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RV ENTHUSIAST

NORTH AMERICA'S PREMIER HOW-TO RV RESOURCE

First Issue!

March 2021





10 Things You Gotta Have!





RV ENTHUSIAST

NORTH AMERICA'S PREMIER HOW-TO RV RESOURCE

March 2021 Volume 1, Number 1

INSIDE

Seal the Deal
How to clean, inspect, maintain and repair a ravaged RV roof, plus tips on preventative maintenance and replacement options. And while we were at it, we addressed door, window, skylight and corner leaks. Why? Because we thought you should know how to tackle just about everything related to water incursion in an RV.

Dealing With Dirty Laundry
Installing a stacking washer and dryer in a closet pre-prepped at the factory will take the sting out of keeping clothes clean and fresh during extended travels. It's not an easy upgrade, but you will look and smell nicer for it.

Baby, It's Cold Outside
Looking for adventure? Hit the road when everyone else is putting their RV into cold storage. The benefits? Unmatched scenery, solitude and outdoor activities. The drawback? It's really cold, so you need to know how to prepare your RV for life in sub-freezing environments.

DEPARTMENTS

SPECIAL SECTION

10 Things You Gotta Have!

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Correspondence is invited from subscribers and readers of *RV Enthusiast*. Technical inquiries relating to RV function, maintenance, repairs and/or upgrades should be directed to either Technical Director Chris Dougherty or Technical Editor Chris Hemer at the above email addresses. Letters to the Editor should be directed to Editor Bruce Hampson at the above email address. Personal replies cannot be sent due to the volume of mail received. By forwarding letters to *RV Enthusiast* magazine, the author consents to allow letters to be published at the discretion of *RV Enthusiast* editors. Letters may be edited for brevity and clarification.

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Welcome to the first issue of RV Enthusiast — North America's premier "how-to" RV magazine!

By Bruce Hampson

What you're reading is, in the belief of those who produced it, quite an ambitious undertaking: a magazine created by — and for — hands-on RV enthusiasts. As such, I'm dedicating this space to provide a bit of the rationale behind RV Enthusiast — and to introduce you to the crew that made it happen.

Anytime you take what's essentially a house on wheels and subject it to the continual jostling of on- and off-highway travel for hundreds (if not thousands) of miles, things are going to shake — and, sometimes, break. It's not a question of "if" it will happen, but "when" — and what happens afterwards. Because while most people love their RVs, they don't necessarily know how to fix, maintain or upgrade them to suit their particular needs. As a result, the service bays of most RV dealerships are often flooded with motorhomes, travel trailers and fifth-wheels in need of some attention.

At *RV Enthusiast*, we have a better idea.

Fix it yourself.

It's our belief that, armed with a toolbox and accurate knowledge of exactly what the repair requires, many RV owners are capable of troubleshooting electrical systems, maintaining their AC generator, replacing a water heater, installing an awning or affecting any of dozens of other tasks. They simply need the confidence to tackle them.

To that end, we decided to pool — and share — our combined knowledge after having spent upwards of 80 years as RV industry technical writers and editors.

Bob Livingston — Perhaps the most experienced technical writer in the RV industry, Bob spent more than 40 years at *Trailer Life* and *MotorHome* magazines, finishing his career there as Group Publisher. Bob is also the author of Trailer *Life's RV Repair & Maintenance Manual*, at one time considered the authority on RV repair for the do-it-yourself crowd. Inducted into the RV/MH Hall of Fame in 2014, today Bob and his wife, Lynne, are full-time RVers.

Chris Dougherty — An RVDA/RVIA certified RV technician, Chris has worked as a dealer service manager, served on an RVIA training committee and, for the past few years, was Technical Editor of *Trailer Life* and *MotorHome* while also being an in-demand presenter at RV rallies, speaking on a variety of topics. Chris was a full-timer for 10 years; he and his wife, Karen, currently own a fifth-wheel and a truck camper he's restoring.

Chris Hemer — A gearhead from an early age, Chris spent years as technical editor and editor of automotive magazines before turning to RVs. After a long stint as Technical Editor of *Trailer Life* and *MotorHome*, Chris continued to author tech articles for both while developing his own marketing firm focused on the nuts-and-bolts of the auto and RV industries. An off-grid camping enthusiast, his most recent RV was a well-travelled Ram 2500 and truck camper.

Bruce Hampson — Like Chris, I grew up spinning wrenches on cars, then took that experience and a love of journalism to the publishing field, overseeing a number of automotive, marine and RV magazines. I also learned the "inside" of the industry firsthand as longtime editor of the trade magazine *RVBusiness*. My RV ownership includes a restored '70s-era motorhome that took my son, Jeremy, and our Siberian Husky across the country several times.

The personalities behind *RV Enthusiast* also include **Jim Mac** — formerly the longtime marketing director of Keystone RV, who is overseeing our social media effort — and **Sue Seidlitz**, who brought her sales acumen honed during more than 35 years at *Trailer Life* and *MotorHome* to the team to oversee the sales side.

So there you have it. The people behind the idea. We hope you enjoy what we've created — and look forward to reading each issue with the same enthusiasm we put into producing them.

One more thing: we're here to help. If you've got a problem with the operation of systems on your RV, we want to hear about it. Our contact information can be found on page 4 of this issue. We welcome your feedback, your ideas and your technical questions. Most of all, we welcome you. RVE

Will 2020 Registrations Eclipse 500,000 RV Sales?

There are two numbers that the RV industry follows religiously: wholesale shipments and registrations. Both are indicative of the health of the industry. Shipments have to do with orders placed by dealers, while registrations denote retail sales.

Both numbers were very nearly off the charts in 2020.

According to the RV Industry Association, a strong December pushed wholesale shipments to 430,412 for the year — the third-highest annual total on record.

And, while final registration numbers for the year weren't available as this issue of *RV Enthusiast* went to production, 2020 was nonetheless shaping up as perhaps the best year ever recorded for new RV sales. According to Statistical Surveys Inc., a Grand Rapids, Mich.-based company that follows new RV registrations, there were 29,355 RVs registered in North America in November 2020, bringing retail registrations to 486,097 through the first 11 months of the year.

A simply average year — December registrations have averaged approximately 16,000 during the past few years — would vault 2020 retail registrations beyond 500,000. According to data compiled by Statistical Surveys, the best previous year for RV sales was 2018, when 495,183 new registrations were recorded.

What's behind the skyrocketing popularity of RVing? In a word, coronavirus. The pandemic fueled people's changing perceptions of travel. Media outlets across the country touted the benefits of RV travel, where families could enjoy an active outdoor lifestyle while also controlling their environment. But you already knew that, or you wouldn't be reading *RV Enthusiast!*

KOA Seeing 'Explosion' of New Construction

While the growth of RVing does have its downside — depending upon the time of year and the location, campsites can sometimes be tough to come by without advance reservations — the campground industry is experiencing tremendous growth in new parks. For example, Kampgrounds of America (KOA), North America's largest campground franchisor with 525 parks, reported recently that KOA franchisees have opened eight new-construction campgrounds since 2017 — and currently has 12 parks either in the planning or construction stages.

According to KOA personnel, that's the most since the early days of KOA in the 1960s and '70s.

Anyone contemplating a visit to a KOA park should go to KOA.com to discover all of the parks in the KOA system. Several years ago, the company began branding each park as KOA Journey, KOA Holiday and KOA resort to give travelers an idea of the type of sites and amenities each park offers.

Compare RVs at GO RVing Website

Go RVing, the industrywide coalition responsible for promoting the benefits of the RV lifestyle to the public, recently revamped its website to offer consumers a wealth of information. The new website (gorving.com) includes tips on getting started (from going to RV shows to renting an RV to finding service and parts), information on national parks and scenic byways from experienced travelers, even recipes for the road.

Enthusiasts new to the lifestyle can increase their knowledge quotient by selecting up to three RV types to compare the differences in cost, comfort levels, occupancy accommodations, towing requirements, amenities and more. There's even an easy way to locate campgrounds by state!

NPS Announces 2021 'Free Entrance' Days

The National Park Service (NPS) has announced six days during 2021 when park service sites that normally change an entrance fee will offer free admission to everyone.

The first of these, Jan. 18, has already passed. The five remaining days should be on everyone's radar:

- April 17: First day of National Park Week
- Aug. 4: One-year anniversary of the Great American Outdoors Act
- Aug. 25: National Park Service birthday

continued on next page...

NEWS & NOTES

•Sept. 25: National Public Lands Day
•Nov. 11: Veterans Day

Established in 1916, the National Park Service oversees more than 400 sites, including 63 national parks. That list now includes New River Gorge National Park, which was reclassified in December. Previously, it was a national river. For additional information and to find a national park by name, state, activity or topic, go to: nps.gov.

Airstream Takes Viewers to National Parks

The iconic image of an aluminum-riveted Airstream travel trailer is synonymous with camping. Now, the manufacturer is taking their "silver bullets" to some of America's greatest destinations — and filming the locales so others can get a glimpse.

The short films, part of the company's new Portable Parks series, run about six minutes each and highlight each park's features. Episodes available on the Airstream website (airstream.com) include tours of Yellowstone National Park, Grand Canyon National Park, Everglades National Park and Arches National Park.

In tandem with the short videos, filmed both from the air and ground, the website also includes information on camping at each location. For the Grand Canyon segment, for example, the supporting information includes information on five campgrounds in the vicinity.

Harvest Hosts Study Predicts Strong 2021

Harvest Hosts (www.HarvestHosts.com), a membership-based platform that allows self-contained RVers to access unique overnight stays, announced in late January the results of its survey of more than 10,000 respondents, revealing promising plans of increased travel this year — especially in RVs.

