Towing 101

A Basic Guide to Your Towing Experience

As the FIRST name in towing products, it is CURT’s first priority to provide a complete line of quality towing products. In addition to this goal, however, we also want to give you the knowledge and resources to Bring It® safely and confidently.

Towing 101 offers information on towing components, weight capacities, vehicle-trailer wiring, safe towing practices and more. This guide can also be found on the CURT Manufacturing website at www.curtmfg.com.

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Chapter 1: Introduction to Towing

Perhaps you, like many drivers, are reluctant to tow a trailer. When towing, your vehicle becomes heavier, slower and will likely require a greater stopping distance.

However, even though several aspects of your normal driving experience may change, **towing a trailer does not need to be a stressful experience**. In fact, with the proper equipment and adjustments, towing can become almost as convenient and easy as normal driving.

**In this guide, we will answer the following questions:**

- What components are needed for towing?
- What are the different types of hitches?
- How do I determine my towing capacity?
- What do I need to know to select a hitch?
- How do I install a trailer hitch?
- What wiring do I need to tow a trailer?
- How do I hook up my trailer?
- How do I select a brake control?
- What safety tips do I need to know before towing?

**Towing 101: a guide to your towing experience**

Whatever your level of experience, Towing 101 is intended to help improve your towing knowledge. It covers everything from selecting a hitch and installing it to hooking up your trailer and towing safely.

Let’s begin by considering a few questions about your own specific towing situation and needs.

**What will you be towing?**

First, you should know what kind of trailer you plan to tow. Will it be a utility trailer, boat trailer, camper, or maybe something heavier, such as an RV or livestock trailer? You may require a basic receiver hitch or a heavy-duty 5th wheel or gooseneck hitch. Your trailer may or may not come equipped with its own set of brakes. There are many factors to consider before towing any type of trailer.

**What will you be towing with?**

You may own a heavy-duty pickup truck, SUV or full-size van, or maybe a light-duty passenger car, crossover or minivan. Your vehicle may be set up with a factory tow package or you may need to install a hitch, wiring or other equipment before you can tow. Each vehicle has different capacities, and each may require different equipment to tow safely and legally.
Where will you be towing?
Your towing needs are also dependent on the distance and road conditions along your route. For example, towing a small utility trailer across town is very different than towing a large 5th wheel camper to a remote destination. It is also likely that you will tow different trailers with the same vehicle. You will need to consider how best to equip yourself for these changes.

Towing Tip: Never exceed the weight capacity rating of the lowest rated component on your towing setup. For example, your trailer hitch and ball mount may be rated to tow 5,000 lbs., but your trailer ball may only be rated at 3,500 lbs. In this case, your towing capacity is limited by the trailer ball to 3,500 lbs.

In following chapters, our goal is to provide you with the resources you need to make towing your trailer a pleasant experience so that you can arrive at your destination relaxed and ready to enjoy yourself.

We'll start by defining the terms and concepts that are associated with towing.

Chapter 2: Basic Towing Components >
There are several different components needed for towing any type of trailer. A towing system is not only made up of the vehicle and trailer, but also the equipment used to connect them.

In this chapter, we will discuss the basic components used in most towing setups. The following terms are widely used in the towing industry and will be used throughout the rest of this guide.

If there is a term you are looking for that does not appear in this list, please contact our Tech Support team at 800.798.0813.

1. Tow Vehicle

A tow vehicle is the car, truck, van, crossover, SUV, RV or other automotive vehicle – even an ATV -- used to pull a trailer. Different tow vehicles have different weight capacities, and the vehicle owner's manual will typically tell you how many pounds your vehicle can safely tow.

As a rule, the lowest rated towing component must always determine the maximum amount of weight you can potentially tow. For more information on determining your vehicle's towing capacity, see chapter 4.
2. Trailer

A trailer is a wheeled construction that is pulled by another vehicle. Some common trailer types include utility trailers, popup campers, travel trailers, livestock trailers, flatbed trailers, enclosed car haulers and boat trailers.

Just like tow vehicles range in weight capacity, trailers range in gross trailer weight and tongue weight. See chapter 9 for information about hooking up your trailer.

3. Trailer Hitch
A trailer hitch is the primary connection component in a towing system that attaches a trailer to your tow vehicle. A trailer hitch requires some extra components, such as a ball mount and trailer ball, to make the connection complete.

A receiver hitch, perhaps the most common type of trailer hitch, mounts to the frame of the vehicle and provides a receiver tube to accept a ball mount or other insert. Receiver hitches typically fall within one of five classes, based on weight carrying capacity and receiver tube size. Selecting the correct type of trailer hitch for your vehicle and trailer is critical. See chapter 3 for more information on the different types of trailer hitches.

4. Ball Mount

A ball mount is a metal tube or bar that inserts into the trailer hitch and provides a mounting plate to hold a trailer ball. Ball mounts are made in a variety of styles and capacities to accommodate different trailers and coupler heights. A ball mount is held in place in the hitch with a hitch pin & clip or a hitch lock.

See chapter 5 for information on choosing a ball mount and chapter 6 for installing a ball mount.
Also called a tow ball or hitch ball, a trailer ball is the immediate connection point between your tow vehicle and trailer. In conjunction with a trailer coupler, a trailer ball allows you to turn corners and travel over bumps and dips without becoming disconnected. The coupler mounts and locks on top of the trailer ball and articulates around it.

Trailer balls come in a variety of diameters, including 1 7/8", 2", 2 5/16" and sometimes 3". In general, the smaller the diameter of the trailer ball, the less capacity it has. However, this may not always be the case. **Always abide by the component with the lowest weight rating.** For information on installing a trailer ball, see [chapter 6](#).
Towing Tip: The trailer ball must be a perfect fit for the trailer coupler. Towing with a mismatched trailer ball and coupler is not safe. Even the difference between a 1 7/8" ball and a 2" ball is enough to create a hazardous situation.

6. Hitch Pin & Clip

A hitch pin is a small metal rod that holds the ball mount in the hitch's receiver tube. Typically, a hitch pin is bent in an "L" shape and drilled or grooved at one end to accept a hairpin-shaped retainer clip. A hitch pin can also be substituted with a hitch lock.
7. Coupler

The coupler, in conjunction with the trailer ball, allows your tow vehicle and trailer to turn corners and travel over bumps and dips without becoming disconnected. The coupler fits over the trailer ball and is designed to articulate around it.

**The size of the coupler and ball must match to operate safely.** See [chapter 5](#) for information on matching your coupler to your trailer hitch, and [chapter 9](#) for instructions on hooking up your trailer.
8. Safety Chains

A safety chain is a length of chain strong enough to restrain the trailer from complete separation if the hitch or coupler should fail. Safety cables are also an acceptable alternative.

For every trailer, two safety chains should be used and should be set up to crisscross under the coupler. If the coupler becomes disconnected, the nose of the trailer may be caught by the safety chains, providing a measure of control while the tow vehicle stops. Use of safety chains is required by most, if not all, states.
9. Trailer Wiring & Lighting

Trailer lights are one of the most important aspects of towing, and like safety chains, they are required by law. **All towable trailers must have taillights, brake lights and turn signals, at the very least.**

In order to have working lights, a trailer must be equipped with a wiring system and must be connected to the tow vehicle’s wiring system. The connection can be simple or more complex, depending on what features the trailer has. For more information on towing electrical, see [chapter 7](#).

These nine components are the basic building blocks of a towing setup. However, before choosing which components to use for your own towing setup, let’s look more in-depth at the different types of trailer hitches available.

[Chapter 3: Types of Trailer Hitches >](#)
Chapter 3: Types of Trailer Hitches

There are many different types of hitches available, and at first glance, selecting the right one for your vehicle can seem like a challenge. However, in actuality, the type of vehicle you drive and the type of trailer you will be towing will determine the type of hitch you will need.

Answered in this chapter:
- What are the five receiver hitch classes?
- Are there any other types of receiver hitches?
- What specialized hitches are available?

In this chapter, we will discuss the different types of trailer hitches that are available and what features and benefits they offer. For more information on selecting a specific hitch, go to chapter 5.

Types of Receiver Hitches

Perhaps the most common type of trailer hitch is the receiver hitch. A receiver hitch is designed to mount onto the tow vehicle's frame and provide a receptacle or tube opening to accept the shank of a ball mount or other insert. Most receiver hitches are made to be vehicle-specific, meaning each one is uniquely designed to fit a different vehicle make and model.

Receiver hitches are generally divided into five classes, based on their receiver tube size and weight capacity range.

Class 1 Receiver Hitches

- 1 1/4” x 1 1/4” receiver tube opening or fixed tongue
- Weight carrying capacity typically up to 2,000 lbs. GTW

Class 1 receiver hitches are generally designed for passenger cars and small crossovers. They are equipped with a 1 1/4” x 1 1/4” receiver tube opening or sometimes a fixed tongue to directly mount a trailer ball instead of a ball mount.
Most class 1 hitches are rated to tow trailers up to 2,000 lbs. However, it is important to remember that not all hitches are rated at the same capacity and that no hitch ever increases the maximum weight a vehicle can tow.

Class 2 Receiver Hitches

- 1 1/4” x 1 1/4” receiver tube opening
- Weight carrying capacity typically up to 3,500 lbs. GTW

Class 2 trailer hitches are very similar to class 1 hitches, having a 1 1/4” x 1 1/4” receiver tube opening and being used for lightweight towing applications. The biggest difference between class 1 and class 2 is that most class 2 hitches are able to tow up to 3,500 lbs. gross trailer weight. This is not true of every model.

