



DISCOUNT TIRE UNIVERSITY

# TPMS REBUILD & INSTALLATION

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PARTICIPANT REFERENCE GUIDE

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# TPMS REBUILD & INSTALLATION

## INTRODUCTION

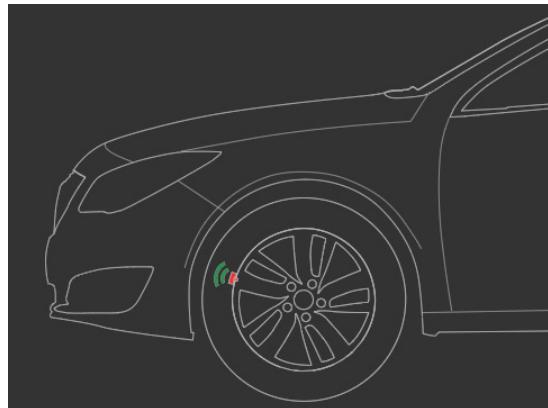
In this module, you will learn about the different styles of sensors used in our stores and how to make certain they are installed correctly, ensuring the system will operate properly.



## TPMS

As a vehicle is driven down the road, the Tire Pressure Monitoring System is constantly monitoring the air pressure in each tire, through sensors that are attached to each wheel.

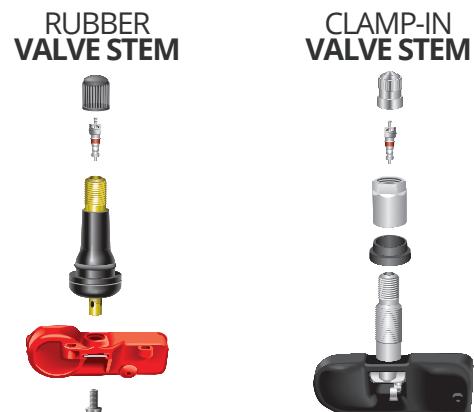
This system is an important safety feature. Due to their placement, sensors are often exposed to extreme forces and harsh conditions.



## Sensors

Back in Wheel Basics, we learned about the different types of sensors and sensor anatomy. We will now focus on how to rebuild and install sensors on wheels.

Most sensors contain one-time use parts that must be replaced each time the sensor is dismounted from the wheel. Replacing and rebuilding sensors is essential to keeping the TPMS operating properly.



# TPMS REBUILD & INSTALLATION



## INTRODUCTION *(continued)*

### Best Practice

Every vehicle we service with an operational TPMS is required to leave our store with an operational TPMS.

It is a Best Practice to rebuild a valve stem sensor every time a tire is dismounted from the wheel.



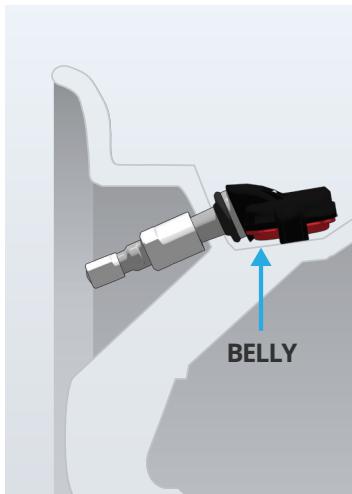


# TPMS REBUILD & INSTALLATION

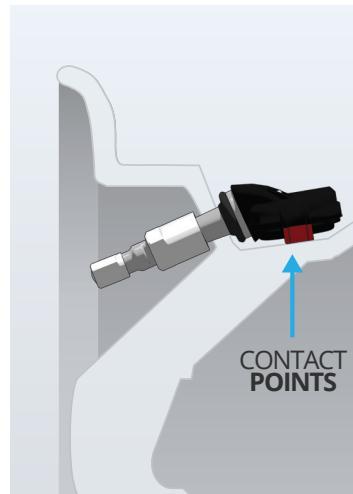
## INSTALLING SENSORS

### TPMS Orientation

When installing a valve stem sensor, there are a few details about the placement of the sensor that must be followed.



Sensors must be installed “belly to the barrel.” This allows for the electronics to identify when they are spinning, while the vehicle is in motion.



The sensor body can make light contact with the wheel when it is installed, but only at the contact points located on the sensor’s “belly.”