Among the key findings from the survey:

• 76% of respondents said they plan to travel more than they did in 2020.
• 60% of respondents said they plan travel more than they did in 2019 before the pandemic.
• More than two-thirds of Americans (69%) do not feel safe getting on a plane.
• 56% of total respondents said they do not feel safe staying at a hotel.

With people hesitant to fly, but so many itching to travel, this begs the question: How will they do it? The short answer: RVs.

• A vast majority of respondents (99%) said they feel safe traveling in an RV.
• 53% are planning to only travel using RVs this year.
• Of people planning to travel by road, 61% plan to travel over 500 miles, and 34% plan to travel moderately far, within 100-500 miles.
• The most popular states visited in RVs were California, Florida, Arizona, Texas and Oregon.
• 57% of respondents said they would take their children on RV trips.
• 71% of total respondents said they would take their pets RVing.
• 23% of respondents reported they are fully remote for work. RVE

Overcoming the Next Big 'Connectivity' Challenge in RVing

RVers have always wanted to be social. It's a core part of the camping experience. Here are three ways to rekindle human connections during travel.

By Steven Hileman

RVing isn't an all-inclusive vacation: it takes effort and know-how to find the relaxation that so many seek with camping. Congratulations to the founders and staff of *RV Enthusiast* for embarking on a journey to help bring more education and technical articles to our community. It's a bold move but one that is well-timed, with so many consumers trying RVing for the first time in the past year.

Like the founders of *RV Enthusiast*, I too have felt moved to help make better stories and tools available to RVers that put a little more "recreation" in recreational vehicles. I left my role at Airstream Inc. and helped create the Togo Group in 2018, which now operates *Roadtrippers.com, RVillage.com* and *TogoRV.com*. We're making quick progress on our mission to bring out the joy of getting to, staying in, and exploring the outdoors. If you haven't tried one of our products I hope that you will soon — and then share your feedback with me. Our RV GPS, automatic safety recall notifications and RV-specific checklists are some of my favorite stress-reducing features.

Staying connected on the road is easier than it's ever been. That's not to say that you can't overcomplicate the process with boosters, antennas, hotspots and other tech gear. However, with both campground WiFi and nationwide cellular service improving, it has never been easier to stay connected in your RV. While many rural or isolated locations don't get cell service, you can simply check what your connectivity will be before you arrive with an app like Coverage or by reading reviews on Campendium. If you're interested in diving deep into the nuts-and-bolts of internet-connectivity, visit our friends at rvmobileinternet.com for the latest information on mobile internet tech.

The next big "connectivity" challenge in RVing is the decline in human connections. There's no denying the last year has been a strange one, full of isolation, separation and restriction. But even before everything that happened in 2020, some of the most extroverted RVers I know complained about the loneliness of RVing. Extended trips longer than a few weeks seem to eventually trigger that yearning for connection, a basic need that shouldn't be taken for granted.

Here are three easy ways to stay connected:

• **Video calls.** There are hundreds of ways to do these, but I have a few recommendations. Schedule a recurring time for family or friends. Simply looking forward to regularly scheduled chats is good for you. Use Google Duo for Android-to-Android calls and FaceTime for calls between Apple devices; these native services are particularly efficient with your data and battery usage. If you need a service that can be used regardless of the device, go with Zoom or Glip which have free tiers of service.

• **Activity Planning.** This can seem a bit trivial, but taking a walk through the campground or planning a hike through a nearby park ensures you'll get the opportunity to wave hello to a passing human or strike up a chat about how someone likes their tow vehicle. Again, the key to success is making it a regularly scheduled habit. This works in reverse also — if you're in a site where people could walk past, enjoy the outdoors and make it a point to wave and say hello to passersby. You never know who you might meet.

•**Virtual Communities**. Since RVillage joined Togo Group in 2020, I continue to be impressed by how well it brings RVers together around common interests, places and activities. With more than 360,000 people on the platform, it's big enough to connect travelers with the information and social interaction you need. In particular, it blends real-world social interaction with virtual messages by allowing you to check in to a location and converse with others who are nearby. And there are hundreds of special-interest groups that range well beyond the busy RV DIY groups, from bird-watchers to Instant Pot lovers. It's free to join and is a great way to connect with others who share a common travel instrument.

RVers have always wanted to be social. It's a core part of the camping experience that I was taught by my grandfather as we explored the upper midwest and Canada. As we navigate 2021, I hope you will take a moment to safely and kindly connect with other campers. There are thousands of new RVers amongst us and it's never been more important to show them how inclusive, kind, helpful and friendly that campers can be. Stay connected to your friends, your family, and your fellow campers — it makes the RV lifestyle that much more durable and enjoyable. RVE

Steven Hileman

As Togo Group's chief customer evangelist, Vice President of Marketing & Communications Steven Hileman is charged with positioning Togo's products as trusted sidekicks for RV owners. Based on more than a decade of customer experience in some of the industry's most well-known brands, his technical acumen is rooted in his deep understanding of consumer tech, dealer marketing and OEM product development. Hileman holds a Bachelor of Science from the University of Dayton and lives in Coldwater, Ohio, with his family. He is a self-described automotive geek and early adopter of all things tech.

Getting Rid of Fifth-Wheel 'Chucking'

MORryde International's Rubber Pin Box utilizes a unique head design with rubber dampeners to help isolate and reduce the bucking motion between fifth-wheel and tow vehicle.

By Rick Kessler

Bob and Sharon Brighton have been avid RVers for several years, mostly escaping to state parks for long weekends during the summers in Michigan, where Bob is a cabinet maker and Sharon is a school principal.

But with Sharon set to retire this June and Bob planning to step back from most of his work, too, the couple intend to take longer RV trips in their 2019 Grand Design Reflection 303RLS, which is paired with a 2019 Ram 2500 diesel outfitted with B&W Companion Hitch for the truck-bed puck system.

One such planned trip, scheduled with several other RVing family members this fall, will be a long journey throughout New England including a stop at Acadia National Park in Maine.

Bob wanted to make at least one more upgrade to his rig before the trip, though. The OE pin box that came with his Reflection fifth-wheel makes the connection, but he thought the ride was rough at times. Whenever the Brightons drove over bumpy roads they experienced the back-and-forth lurching known as trailer chucking — an all-too common occurrence for fifth-wheel owners.

Fortunately, Elkhart, Ind.-based MORryde International offers its Rubber Pin Box that, said MORryde Sales and Marketing Director Jack Enfield, can dramatically reduce back-and-forth chucking. Using a patented rubber shear spring, the system moves back and forth up to 3 inches and up to 1.5 inches side to side to absorb the transfer of energy from the fifth-wheel to the truck.

Measure the distance from the bottom of the factory kingpin to the flat surface directly below. Write this measurement down as you'll need the new pin box to be within half an inch of this distance.

Make note of the bolt hole location of the factory pin box. You will want to remount the MORryde pin box system in the same hole locations. MORryde notes in its installation instructions that some telescoping pin boxes will require one to two holes to be re-drilled.

"All we're doing is taking what was rigid and making it flexible," explained Enfield.

"On traditional fifth-wheels, you have a connection between the truck and the trailer. The stock pin box is designed around a steel-on-steel connection — the steel pin goes into a steel fifth-wheel coupler — and that's it. It's rigid. There is no 'give' in that connection," he continued. "So, when you tow a trailer, you've got the transfer of energy from the trailer to the truck, and it's mostly on a horizontal plane. You'll notice it when you come to a stop, when you accelerate, or when you get on those roads where the expansion joints are in just the right location. The energy is transferred from the trailer to the truck, and where most people feel it is in the driver and the passenger seat.

"So, we separated the top box and the skid plate and added a rubber shear spring," he said. "We use rubber because it's an isolator. It's an absorber. So, what was rigid is now flexible and can now absorb the transfer of energy."

Enfield pointed out that poor road conditions and stops-and-starts will still induce a certain amount of movement that is simply unavoidable, but the Rubber Pin Box is designed to dissipate it. "We want to cushion and absorb the movement so that it's much more comfortable in the driver and the passenger seat," he said. "Interestingly, the people who notice it the most are that people in the passenger seat. The driver is preoccupied with whatever traffic conditions are happening, but in the passenger seat — especially more and more in today's technology age — they're reading, they're on their phone. They're the ones who really notice that jerking and chucking."

Remove any items attached to the factory pin box. In our case, we removed the breakaway switch, but others might need to remove a power cord box, exterior light, lube plate or other items. Then, with your helper holding the pin box, remove all the bolts securing it to the fifth-wheel frame. Set the factory pin box aside and have your helper position the replacement MORryde Rubber Pin Box into position.

Using a drift/centering pin (or screwdriver), center the holes and install at least one bolt on each side in different locations to support the weight of the new pin box for final assembly.

Verify the pin height is within a half-inch (+ or -) of the factory setting, then install the remaining bolts and nuts.

Using the torque wrench, check all the bolts to ensure they are tightened to specifications for bolt types listed on the torque chart supplied with the directions.

The replacement MORryde Rubber Pin Box uses a rubber heer spring in the head to help cushion trailer chucking during travel (not unlike the engine mounts in an automobile). To allow for the spring movement, polyurethane bushings provide spacing between the upper and lower plates.

All By Yourself

While it's strongly recommended that you have someone on hand to assist in this swap, MORryde's Jack Enfield said it is also possible to install the MORryde Pin Box when either a helper is not available or you are otherwise unable to lift and maneuver the new pin box into position.

