

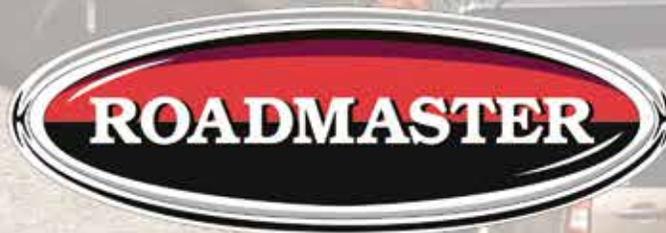
INVISI BRAKE®

patent pending



Part number 8700

Owner's Manual



Time Tested • Time Proven

ROADMASTER, Inc. • 6110 NE 127th Ave. • Vancouver, WA 98682
• 800-669-9690 • Fax 360-735-9300

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Welcome to the ROADMASTER family!

This manual has been prepared to acquaint you with the operation of your InvisiBrake supplemental braking system and to provide you with important safety information.

Read this manual completely. Understand how to operate InvisiBrake and carefully follow the instructions and safety precautions.

Your InvisiBrake has a one-year limited warranty. To qualify for your warranty, fill out and return the enclosed product registration card within 30 days of purchase.

We thank you for your patronage and greatly appreciate your discerning taste.

InvisiBrake specifications

Controller height2¾ inches
Controller width8¾ inches
Controller length8¾ inches
Voltage.....12 volts DC
Fuse size 20 amp
Operating temperature range
..... -2° to +150° F (-19° to +66° C)
Maximum amperage draw10.8 amps
Idle amperage draw.....6 mA
Battery recharging rate.....up to 2 amps
Approximate maximum air pressure..... 80 psi

Save this manual

Save this manual for future reference. It contains important information relative to safety and use. Therefore, make sure this manual is always with you when you're towing. You can download or print a copy of the most current manual at www.roadmasterinc.com (under 'Support').



WARNING

Read all instructions before operating InvisiBrake. Failure to understand how to operate InvisiBrake could result in property damage, personal injury or even death.



The InvisiBrake serial number...

...is on a label on the side of the controller. You will need this number when you fill out your product registration card.

Write down the serial number in the space below and retain for future reference.

Serial number: _____

All illustrations and specifications contained herein are based on the latest information available at the time of publication. ROADMASTER, Inc. reserves the right to make changes, at any time, without notice, in material, specifications and models, or to discontinue models.

IMPORTANT NOTICE!

Safety Definitions

These instructions contain information that is very important to know and understand. This information is provided for **safety** and to **prevent equipment problems**. To help recognize this information, observe the following symbols:



WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in property damage, serious personal injury or even death.



CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in property damage, or minor or moderate personal injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE

Refers to important information and is placed in italic type. It is recommended that you take special notice of these items.

Components

part number	description
1	945201-00InvisiBrake controller, complete
2	452109.....cable only
3	452109-10.....air cylinder only
4	452104-10.....pulley only
5	452140.....cable anchor bracket
6	945202-00brake pedal clamp (with mounting nuts and bolts)
7	450008monitor wire patch cord
8	450008-15car side monitor wire, 15 feet long (not shown)
9	450008-50.....motorhome side monitor wire, 50 feet long (not shown)
10	945203-00four-wire harness with 4-pin connector: break away, power and ground
11	8602break away cable
12	650898break away switch, pin and ring 200200-20.....break away pin and ring only
13	300065-00.....motorhome monitor LED
14	451350.....audio signal circuit board
15	Vacuum check valves
	4521413/8" vacuum check valve
	452142.....1/2" vacuum check valve
16	450701.....1/8" air line (not shown)
17	4507001/4" nylon vacuum line (not shown)
18	4521111/4" rubber vacuum hose, one foot (not shown)
19	452137.....3/8" rubber vacuum hose (not shown)
20	452136.....1/2" rubber vacuum hose (not shown)
21	4521183/8" vacuum line tee
22	4521161/2" vacuum line tee
23	945204-00four-wire flat harness with six-pin connector: towed lighting

(Components not shown to scale)



WARNING

For vehicles with brake pedal presets –

Make certain that the cable and brake pedal clamp assembly were installed with the brake pedal as close to the driver's seat as possible. **MAKE CERTAIN THAT THE BRAKE PEDAL IS AT THAT POSITION WHEN TOWING.**

As an option, the brake pedal may be moved to the desired position and disabled. Do not rely on a mental note to never move the brake pedal.