Sensors are designed to work properly up to a 30-degree angle from horizontal.



If the sensor is installed at anything steeper than 30 degrees, the sensor may not properly communicate when the tire is moving.

This may cause a TPMS malfunction.

# TPMS REBUILD & INSTALLATION



## INSTALLING SENSORS *(continued)*

Some wheels use counterbores, flattened reliefs, and curved wheel surfaces at the valve hole. This can affect the ability of the sensor to seal.

These features can also cause the sensor body to make contact with the wheel in an improper way.



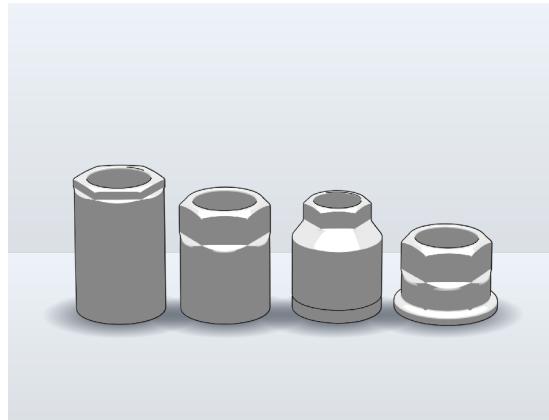


# TPMS REBUILD & INSTALLATION

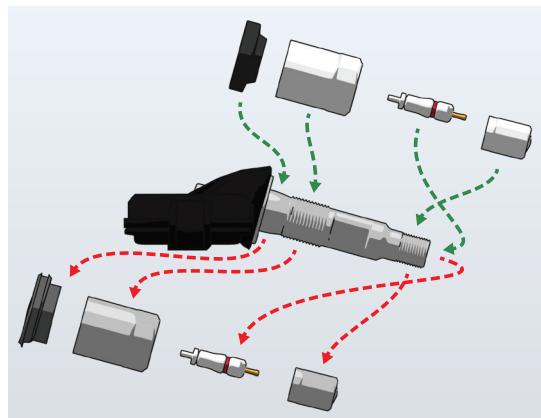
## INSTALLING SENSORS *(continued)*

### Hex Nuts

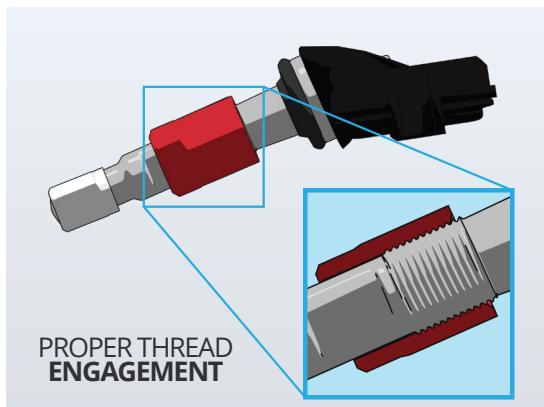
Hex-type retaining nuts come in many sizes and shapes.



The replacement parts should be identical to the parts removed in both length and diameter.



This will ensure compatibility for thread engagement and the length of valve stem that remains exposed for inflation.



# TPMS REBUILD & INSTALLATION



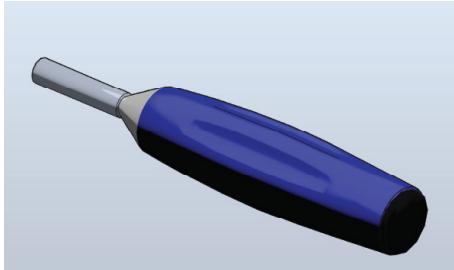
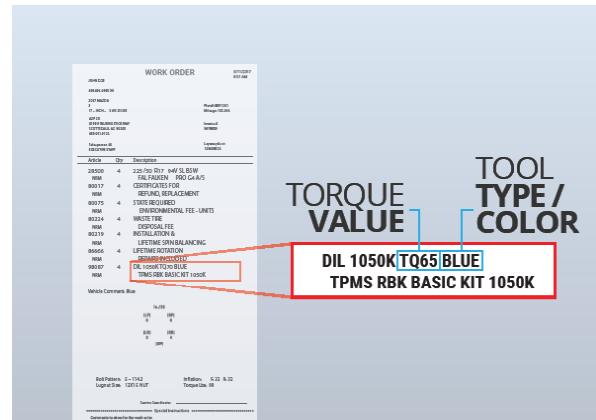
## INSTALLING SENSORS (continued)

### Torque and Tools

There are many different sensor designs, and each requires a specific torque value to properly complete the installation process.