- When removing the factory pin box, leave one bolt in place on the left side at the front and one bolt on the right side at the rear.
- Back your tow vehicle up to the fifth-wheel and connect to the truck hitch.
- Remove the remaining two bolts.
- Using the landing gear on the fifth-wheel, raise the trailer 2-3 inches.
- Pull the truck forward until the pin box clears the trailer. The rear of the pin box will fall to the bed of the truck, so it's important to put a piece of wood across the bed for protection.
- Remove the factory pin box from the truck hitch and replace it with the MORryde Pin Box. Place a spacer block under the rear portion of the pin box so that it can be positioned for installation.
- Back the truck under the trailer. Use your helper to line the pin box up to the mounting plate. Move the truck back and forth to line up the holes front to rear and the landing gear for up and down.
- Center the holes and install at least one bolt on the left side and one on the right in different locations.
- Unlock the hitch and pull the truck forward. Verify the pin height, install the remaining bolts and tighten with a torque wrench to listed specifications.

The Brightons opted to have the new pin box installed by MORryde technicians at the company's Customer Service Center, but Enfield pointed out this is a project that most people would be capable of completing. The process itself is simple — although a second person is needed to help carry the weight of the heavy steel pin box — and most installations should be able to be completed in less than an hour. Required tools include a tape measure, impact wrench or ratchet with sockets, torque wrench (capable of reading up to 300 ft. lbs.), drift/centering pin and a screw gun to remove items such as exterior lights, breakaway switches and power cord boxes. Optional tools include a Porta Power kit or short bottle jack and, of course, the ever-present hammer.

Fifth-wheel owners will immediately notice a visual difference in the design of the MORryde unit compared to the stock pin box. The MORryde product extends out at less of an angle, which allowed company engineers to add the section with rubber isolating dampeners built into the head while strictly maintaining the distance from the centerhole to the kinpin. Installed, the replacement pin box also is designed to maintain the same distance between the kingpin and the ground surface to maintain a level ride. The Rubber Pin Box is a straight changeout, said Enfield, adding that MORryde offers a pinbox identification guide on its website for older models where the original product decals may have worn off.

The result? The improvement, according to Bob Brighton, was noticeable almost immediately.

"We still experienced some chucking when driving down well-used city streets and at starts/stops, but that was expected — and even then, it was much better than before,' he said. "The real improvement was on major streets and highways, when chucking was all but gone, even when passing over the dreaded expansion joints." RVE

Source
MORryde International
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morryde.com

Rick Kessler

A former longtime newspaper editor and journalist, Rick Kessler is the executive editor of *RVBusiness*, one of the top trade publications covering the RV industry. He also serves as managing editor of *Woodall's* Campground Management, which provides business information to campground associations, owners and suppliers.

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Seal the Deal

How to inspect, maintain and repair an RV roof — and a lot more

by Chris Hemer

Be it motorhome, trailer or truck camper, an RV is comprised of many different parts. To the naked eye, nowhere is this more evident than the exterior. The roof, front and rear caps and the exterior walls — not to mention windows and vents — are all individual components on most units, carefully fitted and joined with rubber, caulks, and sealants. If all goes well, the RV in question should remain leak free for many years.

In the event of a defect or deferred maintenance, however, leaks can occur — and the worst part about that is, they may be too small to notice until it's too late. Water creeping into the membrane on a rubber roof can cause dry rot to the wood underneath, while a constant drip into a wall can cause delamination. None of these problems are easy or cheap to fix, but the good news is, you can prevent them with a little maintenance and fix many small leaks yourself. We'll outline the procedures to help guard your investment against the elements and, while we're at it, present a few ways to seal leaky doors and windows from both water and drafts.

Roof Types

RV roofs can be divided into five-main types: Rubber, technically known as ethylene propylene diene monomer (EPDM), thermoplastic polyolefin (TPO), poly vinyl chloride (PVC), fiberglass and aluminum.

Fiberglass roofs are strong and durable, but they can still suffer damage. This roof (above) had a large crack and several holes that had been temporarily repaired. Here, RV Roofing Pros has repaired the large crack and patched all the holes, then covered with fiber-reinforced mastic (below).

By far the most common RV roofing material is EPDM, as it generally does a good job of keeping out the weather and is relatively inexpensive from a manufacturing standpoint. When correctly installed at the factory, an EPDM roof can last 10-12 years (depending on whether the RV is stored indoors or outdoors, environment, maintenance, etc.). EPDM is a rubber membrane that is rolled onto the RV's structural deck (typically comprised of plywood, particle board or luaun) and glued into place

EPDM roofs consist of a black (bottom) layer and white (top) layer and must be regularly cleaned and treated with a protectant product to prevent the rubber from breaking down prematurely. EPDM roofs are most often associated with the dreaded "black streaks" that can run down the sidewalls. In truth, any RV roof type is prone to these if the roof isn't properly maintained, but the deteriorating EPDM roof, with its black bottom, can make things worse.

TPO and PVC roofs are the latest additions to the RV industry and are used in a similar manner to EPDM. When most of us think of plastic, we imagine something bendable, yet firm, like a milk jug. But TPO is actually very pliable, which is why it is a viable choice for a roofing material. There are even TPO membranes, like Dicor Product's DiFlex II TPO roofing, that are extremely flexible and as supple as most EPDM membranes, according to the company. (It should know, it makes both).

The key difference is that TPO is a type of plastic, which as we all know, takes a very long time to break down and does not require as much maintenance as EPDM. It's also less prone to cracking and is not affected by environmental contaminants.

PVC, another membrane type, is thicker than most TPO products and has up to a 20-year warranty.

A fiberglass roof may be applied as a separate component, such as a one-piece fiberglass roof, or it may be integral to the overall structure. There are a few truck campers and travel trailers that use the latter method, where the body is just two pieces of molded fiberglass (upper half and lower half) bonded together. In any case, fiberglass is likely

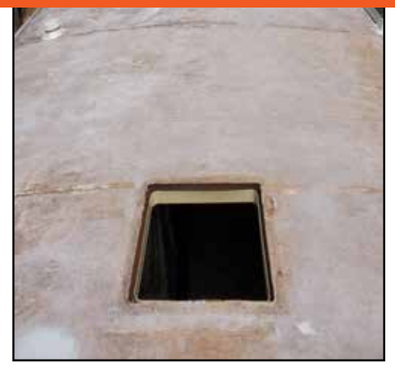
The Doors - *Entry doors don't often let water in, but it is possible — and they can also be drafty. Here are some quick, inexpensive fixes:*

This strike plate is typical of those found on most RVs. Loosening the plate with a screwdriver reveals that the mounting holes are slotted, allowing the plate to be adjusted. If your door is stubborn to close, or doesn't close tight enough, this simple fix could be all you need.

Some RV doorways incorporate a Nader pin instead of a strike plate. To adjust these, simply loosen the pin and turn it one direction or the other.

Many RVs use simple foam weatherstripping that can deteriorate and lose its resilience over time. Carefully scrape away the old weatherstripping as well as the old adhesive left behind then apply new foam weatherstripping to the doorway. Adjust the strike plate or Nader pin to achieve a tight, leak-free fit. If your RV has worn or damaged rubber weatherstripping, LaVanture Products can help — it carries a wide range of trims, seals, sealants and foam tapes for the automotive and RV segments.

This EPDM roof is about as bad as they get. Having sat parked in the hot California sun for years, the membrane completely broke down, became brittle and started to crack and flake. You might think this would be a total loss, but even this roof was savable.



First the old vents and AC were removed and the entire EPDM membrane scraped away. As you can see, the wood underneath is still in pretty good shape.

RV roofing companies like RV Roofing Pros (who completed this job) call this process "direct to deck," whereby the acrylic coating is applied directly to the wooden deck underneath, sealing it from the elements.

a familiar material to you already, so you probably already know that it's tough and durable. It still requires maintenance and care when cleaning, however, as it can deteriorate quickly if the protective gelcoat layer (which is what makes fiberglass shiny) is damaged, removed or worn away.

Metal roofs, as you may have guessed, are typically found on metal (aluminum) trailers, and were fairly common on vintage trailers as well. Metal is obviously a tough material, but it is difficult to work with and is comparatively heavy, which is why its use isn't as widespread as other materials.

One thing all RV roofs have in common, however, is caulk (also known as sealant). It is used around every roof vent, skylight and antenna, as well as along any seams, such as between the roof and sidewalls, and front/rear caps. RV and roof manufacturers will often call out the types of sealant to be used on their products, and these recommendations should be followed carefully. RV membrane roofs should never be sealed with silicone caulk. In any case, sealants are designed to be flexible and water tight, but succumb to the effects of the environment and the flex of the RV over time, and need to be renewed.

Cleaning and Inspection

After washing the roof and allowing to dry, you can clean the caulking with denatured alcohol and a clean terry cloth. This will give you a better idea of the seal condition and will help prepare the surface if re-caulking is necessary. Note that this caulking is free of cracks, is not lifting and is in good condition overall.

Whether you bought your RV new or used, the first step toward leak prevention is to thoroughly clean and inspect the roof at least twice a year, although some manufacturers require an inspection every 90 days during the warranty period. "The goal is to remove dirt, road oils, and hopefully stains without using a chemically heavy cleaner," said Scott Christian of RV Roofing Solutions, a mobile RV roof repair and restoration company. "Most experienced RVers clean with simple dishwashing liquid such as Dawn, Joy, etc. These cleaners cut oil and dirt very well and can be used on any roof surface." A soft bristle brush, available at most RV supply stores, will help loosen dirt and grime in most cases, but if it's really dirty or covered in moss, tree sap or other gunk, you might consider using a deck brush as the bristles are tougher. Work on your hands and knees to avoid slipping or falling.

