickness and some require the new asphalt to match curb and gutter or existing grades. Topcon's System Five™ is very versatile and can be used in all these applications. The following are a few examples of what controls might be used and how to set them up.

## Paving City Streets with Sonics

When paving city streets, the general requirement is to lay a mat that is so many inches above the base at the centerline and to match curb and gutter (Figure 7-1). For this application, sonic control will be used on both sides.

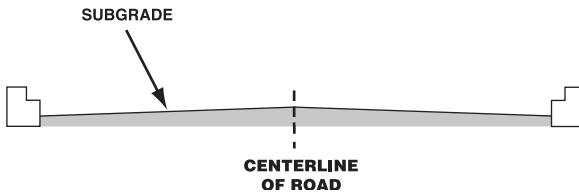


Figure 7-1. Paving to Center Line and to Match Curb

1. Before paving, make sure the machine is properly setup, cross slope is calibrated, and trackers are set in the correct position. See Chapter 5 and Chapter 6 for details.

2. Position right tracker over lip of gutter and left Tracker past the centerline on the base material (Figure 7-2).

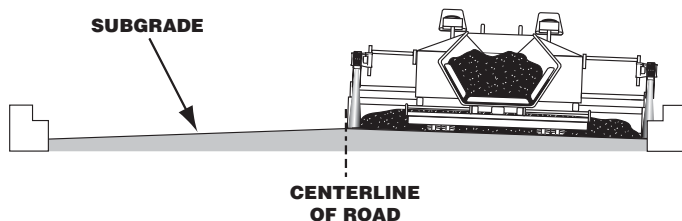


Figure 7-2. Positioning Tracker Over Gutter

3. Turn on the Control Boxes, then Survey and Set the displays to read the depth of asphalt to be laid (Figure 7-3).



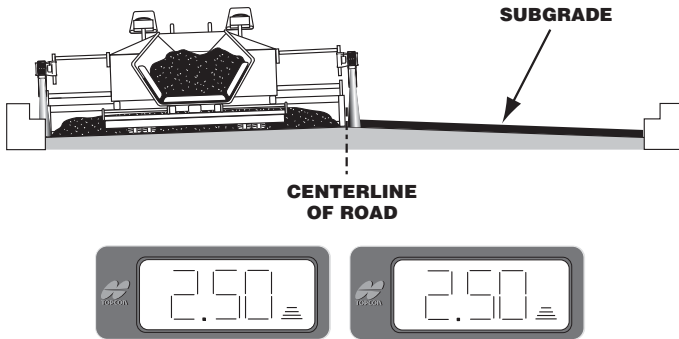
Figure 7-3. Control Box Displays – Depth of Asphalt

4. Put both Control Boxes in automatic mode and begin paving. Check the depth of mat at centerline and verify joint matches at lip of gutter. After compaction, make the necessary adjustments at the Control Box.



If the road width varies, it will be easier to keep the Tracker over the gutter if the Tracker is mounted to the extension on the paver.

- To pave the other side of the road, position the left tracker over the lip of the gutter and place the right tracker over the new mat (Figure 7-4).



**Figure 7-4. Paving Other Side of Road**

- Survey both Control Boxes on-grade and Set the displays to read the depth of asphalt to be laid. Put the Control Boxes in automatic mode and begin paving. Check to make sure joints match after compaction.

## Paving City Streets with Cross Slope

Another option is to pave the street using cross slope and sonic control. The tracker is positioned over the lip of gutter on one side and cross slope is dialed in for the crown on the other. This method may have to be modified due to the fact that in many cases, the curbs may be poured at different elevations on either side of the street. Even though the curb was poured out of tolerance, it may have passed inspection and the asphalt needs to match the curb and gutter. If the curbs are at different elevations, it is impossible to pave a typical design slope on both sides of the street.

A cross section design of a 36 feet wide street with a 2.0% slope will produce a .36 feet rise at centerline (Figure 7-5).