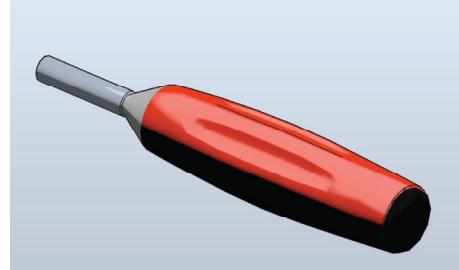
Installing these correctly will result in a proper seal to the wheel.

For each sensor and rebuild kit we sell, we designate the exact torque recommended and the type or color of the tool to be used. This can be found on the detail line of the work order:



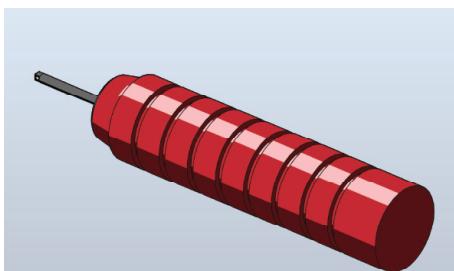
**DIL 1050K TQ12 T10**  
TPMS RBK BASIC KIT 1050K

**T10 Torque Tool** – snap-in sensor; 12 in/lbs



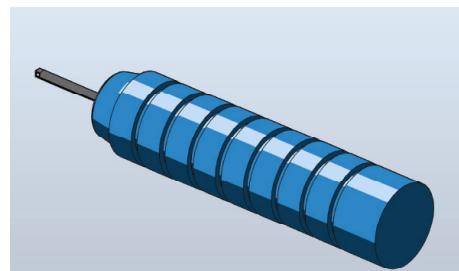
**DIL 1050K TQ40 T20**  
TPMS RBK BASIC KIT 1050K

**T20 Torque Tool** – valve stem retaining screw; 40 in/lbs



**DIL 1050K TQ40 RED**  
TPMS RBK BASIC KIT 1050K

**Red Torque Tool** – for aluminum retaining nuts; 40 in/lbs



**DIL 1050K TQ65 BLUE**  
TPMS RBK BASIC KIT 1050K

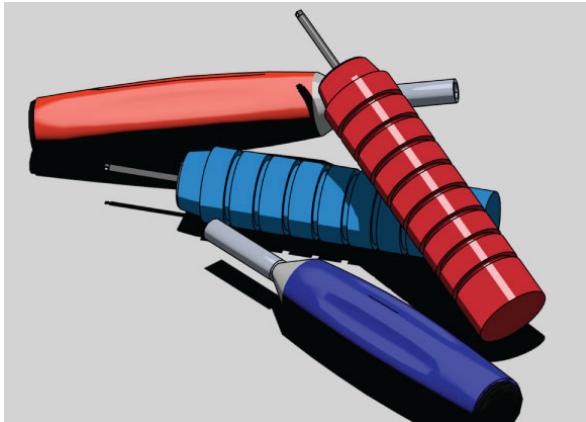
**Blue Torque Tool** – for aluminum retaining nuts; 65 in/lbs



## TPMS REBUILD & INSTALLATION

### INSTALLING SENSORS *(continued)*

#### Torque & Tools *(continued)*



Each of these tools are simple to use.

# TPMS REBUILD & INSTALLATION

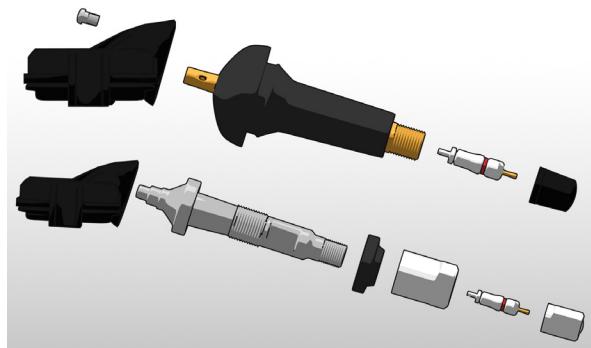


## REBUILDING SENSORS

Rebuilding TPMS sensors is the most detailed labor you will complete in a Discount Tire store.