While it may be tempting to use a pressure washer to speed up the job, the experts we talked to generally recommend against it. "Using a pressure washer on a rubber membrane isn't recommended for a couple reasons," said Christian. "Applying 1,000 psi-plus of pressure over cracked caulking can force water under the rubber membrane, causing a whole new set of issues because the water has no way of getting out. Holding a pressure washer too close to an older rubber membrane can actually cut it, again forcing water underneath. Owning a pressure washer and knowing how to use one are two different things."

Instead, use a common garden hose, and as you rinse the roof off, watch for signs of wear. "One of the first signs of trouble (on an EPDM roof) is when you start to see black as you rinse away the soap," said Luis Mendes of RV Roofing Pros, another mobile RV roof repair and restoration company. "That means the bottom layer is now fully exposed to the elements and will now start to oxidize, break down and begin cracking and

What About Windows?

Older RVs utilize an aluminum flange around the windows, while many newer models feature sleek-looking frameless models. While fixing leaks in the latter is a story unto itself, fixing or preventing small leaks in the earlier models is a pretty simple task. Using a good quality silicone sealant (available from LaVanture Products and others), draw a small bead around the top of the window frame and around the top window radiuses. Finish the silicone bead by misting water onto the surface with a spray bottle, then running your finger along it for a smooth finish. If total re-sealing is necessary, you'll find that framed RV windows are very easy to remove: simply locate the screws on the interior window frame (known as the clamp ring) and remove them. Pull the clamp ring from the window, then gently begin pushing the window outward. Have someone standing on the outside to catch the window as it comes out. To re-seal the window, Dicor offers its Seal-Tite Window Foamcore Kit, which includes 88 feet of foamcore butyl tape, two tubes of Dicor Clear Cap sealant, a putty knife, spray bottle and instructions.

splitting. If you see any black, you're going to want to get the roof re-coated right away."

Once the roof is dry, carefully inspect the caulking around each roof vent, skylight, plumbing/refrigerator vents, antenna(s), etc. While you're at it, check these components for signs of wear or cracking and replace if necessary. Check any seams between the roof and front/rear caps, and where the roof meets the sidewalls for any splits.

By the way: You may have heard that if your RV doesn't have a roof ladder, the roof wasn't designed to be walked on, and therefore you shouldn't go up there — which begs the question: How do you wash it, inspect it, or perform repairs? You just have to know what to do, or perhaps what not to do. "Every RV can be walked on…even ultralight trailers," said Mendes. "You just have to walk on the trusses and watch your step. Before you get on the roof, you should be able to see the trusses, or feel where they are. There hasn't been one roof that I haven't been able to walk on, but you can cause damage if you don't stand on the truss. The area in-between the trusses could just be 1/8-inch lauan and your foot will go right through it." Of course, if you're not comfortable going on the roof, leave it to the pros.

A worn air conditioning gasket can cause major damage that you may not see, because it's underneath the unit. Over time, the weight from the air conditioner will compress the gasket, allowing rainwater to get in. Leaks may make themselves known in the form of yellow water stains on the ceiling inside the RV. RV air conditioning gaskets come in 14 x 14 inches or 14 x 16 inches; choose a black neoprene gasket instead of white foam, as it tends to last longer. If you don't know the size, simply remove the interior cover and measure the opening.

Around the corner

On travel trailers with metal siding, leakage in the corners can be an issue either because the factory did not install and/or seal the trim correctly to start with, or because the sealing tape underneath is no longer doing its job. If ignored, a leaky corner seal can cause a lot of damage, rotting the wood underneath. To fix problems like this yourself, Dicor offers its Seal-Tite Corner Seal Kit, which consists of corner seal tape, cap sealant, putty knife, spray bottle and instructions. After the corner molding is removed, the tape is placed over the gap, with the fleece side facing out.

Cap sealant is applied inside the corner molding, which is then re-installed, squeezing some of the sealant out. Use a spray bottle to mist the bead of sealant with water. A caulk tool is used to clean away. If done correctly, you won't have trouble with corner leaks again.

Want to see how it's done? See a Dicor video of the process here: https://www.youtube.com/watch?v=366yEXwq86k

The Sky's the Limit

While you're up on the roof, now is the time to inspect other related areas, like roof vents and skylights. Over time these can fade, check, crack and, yes, leak. Roof vent covers are an easy remove-and-replace process, but skylights are built into the roof, making them a little more intimidating for the DIY RVer. The good news: It's probably not as hard as you think, and a new skylight will usually cost between $100-$125 from sources like icondirect.com and others.

Anywhere there is a "loop" in the caulking, a fastener head is located underneath. Use a flat blade screwdriver to carefully pick away at the old caulking until the head is exposed. You'll probably need a square (aka Robertson) driver bit for this and many other areas of an RV. Once you've removed all the screws, you should be able to see the edge of the skylight through the caulking. Run a screwdriver down the edge, all the way around the skylight. Work the screwdriver between the roof and skylight and gently begin prying it up until it can be lifted off altogether. If the cover breaks like this one did, don't worry — you'll be scraping off the old caulking along with any plastic left in it.

Some RVs have double skylights or there may just be a hole in the roof once the old skylight is removed. Unless the inner skylight is leaking or damaged, there's no need to mess with it. After carefully scraping away the old caulking with a plastic putty knife and cleaning the area thoroughly, prepare the new skylight for installation. Apply a strip of putty tape (buytl is best) all the way round the mounting lip of the skylight. Camco offers a Universal Vent Installation kit that includes putty tape and screws to help you get the job done. Remove the paper backing on the putty tape and place the new skylight over the opening. Begin screwing the skylight to the roof, using the holes as a guide. It's not important to line up the new skylight to the original holes; for one thing, you probably won't get the exact skylight used on your RV, and for another, you're just inserting new screws into the roof deck. The putty tape, combined with the caulking, will seal both the new screws and original holes. Self-leveling lap sealant is used to ensure a leak-free seal. Don't worry if the finished job isn't pretty — as long as it doesn't leak, you did it right.

Preventative maintenance and small repairs

Cracks in the caulking are to be expected after a year or two (depending on the environment), but that doesn't necessarily mean it needs to be replaced. More often than not, re-caulking, rather than complete removal and replacement, will get the job done.

"Re-caulking a roof should be done as soon as the existing caulking is showing signs of cracking, usually 18 to 24 months depending on the climate," said Christian. He recommends that you wear gloves and work a small amount of caulking into the open cracks.

Once done, apply a layer of caulk over the area. "When to remove the caulk entirely is open for debate as there are many opinions on this topic," he added. "Myself, I recommend removal once you have three layers of caulking and now need a fourth. Removing caulking is like removing five-year-old chewing gum — and will fight you every step of the way."

If you're up for a challenge and on a budget, Dicor offers its two-part EPDM Rubber Roofing Coating System, consisting of a cleaner/activator and a roll-on acrylic coating that it claims will add years to your roof.

When re-caulking an RV roof, always choose a product designed for your RV roof, such as those offered by Alpha Systems, Dicor, Lasalle Bristol and LaVanture Products. Use self-leveling caulk for the roof, and standard (not self-leveling) caulk for sloped or vertical areas, like gutters and corners. One thing our experts agree upon, however, is to avoid products that contain silicone. "I've removed too much of it only to find water underneath," said Christian. "The other downside is that nothing sticks to it, so if you decide it isn't working for you, you can't use anything other than more silicone for a reseal."

If replacing the caulk is necessary, you can do the job yourself — but keep in mind that it can be a tedious, labor-intensive process that is best broken up over a day or more. On the upside, you can save yourself a lot of money. "I've had some customers tell me they were charged $1,900 for a simple re-caulking job along all the seams and penetrations," said Mendes. "That's kind of high, but it's not uncommon to get charged $900 or more." Scrape away old caulk using a plastic, not metal putty knife — and if the sealant is stubborn to remove, leave it alone and caulk over it.

Small tears or punctures in the membrane are best repaired using EternaBond tape, which is suitable for all RV roof types and will last for several years. In fact, the company claims that EternaBond has an expected life of 18-35 years when exposed to the elements, depending on the environment. The key, however, is installing it correctly. "It's not a cure-all," Mendes cautioned. "If you're applying it correctly at the right temperature and there is good adhesion, it can last for years. I've seen it used all kinds of ways. Any place there is a seam, you can use EternaBond. But if you have screws, old lumps of caulking, etc., sticking up, that will interfere with good adhesion."

It's a good idea to keep a roll of EternaBond with you for any quick repairs, but in an emergency, Mendes says you can even use Gorilla tape, available at any hardware o home improvement store, to shore up problem areas. "I've had customers bring their RVs to me with nothing holding down the membrane but Gorilla tape," he said. "But whenever you apply tape of any kind, the surface must be clean. You can use denatured alcohol, even glass cleaner will work." However, petroleum distillates and citric-based cleaners should be avoided.

Whatever you use to clean an EPDM roof, make sure it's designed for that purpose — or this could be the result. Solvents in the cleaning product penetrated the membrane and caused it to bubble up, necessitating a complete tear-off.

EternaBond is an invaluable resource to the DIY RVer. Not only can it be used to fix small punctures and leaks, it can also be used instead of caulk to seal vent flanges. EternaBond is very sticky and once it makes contact with the surface you won't be able to move it. A pro tip is to remove the backing from just one end of the tape, then, while keeping the backing in one hand, continue to push the tape into place as you pull the backing from underneath. The company sells a weighted roller to help with this process. To make double sure of a good seal, lay a bead of caulk around the edge of the tape, and wherever it overlaps.