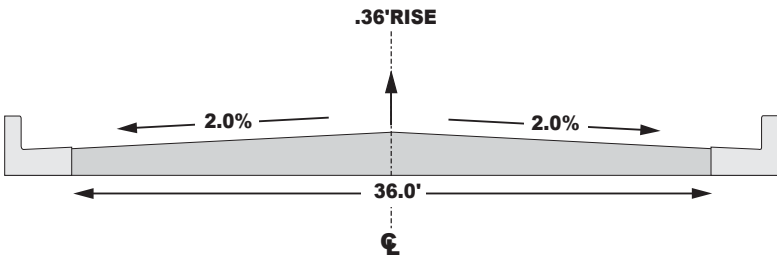


Figure 7-5. Paving with Cross Slope

If the curbs are at different elevations, a .36 feet rise at centerline will produce incorrect slopes (Figure 7-6).

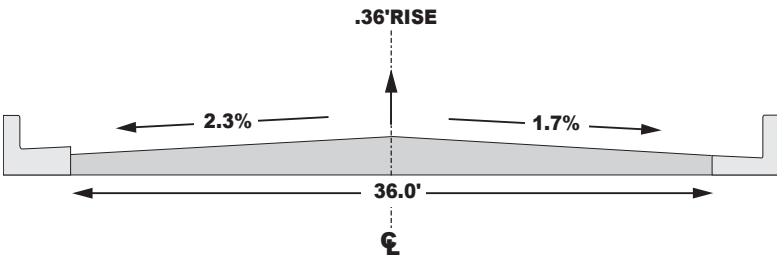


Figure 7-6. Curbs with Different Elevations

When System Five is used to pave a true 2.0% slope, the crown of the street will not be at the centerline (Figure 7-7).

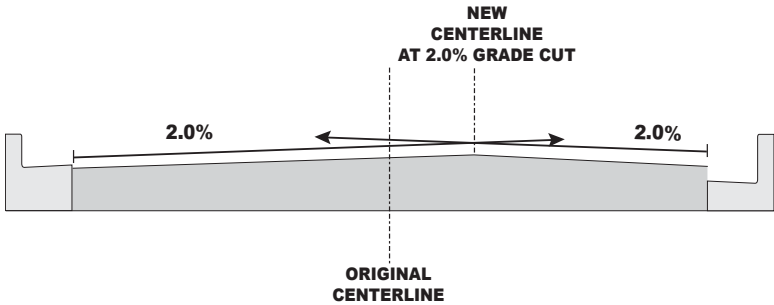


Figure 7-7. Curb with Same Slope

To pave from uneven curbs using slope control, choose the side of the road with the highest curb and position the tracker over the curb. Set the other side for the desired cross slope and begin paving (Figure 7-8).

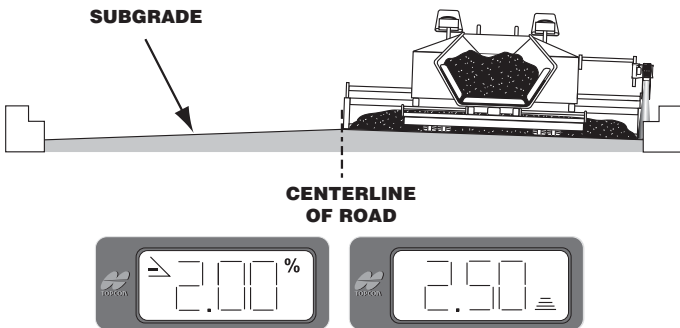
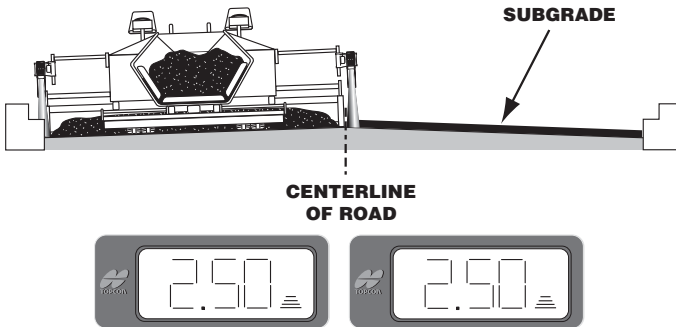