Failure to follow these instructions may cause unintended braking and eventual brake failure, which may result in property damage, personal injury or even death.

CAUTION – check seat movement and adjustments

If the InvisiBrake controller is installed under one of the seats, carefully check to make certain that the controller will not interfere with the movement of the seat or affect any adjustments to the seat. Severe non-warranty damage to the seat and/or the controller can result if the seat comes into contact

with the controller.

If there is interference, make certain that the seat is not moved beyond the point that would cause damage.

Failure to follow these instructions may cause property damage.

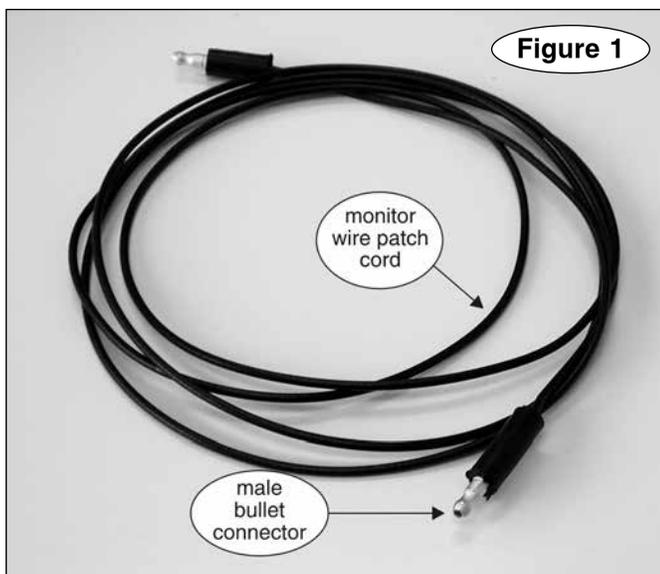
Preparations for towing

The installer should have pre-set the braking pressure to a level appropriate to your vehicle. If the InvisiBrake brake pressure is ever adjusted, or if InvisiBrake is transferred to another vehicle, follow all instructions in the section titled "How to change the brake pressure."

1. Connect the monitor wire patch cord – plug the monitor wire patch cord (Figure 1) into the front of the towed vehicle and the rear of the motorhome.

Allow enough slack to prevent the patch cord from being pulled loose when the motorhome turns. If the cord is too long, wrap it around or through the umbilical cord.

2. Connect the break away cable – Attach one of



the snap hooks (Figure 2) to the large ring on the break away pin (Figure 2) at the front of the towed vehicle, then clip the other end of the break away cable to the rear of the motorhome, close to the center.

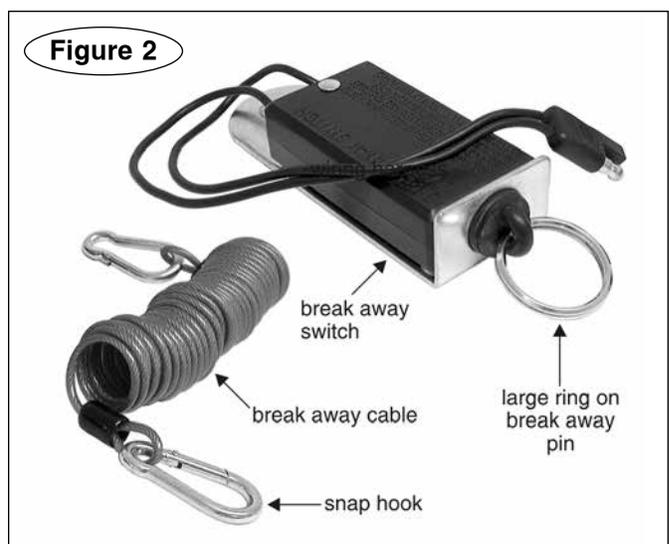
Note: see the break away warnings beginning on this page.

3. Turn the motorhome park lights on – this will activate the InvisiBrake charge circuit, which will provide a constant trickle charge to the vehicle's battery during towing.

4. Enjoy your travels.

WARNING

When connecting the break away system, always
continued on next page



Preparations for towing

continued from previous page

check the following:

- Connect the cable at the rear of the motorhome, close to the center. Connecting the cable toward either side of the motorhome may cause the break away pin to be pulled when the motorhome turns, activating the break away system.
- Be certain there are no obstructions which would prevent the cable from pulling freely away from the break away switch. Do not wrap the cable around anything – doing so could keep the cable from pulling the break away pin, preventing the system from activating in a break away.
- Make certain the cable is the correct length –
 - The cable must be long enough to prevent the break away pin from being pulled out during normal towing – make certain there is enough slack to allow for sharp turns. If the cable is not long enough, the break away system will activate even though the towed vehicle has not detached.