Back is Black

If you bought your RV used (or even if you didn't) you may not know whether it has a rubber (EPDM) or TPO roof. After all, they're both white and pliable, so how can you tell? An easy way, according to the folks at Dicor, is to go inside the RV and locate an overhead roof vent. Using the appropriate screwdriver, remove the vent trim. Most RV manufacturers will have some of the roof material stapled into the inside of the vent opening. If necessary, carefully remove one of the staples and look at the other side of the material. If the side facing you is white or dove-colored, and the other side is black, it's EPDM. If it's the same color on both sides, it's TPO.

LaVanture Products offers a number of formulations for RV roof repair, including Korapur 140 and Chem-X Pro, sealant/ adhesives in liquid form that have very high strengths and can replace screws.

Replacement options

Rubber roofs are not the only roofing type that can require replacement. "TPO lasts a little longer, because it's plastic," said Mendes, "but it eventually breaks down. So does fiberglass. I saw one roof that was unsealed and unwaxed for years, and there were fiberglass shards floating around everywhere."

So if it appears your roof requires replacement, what are your options?

If your roof is EPDM, that depends on your budget and how long you plan to keep the RV. If the rubber is breaking down and the black layer is starting to show through, Dicor offers its two-part EPDM Rubber Roofing Coating System consisting of a cleaner/activator and a roll-on acrylic coating that Dicor claims will add years to your roof. The company also offers other coating options for EPDM as well as for fiberglass and metal RV roof coatings. If the rubber or TPO membrane is damaged or too far gone, you can have it completely replaced — but a complete "tear off" (as it is referred to in the roofing business) performed by a qualified dealer or RV center is very expensive (on the order of $8,000-$10,000 for an EPDM or TPO roof) and any warranty is for the membrane only.

Bridging the gap between small repairs and total replacement are companies that simply re-coat your RV roof, regardless of type, making regular cleaning and maintenance unnecessary. Companies like RV Armor, RV Roofing Pros and RV Roofing Solutions can come to you wherever your RV is located and use a multi-step inspection, repair and re-coating process using their own roll-on acrylic products. The processes, materials and warranties vary from company to company, so do your own research to find out what works best for you. The advantage of these companies is that you don't have to take your RV anywhere, the cost is substantially less than a new roof (around $150-$160 per linear foot) and the warranty is at least 10 years (material and labor). Some, like RV Armor, offer a lifetime warranty that follows the VIN of the RV, not the owner. All of these companies

Here's an example of caulking in need of replacement. It is severely cracked and lifts easily when prompted by a putty knife. Unless you are experienced and very careful, use a plastic putty knife for removing old caulk to prevent damaging the roof membrane. Use self-leveling lap sealant to reseal the area, using care to make sure the edges, as well as the fasteners, are completely covered.

can also perform repairs, replace skylights/vents — even rebuild the roof, if necessary — before coating (at an additional cost that will vary depending on the company and the nature of the repairs).

Another company, FlexArmor, uses a spray-on polyurea product that must be applied at one of the company's qualified application centers. The upside is that all work is performed indoors, so you don't have to wait for good weather to get your roof replaced. FlexArmor can also perform all necessary repairs before recoating.

Finally, if you've got more time than money and are fond of DIY projects, Crazy Seal offers a DIY roll-on roofing system that the company says is seamless, permanent and backed by a 50-year product warranty. RVE

Small repairs on the roof can be completed using a product like Dicor's lap sealant, but be sure to use the right kind. Not all roof sealants are compatible with all roof types and can damage the membrane. Non-leveling sealant (above, left) is for sloped or vertical surfaces, while self-leveling sealant is used on flat surfaces like roof vents, seams, etc. You can also use self-leveling lap sealant to re-seal caulking at the roof seams.

SOURCES:

Alpha Systems
800-462-4698
alphallc.us

Crazy Seal
800-963-0131
crazyseal.com

Dicor Products
800-837-2059
dicorproducts.com

EternaBond
A Division of Royal Adhesives and Sealants
800-248-4010 X 7106
enternabond.com

LaVanture Products
800-348-7625
lavanture.com

RV Armor
855-782-7667
rv-armor.com

RV Roofing Pros
833-776-6377
rvroofingpros.com

RV Roofing Solutions
888-847-7010
rvroofingsolutions.com

FlexArmor
904-830-5445
rvroof.com

RV ENTHUSIAST

NORTH AMERICA'S PREMIER HOW-TO RV RESOURCE

Created by – and for – hands-on RV enthusiasts!

RV Enthusiast magazine was developed to take the mystery out of RV maintenance, repairs and upgrades, as well as providing how-to tips to make RVing better. We get it: Things happen as time and untold miles of bad roads will take their toll on your RV. But we also know that you don't have to be a mechanic to be able to confidently deal with problems that may crop up. All you really need is truly accurate information you can rely on — fully illustrated every step of the way and written in a friendly, conversational manner you can understand.

As this issue shows, each monthly edition of ***RV Enthusiast*** will be filled cover-to-cover with the kind of information and instruction you need to continue to enjoy your RV for years to come. In fact, there are nearly 50 pages of 'how-to' stories in this issue — just imagine the wealth of topics to be covered and the knowledge gained in a year's time!

If you like what you see, don't miss an issue. It's less than $1 a month! Go to our website — www.rventhusiast.com — click the "subscribe" icon risk-free and simply follow the prompts.

Coming in the April issue:

Our next issue takes a look at **Off-Grid Camping**. Even if you never veer away from the campground, you can still gain invaluable advice on how to add solar panels and a water-filtration system to your rig, plus pick up some tips to use when it's time to replace your house batteries. **Available March 15.**

Future issues will focus on **plumbing maintenance, appliance repair, RV and tow vehicle suspension upgrades, troubleshooting A/C and furnace systems —** and, yes, enough additional how-to's to start your own library! Along the way, we will include information on top new RVs, components and accessories; follow complete RV makeovers done the right way; provide helpful reviews; and much, much more. ***Don't miss a word — subscribe today!***

10 Things You Gotta Have!

Not all RVs are created equal. By adding these components to your RV, you can increase its safety, comfort and conveniences

Buying a new RV is oftentimes a balancing act between what you want and what you can afford. You walk onto a dealership lot and fall in love with a certain RV only to have your better half — or your conscience — let you know in no uncertain terms that it's about six feet longer, 1,000 pounds heavier and $10,000 more expensive than what you've budgeted for.

Don't worry, we've all been there. But while it may not be evident to newer RV enthusiasts, the quality and components seen in today's crop of even entry-level RVs is actually pretty impressive. As you've probably already noticed, the RV industry tends to reflect trends in the housing market — and both have thankfully come a long way from the days of shag carpeting and metal mini-blinds. In today's RVs, for example, it's not unusual to see pop-up AC outlets with USB ports, LED lighting, Bluetooth entertainment systems and flatscreen TVs — even in entry-level units.

And it's not just the cool stuff that should be on your "wish list." Rearview cameras and tire-pressure-monitoring systems were relatively unknown to the RV market just a handful of years ago. As a consequence, there are legions of RVs traveling the highways without such "must have" safety equipment.

Fortunately, these accessories and more like them are readily available in the aftermarket and only require an hour or two for installation in most instances.

With that in mind, the staff of RV Enthusiast has identified 10 things every RVer needs to add to their new/used RV or tow vehicle that will make it easier, safer and more comfortable to hit the road this spring. Some are as simple as ensuring you have the right assortment of electrical adapters on hand, while others — from adding a power roof vent or a cell signal booster — will add to your comfort throughout the trip.

One thing's for sure: once you upgrade to these and other accessories highlighted on the following pages, you'll wonder how you ever managed to go camping without them.

10 Things You Gotta Have!

Time Required: 2 hrs
Difficulty: Easy

Signal Strength

When more reception is needed, the weBoost cellular booster by Wilson Electronics can make all the difference in the world.

By Bob Livingston

Staying connected has never been more important. Smartphones, tablets and laptops have become an integral part of our daily lives — so much so that, when something goes awry, many RV owners have to reach for their anti-depressants. We're just plain obsessed with watching the bars on our devices showing reception strength — and when nothing or just one appears, we tend to shudder. Shockingly, given all the advancements in technology, the number of service providers and, of course, the staggering number of customers, not all places have cell towers within range. Consequently, we cuss at our devices, go running up hills or to clear areas to find better signals or, in many cases, just give up the ghost.

In a world where someone builds something and someone else builds something to make it work better, Wilson Electronics' weBoost can provide a welcome respite for RVers who need to stay connected, whether for professional or social reasons. The weBoost name has pretty much become synonymous with cell boosting equipment, and its new Drive Reach RV cell booster is one product in the company's lineup that is a "must have" for RV travelers, especially those who stray from large urban areas.

The Drive Reach RV is the company's most robust system for those who want service while on the road as well as in an RV park. It allows for a claimed 74% improvement in signal reception over the previous model, the Drive X RV, that we tested in various areas before moving up to the Drive Reach RV. While the Drive X RV helps with distant signals, it doesn't compare to the performance attained by the Drive Reach RV.

The Drive Reach RV has all the same installation attributes as the Drive X RV, but improvements in antenna design and electronics give it an advantage when seeking out signals from more remote towers. Owners of the Drive X RV who want to upgrade while retaining the existing antenna cabling can make the connection using the included SMA to SMB adapter.

The weBoost is capable of strengthening 4G, LTE, 3G and now 5G signals. The Drive Reach RV boasts uplink output power capabilities of 29.5 dBm and 50 dB gain – the maximum allowable gain under Federal Communications Commission (FCC) standards — and can be used by multiple family members or friends while in an RV park or on the go. The booster is compatible with all U.S. service providers and can be used with any phone or cellular device. For those RVers who stay put for longer periods of time, the company offers its Connect 65 model with an antenna that is placed on a 25-foot mast. It provides additional signal boosting, which will improve service from more remote towers, but is not practical for RVers who travel and want uninterrupted performance while on the road.