Attention to detail is important to make sure the work is done correctly.

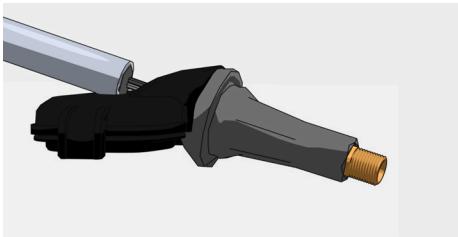
The valve stem, grommet, retaining nut, and valve core are all important parts of the inflated assembly.



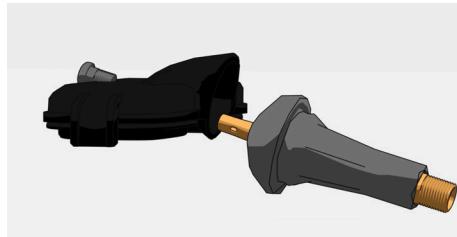
A slow leak from the valve stem can place a customer in the same inconvenient situation as driving over a nail or other tire failures.

### Rebuilding a Rubber Valve Stem

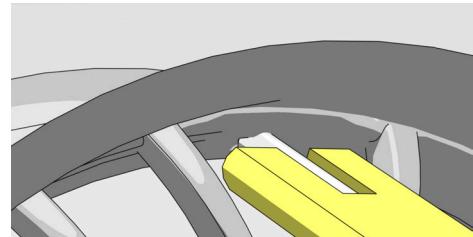
#### When using retaining screw style sensors:



1. Remove the valve retaining screw to separate the valve stem from the sensor.

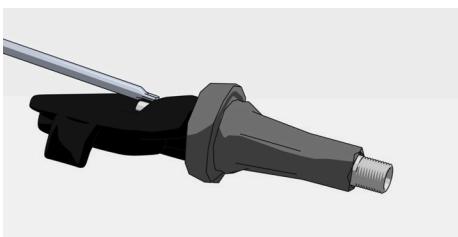


2. Attach the replacement valve stem using a new retaining screw.

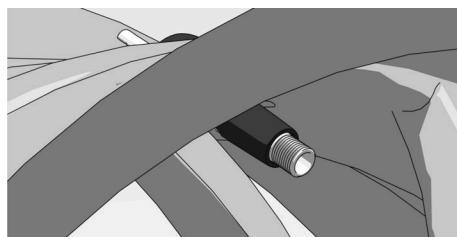


3. Use the valve puller to install the sensor and stem into the wheel.

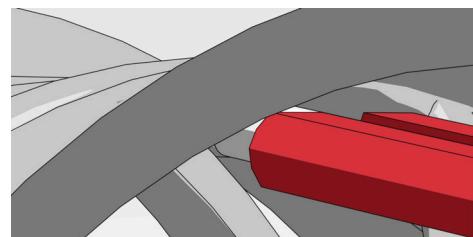
#### When using a clip-in rubber valve stem:



1. Depress the release button to separate the valve stem from the sensor.



2. Install the valve stem into the wheel using the valve puller.



3. Press the sensor onto the valve post until it clicks into place.



# TPMS REBUILD & INSTALLATION

## REBUILDING SENSORS *(continued)*

### Rebuilding a Basic Kit

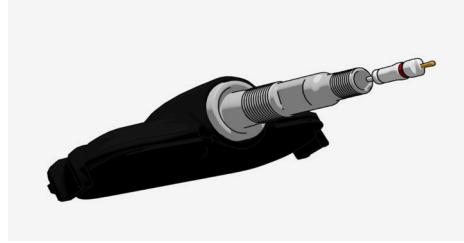
Follow these steps for a basic kit:



1. Retrieve the sensor from the tire cavity after the first bead is removed.



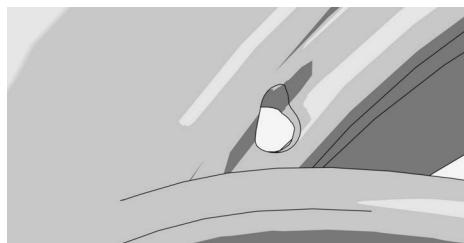
2. Remove the grommet and grommet seat washer (if applicable). When using the grommet removal pick, hook the grommet from the inside and pull it up the stem, or break it free.