Class 2 hitches are typically found on full-size sedans, minivans and crossovers but can also be found on small SUVs and pickup trucks as well.

Class 3 Receiver Hitches

- 2” x 2” receiver tube opening
- Weight carrying capacity typically up to 8,000 lbs. GTW
- May be compatible with a weight distribution hitch
The class 3 trailer hitch is the most common receiver hitch class installed on full-size pickup trucks and SUVs. If your full-size truck is equipped with a towing prep package, it probably has a class 3 hitch. CURT class 3 hitches are equipped with a 2" x 2" receiver tube opening and typically have a weight carrying capacity up to 8,000 lbs. gross trailer weight.

Also, unlike classes 1 and 2, most class 3 hitches are able to be used in combination with a weight distribution system, typically to offer a gross trailer weight capacity up to 12,000 lbs.

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### Class 4 Receiver Hitches

- 2" x 2" receiver tube opening
- Weight carrying capacity typically up to 10,000 lbs. GTW
- Usually compatible with a weight distribution hitch

Class 4 trailer hitches are commonly mounted on full-size pickup trucks and SUVs. They feature a 2" x 2" receiver tube opening and generally have a weight carrying capacity up to 10,000 lbs. gross trailer weight. Many can also utilize a weight distribution hitch for a gross trailer weight rating up to 14,000 lbs.
Class 5 Receiver Hitches

- 2” x 2” or 2 1/2” x 2 1/2” receiver tube opening
- Weight carrying capacity up to 16,000, 18,000 or 20,000 lbs. GTW
- Typically compatible with a weight distribution hitch

Class 5 trailer hitches have the highest weight ratings of the receiver hitch classes, offering as much as 20,000 lbs. GTW. Because class 5 hitches are built to handle such immense loads, adding a weight distribution hitch usually does little to increase the towing capacity. However, a WD hitch can be used to help level the trailer and tow vehicle.

Class 5 trailer hitches are typically used on full-size pickups and commercial trucks, and they are equipped with a 2” x 2” or 2 1/2” x 2 1/2” receiver tube opening.

**Towing Tip:** Always choose a trailer hitch that matches or slightly exceeds your vehicle’s towing capacity. You may not need the full capacity now, but if ever you want to pull a larger trailer, it pays to have a hitch that is already equipped to handle the weight.

**Other Types of Receiver Hitches**
There are a few different receiver hitches that do not fit within the five classes. Although they serve more specialized applications, they are widely used on vehicles today.

**Bumper Hitches**
- Mounts to the vehicle’s bumper
- 2” x 2” receiver tube opening
- Weight carrying capacity typically up to 5,000 lbs. GTW
A bumper hitch is a light-duty receiver hitch that bolts onto the vehicle's bumper and provides a 2” x 2” receiver tube opening. It is important to note that because a bumper hitch attaches directly to the bumper, it is always limited to the weight carrying capacity of the bumper rather than the vehicle overall. Bumper hitches are commonly found on pickup trucks, SUVs and other larger vehicles.

**Front Mount Hitches**
- Compatible with certain trucks, vans and SUVs
- 2” x 2” receiver tube opening
- Weight carrying capacity typically up to 5,000 lbs. GTW
- Usually rated even higher for straight line pull applications

A front mount hitch can be a useful addition to larger vehicles such as pickup trucks, full-size vans and SUVs. A front mount hitch allows you to place a cargo carrier at the front of your vehicle, freeing up your rear mount hitch for other types of towing. It can also be used for launching a boat or when parking a trailer in a tight spot, allowing you to maintain close control of your trailer.

Front mount hitches can also be used to attach a snow plow, winch, spare tire mount or skid shield.
Specialized Hitches

There are a number of hitches that do not fall within the receiver hitch classification. The following are less common methods of towing and are typically designed for heavier towing applications.

Weight Distribution Hitches

- Redistributes the tongue weight across the tow vehicle and trailer
- Typically compatible with class 3, 4 and 5 receiver hitches

A weight distribution or weight distributing hitch is actually a receiver hitch attachment. It is designed to distribute the tongue weight of a trailer across all axles of the vehicle-trailer combination.

Weight distribution hitches are typically used with class 3, 4 and 5 receiver hitches and use an adjustable shank to insert into the receiver tube opening like a ball mount.

A weight distribution hitch uses long rods called "spring bars" to leverage the connection point of the combination, transferring some of the tongue weight to the axles of the tow vehicle and trailer. Without a weight distribution hitch, heavy tongue weight can unload the tow vehicle's front tires, leading to reduced steering sensitivity. The most advanced weight distribution hitches also integrate trailer sway control to limit unwanted lateral motion of the trailer.
5th Wheel Hitches

- Accepts the kingpin of a 5th wheel trailer
- Weight capacities ranging from 16,000 up to 25,000 lbs. GTW
- Compatible with pickup trucks only

A 5th wheel hitch is a heavy-duty hitch that mounts into the bed of a pickup truck, usually over or just forward of the rear axle. 5th wheel hitches are similar in design to those used by commercial tractor-trailer rigs. They typically range in capacity from 16,000 up to 25,000 lbs., depending on the design of the hitch, and are commonly used for towing large campers, travel trailers and car haulers.

Most 5th wheel hitches have some "pivot" capability to absorb bumps and contours of the road. They are also the only type of hitch where the coupling device is part of the hitch and not the trailer.
Gooseneck Hitches

- Takes up very little space in the truck bed
- Weight capacity typically up to 30,000 lbs. GTW
- Compatible with pickup trucks only

Like a 5th wheel hitch, a gooseneck hitch mounts into the bed of a pickup truck and usually places the trailer's tongue weight slightly forward of a vehicle's rear axle. Gooseneck hitches are designed to be less intrusive than 5th wheels, allowing full access to the truck bed when the trailer is not hooked up.

Typical applications for a gooseneck hitch include horse or livestock trailers, car haulers, large flatbeds and other commercial or industrial trailers. Gooseneck hitches are commonly rated to tow up to about 30,000 lbs. gross trailer weight.

Pintle Hitches

- Simple hook-and-loop coupling system
- Available weight capacity up to 60,000 lbs. GTW
A pintle hitch is a simple but strong coupling mechanism, consisting of a pintle hook and a lunette eye. The pintle hook, mounted on the tow vehicle, latches onto the lunette eye attached to the trailer. Depending on the tow vehicle and specific model, pintle hitches can tow anywhere from 10,000 to 60,000 lbs. gross trailer weight.

Now that you have a basic understanding of the different types of trailer hitches, you might be starting to get an idea of which type will suit your needs. In the next two chapters, we are going to look at how to determine weight capacity and how to select the right hitch for your vehicle.
Chapter 4: Towing Capacity

Before you hook up a trailer or even purchase a trailer hitch, you should first consider towing capacity. How much weight is your vehicle rated to tow? How much does your trailer weigh?

In this chapter, we will discuss the terminology and acronyms used to describe vehicle and trailer towing capacity, how to find the towing capacity of your vehicle and how to measure some of the crucial weights involved with towing.

Towing Capacity Terminology

Before we get into methods for determining weight and weight capacity, we need to go over some terms.

**Gross Vehicle Weight Rating (GVWR)**

The gross vehicle weight rating (GVWR) is the maximum loaded weight of your vehicle, as determined by the vehicle manufacturer. If you exceed this weight, the vehicle's engine, transmission, brakes and other systems may be loaded beyond their design limits.

**Gross Axle Weight Rating (GAWR)**

The gross axle weight rating (GAWR) is the maximum weight that can be placed on your front or rear axles. The vehicle manufacturer gives each axle its own rating. If you exceed these weight ratings, the vehicle components may be loaded beyond their design limits.

**Gross Trailer Weight (GTW)**

The gross trailer weight (GTW) is the total weight of the trailer and its cargo. It can be determined by putting the fully loaded trailer on a vehicle scale.

Answered in this chapter:

- What weights and capacities do I need to know?
- How do I determine my vehicle's towing capacity?
- How do I weigh my trailer?
- How do I measure tongue weight?
- Is there a proper way to load my trailer?
Tongue Weight (TW)

\[
\text{Tongue Weight (TW)} = \text{downward force exerted on the back of a tow vehicle by a trailer or towable load.}
\]

The tongue weight (TW) is greatly affected by where cargo is positioned and is important for maintaining good control of the vehicle. Proper tongue weight should be about 10-15% of the GTW.

How to Determine Vehicle Towing Capacity

The best means for determining your vehicle's towing capacity is to read your vehicle owner's manual. The owner's manual will provide detailed instructions and limitations, usually accompanied by tips for safe towing. *If your owner's manual has been misplaced, most manufacturers provide free downloadable copies on their website.*

**Towing Tip:** In general, 2WD vehicles have a higher towing capacity than comparable AWD and 4WD vehicles. This is because 4WD models are several hundred pounds heavier than equivalent 2WD models, having a transfer case, extra drive shaft and extra axle.