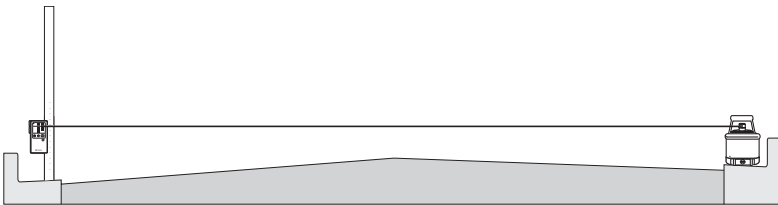
Figure 7-8. Paving Uneven Curbs with Slope Control

To keep the centerline in the middle of the road, the second pass will have to be set up with Sonic Control on each side of the paver. The left tracker will match the lip of the curb and the right side tracker will follow the new mat (Figure 7-9). The cross will not be consistent on this side of the roadway, but the joints will match.



**Figure 7-9. Second Pass when Paving Uneven Curbs**

The curb elevations can be easily spot checked using a fast leveling RL-HB rotating laser. Set the laser at the lip of one curb, then use the detector and a folding rule to take a reading on the other curb (Figure 7-10). Spot check every 25-50 feet by just moving the laser.



**Figure 7-10. Checking Curb Elevations**

## Paving Streets Through Intersections

As you pave city streets, you will come upon intersections where the curb stops. There are a couple of methods for controlling grade through the intersection.

### Method 1 for Paving Intersections

For this method, the base of the intersecting road will be used as the reference.

1. With both sides in Elevation Control, pave to the intersection (Figure 7-11).

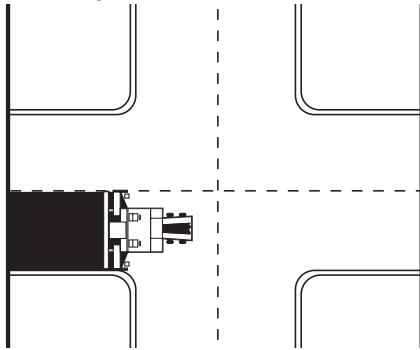


Figure 7-11. Paving Through Intersections

2. Just before the right tracker reaches the end of the curb, press the Auto/manual button to put the Control Box in manual mode (Figure 7-12).

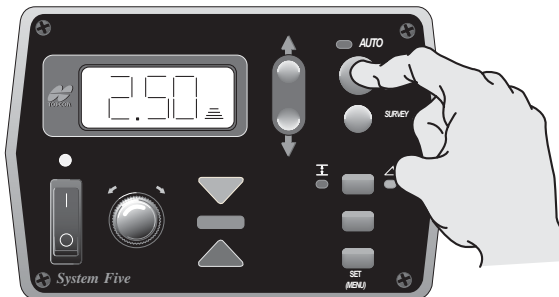
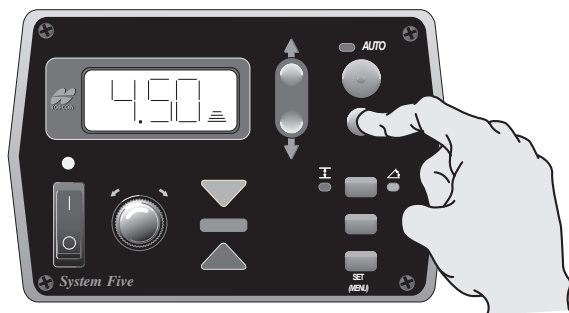