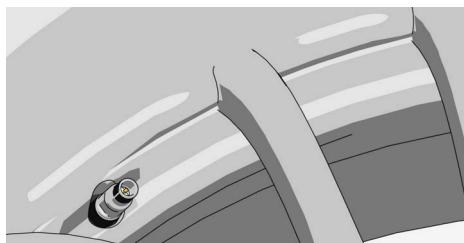
3. Install the new valve core.



4. Install the new grommet seat washer (if applicable) and new grommet.



5. Check the valve hole and make sure it is clean and free from gouges.



6. Place the sensor in the wheel valve hole, making sure to center the grommet into the hole.

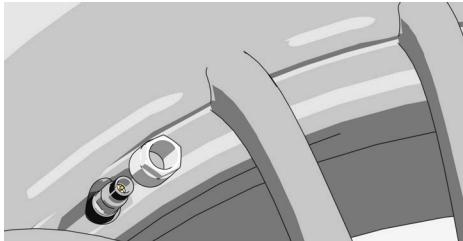
Note: Ensure the tapered end of the grommet is facing the valve hole.

# TPMS REBUILD & INSTALLATION

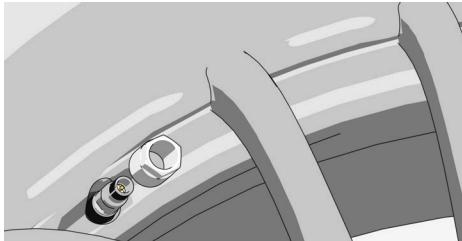


## REBUILDING SENSORS *(continued)*

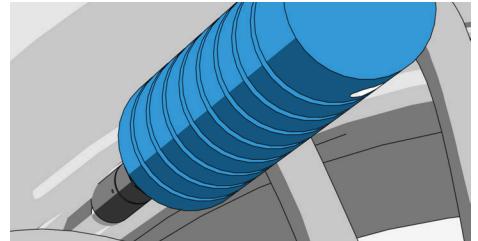
### Rebuilding a Basic Kit *(continued)*



7. Check for clearance issues and proper orientation of the sensor. If the sensor will not fit properly when installed, notify your Service Coordinator.



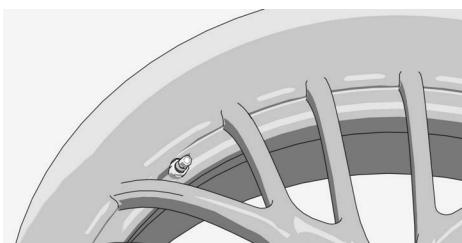
8. Install isolation washers (if applicable) and the retaining nut, threading by hand for a few turns.



9. Tighten the retaining nut using the proper torque tool.



10. Verify the proper inflation has been set and the TPMS has been sprayed to verify no leaks.



11. Install the valve cap.

**Note:** You will learn more about proper inflation techniques in the Inflating Tires module.

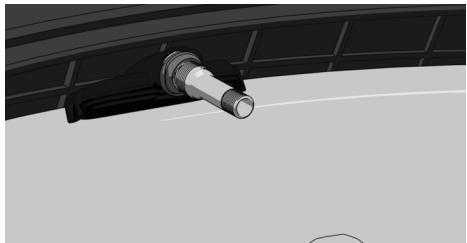


# TPMS REBUILD & INSTALLATION

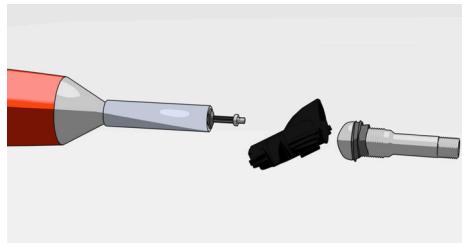
## REBUILDING SENSORS *(continued)*

### Rebuilding a Valve Kit

Follow these steps when replacing a valve kit:



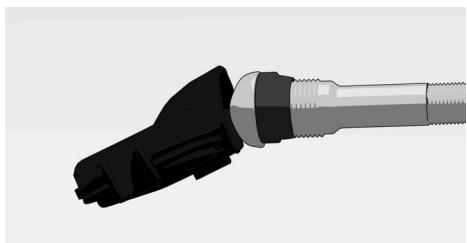
1. Retrieve the sensor from the tire cavity after the first bead is removed.