How to Weight a Trailer

After familiarizing yourself with your vehicle's weight capacities and general towing capacity, it is time to look at trailer weight. Your trailer should have a VIN plate (Vehicle Identification Number), usually installed somewhere on the trailer frame. This plate not only carries the trailer's serial number, but it will also list the trailer's unloaded GTW, maximum GVWR and GAWR for each axle.
The table below shows representative weights for a number of common trailer styles. These weights may not reflect the weight of your own trailer.

<table>
<thead>
<tr>
<th>Estimated Trailer-Only Weights</th>
<th>Aluminum trailer</th>
<th>Fiberglass trailer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boat</strong></td>
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<tr>
<td>12'-15' - Trailer weight: 200 lbs.</td>
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<tr>
<td>16'-20' - Trailer weight: 300 lbs.</td>
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<tr>
<td><strong>Single axle</strong></td>
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<tr>
<td>8' - Trailer weight: 320 lbs.</td>
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<tr>
<td>10' - Trailer weight: 360 lbs.</td>
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<tr>
<td><strong>Utility</strong></td>
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<tr>
<td><strong>Recreational vehicle</strong></td>
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<tr>
<td><strong>Motorcycles, ATVs, personal watercraft, snowmobiles</strong></td>
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<tr>
<td>Carries two (8') - Trailer weight: 350 lbs.</td>
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<tr>
<td>Carries four (14') - Trailer weight: 980 lbs.</td>
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<tr>
<td><strong>Livestock trailers (gooseneck pull)</strong></td>
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<tr>
<td>16' - Trailer weight: 3,500 lbs.</td>
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<td>20' - Trailer weight: 4,000 lbs.</td>
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<tr>
<td>28' - Trailer weight: 5,000 lbs.</td>
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<tr>
<td><strong>Horse trailers (bumper pull)</strong></td>
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<tr>
<td>One horse - Trailer weight: 1,800 lbs.</td>
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<tr>
<td>Two horses - Trailer weight: 3,100 lbs.</td>
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<tr>
<td>Four horses - Trailer weight: 4,500 lbs.</td>
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<tr>
<td><strong>Campers</strong></td>
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<tr>
<td>17' - Trailer weight: 2,300 lbs.</td>
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<td>23' - Trailer weight: 4,200 lbs.</td>
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<tr>
<td>30' - Trailer weight: 4,800 lbs.</td>
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<tr>
<td><strong>5th wheels</strong></td>
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<tr>
<td>25' - Trailer weight: 5,900 lbs.</td>
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<tr>
<td>31' - Trailer weight: 7,800 lbs.</td>
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<tr>
<td>35' - Trailer weight: 10,200 lbs.</td>
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</tbody>
</table>

For more information, contact the CURT Technical Support line at 800.798.0813.

Note: CURT Manufacturing recommends the use of a trailer hitch with a weight distributing (WD) rating when carrying a personal mobility vehicle (power wheelchair, scooter, etc.). By using a trailer hitch with a capacity lower than the gross trailer weight, the warranty may be voided and could result in damage to both the tow vehicle and the load.

The only way to be sure of the gross trailer weight is to load the trailer as you expect to use it and weigh it on a vehicle scale. Such scales are sometimes available to recreational users at state highway weigh stations, refuse transfer stations and commercial truck stops.

The advantage of using a vehicle scale is that you learn the actual weight of your loaded trailer. Be sure to call ahead and confirm that you are welcome to use these scales before driving over.

**How to Measure Tongue Weight**

The last weight you have to consider is your trailer’s tongue weight. Tongue weight is the weight exerted at the vehicle-trailer coupling point when your trailer is fully loaded and hooked up for towing. **In general, you want the tongue weight to be about 10-15% of the gross trailer weight.**

There are a few different methods that can be used for measuring tongue weight, and with each of them, always be sure that your trailer is parked on an even, level surface.

1. **Tongue weight scale** - Available at most towing supply shops, a tongue weight scale is a small scale designed specifically to measure a trailer’s tongue weight. Because you probably will not need to check your trailer’s tongue weight very often, you can call and ask if your local trailer dealer has a tongue scale you can use.
2. **Bathroom scale** - You can also measure your trailer’s tongue weight with a common bathroom scale. If the tongue weight is expected to be less than 300 lbs., simply place the tongue directly on the scale. If the weight is likely greater than 300 lbs., you can use some boards and pipes and set up a test as shown below. Using this setup, take a reading off the bathroom scale and triple it to find your actual tongue weight.

3. **Vehicle scale** - One last method for measuring the tongue weight of your trailer is to use a vehicle scale at a rest stop or at your local trailer dealer. Begin by weighing your vehicle without the trailer hooked up. Then, hook up your trailer and weigh your vehicle again, without letting the wheels of the trailer touch the scale. Take the weight of your vehicle and subtract it from the weight of your vehicle with the trailer attached. The difference is the tongue weight of the trailer.

**How to Properly Load a Trailer**

After finding the tongue weight and comparing it to the gross trailer weight, you may realize you have too much or too little. Remember, an ideal tongue weight is 10-15% of the gross trailer weight.

The best way to achieve proper tongue weight is by distributing the weight of your cargo. If you place more weight in front of the trailer axle, you will generate more tongue weight. If you place more weight behind the axle, the tongue weight will decrease. **A good figure to follow is 60% in front and 40% behind, unless otherwise specified by the trailer manufacturer.**

Check out our “**How to Properly Load a Trailer**” video on YouTube at [youtube.com/curtmfg](http://youtube.com/curtmfg).
If you have too much tongue weight, your tow rig may not be as responsive as it should be. If you do not have enough tongue weight, your trailer may be more likely to sway. Always follow the tow vehicle and trailer manufacturer's instructions for tongue weight.

Once you know the towing capacity of your vehicle and the weight of your trailer, it is time to select a hitch. In the next chapter, we will cover how to select the right hitch for your towing needs.

Chapter 5: Selecting a Trailer Hitch >
Chapter 5: Selecting a Trailer Hitch

Selecting the right trailer hitch for your vehicle can actually be one of the easiest steps in getting ready to tow. If you already know the weight capacities of your vehicle (see chapter 4 if you do not) and you know the type of trailer you are planning to tow, then it is only a few simple steps to finding the right hitch.

In this chapter, we will discuss how to select a receiver hitch for your specific vehicle, as well as the right ball mount and trailer ball to complement your towing setup. We will also discuss the selection process for heavy-duty hitch applications, such as in weight distribution, 5th wheel and gooseneck towing.

How to Select the Right Receiver Hitch

Most receiver hitches are designed to be vehicle-specific, making selection fairly easy. One of the best ways to find the right fit for your vehicle is to use CURT's Quick Hitch Lookup tool, located at the top of every page at curtmg.com. Simply enter the year, make, model and style of your vehicle, and the search results will show all receiver hitches that are compatible, including front mount and rear mount options. It will also show custom wiring harnesses that are able to fit your specific vehicle.

Remember, a hitch is only one component of a towing system. The responsibility for knowing the capabilities of your vehicle and equipment is up to you. Take a moment to watch the "How to Select a Trailer Hitch" video for a general guide to choosing a trailer hitch. You can view it on our YouTube page at youtube.com/curtmfg.com.

Matching Maximum Weight Carrying Capacity

Weight carrying capacity is one of the biggest factors in determining which trailer hitch to choose. If you are towing with a minivan or sedan, your choices will probably be within the class 1, class 2 or possibly class 3 range. On the other hand, if you have a full-size pickup truck or SUV, you will probably be able to choose from classes 3, 4 or 5.
To help you get an idea of what hitches fit with which tow vehicles, the table below shows the possible relationships between the two. **Remember that these are representations only and do not reflect any actual vehicles.** Also, not all vehicles within a particular category will be compatible with each hitch class listed.

<table>
<thead>
<tr>
<th>Class</th>
<th>Subcompact &amp; Compact Cars</th>
<th>Full-Size Cars</th>
<th>Crossovers</th>
<th>Minivans</th>
<th>1/4 - Ton Trucks &amp; SUVs</th>
<th>1/2 - Ton Trucks &amp; SUVs</th>
<th>3/4 - Ton Trucks</th>
<th>1 - Ton Trucks</th>
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**How to Choose a Ball Mount**

After you have selected a receiver hitch, you will also need to select a ball mount. The right ball mount should have a shank size that matches the receiver tube opening of your hitch, a weight rating that meets or exceeds your gross trailer weight and a rise or drop to help level your trailer.

Consider the scenario shown in the diagram below. The height of the receiver tube (A) is greater than the height of the trailer coupler (B). When you tow, you want your trailer to be as level as possible. Because the receiver tube is higher than the trailer coupler, the ball mount is used to make up the difference (C).
Level Ground

Most ball mounts are made with "drop" or "rise" to help level the trailer. When the receiver tube is positioned higher than the coupler, a ball mount with drop will make up the negative difference. When the coupler is positioned higher than the receiver tube, a ball mount with rise will make up the positive difference. The figure above shows a ball mount with drop, indicated by measurement C.

Determining Drop and Rise

To find the measurement of drop or rise for your tow vehicle and trailer, you will need to measure the receiver tube height (A) and the coupler height (B). B minus A equals C, the drop or rise needed. If C is a positive number, your ball mount will need to have rise. If C is negative, your ball mount will need drop.

In general, you will want to select a ball mount that sits slightly higher than the coupler to account for the trailer's tongue weight.

View our “How to Select a Ball Mount and Trailer Ball” video at youtube.com/curtmfg.