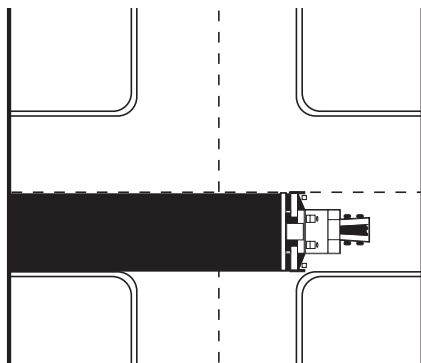
Figure 7-12. Control Box in Manual Mode

- Without stopping, continue paving until the right tracker is on the base material of the intersecting road. Survey the tracker on-grade to the new reference (Figure 7-13) and put back into Automatic Control.



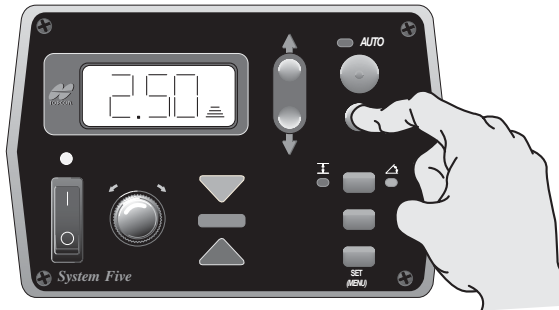
**Figure 7-13. Survey to On-grade and Return to Automatic Control**

- Pave through the intersection, and just before the Tracker reaches the curb on the other side (Figure 7-14), press the Auto/manual button to put the Control Box in manual mode.



**Figure 7-14. Paving Through Intersection**

- Without stopping, continue paving until the tracker is back on the lip of the curb. Survey the tracker on-grade (Figure 7-15 on page 7-9) and put back into automatic control.



**Figure 7-15. Survey to On-Grade and Return to Automatic Control**

You may find after surveying that for the tracker on the curb the number has changed slightly from the curb on the other side of the intersection. This is due to the different depth of the base below the lip of curbs. While paving, slowly dial the display back to the previous number.

## Method 2 for Paving Intersections

Sometimes, the base of the intersecting road is too rough to use as a reference. An alternative is to use a simple piece of stringline.

1. Take a section of 1/8" diameter string and nail or secure it to the curb.
2. Pull the string tight through the intersection and nail or secure it to the other curb (Figure 7-16 on page 7-10).



If the intersecting road has a crown, hike the stringline up in the middle of the road to place the string at the proper height. A hub or a stake with a piece of wire to hold the stringline works fine.

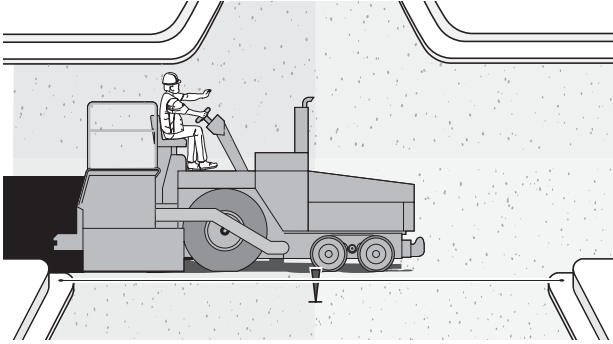


Figure 7-16. Paving Through Intersection Using Hub

This constant reference will give you complete control through the intersection and will also ensure that you tie in perfectly to both curbs.

## Paving Intersections with Cross Slope

When paving with slope, intersections do not require any adjustments if the “mainline” cross slope does not change. If the slope does change, then a combination of slope and Tracker should be used (Figure 7-17).