- The break away cable must be longer than the safety cables. This will prevent the break away system from activating if a component of the towing system has separated, but the towed vehicle is still held by the safety cables.

- Make certain that the cable is not too long – it should not hang down to the extent that it may catch on obstructions, or drag on the ground. This much slack could allow the cable to be pulled inadvertently, activating the break away system.

- If you have a telescoping tow bar, allow enough slack for the tow bar arms to be fully extended.

- Except to test the break away system or adjust the braking pressure, leave the break away pin in place, even when the vehicle is not being towed. If the pin is not in place, the InvisiBrake compressor will run constantly, which will damage the compressor and drain the vehicle's battery.

Failure to follow these instructions may cause property damage, personal injury or even death.

Protection modes

Extended braking protection

To protect the towed vehicle's brakes, InvisiBrake will automatically release braking pressure after an extended period (approximately 15 seconds) of continuous braking – for example, someone who constantly drives with their foot on the brakes.

To regain supplemental braking in the towed vehicle, release and depress the motorhome brake pedal.

Note: motorhomes with exhaust brakes may activate the brake lights, causing InvisiBrake to brake the towed vehicle. InvisiBrake automatically protects the towed vehicle's brakes by releasing braking pressure after 15 seconds of continuous braking.

When the exhaust brakes disengage, InvisiBrake resumes normal operation.

Responding to an audio alert

If, for any reason, the towed vehicle's brakes are applied continuously (for approximately 20 seconds), you will hear an audible alarm.

In addition to the audio alert, the monitor LED will be illuminated continuously.

Stop immediately. The audio alert and illuminated LED are indicating that the towed vehicle's brake pedal is being constantly depressed. Significant brake system damage to the towed vehicle will occur.

Identify and correct the cause of the audio alert before using InvisiBrake.

If you are unable to determine the cause of the audible alarm, disconnect the cable from the brake pedal arm in the towed vehicle.

CAUTION

If InvisiBrake signals you with an audio alert, stop immediately. Identify and correct the cause of the alarm before using InvisiBrake.

Failure to respond to an audio alert, as indicated above, may cause significant non-warranty damage to the towed vehicle's tires and brake system, as well as other consequential damage.

How to change the brake pressure

Based on your personal preferences, if you'd like to increase or decrease the braking pressure follow the steps below. Before changing the brake pressure, read this section completely.

For vehicles with full-time ('active') power braking systems...

IMPORTANT – if your towed vehicle is a hybrid or

a Hummer H3 it may have full-time ('active') power brakes. A vehicle with 'active' brakes will have power brakes even with the ignition off.

If your towed vehicle does have full-time ('active') power brakes, the brake pressure setting **must** be lower than the factory setting.

This step is included in the installation instructions.

continued on next page

How to change the brake pressure

continued from preceding page

If InvisiBrake was professionally installed, make certain that the installer has lowered the brake pressure setting.

CAUTION

If the towed vehicle has full-time ('active') power brakes, the brake pressure setting must be lowered. Otherwise, InvisiBrake will apply excessive force to the towed vehicle's brakes, which will 'flat-spot' the tires, damage the braking system or cause other non-warranty damage.

The degree to which the brake pressure setting will affect the motorhome will vary, depending on the size and weight of the motorhome in comparison to the size and weight of the towed vehicle –

- **Brake pressure set too high** – a sharp pull at the motorhome may indicate that the brake pressure is set too high – in this case, you may choose to lower the setting until the towed vehicle brakes with less force. See "If necessary, change the brake pressure setting" (below).

WARNING

It is possible to lower the brake pressure setting to the point that it negates the benefit of the supplemental braking system and break away. Insufficient brake pressure will lengthen stopping distance.

Failure to follow these instructions may cause property damage, personal injury or even death.

- **Brake pressure set too low** – if the combination of vehicles takes longer to stop than the motorhome alone, you may choose to raise the setting. See "If necessary, change the brake pressure setting" (below).

WARNING

If brake pressure is set too high, InvisiBrake will

apply excessive force to the towed vehicle's brake pedal, which will cause tire and brake system damage, as well as other consequential, non-warranty damage.

Failure to follow these instructions may cause property damage, personal injury or even death.