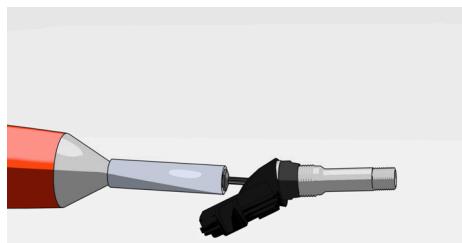
2. Remove the used valve stem and retaining screw (if applicable).



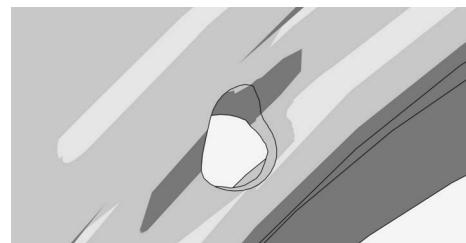
3. Keep and reuse any large swivel joints that may exist on the front side of the sensor.



4. Install the new valve stem to the sensor.



5. Tighten the retaining screw (when applicable) with the T20 Torque Tool.



6. Check the valve hole and make sure it is clean and free from gouges.



7. Place the sensor in the wheel valve hole, making sure to center the grommet into the hole.

Note: Ensure the tapered end of the grommet is facing the valve hole.



8. Check for clearance issues and proper orientation of the sensor. If the sensor will not fit properly when installed, notify your Service Coordinator.



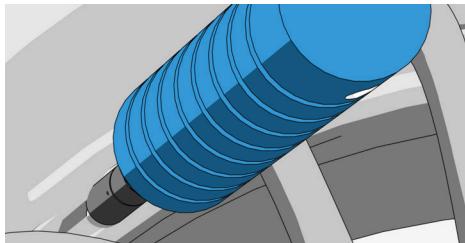
9. Install isolation washers (if applicable) and the retaining nut, threading by hand for a few turns.

# TPMS REBUILD & INSTALLATION

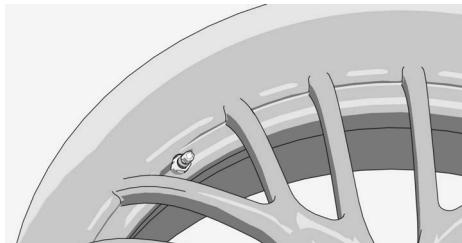


## REBUILDING SENSORS *(continued)*

### Rebuilding a Valve Kit *(continued)*



10. Tighten the retaining nut using the proper torque tool.



11. Install the valve cap after proper inflation has been set.

## Troubleshooting

If you notice the components of the rebuild kits pulled don't match those being removed from the sensor, first check to ensure the rebuild kit pulled matches the rebuild kit invoiced on the work order. If the rebuild kit matches that on the invoice, contact your Service Coordinator to determine the correct rebuild kit for the sensor being serviced.





# TPMS REBUILD & INSTALLATION

## REBUILDING SENSORS *(continued)*

### Troubleshooting *(continued)*

A sensor that cannot be rebuilt because it is an aftermarket design will need to be replaced or bound to the wheel barrel with a band and bracket kit.



**Note:** Sensors should not be “modified” in order to force the installation of rebuild kit parts that do not match the original discarded parts.



**Note:** Never use chrome steel valve caps on aluminum stem sensors. The two different metals in contact with each other can seize together in a matter of days or weeks.



# TPMS REBUILD & INSTALLATION



## REMOVING SEIZED SENSORS

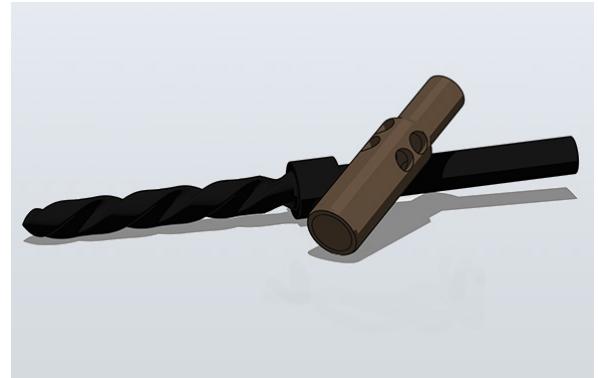
### Seized Sensors

If they are not serviced often enough, sensors on vehicles exposed to harsh environments can become seized due to corrosion.