A 25-foot RG-6 cable is provided with the kit. The antenna here was mounted to the L-bracket that was attached to the side wall, adjacent to the rear slide-out where the overhead cabinet is located. Screw holes were properly sealed to prevent water intrusion.

In order to use the provided spring with the antenna, the adapter with the side access hole must be used. A pigtail makes it possible to attach the antenna using the threaded fittings without wrapping the cable.

Installing the Booster

There are a number of options for installing the system, including one that requires drilling a hole in the roof or sidewall to route the cable. We chose to pass on the latter option, but those who have no choice because of location necessity can use the provided cover plate where the cable enters the roof.

One option is to run the cable through the space between a slide-out room and wall structure. Moving the slide-out seal to the side should allow for easy cable routing; however, the cable may have to be removed when closing the slide. For our test, we chose to route the cable down the slide-out bulb seal and underneath, through the existing hole used to run other factory cables and wires. This allowed the cable to be permanently attached and routed up the back of the slide-out wall and into an overhead compartment that houses the satellite TV receiver. There was plenty of cable provided by the company to accommodate the distance from the antenna bracket to the booster box, which was mounted in the aforementioned cabinet. The booster box will get hot, so the cabinet door should be left open when in use, or ventilated using mesh material, as was the case on the test fifth-wheel.

Provided with the weBoost kit is all the hardware for mounting the antenna to the roof, sidewall or ladder. This gives the installer a number of options; in our case, we mounted the bracket to the sidewall of the fifth-wheel. The process was easy and, in this case, plenty of sealant was used to prevent any water intrusion. There is an exact order to mounting the antenna to the bracket to allow for proper cable management. A 13-inch mast extension is provided in the kit, which can be used to extend the height of the antenna. Just make sure it doesn't extend above the legal height limit for roadways, however; 13 feet, 6 inches is a safe number.

A 13-inch mast can be attached to raise the antenna height (below). Owners must make sure the final height meets legal roadway requirements.

Once the booster was connected to the antenna cable and 120-volt AC power, the inside antenna was moved to a suitable location near the phone or other cellular device. A 13-foot RG-58 cable is provided to connect the inside antenna to the booster box; this antenna should be placed within 4-10 feet of the cellular device for best reception. For this installation, the inside antenna was set on the wood slide-out decorative molding and moved closer to the phone when necessary. When traveling, the inside antenna stores in the adjacent cabinet to the one with the booster box. Motorhome owners will likely mount the inside antenna in a logical place for use while on the road.

Does it Really Work?

The short answer is "yes." Boosters do not create a signal — they pick up the outside signal and amplify it. The closer the tower is to the RV, the better the performance. Therefore, the amount of boost is changeable with location, terrain and obstructions. Fortunately, the outside antenna is omnidirectional, which makes it unnecessary to physically point at the tower, since most owners will have no idea where that is. Keep in mind that if you are deep in the "boonies," the nearest tower might simply be unreachable. Fortunately, that doesn't happen too often. Besides, those addicted to their cellular devices will not stick around too long if there are no bars showing.

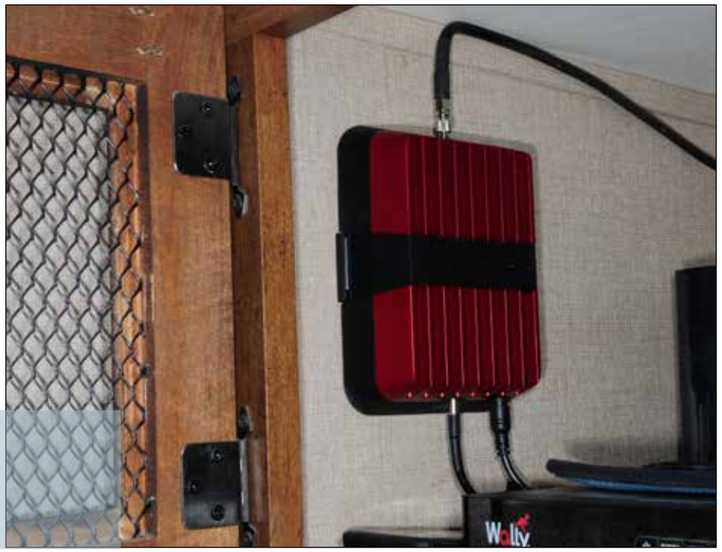
The Drive Reach RV outperformed the Drive X RV in all areas, making it a logical choice for

RVers who love to stay in touch. During our testing of the Drive Reach RV, there was a significant improvement — enough, in many cases, to make data more usable for Internet functions. In areas where reception teetered back and forth between "no service" and one bar, the booster helped with dropped calls. The booster is a great asset for RV travelers, putting on happy faces for those with little patience for connecting to the Internet. RVE

Source
Wilson Electronics
866-294-1660
www.weboost.com

In this application, the cable was routed in the bulb seal surrounding the opening for the slide-out room. Once routed, the cable has no effect on proper sealing of the side-out. The hole underneath the slide-out room provided by the factory to route cables and wires made a perfect entry point for the antenna cable. The cable was zip tied to allow movement that follows the slide-out when opening and retracting.

A 13-foot cable connects the inside antenna to the booster box. In this fifth-wheel, the antenna is placed on the decorative molding around the slide-out. For best reception, the inside antenna should be placed between 4 feet and 10 feet of the cellular device.



Mounting the bracket for the booster box was a simple step: just allow room for air flow and to remove/connect cables. The booster box will heat up, so the cabinet door should be left open during use. The owner of this fifth-wheel opted to replace the glass insert in the cabinet door with a mesh screen to allow adequate ventilation.

The Watchdog series of surge protectors by Hughes Autoformers is available in portable and permanent versions (right). It's Bluetooth only for reading voltage, amperage and polarity/ground and will disconnect the RV from poor power conditions.

10 Things You Gotta Have!

Time Required: 30 mins
Difficulty: Easy

The Shocking Truth

Using a surge protector to guard your RV's electrical components from power grid anomalies is essential

BY MIKE SOKOL

While many of us have been plugging into shore power for decades without any kind of shore power protection, doing so simply isn't a good idea — especially today. Campgrounds are often full to capacity with RVs that require up to 10 times the electrical power of their predecessors from even 10 years ago. An overloaded RV park's power grid can create all kinds of electrical system failures, ranging from low voltage to high voltage, voltage spikes and lost safety grounds. Some of these electrical problems can damage

A 30-amp pedestal outlet in the center of this photo is a NEMA TT-30 receptacle specific to the RV industry that supplies 30-amperes of current at 120 volts, single-pole. The 50-amp RV outlet on the left supplies 50-amperes of current per leg at 120/240-volts split phase.

This is how the author tests surge protectors for proper operation in his lab. This class of surge protector will disconnect your RV from pedestal with power below 102 volts, above 132 volts, reversed polarity, open neutral or an open ground connection that could cause a hot-skin voltage on your RV.

your expensive RV components such as air conditioners, microwave ovens and refrigerators. Worse yet, other RV park (and home) power failures can create potentially dangerous conditions such as electrical shock and fires caused by electrical overload.

All manufacturers build surge protectors in 30- and 50-amp varieties to suit the system in your RV. However, if you need to plug in an RV with 50-amp service into a 30-amp pedestal, you can still use the 50-amp surge protector with a 30-amp/50-amp "dogbone" adapter to plug it into the 30-amp outlet (see "Making Connections" elsewhere in this issue.). Or, you can use a 20-amp/50-amp dogbone adapter to plug it into 50-amp surge protector and then into the RV shore power cord. You'll only be able to use 20 or 30 amps of current, but it will be safe and the surge protector will still operate as designed.

Surge protectors are available in different types and offer different levels of protection. Basic units retail for as little as $100, while those offering more protection with added features can cost a number of Benjamins. But if paying up to $300 seems like a lot of money for something you think you may never need, the security of knowing it will pay for itself — and then some — if a serious electrical surge strikes your RV is priceless.

Physical Mounting

RV surge protectors are available in two basic types — portable and permanent — as well as options for RVs with built-in generators.

• *Portable surge protectors* are inserted between the RV park utility pedestal and the RV's cordset. This is handy because you don't need to do any wiring in your RV to use them — just plug it in and go. However, they are susceptible to theft, plus you need some sort of Bluetooth remote control if you want to know what the RV park voltage is or how much amperage the rig is using in the middle of the night. Still, this is the top choice for many owners since a portable surge protector can be retained when moving to another RV.

A portable surge protector is easily added between the RV and a park's electric grid. The downside is that it's easy for someone else to remove it.

• *As you might have guessed, hard-wired surge protectors* need to be wired directly into the RV's electrical system and actually mount inside the RV. This is more secure since a would-be thief would need to break into a storage compartment to steal it, which is unlikely. However, without an additional remote control (either hard-wired or Bluetooth connected to a smartphone) you can't monitor what's going on electrically with these, either.

• *Generator/Automatic Transfer Switches with Surge Protection*
These are a special class of Automatic Transfer Switch (ATS) units that select between built-in generator power and shore power. While a basic ATS is just a relay to connect an RV to one power source or the other, a surge protector ATS also includes voltage spike protection as well as monitoring power to low voltage, high voltage and open grounds.

Levels of Protection

Like many things, surge protection is available in varying price points with congruent levels of protection.