If necessary,

change the brake pressure setting

1. Pull the break away pin (Figure 2). The pressure gauge on the controller (see page one) will display the current braking pressure.

CAUTION

Reinsert the brake away pin within five minutes, or premature compressor failure may result.

2. Pull out on the brake pressure adjustment knob (see page one) to unlock it. Turn the knob clockwise to increase the braking pressure or counterclockwise to decrease the braking pressure.

3. Adjust the pressure by no more than 10 psi.

4. Push the brake pressure adjustment knob in to lock it in place. Reinsert the break away pin.

5. Test drive the motorhome and towed vehicle for a short distance, making six to eight stops. If necessary, adjust again until you are satisfied with the brake pressure setting.

WARNING

Every time you adjust the brake pressure, you must test drive the motorhome and towed vehicle. After repetitive braking, check for excessive heat near the center of the towed vehicle's wheels – this indicates that the brakes are overheating and that the brake pressure is set too high.

You must lower the braking pressure and retest until the brakes are not excessively hot.

Failure to follow these instructions may cause brake failure, resulting in property damage, personal injury or even death.

Test InvisiBrake

Following is a comprehensive test of InvisiBrake functions. We recommend that you perform this test before each towing season.

Test InvisiBrake main functions

The following tests can be performed with the motorhome and towed vehicle stationary.

1. Confirm braking – with the motorhome engine running, depress and hold the motorhome brake pedal down. The towed vehicle's brake pedal will be depressed. Then, release the motorhome brake pedal. At the towed vehicle, the brake pedal will retract.

2. Confirm that the motorhome monitor is functioning – the LED will illuminate after the motorhome's brake pedal is depressed and stop illuminating when the brake pedal is released.

3. Confirm the proper operation of the extended braking protection mode – depress and hold the motorhome's brake pedal down. The towed vehicle's brake pedal will be depressed. After approximately 15 seconds, the brake pedal will retract, even

though the motorhome brake pedal is still depressed.

4. Confirm the proper operation of the audio alert – in the **towed vehicle**, depress and hold the brake pedal down. After approximately 20 seconds, the audio alert will sound in the motorhome. (To cancel the audio alert, release the towed vehicle's brake pedal.)

WARNING

If InvisiBrake fails any of the above tests, you must refer to the “Troubleshooting” section and repair the fault before towing.

Failure to follow these instructions may cause property damage, personal injury or even death.

Test the break away system

1. Pull the large ring on the break away pin (Figure 2) out of the break away switch (Figure 2). The towed vehicle's brake pedal will be depressed when the pin is pulled. Insert the pin back into the switch. The brake pedal will be released.

Troubleshooting

Symptom	Solution
Nothing happens after proper installation, or InvisiBrake only operates sporadically.	<ul style="list-style-type: none">• Make certain the 20-amp fuse was installed during the installation.• Make certain that InvisiBrake is connected to a full-time power supply – some vehicles have an automatic shut off feature, some require you to pull a fuse for towing and some require the battery to be disconnected for towing.• Make certain that the check valve was installed with the arrow pointing toward the engine.• Check all electrical connections, with particular attention to the ground between the motorhome and towed vehicle.<ul style="list-style-type: none">• Pull the break away switch. Does InvisiBrake activate? If so, you likely have a bad ground. Test the ground by connecting a temporary wire between both vehicles' chassis, then apply the motorhome's brakes. If InvisiBrake now activates, you have a bad ground.• Make certain that InvisiBrake is receiving a brake light signal from the motorhome. (Is the motorhome engine on? Many motorhomes do not supply enough voltage to activate InvisiBrake unless the engine is running.)• The InvisiBrake wiring was connected downstream of the diodes. Reconnect the wiring upstream of the diodes.• Inspect the brake pedal clamp, pulley and cable anchor bracket. Make certain that they are installed correctly and that the cable is routed properly.• The operating temperature range is between -2° and +150° F (-19° to +66° C). InvisiBrake will not operate at temperatures above or below this range.