Sensors exposed to salty roads or other chemicals can become corroded and the hex [retaining] nut can become seized.



When a hex [retaining] nut will not come loose, or the nut becomes tight after being initially loosened, stop and inform your Service Coordinator.



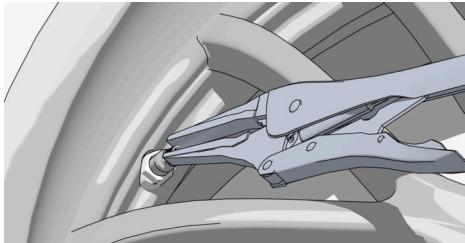


# TPMS REBUILD & INSTALLATION

## REMOVING SEIZED SENSORS *(continued)*

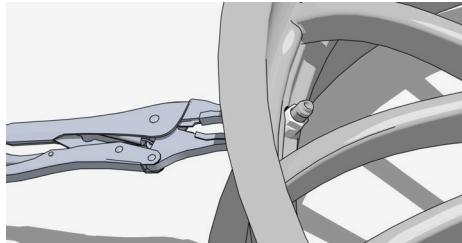
### Using a Seized Valve Removal Kit

This process ensures we protect the customer's property and it saves time.



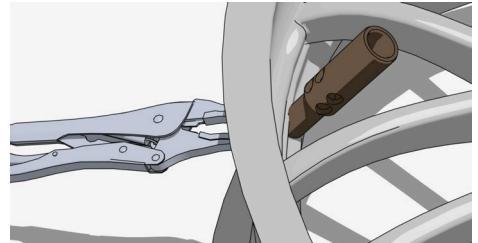
1. Use vice grips to break off the valve tip.

Note: If you cannot break the valve tip without scratching the wheel valve hole, then remove the valve core, if possible.

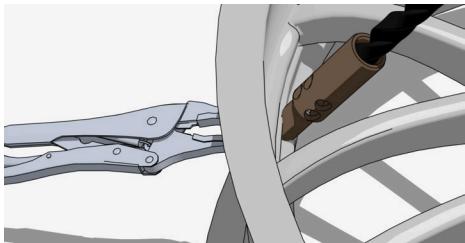


2. Attach the vice grips to the valve stem base in order to keep it from spinning.

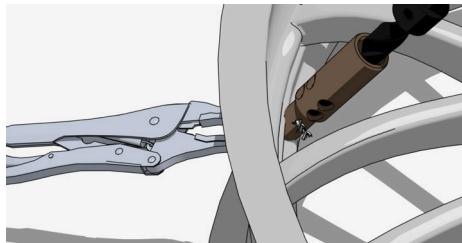
Note: If the sensor was not removed, vice grips may not be needed.



3. Place the guide sleeve over the retaining nut and push it down completely.



4. Place the drill bit into the guide sleeve.



5. Apply pressure to ream the valve stem and retaining nut down until the valve base or sensor falls from the back of the wheel.

Now your seized sensor is free and you can rebuild or replace it.