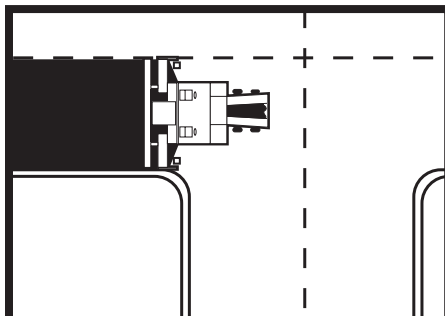
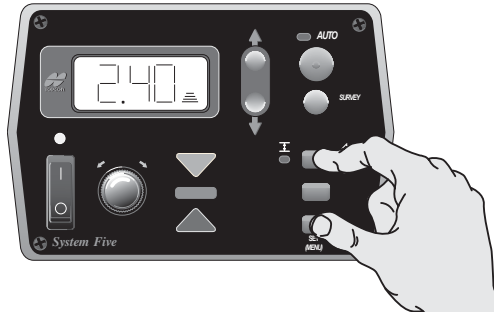


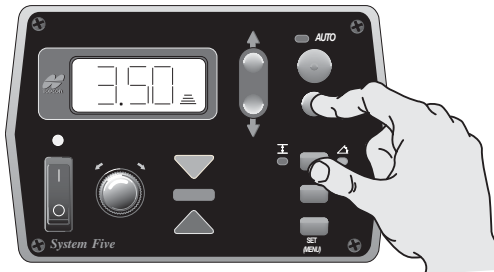
Figure 7-17. Paving Intersections with Cross Slopes

1. Put the slope side of Paver in manual mode just before the slope of the intersection begins to change (Figure 7-18).



**Figure 7-18. Switching to Elevation Control and Surveying On-grade**

2. Switch from slope to elevation control on the Control Box and Survey the tracker on-grade (Figure 7-19).



**Figure 7-19. Surveying Tracker to On-grade**

3. Pave through the intersection with the Sonic Tracker in automatic.

4. Upon reaching the end of the intersection (Figure 7-20), put the Control Box back in manual mode, change to slope control, and Survey the slope to get an on-grade signal (Figure 7-21).

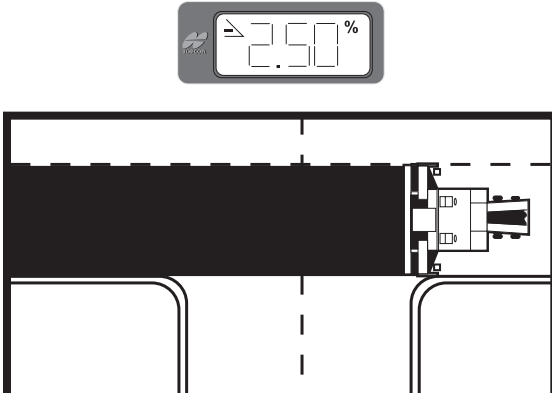


Figure 7-20. Paving Through Intersection

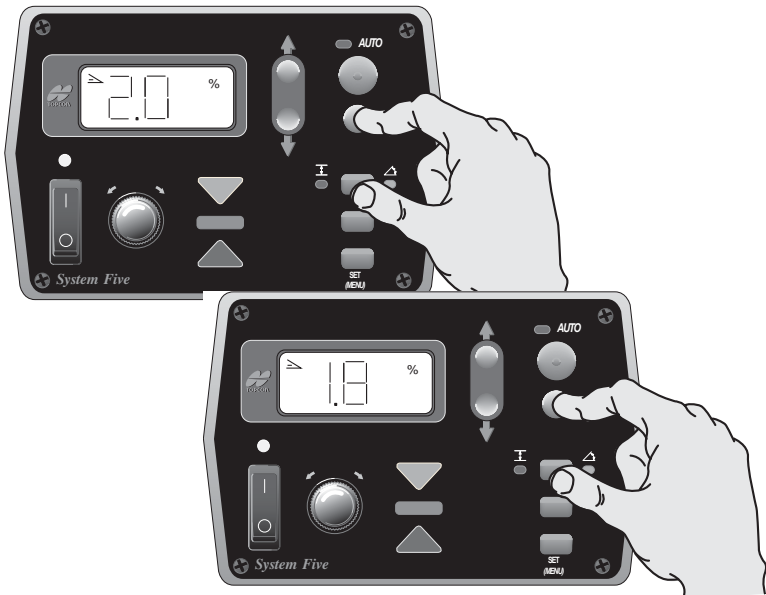


Figure 7-21. Returning to Manual and Surveying On-Grade



## NOTICE

*You may find after surveying the slope that the number displayed is not the same as the desired cross slope. This will occur if the surface being paved is not also at the desired slope. To get back to the correct slope continue paving in automatic and slowly dial the display to the desired slope. Failing to survey when changing back to slope control could result in a bump in the mat.*