Your trailer dealer can help you choose a ball mount with the correct amount of drop or rise. Many ball mounts are designed to work in either the drop or rise position, allowing you to accommodate various trailer heights.

Also, be aware that you can adjust drop or rise by selecting a trailer ball with a shorter or longer neck.
How to Choose a Trailer Ball

Another component to add to your trailer hitch is a trailer ball. Some ball mounts come with a trailer ball already attached, whether bolted on with a nut or welded on as in a Fusion ball mount.

Most ball mounts will require you to purchase a trailer ball separately and you will need to select one that fits your towing setup. You will need to know the coupler size, the trailer ball hole diameter of your ball mount and the weight of your trailer.

**Measuring a trailer ball**

A: Ball diameter  
B: Shank length  
C: Shank diameter  
D: Rise

**Torque specifications**

<table>
<thead>
<tr>
<th>Shank Diameter</th>
<th>Torque Specifications</th>
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<tbody>
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<td>450 ft. lbs.</td>
</tr>
<tr>
<td>2&quot;</td>
<td>4,550 ft. lbs.</td>
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</tbody>
</table>

**Coupler Size**

For the coupler size, most manufacturers stamp or label the correct trailer ball size on the coupler. Use the measurements in the diagram to help select the right size trailer ball for your towing setup. Make sure that your coupler and trailer ball have a solid connection before towing and that all necessary adjustments have been made.

**Trailer Ball Hole**

The hole in the platform of a ball mount or trailer hitch tongue is where the trailer ball bolts onto. It is important to know the diameter of this hole so that you can choose a trailer ball with a matching shank diameter. If the trailer ball shank is too small, it will shift while towing and tend to come loose. If the shank size is too small for the trailer ball hole, you may be able to use a reducer bushing to make up the difference.

It is also very important to torque the trailer ball nut to the correct foot pounds, based on its shank diameter. Trailer ball installation will be discussed further in chapter 6.

**Weight Capacity**

As was the case when selecting your trailer hitch and ball mount, weight capacity must be considered when choosing a trailer ball. The **weight rating for a trailer ball will be listed as the ball capacity**. This will reflect the gross trailer weight limit, not the tongue weight. You must select a trailer ball with a ball capacity that exceeds the gross weight of your trailer.
Adding a Weight Distributing Hitch
If your trailer weighs more than 3,500 lbs., you may want to invest in a weight distribution hitch. As discussed in chapter 2, a weight distribution hitch is a receiver hitch attachment that levels out your trailer and vehicle by distributing some of the tongue weight across the axles. It may also increase the overall gross trailer weight capacity, based on your specific trailer hitch. **Remember, you must always abide by the lowest rated towing component in your towing system.**

Weight distribution hitches are compatible with most class 3, class 4 and class 5 receiver hitches. However, some hitches are only rated for weight carrying applications. Verify the compatibility of your own particular hitch before towing.

Installing a weight distribution hitch tends to be fairly in-depth. In chapter 6, we will go through some of the common steps involved in setting up a weight distribution hitch. Be sure to follow all manufacturer's instructions concerning when and how to use a weight distributing system.

Selecting a 5th Wheel or Gooseneck Hitch
For some applications, your choice of trailer hitch may already be decided because of the type of trailer you are planning to tow. Namely, if you have a 5th wheel trailer, you will need a 5th wheel trailer hitch mounted in the back of your pickup truck to haul it. The same is true of gooseneck trailers. A gooseneck trailer must be towed using a gooseneck hitch or a gooseneck hitch adapter attached to 5th wheel base rails.

Keep in mind that even with these specialized hitches, you will still need to consider the weight capacities of your towing system, vehicle and trailer. 5th wheel hitches range from 16,000 lbs. to 25,000 lbs. in capacity, and gooseneck hitches are typically rated to tow up to 30,000 lbs. You will need to know how much your trailer weighs and verify that your truck is rated to tow the heavy load, using your owner's manual.
If you are ready with the right hitch, the right ball mount and the right trailer ball, let's move onto some of the common steps involved when installing these components.
Chapter 6: Trailer Hitch Installation

When it comes to installing a hitch, the majority of CURT receiver hitches are "no-drill" applications. This means that the trailer hitch and hardware are designed to fit into existing bolt holes in the frame of the vehicle, and this usually makes the job fairly simple. However, with any trailer hitch installation, it is very important to take your time and start with the right tools for the job.

Answered in this chapter:
- What tools do I need to install my hitch?
- What steps are involved in a common installation?
- How do I install a ball mount?
- How do I install a trailer ball?
- How do I set up a weight distribution hitch?

In this chapter, we will discuss some of the common steps that go into a typical hitch installation. We will cover what tools you might need and how to install some of the additional towing components, such as a ball mount, trailer ball and weight distribution hitch.

Towing Tip: Before purchasing a hitch, look up the installation instruction sheet or installation video online for the hitch you are considering, and then decide if it is something you can handle on your own or if you will need to bring it to a professional installer.

Tools Needed for a Trailer Hitch Installation

Before you even begin removing the spare tire, set aside the tools necessary for the install. These may be different depending on your specific hitch, but in general, a hitch installation only requires some basic tools found in the average do-it-yourselfer's tool box.

We also recommend looking at the installation instructions or installation video before you begin. Check out our YouTube library of installation videos at youtube.com/curtmg. If you find that you lack the necessary tools or do not have the capability of installing your trailer hitch yourself, you may want to go to a professional installer.
The following are some of the tools used during the installation of a trailer hitch:

1. Shop light
2. Socket set
3. Ratchet
4. Ratchet extension
5. Swivel socket
6. Work gloves
7. Safety glasses
8. Torque wrench
9. Jack and stands
10. Pry bar
11. Tape measure
12. Torx bits
13. Trim tool
14. Screw driver
15. Paint pen
16. Die grinder
17. Carbide drill bits
18. Cutting lubricant
19. Box wrench set
20. Power drill
21. Rotary cutting tool
22. Penetrating lubricant
23. Rat tail wire brush
24. Masking tape
25. Utility knife
26. Aviation sheers
Keep in mind that every trailer hitch installation is different. One installation may require only a few of these tools, while another may require a select combination from all three lists. Before starting an installation on your own vehicle, check the installation instructions to find out exactly which tools you will need.

Common Steps in a Trailer Hitch Installation
To give you a general idea of how to install a trailer hitch, we will go through some of the common steps. You can also view any of our installation videos, even for an example, on our YouTube channel at youtube.com/curtmfg.

Preparing Your Work Space

Step 1: Chock your wheels and jack up your vehicle. Jacking up the vehicle is not necessary for most hitch installations, but it does help to have some extra space underneath the vehicle to work. Make sure the emergency brake is activated, that your vehicle is at a safe height and that you use jack stands to ensure the vehicle is properly stabilized.

Step 2: Find a strategic location for your work light. It always helps to have extra light when working underneath the vehicle, and it will help when referencing the installation instructions. At this time, you should familiarize yourself with the various bolts, holes and other components you will be using during the installation.

Removing Components if Necessary

Step 3: Remove the spare tire. On some vehicles, the spare tire stored underneath the vehicle will be in your way as you install the hitch. If necessary, remove it and set it aside.

Step 4: Remove any bolts or plugs specified in the instructions. This step will not be needed for all hitches, but some require the removal of certain panels or a heat shield in order to get the hitch into place. The hitch may also use the holes created from removing this hardware as mounting points for bolts.

Attaching the Hitch

Step 5: Move the hitch into position and attach the necessary hardware. You may need some assistance at this point as trailer hitches can weigh up to 50 lbs. or more. For now, you will only need to tighten the nuts enough to hold the hitch in place until you are ready to torque.

Step 6: Fully tighten the bolts. When all of the bolts are in place, torque them to the values specified in the instruction sheet.
Some of the other steps that may be part of your hitch installation include lowering the exhaust, trimming fascia, fishing bolts through the vehicle's frame and, in some cases, drilling holes for mounting bolts. Also, before or after torqueing the bolts, you may need to reattach certain components such as panels, a heat shield or the exhaust. These steps are not typical for all trailer hitch installations, but they are required from time to time.

For a helpful guide to completing these steps, see our Trailer Hitch Installation Techniques video, available on our YouTube channel at youtube.com/curtmfg. Be sure to check the instructions or installation video for your specific hitch to see what additional steps are needed.

**Towing Tip:** If your hitch installation requires you to feed bolts in through a hollow frame and you accidentally lose a bolt inside, getting it out can be extremely tedious. However, it CAN be done. Insert a telescoping magnet in through the hole, and lure the bolt to the hole until you can pull it out.

**How to Install a Ball Mount**

Compared to a trailer hitch, installing a ball mount is very simple. To begin, insert the shank into the receiver tube and line up the holes of the shank and receiver tube. Then, secure the mount using a pin & clip or a hitch lock.

**It is a good idea to tug on the ball mount and try to wobble it back and forth once you have it secured.** If your ball mount has a little wiggle room, you may want to buy an anti-rattle kit for a quieter ride. Anti-rattle kits typically only work with hollow-shank ball mounts.