• *Basic Surge Protectors*: These generally cost less than $100 and offer voltage spike protection as well as visual indicators of power polarity and grounding. They rely on what's called MOV (Metal Oxide Varistor), a sacrificial element rated in Joules (a unit of work or energy) that dies just a little bit every time it absorbs the voltage spike from a nearby lightning strike or other electrical issue. Note that these basic surge protectors will not disconnect the RV from shore power if the voltage gets too high or low, nor will they protect the RV from a "hot-skin" voltage due to an open ground. Yes, the lights on the basic units will indicate if polarity and ground is okay when you first plug in, but after that you're on your own.

Progressive Industries EMS-LCHW50 with wired remote is among a class of surge protectors that mount inside an RV where it's protected from the elements and thieves. There is a remote hard-wired panel you can mount in the interior of your RV that allows you to monitor voltage, current draw and any error messages from electrical problems.

A generator transfer switch (generally called an ATS) can also include surge protection as well as voltage monitoring. The Southwire/Surge Guard unit shown also has Total Electrical Protection that monitors high/low voltage, reversed polarity and open ground conditions at the pedestal and will disconnect your RV from power if it's out of range.

• *Total-Protection/EMS Surge Protectors:* These generally cost around $300, and include some level of voltage spike protection just like the basic surge protectors, but go beyond that with the ability to monitor incoming power for high voltage (above 132 volts), low voltage (below 104 volts), reverse polarity (swapped hot and neutral conductors) and open safety ground (which can allow an RV hot-skin voltage to happen). They all include a large relay that will disconnect the RV from incoming power if it determines that the power is out of spec. EMS stands for Electrical Monitor System, a term coined by Progressive Industries — one of three major manufacturers of surge protector products, along with Southwire/Surge Guard and Hughes Autoformers. EMS has entered the RVers lexicon to become a generic term for any full-protection surge protector that includes an over-voltage/under-voltage/open-ground detection circuit with a disconnect relay. **RVE**

Sources
Hughes Autoformers
hughesautoformers.com
(888) 540-1504

Progressive Industries
progressiveindustries.net
(800) 307-6702

Southwire/Surge Guard
rvpower.southwire.com
(800) 780-43

Hot-Skin Voltage

A "hot-skin" condition is when a potentially dangerous voltage spike appears on the chassis and "skin" of the RV. In order for this to occur, there has to be two simultaneous failures.
First, the ground conductor in the RV shore power cord must be interrupted on its way to connect with the service panel's ground-neutral bonding point.
Second, there needs to be a source of a ground fault current in the RV's electrical system. This can be a low-current (a few mA / milliamperes) fault source such as the normal ground leakage currents in a converter or charger, a medium-current source (1 or 2 amperes) caused by things such as a burned-out water heater element, or a high-current source (full circuit breaker current up to 20 amperes) caused by a screw through a wire in the wall or an insulation loss allowing a hot copper wire to contact the metal skin and chassis of an RV.
Basic surge protectors can notify you of a lost ground connection via their warning lights but will not disconnect you RV from pedestal power. However, a full-protection or EMS surge protector will disconnect your RV from shore power if it detects a lost ground connection.

Progressive Industrie's entry-level 30-amp surge protector (left) alongside the company's 50-amp, EMS surge protector illustrates the size variation in models. The 50-amp unit's larger size is due to an internal 50-amp/2-pole relay.

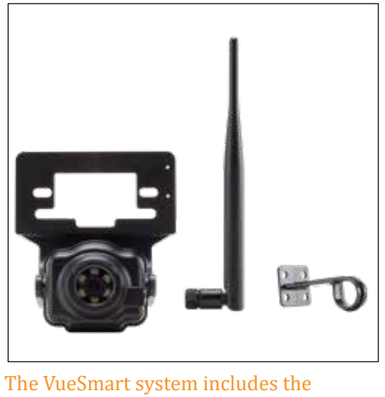
10 Things You Gotta Have!

Time Required: 30 mins
Difficulty: Easy

Watching Your Back

Adding a rearview camera system to your motorized or towable RV is an easy way to prevent mishaps — and bruised feelings.

By Bruce Hampson



The VueSmart system includes the camera, antenna, housings for both and installation hardware. The camera housing includes six high-intensity LED lights that can be activated for backing up in low-light conditions.

When it comes to improving vehicle safety, few products have been met with more enthusiasm by drivers than rearview cameras. Also known as backup cameras, these systems tie into a dash display or smart device and provide an extra layer of assurance that a vehicle operator didn't overlook something before shifting into reverse — or, worse yet, that a person or animal hasn't inadvertently entered the blind area behind the vehicle.

In fact, rearview-monitoring technology — meaning, essentially, rearview cameras — has been mandated by federal regulations since May 2018 for all new cars, trucks and vans weighing less than 10,000 pounds sold in the U.S.

Unfortunately, rearview camera systems haven't yet been required equipment for RVs. It stands to reason, however, that if such a system will aid a driver when backing up a 16-foot-long Toyota Corolla, it would prove invaluable when reversing direction in a Ford F-150 pickup towing a 30-foot-long travel trailer. How many times have you had to ask a traveling companion to stand at the rear of your trailer or motorhome and guide you into a campsite?

Based upon the number of rear- and perimeter-view cameras available on the aftermarket, the technology is a popular addition among RVers. Aftermarket rearview camera systems are available in a number of permutations, and while some are hardwired into the tow vehicle or motorhome, the more popular systems transmit wireless signals between the camera and monitor.

Here, too, there are different choices; some wireless systems utilize Bluetooth technology while others operate through a Wi-Fi signal.

One of the newest to hit the market — and perhaps the easiest to install — is the VueSmart system from Hopkins Manufacturing. In fact, it consists of just four main parts — the camera and universal mount, the antenna and its mount — along with the requisite installation hardware. There's also an app for Android and Apple smart devices, necessary because the VueSmart intentionally does not include a monitor.

"We thought that last thing anyone needed on their dash was another monitor," said Mike Williams, chief marketing officer for Hopkins.

For communication, the VueSmart utilizes Wi-Fi technology to connect the camera and screen. The signal was extensively field-tested and is capable of transmitting far in excess of the longest tow vehicle/fifth-wheel combination. And, according to Director of Product Marketing Dan Scheller, once the app is downloaded and an Internet connection is established, venturing out into terrain without Internet service doesn't present a problem — the camera has its own Wi-Fi built in and will continue to transmit when powered on.

One big reason for the ease of installation — which, Williams noted, can be accomplished in about 20 minutes — is because the VueSmart is engineered to fit within the existing mounting location for the top clearance light at the back of the trailer (it also can be hard-mounted to the back of the unit). For power, the camera taps into the power supply for the light. The camera and clearance light share the supplied universal mounting bracket, the antenna is installed and the app is downloaded. It really is that easy.

To install the camera using the existing top center clearance light, remove the light and connect the camera to the existing wiring for the light.

The VueSmart system also offers several other benefits. The high-definition camera provides a wide 152-degree field of vision (that can be adjusted for viewing specific areas) and the camera lens itself is surrounded by six high-intensity LED lights that can be activated within the app for illuminating the area behind the trailer when backing up in low-light conditions. The camera also can be activated at any time during travel through the intuitive app to view situations behind the trailer.

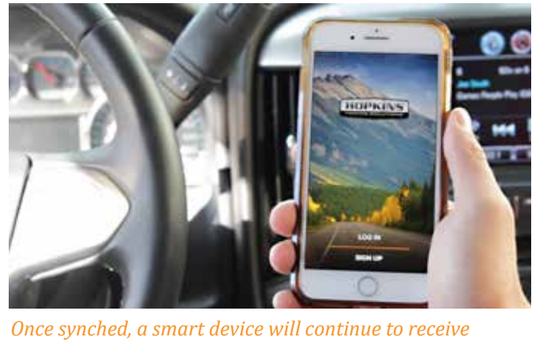
The system, which retails for $129.99, also is waterproof, Williams noted, and is capable of withstanding the use of a power washer employed by many RVers to clean their rigs.

Beyond the safety aspects, though, a rearview camera will eliminate the bruised feelings caused by RVers when they get their backing-up signals crossed. **RVE**

Source
Hopkins Manufacturing
(800) 524-1458
www.hopkinsmfg.com

The housing for the clearance light is fitted into the provided universal mount and reattached to the trailer.

Once the camera and clearance light are in place, attach the antenna. After downloading the proprietary app and establishing a connection, the camera's 152-degree view can be adjusted for driver preference.



Once synched, a smart device will continue to receive constant communication from the camera even in rugged terrain where Internet reception may be spotty.

10 Things You Gotta Have!

Time Required: 20 mins
Difficulty: Easy

Making Connections

Many campground electric pedestals are wired for 20-, 30- and 50-amp hookups. If you pull into a new resort featuring only 50-amp service in a rig built for 30-amp power, however, you'll need the appropriate adapter.

Demystifying 30- and 50-amp hookups from shore or generator power

By Mike Sokol

Getting outdoors and "roughing it" in an RV means different things to different people. Some go all-out and load up the RV for a weekend or more of off-the-grid camping. Others, however, will opt to leave their hectic lifestyle for a few days and find the nearest campground or RV resort that allows them to plug into enough power to enjoy life's comforts while still shedding the everyday stress that tends to walk in our shadows.

50-, 30- and 20-amp plugs

A typical campground electric pedestal with 50-, 30- and 20-amp connections.

Being able to tap into the park's power, however, requires being able to connect the electric pedestal to an RV's power cord — and there will be times when that may not be possible. Your RV, for example, may have been built with 30-amp onboard power — but the resort may only offer 50-amp plug-ins.

So, you'll need an adapter.