# Maintenance

This section contains information regarding preventative maintenance and daily care of System Five™. Also included are:

- Cleaning procedures for the Sonic Tracker II™ Transducer.
- Replacement procedures for the Sonic Tracker II Transducer.

## **Preventative Maintenance & Daily Care**

A good preventative maintenance and daily care routine will prevent many problems before they occur. The most important part of daily care for System Five™ is to clean it and keep it free of debris, and to thoroughly dry removable components (Sonic Tracker II™, the Control Box, and cables) before storing them in the Carrying Case. In addition, the following procedures will ensure trouble free operation:

1. Keep the Carrying Case clean and dry. Do not leave it open and exposed to the elements. Clean and dry all components prior to placing them into the Carrying Case.
2. Be sure cables left on the paver are attached to protective connector caps, not in use. Water accumulating on the connectors can cause electrical shorts.

3. Do not use high pressure spray water steam cleaner hoses directly on cables and components. The components can be used in the rain or light spraying.
4. Check the Sonic Tracker II™ Transducer daily to make sure the Filter Foam and Transducer are clean and free of debris. If the Filter Foam is clogged with dirt, replace it. If the Transducer appears to be covered with debris and performance is being affected (see Sonic Tracker II™ in Chapter 2: Operation) clean or replace Sonic Tracker II™ Transducer using the steps listed later in this chapter.

## Sonic Tracker II Transducer Cleaning

### NOTICE

*This procedure is not meant to be a regular maintenance procedure. Clean the Transducer only when contamination is suspected or evident.*

### NOTICE

*Cleaning the transducer too much will result in a shortened Transducer life and/or water damage to the Sonic Tracker.*

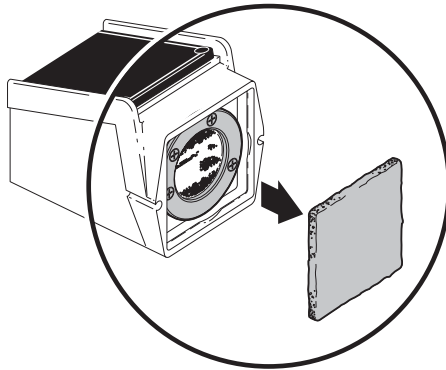
1. Hold the Sonic Tracker II™ in an upright position to prevent moisture from inadvertently entering the Sonic Tracker.
2. Mix a mild detergent with water and place the mixture in a spray bottle (use Simple Green® where available).
3. With the Sonic Tracker upright, thoroughly spray the Transducer with the detergent solution.

4. After spraying the Transducer with the detergent, fill the spray bottle with clean water and rinse any residual detergent off of the Transducer.
5. Allow the Sonic Tracker to thoroughly dry.

## Sonic Tracker II Transducer Replacement

If the ability of the Sonic Tracker II to “see” a sonic stringline or other reference continues to be impaired, the transducer may be damaged and needs replaced.

1. Remove and discard the Filter Foam—a new filter foam is provided in the Transducer Replacement Kit (Figure 8-1).



**Figure 8-1. Remove Filter Foam**

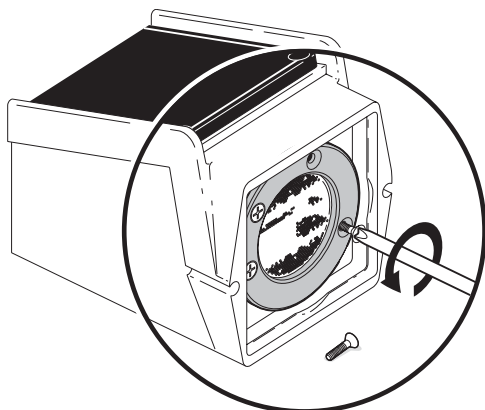
2. Remove the four screws and the black retaining ring. Remove and discard the “O”-Ring (Figure 8-2 on page 8-4).