Also, if you own a ball mount that does not fit into your receiver tube opening, the solution is usually as simple as a receiver tube adapter. Ball mount shanks are typically available in standard sizes of 1 1/4" x 1 1/4", 2" x 2" and 2 1/2" x 2 1/2". For each of these shank sizes, adapters are available to fit into your particular receiver tube size and provide the necessary size opening to accept the shank. Keep in mind that most adapters are rated for a particular weight capacity. Always abide by the lowest rated towing component.
How to Install a Trailer Ball

If your ball mount does not come with a trailer ball already attached, you will need to install one. Trailer balls are very simple to attach. However, the installation process should not be taken lightly. Each trailer ball requires attention to detail when it comes to its particular torque specifications.

To install your trailer ball, remove the nut and washer from the threaded shank and place the shank into the hole on the ball mount platform. Then, replace the washer and nut, and tighten them by hand. When you can no longer turn the nut, use a torque wrench to tighten the trailer ball the rest of the way.

Trailer balls require different amounts of torque, depending on the diameter of the shank. The table shows the various torque values for different size trailer balls.

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Also, some trailer balls may require a reducer bushing or tongue sleeve during installation to allow the trailer ball to better fit the ball mount. If these parts are included with your trailer ball, be sure to mount them during the installation.

How to Set Up a Weight Distribution Hitch

Installing a weight distribution hitch is very different from installing a receiver hitch or any ball mount. Read the steps below and watch the “How to Set Up a Weight Distribution Hitch” video at youtube.com/curtmfg video to familiarize yourself with the process. It is very important when installing a weight distribution hitch that you carefully follow all of the manufacturer's instructions.

An improperly adjusted weight distribution hitch can create problems in your driving and can even cause major damage to your vehicle, including warping, bending and weakening of the frame and body. If you do not feel confident setting up a weight distribution hitch on your own, do not hesitate to take it in to a professional installer.
Tools Needed for Installing a Weight Distribution Hitch:

1. Wheel chocks
2. Level
3. Tape measure
4. Ratcheting wrench set
5. Torque wrench

When you have the necessary tools set aside, you can begin setting up your weight distribution hitch. Below are the common steps involved in a weight distribution hitch installation. **These are meant to give you an idea of what a WD installation is like.** Some of the steps may be different for your specific hitch, and there may be a few additional steps required. Be sure to check the manufacturer’s instructions before you begin.

**Preparing Your Vehicle and Trailer**

**Step 1: Level your vehicle and trailer.** Park your vehicle and trailer on a level surface and use the trailer tongue jack and a level to make sure your trailer is parallel with the ground.

**Step 2: Measure and record the height of your vehicle and trailer.** You will need to know the distance from the ground to the top of the trailer coupler and the distances from the ground to the bottom of the rear bumper and front bumper on your tow vehicle. You can also use the distance from the ground to wheel well if you prefer.

**Setting Up the Hitch Head**

**Step 3: Insert the weight distribution shank into the receiver tube.** Be sure that the shank is fully inserted in the receiver tube of your trailer hitch and secure it using a hitch pin & clip.

**Step 4: Position the head assembly on the adjustable shank.** The head should be raised into position so that the top of the trailer ball is one to three inches above the coupler height. Use one mounting bolt at the bottom of the assembly to hold it in place, but do not tighten with a nut.
Step 5: Install the adjustment rod. Pivoting the head downward, place two washers on the adjustment rod and insert the rod into the lower hole on the head.

Step 6: Pivot the head up into the mounting position. It should be vertical or slightly tilted back toward the trailer. You may need to add or remove washers to achieve the proper angle.

Step 7: Secure the head with a bolt. Insert the second bolt into the top hole in the hitch head and fasten both bolts with the provided nuts and washers. Tighten the bolts but only enough to hold the head in place.

Installing the Spring Bars
Step 8: Mount the spring bars on the hitch head. If the spring bar chains have not yet been attached, attach them to the spring bars before mounting the bars to the head.

Step 9: Couple the trailer. Raise the trailer coupler, and back the tow vehicle up to couple the trailer to the trailer ball.

Step 10: Lift the tow vehicle using the trailer jack. With the coupler latched onto the trailer ball, raise the coupler three inches using the trailer jack.

Step 11: Attach the hookup brackets to the trailer. Position the spring bar brackets on the trailer frame using the spring bar chains as a guide, and mount the brackets using the provided bolts.

Step 12: Attach the spring bar chains to the brackets. Make sure both sides are spaced vertically with the same number of chain links, and then pry the brackets into the locked position using the provided lift handle.

Note: There must be a minimum of five chain links between the bracket and the spring bar.

Make Final Adjustments
Step 13: Re-measure the height of your vehicle. Retract the trailer jack so that the full weight of the trailer is resting on the hitch. Then, re-measure the distances between the ground and the front and rear bumpers. Each distance should be within 1/2” of the original measurement. If the distances have changed too drastically, you can adjust the number of links on the spring bar chains to increase or reduce the tension, or you can adjust the tilt of the head unit.
**Step 14: Fully tighten the bolts.** Uncouple the trailer and torque all hardware to the values specified in the instructions.

Weight distribution setup differs across various models. With your weight distribution hitch, always follow the instructions provided by the manufacturer, and remember to take your time.

With your trailer hitch, ball mount and trailer ball installed and ready to be hitched up to a trailer, there are a few more things to take care of before towing. One of the most important aspects is wiring and electrical systems, and we will cover these in the next chapter.

[Chapter 7: Towing Electrical & Wiring >]
Chapter 7: Towing Electrical & Wiring

Before you can legally tow your trailer on public roads, you need to have working trailer lights that are plugged into your vehicle and operating in sync with your vehicle's lights. Not only will working taillights, brake lights and turn signals help you avoid a ticket, but more importantly, they will communicate your actions to other drivers on the road and promote safe towing.

In this chapter, we will discuss the various wiring and electrical aspects of towing a trailer. We will cover the different types of vehicle wiring systems, how to wire your vehicle for towing, how to connect opposing wiring systems and connectors, as well as how to rewire your trailer.

Types of Vehicle Wiring Systems
When towing, your trailer's wiring system needs to be connected to your vehicle's wiring system. This requires a plug and socket, as well as a converter in many cases. Before we get into the trailer wiring components, let's look at some of the different wiring systems used in vehicles today.

Two-Wire System
The two-wire system is the simplest form of vehicle and trailer wiring and is still used by some vehicles today. This system sends the stop or brake signal and the turn signals along one wire, and the taillight signal along a second wire.
Three-Wire System
The three-wire system is the most common in the automotive industry. It sends the stop, tail and turn signals along three separate wires. Vehicles with a three-wire system usually require a converter to be able to tow a trailer.
Pulse Width Modulation (PWM) System
More and more vehicles today use a PWM wiring system. Sometimes called a 'multiplex' system, this type of wiring is able to control multiple lighting functions through a single wire by varying the signal intensity. PWM systems can use incandescent or LED lights, and they generally fall into one of two categories: ST systems and STT systems.

ST Systems
The ST system (stop / tail) is a PWM system that uses a single wire to control the stop and taillight signals. Separate wires are used to control the left and right turn signals.
**STT Systems**
The STT system (stop / turn / tail) is a PWM system that uses a single wire to control all three lighting functions: the stop or brake lights, turn signals and taillights.

**How to Wire Your Vehicle for Towing**

If your vehicle is not equipped with a factory-installed connector, custom wiring is the ideal solution. A custom wiring harness or 'T-connector' is a vehicle-specific harness that connects to the vehicle's electrical system and provides a vehicle-to-trailer wiring socket, usually in the form of a 4-way flat.

Some custom wiring harnesses use an integrated converter while others do not. Because each harness is made for a specific vehicle, a converter will only be included if the vehicle requires it.
Two Types of Custom Wiring

There are two basic types of custom wiring harnesses or T-connectors: custom vehicle-to-trailer wiring harnesses and custom original equipment vehicle-to-trailer connectors. The difference between them can seem subtle at first glance, but in terms of function, the two are not interchangeable.

Custom Vehicle-to-Trailer Wiring Harnesses

A custom vehicle-to-trailer wiring harness has multiple plugs that are used to 'T' into the vehicle's taillight assembly, drawing power directly from the taillights or from a direct battery connection. While custom vehicle-to-trailer wiring harnesses usually require two or more connection points, splicing and soldering are rarely ever needed.

Custom Original Equipment Vehicle-to-Trailer Connectors

While some vehicles may not be equipped with a trailer wiring connector, they may have a special socket specifically intended for hooking up wiring, provided by the vehicle manufacturer. A custom original equipment vehicle-to-trailer connector uses a single plug to plug into the special factory socket and provide a standard trailer wiring connector.

Custom Vehicle-to-Trailer Wiring Harness

Custom OE Vehicle-to-Trailer Connector

To find custom wiring for your vehicle, you can use CURT's Quick Hitch Lookup tool, found at the top of every page at curtmfg.com, or the CURT Application Guide.
How to Convert Two Different Wiring Systems

If custom wiring is not available for your particular make and model, an electrical converter may be required to equip your vehicle with the proper vehicle-to-trailer wiring connection.

An electrical converter or taillight converter is a device designed to convert your vehicle's "complex" wiring system to be compatible with your trailer's "simple" wiring system. As previously mentioned, many vehicles are equipped with a three-wire or PWM system. Most trailers, on the other hand, typically use a two-wire system. An electrical converter acts as a bridge between the two, allowing you to properly connect your vehicle and trailer through a standard plug and socket.