continued on next page

Troubleshooting

continued from preceding page

Symptom	Solution
The motorhome monitor LED does not illuminate, even though the brakes in the towed vehicle are being applied.	<ul style="list-style-type: none">• Make certain the brake light fuse was replaced in the towed vehicle.• Make certain that the monitor wire patch cord between the two vehicles is securely connected.• Make certain that there is an electrical ground between the motorhome and the towed vehicle.• Check for power at the stop light switch, at the front of the vehicle and at the LED in the motorhome.• Check for power at the back side of the LED light when the brake pedal is held down in the towed vehicle for approximately 20 seconds. You should hear an audible alert after 20 seconds which proves there is power to the harness just before the LED. If you hear the audible alert, verify proper power and ground connections at the LED light. You can also provide positive 12 volts and ground to the LED to determine if the LED has failed.• The monitor LED is connected to the towed vehicle's brake light circuit. If the fuse in the circuit is blown, the LED will not operate. Check the towed vehicle's brake lights – if they illuminate when the brake pedal is depressed, the fuse is good.• Was the optional Brake-Lite Relay installed? If so, make certain that the monitor wire is connected to the towed vehicle's brake light wire after the brake light switch, but before the Brake-Lite Relay – connecting the wire anywhere else will prevent the monitor LED from functioning.
InvisiBrake doesn't stop braking when the motorhome brakes are released. It keeps braking for about 15 seconds.	<ul style="list-style-type: none">• If the towed vehicle has been wired for towing (as opposed to installing a bulb and socket kit), diodes must be attached to the wires. If diodes are not attached, electrical feedback through the brake light wire will prevent InvisiBrake from releasing until the extended braking protection mode overrides the brake light signal, after approximately 15 seconds. Likewise, if a 'plug and play' electrical harness has been used, diodes must be installed to protect the towed lighting harness. (Most harnesses of this type only have diodes to protect the towed vehicle's electrical circuits.)
Turning the hazard lights on causes InvisiBrake to cycle on and off with the lights for a few seconds.	<ul style="list-style-type: none">• This is normal – the hazard lights use the brake light circuit, which is what activates InvisiBrake. It takes InvisiBrake three or four cycles to recognize that this is not a brake light signal. This cycle will start over each time you brake the motorhome while the hazard lights are on.
I'm not braking the motorhome, but the motorhome monitor light stays on.	<ul style="list-style-type: none">• Readjust the brake pedal clamp.• The cable is bound or obstructed. Inspect the cable assembly from the brake pedal to the cable anchor bracket.• Incorrect cable adjustment – refer to the installation instructions for proper adjustment.
The air compressor is running, but the pressure gauge is not showing any air pressure.	<p>The air pressure is set at maximum. At this setting, the needle has rotated completely around the gauge, making you believe it is at zero.</p> <p>To confirm that the compressor is operating properly, pull out on the brake pressure adjustment knob and rotate it counterclockwise. The needle will move as you lower the pressure. Adjust to desired pressure setting.</p>

Limited warranty

1. WARRANTY

1a. WARRANTY OF CONFORMITY AT TIME OF SALE

ROADMASTER, Inc. warrants that at the time of sale of this product it will be free from defects in material and manufacture and will conform to ROADMASTER'S specifications for the product.

1b. CONDITIONAL ONE-YEAR WARRANTY

In addition to the preceding time-of-sale warranty, if the product registration card is completely and accurately filled out and mailed to ROADMASTER within thirty (30) days of purchase, ROADMASTER will provide an additional warranty that for a period of one year after sale the product will remain in good working order, PROVIDED THAT the product is installed and maintained in accordance with ROADMASTER'S instructions and is not subjected to: (a) alteration or unauthorized repairs or repairs by anyone other than ROADMASTER or a ROADMASTER-authorized service center, (b) misuse, abuse, commercial use, or improper maintenance, (c) Acts of God (including without limitation hurricanes, tornadoes, floods, or other severe weather or natural phenomena), (d) failures due to products not supplied by ROADMASTER, or (e) other treatments, uses, or installations for which the product was not intended. This warranty extends only to the first retail purchaser-consumer of the product and is not transferable.

2. DISCLAIMER OF OTHER WARRANTIES

The preceding warranties are the exclusive and sole express warranties given by ROADMASTER. They supersede any prior, contrary or additional representations, whether oral or written. No agent, representative, dealer or employee has the authority to alter or increase the obligations or limitations of this warranty. Any implied warranties, including the WARRANTY OF MERCHANTABILITY and any WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, are limited in duration to thirty days or the term of the applicable express warranty provided above, whichever is longer.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

3. EXCLUSIVE REMEDY FOR ANY NONCONFORMITIES

If during the applicable Warranty Period, the product does not conform to the preceding Warranties, notify ROADMASTER as provided below, and within a reasonable time ROADMASTER will provide, at its option, one of the following: (1) replacement components for any nonconforming or defective product or components or (2) the percentage of the purchase price for the nonconforming product equal to the percentage of the Warranty Period remaining when ROADMASTER is notified of the nonconformity. ROADMASTER will, at its option, (a) use new and/or reconditioned parts in performing warranty repairs and making replacement products, (b) use parts or products of original or improved design in the repair or replacement. If ROADMASTER repairs or replaces a product, its warranty continues for the remaining portion of the original War-

ranty Period or 60 days from the date of the return shipment to the customer, whichever is greater. All replaced products and all parts removed from repaired products become the property of ROADMASTER. ROADMASTER will not provide, and will not be liable for, labor, costs of removal or reinstallation of components, disposal, shipping, freight, taxes, or other incidental charges.