### NOTICE

*Always remove and discard used “O”-Rings. Used “O”-Rings are distorted and can lose elasticity due to weather or exposure to diesel fumes.*

The Transducer Replacement Kit includes an “O”-Ring and four replacement screws; however, use the original screws and keep the four supplied in the kit for replacements in the event one or more are lost.

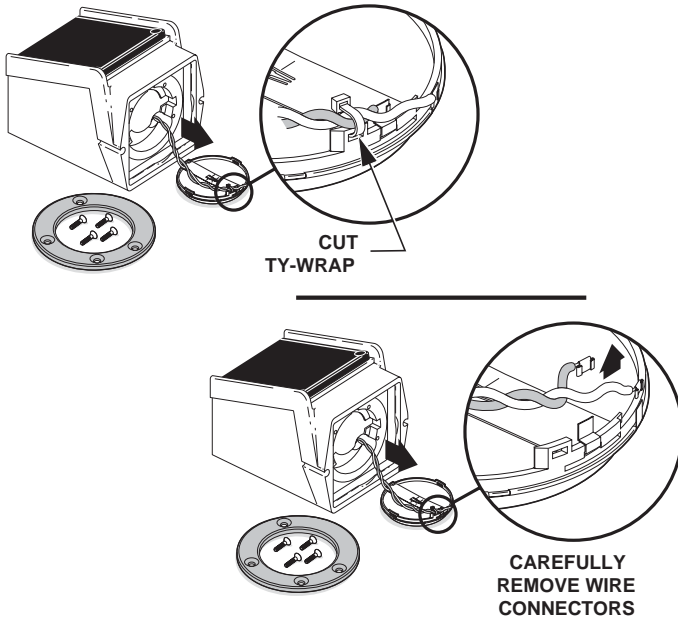


**Figure 8-2. Remove Screws, Retaining Ring, and “O”-ring**

3. Gently pull out the transducer and use a SMALL pair of dikes to gently cut the Ty-Wrap, then remove the small wire connectors from their tabs (Figure 8-3 on page 8-5).