Differences Between Plugs & Sockets

Plugs and sockets are the electrical components that actually connect the vehicle wiring system to the trailer wiring system. 'Socket' is used to refer to the vehicle side of the connection, and 'plug' is used to refer to the trailer side. They can use anywhere from two to seven wires, depending on the trailer's electrical requirements.

The tables on the following page show the electrical functions of each plug and socket type. While most plugs and sockets come with standard color-coded wires, the colors illustrated may not reflect those found on all vehicles and trailers.
# Towing 101 by CURT Manufacturing

## 7-Way RV Blade

### Traditional Configuration

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### SAE J2863 Configuration

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## 7-Way Round

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## 6-Way Round

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## 6-Way Square

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## 5-Way Flat

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## 4-Way Flat

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<tr>
<td>Tailights</td>
<td>Brown</td>
</tr>
<tr>
<td>Ground</td>
<td>White</td>
</tr>
</tbody>
</table>

## 4-Way Round

<table>
<thead>
<tr>
<th>Vehicle Side</th>
<th>Trailer Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Color</td>
</tr>
<tr>
<td>Right turn / brakes</td>
<td>Green</td>
</tr>
<tr>
<td>Left turn / brakes</td>
<td>Yellow</td>
</tr>
<tr>
<td>Tailights</td>
<td>Brown</td>
</tr>
<tr>
<td>Ground</td>
<td>White</td>
</tr>
<tr>
<td>Left turn / brakes</td>
<td>Yellow</td>
</tr>
</tbody>
</table>
Common Plug Ends by Trailer Type
Trailers are equipped with different plug types based on their electrical components. The chart below provides examples of common trailers and the types of plugs they typically use.

<table>
<thead>
<tr>
<th>Common Corresponding Plug Ends</th>
<th>Most Commonly Used</th>
<th>Occasionally Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat Trailer without Surge Brakes</td>
<td>4-Way Flat</td>
<td>7-Way RV Blade (rarely used)</td>
</tr>
<tr>
<td>Boat Trailer with Surge Brakes</td>
<td>5-Way Flat</td>
<td>6-Way Round or 7-Way RV Blade</td>
</tr>
<tr>
<td>Utility Trailer</td>
<td>4-Way Flat</td>
<td>6-Way Round or 7-Way RV Blade</td>
</tr>
<tr>
<td>Camper Trailer</td>
<td>7-Way RV Blade</td>
<td>6-Way Round or 7-Way Round</td>
</tr>
<tr>
<td>5th Wheel Trailer</td>
<td>7-Way RV Blade</td>
<td>6-Way Round</td>
</tr>
<tr>
<td>Gooseneck Trailer</td>
<td>6-Way Round</td>
<td>7-Way RV Blade</td>
</tr>
</tbody>
</table>

Towing Tip: A bad ground connection is actually the most common cause for trailer wiring problems. A bad ground can show up as an overall lighting failure, even when the voltmeter says you have a charge. It can also create intermittent failure, causing your lights to flicker randomly. When mounting a ground wire, choose an existing factory ground connection where other ground wires are connected or use a bolt to mount the wire directly to your vehicle's chassis.
How to Adapt Two Different Connector Types

With so many different types of connectors, it is possible that your vehicle will have a different connector type than your trailer. For example, your vehicle may have a 7-way RV blade, while your trailer has a simple 4-way flat.

An adapter is an electrical device that allows a connection to be made between a mismatched trailer plug and vehicle socket. In most cases, an adapter is plug-and-play, creating an instant connection between the two opposing connector types. However, sometimes an adapter requires extra wires to be grounded or spliced into existing vehicle wiring.

Use the chart below to identify which CURT adapter is needed for your vehicle-trailer setup, based on the plug and socket types.

<table>
<thead>
<tr>
<th>Trailer Side Connectors</th>
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<tbody>
<tr>
<td>4-Way Flat</td>
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<td>4-Way Flat</td>
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<td>4-Way Flat</td>
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<tr>
<td>4-Way Flat</td>
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<tr>
<td>4-W way flat adapter</td>
</tr>
<tr>
<td>Suggested Part#: N/A</td>
</tr>
<tr>
<td>4-way round to 4-way flat adapter and splice-in 5-way flat harness</td>
</tr>
<tr>
<td>4-way round to 4-way flat adapter and splice-in 5-way flat harness</td>
</tr>
<tr>
<td>Suggested Part#: N/A</td>
</tr>
<tr>
<td>6-way round to 4-way flat adapter</td>
</tr>
<tr>
<td>Suggested Part#: 57621</td>
</tr>
<tr>
<td>6-way round to 4-way flat adapter</td>
</tr>
<tr>
<td>Suggested Part#: 57621</td>
</tr>
<tr>
<td>7-way RV blade to 4-way flat adapter</td>
</tr>
<tr>
<td>Suggested Part#: 57241</td>
</tr>
</tbody>
</table>
How to Rewire Your Trailer
Depending on the type of trailer, installing new wiring typically requires only a few basic tools and a good wiring kit. If you don't feel equipped to do the job yourself, you can also take your trailer in to a professional.

The following installation is based on the CURT #53540 trailer light kit. The steps may not reflect those involved with rewiring your own trailer. To view the full installation video of the CURT #53540 trailer light kit, go to our YouTube channel at youtube.com/curtmfg.

Installing the Wiring
Step 1: Remove the old wiring. If the old taillights and wiring are still attached, remove them and take note of the layout of the wires on the frame.

Step 2: Lay out the new wiring. Route the new wiring through the frame to the back of the trailer, with the yellow and brown wires on the driver side and the green and brown on the passenger side (these may be different for different connector types).

Step 3: Mount the ground wire. With an equal length of wiring on each side and plenty of length on the front end to connect to the vehicle, attach the ground wire at the front of the trailer frame.

Mounting the Lights
Step 4: Install the marker lights. Mount the marker lights with the provided bolts and then splice in the marker light wires using snap locks.

Step 5: Attach the wires to the frame. Use the clips already in place or those provided in the kit. Make sure the trailer wiring stays fairly taut and sheltered by the trailer frame to protect them from moving parts and road debris.

Step 6: Install the taillights. Mount the taillights to the trailer frame and connect all wires to the appropriate connection points.
Testing the Connection

Step 7: Test your trailer lights. Hook up your vehicle before you tow and make sure your trailer's lights are functioning in sync with your vehicle's lights.

No matter what or far your are planning to tow, it is always a good idea to test your trailer lights.

If you have additional questions about trailer wiring or electrical issues, contact the CURT Tech Support team toll-free at 800.798.0813.

In the next chapter, we will cover the ins and outs of using trailer brakes and how towing with trailer brakes can change the way you drive.
Chapter 8: Trailer Brakes & Brake Controls

No matter how fast they are traveling, it takes a lot of power to bring the massive weight of a tow vehicle and the trailer that it is towing to a dead stop, and in many cases, it requires more than just the tow vehicle's brakes.

In this chapter, we will discuss the two major types of trailer brakes: surge brakes and electric brakes. We will also cover the different types of brake controls, breakaway kits and how to properly care for your trailer's brakes.

Types of Trailer Brakes

Surge Brakes

Surge brakes are a self-contained, hydraulic braking system that uses the trailer's own weight and momentum to actuate the brakes. Unlike electric trailer brakes, they do not require a brake control or even an electrical connection to the tow vehicle.

In a surge brake system, when you step on your vehicle's brakes and slow down, the trailer pushes against the connection and compresses a hydraulic cylinder. This compression transfers pressure to the trailer brakes to help stop the trailer.

When they are adjusted properly, surge brakes are easy to work with and make smooth stops. They require no additional effort from the driver while towing. The downside, however, is that surge brakes cannot be directly controlled by the driver, as is the case with some electric brakes.

Towing Tip: Towing a trailer can take a heavy toll on both your vehicle’s brakes and your trailer’s brakes. The more you can ease on the brakes and use the engine to help you slow down, the longer your brakes will last.

Electric Brakes

Electric trailer brakes use electrical power from the tow vehicle to actuate electromagnetic brake drums. Unlike surge brakes, electric trailer brakes make an electrical connection to the tow vehicle. This allows for more "programmable" brake operation and gives the driver the ability to activate the trailer brakes at will, if needed. In order to tow a trailer with electric brakes, the tow vehicle needs to be equipped with a brake control.

Answered in this chapter:
- What are the different types of trailer brakes?
- What are the different types of brake controls?
- How do I choose a brake control?
- How does a breakaway kit work?
- How do I take care of my trailer's brakes?
Types of Brake Controls
A brake control unit is a small electronic device that regulates and actuates the electric brakes of a trailer and allows the driver to activate and monitor trailer brake activity from the cab of the vehicle. This requires an electrical connection between the vehicle and the trailer brakes.

A brake control mounts in the cab of the vehicle and generally has a few different controls. It may have a sliding button or wheel to adjust sensitivity and gain, and most have a second sliding button to allow activation of the trailer brakes without stepping on the brake pedal. This allows the driver to have more control over the trailer, especially in a situation with trailer sway.

There are two basic types of brake controls: time-based and inertia-based or proportional. Each type is classified by the method of activation the brake control uses.

Inertia-Based Brake Controls
An inertia-based or proportional brake control uses an electrical component called an accelerometer to sense the inertia of the tow vehicle. When the driver applies the brake pedal, the inertia-based brake control will apply power to the trailer brakes in proportion to the vehicle's momentum.