THESE REMEDIES ARE THE EXCLUSIVE AND SOLE REMEDIES FOR ANY BREACH OF WARRANTY.

For any breach of warranty, the Owner must telephone ROADMASTER at 1-800-669-9690 within thirty (30) days after discovering the nonconformity. Do not return any product without first calling ROADMASTER and getting a return authorization number. Returned products must include the return authorization number and a copy of the original invoice, bill or other proof of the date of purchase. The date of purchase must coincide with the original warranty registration card on file. ROADMASTER will authorize (a) shipment of the product to ROADMASTER or (b) repair or replacement at the nearest warranty service center—in both cases with shipping at your expense. Do not purchase replacement parts or pay for repair labor—you will not be reimbursed. Compliance with the requirements of this paragraph is a condition to coverage under the Warranty: if these requirements are not complied with, ROADMASTER will have no obligation to provide any remedy for any breach of warranty.

4. DISCLAIMER OF INCIDENTAL AND CONSEQUENTIAL DAMAGES

IN NO EVENT SHALL ROADMASTER BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM NONDELIVERY OR FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

5. APPLICABLE LAW

This Warranty will be interpreted, construed, and enforced in all respects in accordance with the laws of the State of Washington, without reference to its choice of law rules. The U.N. Convention on Contracts for the International Sale of Goods will not apply to this Warranty.

6. SEVERABILITY

If any provision of this warranty is found to be invalid or unenforceable, then the remainder shall have full force and effect, and the invalid provision shall be partially enforced to the maximum extent permitted by law to effectuate the purpose of the agreement.

7. ADDRESS FOR NOTICES TO ROADMASTER

ROADMASTER, Inc., 6110 NE 127th Ave, Vancouver, WA 98682

This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

— ADVERTISEMENT —

Towed vehicle protection

Protect your towed vehicle's finish, headlights and windshield against damage with these two ROADMASTER products!



Made in the U.S.A.



Protect your towed vehicle and RV against dings and rock chips!

The Guardian is crafted from rotationally-molded, high-impact polyethylene to absorb the impact of rocks, gravel and road debris – instead of ricocheting it back at the motorhome.

The Guardian can be attached and removed in seconds, and fits all ROADMASTER tow bars equipped with quick-disconnects. (Note: MX brackets will not accommodate the Guardian.)

The Guardian can also be used with a tow dolly to help protect your towed vehicle by using the Guardian bracket (part number 2000-8).

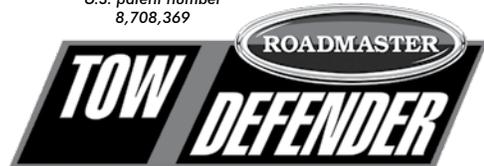
If you tow more than one vehicle, the second vehicle kit has all the mounting hardware necessary to swap the Guardian from one vehicle to another.



Gas struts automatically compress for cornering.

pictured:
4700 Tow Defender

U.S. patent number
8,708,369



A bumper-to-bumper blanket of protection!

The Tow Defender's all-weather, heavy-duty screen deflects rocks, gravel and road debris down and away, protecting your towed vehicle's finish, headlights and windshield against chips and dings. The vinyl-coated mesh lets air through, keeping it low and over the road.

Fully extended, both Tow Defenders offer 20 square feet of protection, and are held in place with shock-absorbing gas struts. Once you've reached your destination, roll up the Tow Defender, snap the elastic straps around each end, and store it against the motorhome.

- Quick installation and release
- Lightweight and compact – weighs just 14.5 pounds, and rolls up to four inches in diameter
- Powder-coated steel supports and heavy-duty gas struts for maximum durability, support and cornering flexibility

For maximum protection, use a Tow Defender and a Guardian.

Motorhomes kick up rocks, gravel and road debris, but so does oncoming traffic. A Tow Defender/Guardian combination protects your towed vehicle's finish, headlights and windshield against damage from both lanes.