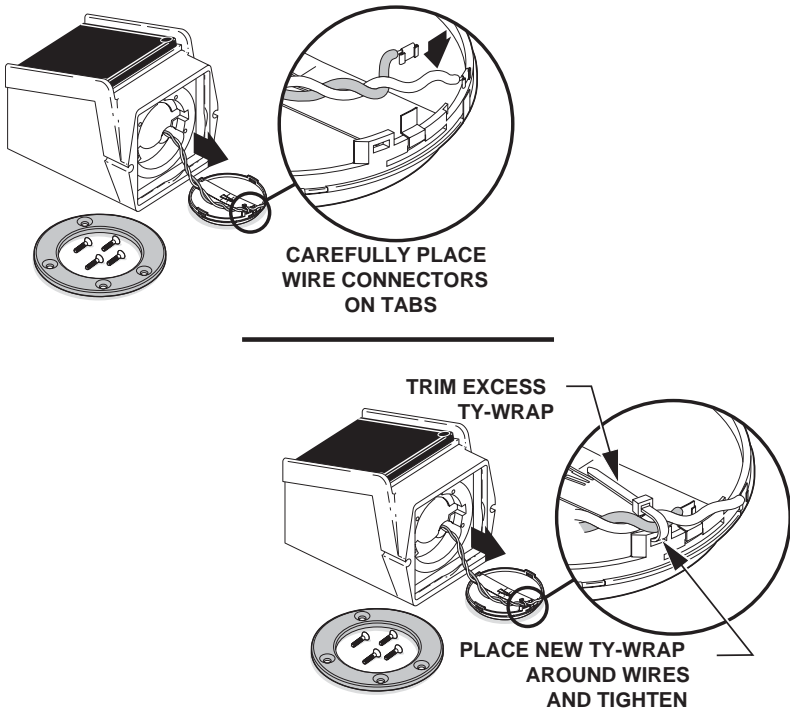
**NOTICE** NOTICE

*When cutting the Ty-Wrap, be careful not to cut or damage the wires.*



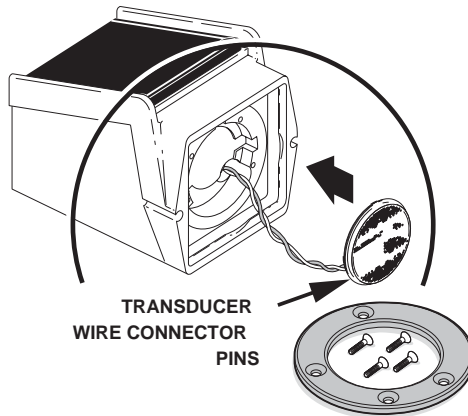
**Figure 8-3. Remove Transducer, Cut Ty-Wrap, and Remove Connectors**

4. Place the wire connectors of the new transducer firmly on their tabs; the gray wire connector is placed on the elevated tab. Place the Ty-Wrap in the slot next to the elevated (gray wire) tab, tighten and trim. **DO NOT** pinch the wires (Figure 8-4 on page 8-6).



**Figure 8-4. Replace Transducer, Connectors, and Ty-Wrap**

5. “Feed” the wires back up into the Sonic Tracker II and seat the transducer into place (the two wire tabs have to sit down into the extra deep area of the recess). Place the new “O”-ring around the transducer and seat firmly between the transducer and the Sonic Tracker II transducer recess (Figure 8-5 on page 8-7).



**Figure 8-5. Replace Wires, Transducer, and “O”-ring**

6. Place the black retaining ring over the transducer assembly with the beveled edges out and the flat surface against the Sonic Tracker II base. Line up the holes for the mounting screws. The mounting screw holes are set to an irregular pattern, ensuring the retaining ring only lines up with the mounting holes one way (Figure 8-6 on page 8-8).
7. Start the mounting screws into the holes and tighten each until firm (Figure 8-6 on page 8-8). **DO NOT OVER TIGHTEN.** Use a cross (X) pattern when tightening the screws.

**NOTICE**

**NOTICE**

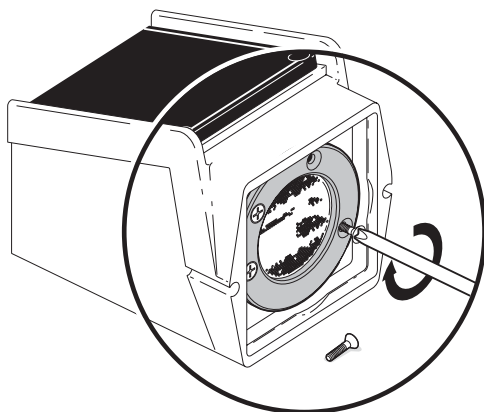
*DO NOT use Loctite® on the mounting screws. Loctite® will attack and degrade the plastic retaining ring.*

**NOTICE**

**NOTICE**

*Over tightening the screws can distort the transducer metallic material and may crack the*

*retaining ring. The “O”-ring provides tightness while preventing vibration from loosening the mounting screws.*



**Figure 8-6. Replace and Tighten Mounting Screws**

8. Ensure the metallic surface inside the transducer has no visible wrinkles. If distortion is evident, repeat steps 5 on page 8-6 to step 8.
9. Place a new filter foam over the transducer. The Sonic Tracker II is now ready for operation.