Inertia-based brake controls generally allow for smoother stops and more efficient braking, compared to time-based brake controls. This is especially apparent when braking on a hill. Whether driving up or down a hill, the inertia-based brake control is able to sense the change in momentum and apply brake power accordingly. If the tow vehicle and trailer are traveling on an incline, less power is needed to brake. If they are traveling on a decline, more power is required.
Time-Based Brake Controls
A time-based brake controls activates the trailer brakes as soon as the driver steps on the brake pedal and applies pressure over time based on the gain setting set by the driver. Though they are very effective and simple to use, time-based brake controls are generally not as precise as inertia-based brake controls.

How to Select a Brake Control
There are several factors to consider when selecting a brake control. The following question will help you determine which is the best fit for your vehicle-trailer combination.

What will you be towing?

Heavy-Duty
If you are planning to tow livestock, construction materials or other heavy or fragile cargo, an inertia-based brake control is ideal, such as the CURT TriFlex™ or Reflex™.

Inertia-based controls perform much smoother stops, resulting in less stress on the cargo and on your vehicle. For the long-term benefits, an inertia-based brake control is worth the small difference in cost compared to a time-based unit.

Light-Duty
If you are planning to tow a relatively light trailer, such as a popup camper or pontoon boat, a time-based brake control may be sufficient. CURT’s time-based controls -- Venturer™ and Discovery™ -- are more budget-friendly and perform very well with lightweight loads.
How often will you be towing?

Frequently
If you are planning to tow frequently or commercially, it is recommended that you use an inertia-based brake control. The TriFlex™ is the preferred control as it uses triple-axis accelerometer technology to sense changes in momentum and respond with the utmost accuracy. The Reflex™ is also highly accurate, though it uses only two axes.

Occasionally
If you tow only a few times a year, a time-based brake control may be enough to meet your needs. Discovery™ features a digital display to show brake power adjustments, and both Discovery™ and Venturer™ can be mounted at any angle in your vehicle. However, because inertia-based brake controls are not drastically different in price, you may want to consider the investment for the added sensitivity and smoothness in braking.

Plugging in Your Brake Control

No matter which brake control you choose for your vehicle, you will need to connect it to your vehicle's wiring system. A vehicle-specific brake control harness from CURT easily plugs into an OEM socket on your vehicle, using something called a quick plug.

A quick plug allows for easy installation and a custom fit, and all CURT brake controls are quick plug equipped. Though quick plug harnesses are available for a wide variety of vehicles, offering plug-and-play convenience, some vehicles may require a splice-in connection.

To find a compatible brake control harness for your specific vehicle, use the CURT Application Guide or Quick Hitch Lookup at the top of every page at curtmg.com. Quick plug harnesses typically install in less than ten minutes, and they come with 24” of wire protected by a slit-loom sleeve.
How a Breakaway System Works
Many larger trailers are required by law to use a breakaway system. A breakaway system is a safety device that works with your trailer brakes to protect you and the vehicles around you in the event that your trailer becomes disconnected from your vehicle. A disconnect can be unpredictable and highly dangerous, and a breakaway system is designed to deter damage and injury.

A breakaway system is made up of a battery on your trailer and a switch connected to a cable. One end of the cable attaches to your trailer, while the other end attaches to your vehicle. If the connection between your vehicle and trailer fails, the trailer will pull the cable as it breaks free. The switch will actuate the battery and firmly apply the trailer brakes to slow the trailer.

If your trailer has a breakaway system, maintenance is simple. Check the breakaway battery regularly to make sure it is charged (many high-quality systems include a charger), and check the breakaway cable to make sure it is in good condition.

Always securely connect the breakaway cable to your vehicle. You can test the breakaway system by pulling the cable. Your trailer brakes should immediately activate and lock up the tires. To disengage the breakaway, simply replace the cable in the switch.

How to Service Your Trailer Brakes
Like any other brakes, trailer brakes require regular service. The heavier the loads you tow, the more frequently you should inspect and adjust your trailer brakes.

Because trailer brakes are almost always drum brakes, you generally have to use a flat screwdriver or brake adjustment tool to perform the adjustment. Follow the trailer manufacturer's instructions. Most brakes use a "star wheel" adjuster and will require you to tighten the brakes until the wheel does not turn, then to back off slightly until the wheel turns freely.

Over time, you may need to replace the electromagnets or replace the brake shoes and drums. If you are not confident of your ability to inspect and adjust your brakes properly, you can take your trailer to a professional.
Towing Tip: If you have a trailer shop adjust your brakes, have them lubricate your wheel bearings, check your wheel nuts and inspect your tires and valve stems at the same time.

Now that you have a clear understanding of trailer brakes and brake controls, we will move onto hooking up your trailer.

Chapter 9: Hooking Up Your Trailer >
Chapter 9: Hooking Up Your Trailer

Hooking up your trailer to your vehicle requires patience and attention to detail. As discussed in previous chapters, it is important to outfit your vehicle with the right trailer hitch, ball mount, trailer ball and electrical components. If you are not familiar with any one of these items, you should address it before towing.

In this chapter, we will discuss the procedures for hooking up your trailer. We will cover what to do if you have a friend to help you in the process and what to do if you do not have a helper. We will also go over the procedures for hooking up a 5th wheel trailer and a brief checklist of things to do before towing any trailer.

How to Hook Up Your Trailer

The first step when hitching up your trailer is to back your vehicle up to the trailer. To make this easier, we recommend having a friend help you.

Before starting, agree on a set of signals to indicate which way you should turn, when to back up and when to hit the brakes. Have your helper stand on the driver’s side of the trailer, about even with the trailer tongue, and make sure you can see him or her clearly before backing up.

For an example of how to hook up a trailer, check out our “How to Hook Up a Standard Trailer” video at youtube.com/curtmfg.com.

Backing Up Your Vehicle

**Step 1: Line up your vehicle in a straight line with your trailer.** Having a straight shot to the coupler will make it much easier than trying to zigzag your way backward. Your helper should stand off to the side and give you signals of which direction to go.

**Step 2: When you are about a foot away, stop and adjust the coupler height.** Make sure the coupler will clear the trailer ball. If it is raised too much, lower it until it is only a couple inches higher than the ball.

**Step 3: Back your vehicle up the rest of the way.** The coupler should be perfectly lined up with the trailer ball. It is important that you go slowly during this step and that you rely on your helper to tell you which way the vehicle needs to go. If things are not lining up, don’t be afraid to pull forward and try again.
Connecting the Coupler

**Step 4: Lower the coupler onto the trailer ball.** With the vehicle in park and the emergency brake engaged, use the trailer jack to lower the coupler until it is resting on the ball. You should also make sure the coupler latch is in the upright, unlocked position before lowering. If you find that the coupler is offset from the ball, raise the jack again and repeat the previous step.

**Step 5: Latch the coupler and secure it.** With the coupler latch engaged and locked, lift up on the trailer tongue to test the connection. If it comes off the ball, it means that the coupler was not properly set before being latched. Unlatch it and try again. When the coupler is secure, fully retract the trailer jack.

**Step 6: Attach the safety chains in a crisscross pattern.** This is a very important step. Safety chains are required by law, and attaching them in a crisscross pattern underneath the coupler will provide a cradle to catch the coupler if it ever becomes disconnected from your hitch. Your safety chains should each be rated to meet or exceed the gross trailer weight, and they should not touch the ground when attached.

Hooking Up Your Trailer Lights

**Step 7: Plug in the electrical connector.** You should limit the amount of excess wire between the vehicle and trailer by wrapping the wires around the trailer tongue. They should not be touching the ground. With an adequate amount of wire length, press the trailer-side plug firmly into the vehicle-side socket.

**Step 8: Check your trailer lights.** With your helper standing in view of the trailer lights, turn them on one at a time to make sure they are working. You should check your right turn signal, left turn signal, hazards, running lights and brake lights. Have your helper call out each lighting function as he or she sees it. If one of your lights are not working, use an electrical tester to make sure there is an active signal at the vehicle-to-trailer wiring connection.

**Towing Tip:** Greasing the trailer ball before latching on the coupler can help maintain both components. With the amount of weight from the coupler constantly pushing down on the ball, a coupler can actually start to wear through if not properly greased.
Tips for Hooking Up a Trailer by Yourself

If you do not have a friend to help you, hooking up your trailer may be more difficult. Here are a few tips to make the process easier.

**Tip #1:** Go slowly. This is a good tip any time you are hitching up a trailer, whether you have someone helping you or not. Take your time and don’t be afraid to redo a step if needed.

**Tip #2:** If your trailer is lightweight, push it to the vehicle rather than trying to back the vehicle up to the trailer. Don’t strain yourself. If the trailer is too heavy, this step may not be an option.

**Tip #3:** Use a backup camera. If your vehicle is not equipped, use a brightly colored stick or flag attached to the coupler to better see your target. Point the stick straight up so that you can see it through the back window of your vehicle.

**Tip #4:** Place a piece of tape on the center of your rear window to indicate the location of the trailer ball. If you are using a stick or flag to mark the coupler, line up the tape with the marker.

**Tip #5:** With only a foot or two left between your vehicle and the coupler, open your driver-side door and pick a spot on the ground as a reference point. Use the point as you back up to judge the remaining distance. Remember to have your coupler raised above the trailer ball to avoid damage.