# TPMS REBUILD & INSTALLATION



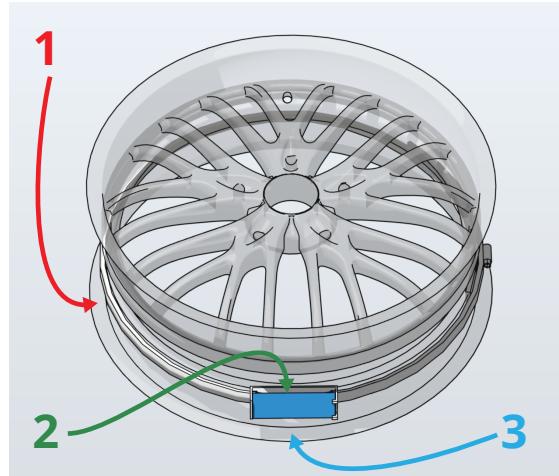
## WORKING WITH BANDED SENSORS

### Banded Systems

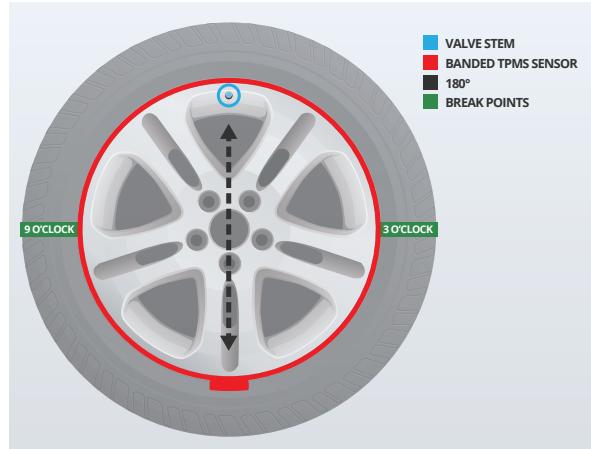
We also use the banded system to mount the TPMS sensor onto the wheel. The original equipment, Banded Sensor System, is used primarily on 1990s Corvettes and 2006-2010 Ford/Lincoln/Mercury vehicles.

These vehicles' sensor systems consist of three main parts:

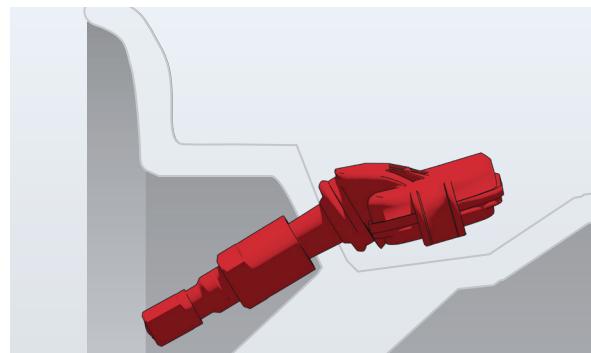
1. The band that is attached to the wheel barrel.
2. A bracket that is attached to the band.
3. A specifically designed sensor that is installable and removable from the bracket.



The bracket and attached sensor are always mounted 180 degrees from the valve stem. For this reason, it is critical to always break tire beads at 3 and 9 o'clock to avoid damaging the sensors.



The banded system can also be used to relocate an operational valve style sensor to the barrel of the wheel if it cannot be mounted properly in the valve hole.





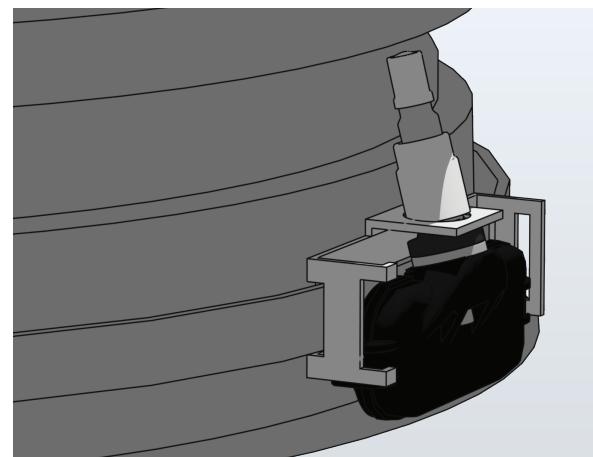
## TPMS REBUILD & INSTALLATION

### WORKING WITH BANDED SENSORS *(continued)*

#### Banded Systems *(continued)*

This happens when the valve hole angle, direction, or location in the barrel will not allow a sensor to be installed safely or perform properly.

In this instance, we will install a replacement band and specially designed bracket in order to mount the valve sensor.



The sensor should be installed in its proper orientation: "belly to the barrel" and at no more than a 30 degree angle, with the valve facing out towards the face of the wheel.

Secure the bracket and sensor 180 degrees from the valve stem, by tightening the band to the wheel using a flat head or 5/16" socket to replicate the original equipment, Banded Sensor System.

Special care should be taken when installing and removing the tire from the wheel to avoid dislodging the sensor or bracket with the tire beads.