How to Hookup a 5th Wheel Trailer

Hooking up a 5th wheel trailer requires a few additional steps, compared to a bumper pull trailer. To begin, park on a level surface, chock your trailer wheels and jack up your 5th wheel trailer to a level height.

Preparing Your 5th Wheel Hitch

**Step 1:** Measure the height of your coupler and open tailgate. This will determine how high your 5th wheel hitch will need to sit in your truck bed. Subtract the tailgate height from that of the coupler. The difference is how high your 5th wheel hitch should be set. Also, it is vital that the clearance between the truck bed rails or walls and the overhang of the trailer be at least 5 1/2”.

**Step 2:** Place your hitch into the coupling position. With the hitch mounted, open the coupler jaws. At this point, make sure the 5th wheel head is properly greased or lubricated and that the jaws are free of obstructions.
**Coupling the 5th Wheel Trailer**

**Step 3: Back your truck up to the 5th wheel kingpin.** It helps to have a friend to guide you during this step. You can also start with your truck and trailer lined up in a straight line to make the process easier. When you are about 4” from the kingpin, stop the truck.

**Step 4: Raise or lower the trailer jacks.** The kingpin coupler should be sitting about 1/2” below the top of the 5th wheel hitch head. This will ensure that the locking jaws properly grasp the kingpin.

**Step 5: Back the vehicle the rest of the way.** After the kingpin is coupled to your hitch, you will want to visually inspect the connection. Put your vehicle in park and engage the emergency brake.

**Step 6: Engage the lock on the 5th wheel handle.** When the jaws are properly wrapped around the kingpin, engage the lock on the hitch. On CURT 5th wheels, this is a safety pin in the handle.

**Step 7: Plug in the electrical connector.** Press the trailer-side plug firmly into the vehicle-side socket. The socket may be located somewhere near the bumper or in the truck bed. If your vehicle does not have an electrical socket, see chapter 7 on towing electrical and wiring.

**Checking Your Work**

**Step 8: Test the coupler.** Disengage the emergency brake on your vehicle and engage the trailer brakes using your brake control unit. Then, put your vehicle into drive and ease off the brakes. Only allow the vehicle to move forward a few inches, just enough to test the connection. If the trailer is coupled properly, you should feel resistance. If your vehicle moves forward without your trailer, go back and start again from step 2.

**Step 9: Do a safety check before towing.** Check the 5th wheel handle safety pin to make sure it is locked into place and fastened with a safety clip. Test your trailer lights and other lighting functions to make sure they are working correctly. Install the breakaway switch and test the breakaway battery. Also, do not forget to close the truck tailgate, remove the wheel chocks and fully retract the trailer jacks before towing.

Many 5th wheels, goosenecks and other large trailers are equipped with electric trailer brakes to assist the tow vehicle when stopping. It is important that these brakes are properly calibrated using a brake control before you tow. For more information on brake controls and trailer brakes, go to chapter 8.
Things to Do Before Towing a Trailer
When you have your coupler hooked up, your connector plugged in and your trailer ready to tow, it is always a good idea to double check your work. Take a moment to go over the following items to help ensure a safe, successful trip.

TRAILER HOOKUP CHECKLIST

☐ Trailer ball matches coupler size
☐ Trailer ball properly torqued on the ball mount
☐ Ball mount secured in the receiver tube with a hitch pin or lock
☐ Trailer ball fully engaged in the coupler
☐ Coupler latch in the locked position and secured with a safety pin or lock
☐ Trailer jack fully retracted
☐ Electrical plug firmly inserted in the vehicle socket
☐ Safety chains hooked up and crisscrossed underneath the coupler
☐ Running lights, brake lights and turn signals working on the vehicle and trailer
☐ Breakaway switch cable securely attached to the vehicle
☐ Break control working and properly adjusted to the trailer’s weight

Now that you know how to properly hook up your trailer, it is time to discuss safety. In the next chapter, we will talk about what practices to follow while towing a trailer, how to properly load cargo and how to handle certain driving situations with a trailer in tow.

Chapter 10: Towing Safety >
Chapter 10: Towing Safety

With the right equipment, some practice and a healthy amount of confidence, towing can be almost as easy as regular driving. Yet safety should always be one of your highest priorities when pulling a trailer. No matter how comfortable you may become with towing, the fact is that the combination of your vehicle and trailer weighs more and does not maneuver or stop as easily as your vehicle alone.

In this chapter, we will cover some of the safety rules and precautions that should be observed while towing, as well as how to back up your trailer successfully.

How to Properly Load Your Trailer

Just as it is your responsibility for knowing the weight capacity of your vehicle, trailer and towing system and making wise decisions based on that knowledge, it is equally your responsibility to make wise decisions on the road. This starts by loading your trailer the right way.

The key is to make sure your trailer has the right amount of tongue weight. This is typically between 10 and 15 percent of the gross trailer weight. You also want to make sure the load is centered evenly side to side and that the center of gravity is kept as low as possible.

When packing your trailer, make sure all items are properly secured. Loose items can cause damage to other items, to your trailer or to your vehicle and can be very dangerous if they fall out along the road. Contain small items within a bag or tote and tie down large items with quality cargo straps. A little extra time spent strategically packing will pay off and could save you a lot more time and money.

How to Tow Safely

The leading cause of accidents both in towing and in normal driving situations is driver error, not faulty equipment. Some of the main reasons people get into accidents is because they are not paying attention, they are driving too fast, they are tailgating the person in front of them and so on.
The following are some simple safety rules and precautions to help promote safe driving while towing a trailer:

1. **Hitch up your trailer correctly.** Make sure you have followed the proper procedures for hooking up your trailer. Double check all connections, including the coupler and wiring, and make sure your safety chains are crossed under the trailer tongue and securely connected.

2. **Allow plenty of stopping distance.** You need to increase your following distance when towing a trailer. It takes longer to stop your towing rig than your tow vehicle alone. Also, you should avoid sudden acceleration, braking and maneuvering.

3. **Anticipate problems.** Since it takes longer to accelerate, stop, change lanes and turn with a trailer, look ahead farther than you normally would. You can see many problems developing a long way off. Observe traffic flow and be ready to react.

4. **Keep an eye out for trailer sway.** Crosswinds, large trucks, downhill grades and high speeds can all lead to trailer sway. If you are not careful, your trailer can start swinging back and forth like a pendulum. The best way to address this problem is with a sway control unit. If you experience trailer sway, you can also take your foot off the gas and manually apply the trailer brakes with the brake control. Press the button once and your trailer should align with your tow vehicle.

5. **Be extra careful when changing lanes.** Changing lanes is a challenge, especially when towing. With a trailer, your blind spots increase, and you cannot accelerate as quickly. You should consider installing tow mirrors to increase your view.

6. **Be patient when passing other vehicles.** You have to allow more distance when passing another vehicle. Passing on a two-lane road should almost never happen.
7. **Stop gradually whenever possible.** Towing a trailer requires extra work out of your brakes. Keep your vehicle and trailer brakes maintained and your brake control properly adjusted.

8. **Don't pull in where you can't see out.** It is easy to get stuck with a trailer. You might pull into a small parking lot and have to perform a complicated backup maneuver to get out. Parking farther away may be a better option.

9. **Be safe with a trailer lock.** Trailer theft is a serious problem. A trailer left unattended can easily be uncoupled and stolen while you are away. Use a coupler lock when towing, as it not only keeps your coupler secure but also deters theft.

### How to Back Up a Trailer

For most people, one of the most dreaded things about towing a trailer is having to back up. Drivers do all kinds of things to avoid it. **However, the fact is that if you are going to tow a trailer, you are going to have to put it in reverse at some point.** The following tips are intended to help you get started. Remember, backing up with a trailer takes lots of practice.

**Tip #1: Hold the steering wheel in the 6 o'clock position.** With your hand in this position, it is much easier to visualize which way to steer your trailer. Moving your hand to the left will cause the trailer to go left. Moving your hand to the right will steer the trailer to the right.

**Tip #2: Look over your shoulder if you can.** If your view is blocked by your trailer, roll down your windows and make sure you have a good view through your side mirrors. Face forward and use your side mirrors to keep track of your trailer's movements.

**Tip #3: Think of your vehicle pushing your trailer.** Try not to think about them as one complete unit moving together. As you back up, visualize the back end of your vehicle pushing the coupler of the trailer. Think of it as a person pushing the handles of a wheelbarrow. If you want to turn the wheelbarrow to the right, you have to move the handles to the left and vice versa.

**Tip #4: Make wide initial turns but go slowly.** To steer the trailer, you have to steer the vehicle, and some inexperienced drivers tend to turn too little. It might feel uncomfortable at first, but making wider turns will become more familiar with practice. One note of caution: do not move too quickly and do not exaggerate your turns so much that it causes the trailer to jackknife.
Tip #5: Do not jackknife the trailer. This point is worth repeating. A jackknifed trailer can cause damage to both the vehicle and the trailer. When backing up, go slowly and correct excessive turns by steering the tow vehicle the same way the trailer is moving or by pulling forward and trying again.

Towing Tip: When backing up, a shorter trailer will swing around faster with the slightest turn of the steering wheel. Long trailers are comparatively easy to back up. Keep this principle in mind when towing your own trailer, and be especially cautious when towing an unfamiliar trailer.

You may have additional questions about towing and towing equipment. The CURT Tech Support team is an excellent resource and can be reached at 800.798.0813. You can also reach us using our Contact page at curtmfg.com.