All modern RVs come in one of two flavors of power service: 30-amp and 50-amp. While a third option of a 20-amp outlet is available, there are no currently produced RVs (that we're aware of) which have a 20-amp shore power cord. It's either a TT-30 connector, which is 30 amps at 120-volts AC, or a NEMA 14-50 connector, which is 50-amps at 240-volts AC (split down two separate circuits of 50 amps at 120-volts AC each, for a total of 100 amps of current at 120 volts AC). There are also a few variations of generator outlets available that must be considered when you're running from a generator rather than shore power.

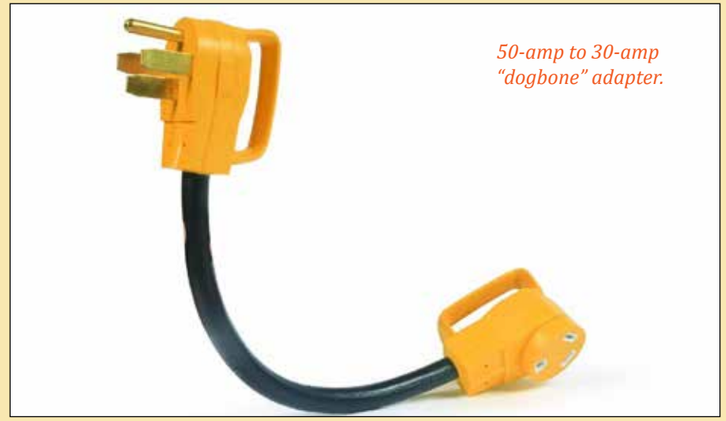
In order to be able to plug your RV into whatever power is available, there's a plethora of possible adapters you can purchase. Most of them are in "dogbone" style, so named because they look like a cartoon version of a big bone held in a dog's mouth. There are a few versions of adapters that resemble a tall hockey puck, but they tend to put a lot of twisting strain on the outlet they're plugged into.

Adapters can be divided into three basic categories: 50-amp and 30-amp RV shore power cords, and generator twist-lock connectors. We'll take a look at some of the most popular connectors; however, keep in mind that this is by no means an exhaustive overview.

Just remember that you can't get blood out of a turnip. So even if you're using a 30- to 50-amp dogbone adapter to power your 50-amp RV, you still only have 30 amps of total current to use. The same goes for a 50-amp pedestal to 30-amp shore power dogbone connection: your RV is still limited to 30 amps total current, no matter how much more you wish for. Know, too, that all quality dogbone adapters will properly split 240-volts from a 50-amp pedestal outlet or generator, to the proper 120-volts for a 30-amp shore power cord, or 120/240-volts for a 50-amp RV shore power cord. However, if in doubt, use a meter to confirm anything new before plugging in your RV. RVE

30-amp RV adapters

If you have a 30-amp RV there are fewer options to consider. If you need to plug your 30-amp RV into a 50-amp shore power outlet, you'll need a 50- to 30-amp adapter. Note that a properly wired dogbone adapter will only use one of the 120-volt legs in the 50-amp outlet to feed to the single leg of your 30-amp shore power cord, so you will indeed be feeding 120 volts to your RV's electrical system, not 240 volts. However, your power will still be limited to 30 amps total since your RV's power center will have a 30-amp master circuit breaker. This adapter is also useful if the pedestal you're plugging into has a worn 30-amp outlet but a newer 50-amp outlet. You won't get any more power, but you may get a more solid outlet connection.



50-amp to 30-amp "dogbone" adapter.

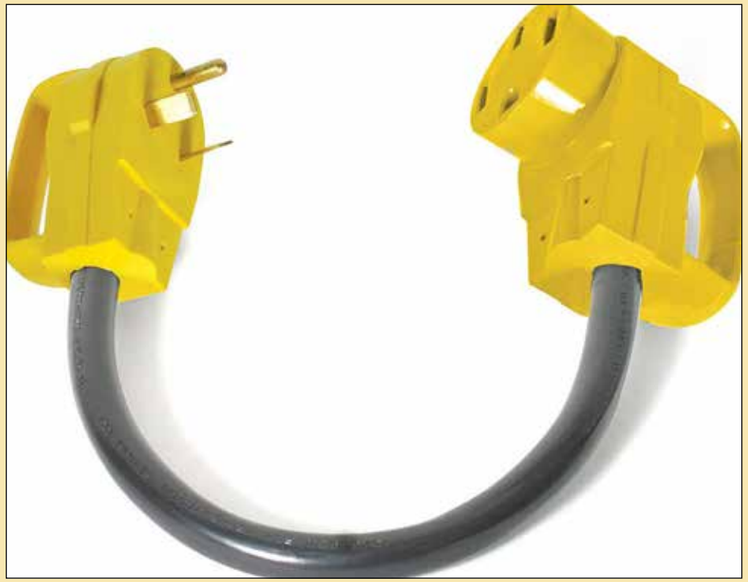
This is a 15 to 30-amp adapter that will allow you to connect your 30-amp RV to a standard 15/20-amp home outlet. Note that all outside 20-amp outlets are required by code to be protected by a GFCI breaker or outlet set to a 5mA trip point. However, many RVs have normal leakage that can exceed that 5mA threshold, which may cause nuisance tripping. But that's another entire article.

50-amp RV Adapters

Some RVs use a 50-amp 120/240-volt shore power cord. Note that while this is indeed a 240-volt service, it's split down the middle to two separate 120-volt feeds (commonly called legs) with a four-pin plug (two hot, one neutral, one ground). Each leg feeds a separate side of the RVs service panel. So, when you need to plug your three-pin, 30-amp RV into a 50-amp outlet (from a pedestal or generator), your 30-amp RV uses only one 120-volt leg at a maximum of 30-ampers of current. Conversely, when you plug your 50-amp RV into a 30-amp shore power outlet, that single leg of 30-amp power is sent to both legs of your 50-amp shore power cord to share. However, the maximum current is always determined by how much amperage and how many power legs (1 or 2) are available from the outlet.

This 15- to 50-amp adapter will allow an RVer to plug a 50-amp RV into a standard Edison/Home outlet. Note that even though we call this a 15-amp outlet, it's usually wired with 12-gauge conductors and powered by a 20-amp circuit breaker. So it's actually rated for 20-amperes of current at 120 volts.

Below is a typical 30- to 50-amp adapter, allowing you to connect a 50-amp RV to a 30-amp pedestal outlet. In a properly wired dogbone adapter this will connect the pedestal's120-volt, single-pole, 30-amp outlet to both legs of the RV's shore power connector. This will ensure that both halves of the RV receive 120-volt power, albeit with 30-amperes of available current instead of the 100-amperes total current normally available from a 50-amp outlet.



You can "stack" adapters by using a 15 to 30-amp adapter connected to a 30 to 50-amp adapter which you can plug your 50-amp RV cable into. This will feed the 20 amperes of current into both legs of the RV's shore power cord, powering everything in the unit, albeit with a total of 20 amperes of power. So running multiple high-power appliances while plugged into a 20-amp outlet won't work. That's when you'll begin tripping the main circuit breaker feeding that outlet.

Generator Power

There are three basic categories of generator outlets typically used to power RVs: 2,000-watt, 3,000-watt and 6,000-watt. So if you want to connect your RV shore power cord into a generator, you'll need an adapter that matches your generator output on the one side with the appropriate RV shore power plug on the other side. On 2,000-watt generators with 20-amp duplex outlets, for example, you would use a standard 15-amp to a 30- or 50-amp dogbone adapter described earlier.

Keep in mind, too, that even though your generator will have some sort of ground connector, portable generators powering an RV are NOT required to be connected to any kind of grounding rod. However, any 2,000 to 7,500-watt inverter generator may require a ground-bonding plug if you'll be connecting it to an EMS/Full-Protection Surge Protector.

Adapter for a 6,000-watt 240-volt 4-prong generator with twist-lock outlet to 30-amp shore power cord.

A Southwire Ground-Neutral generator bonding plug

Sources

Camco Manufacturing Inc.
(800) 334-2004
www.camco.net

Conntek Integrated Solutions
(877) 267-3788
www.conntek.com

Park Power by Marinco
(800) 307-6702
www.park-power.com

SmartPlug Systems
(206) 285-2990
www.smartplug.com

Southwire Co.
(770) 832-4242
www.southwire.com

Valterra Products
(818) 898-1671
www.valterra.com

Voltec Power & Lighting
(866) 486-5832
www.voltec-industries.com

10 Things You Gotta Have!

Time Required: 30 mins
Difficulty: Easy

Crank No More

Lippert's Quick Drop speeds trailer connecting and leveling without requiring a power connection

By Chris Dougherty

The Quick Drop is a direct replacement for most trailer A-frame jacks, however, it's only available in a top handle design.

Connecting or disconnecting a travel trailer or utility trailer to a tow vehicle with a manual crank jack can be a slow, tedious process. Sure, you can simply accept it as the price of camping — and even include it as part of your cardio-vascular exercises while on the road. If you'd rather take a pass on revving up your rotator cuff muscles, however, an electric tongue or A-frame jack can reduce this to the push of a button.

That said, not everyone wants to invest the money in a power jack or be reliant on enough battery power to operate it. Indeed, many utility trailers don't even have a battery to run it.

A third option is Lippert's Quick Drop A-frame jack. The Quick Drop is a hybrid of a manual jack; it includes the topwind handle for manual operation, but also includes a ¾-inch built-in drive nut in the head of the jack. Fit your drill motor with a ¾-inch socket and you can run the jack up and down just like the scissor stabilizing jacks many RVs have. The design allows for much quicker deployment and stowing of the jack with less physical effort required, while at the same time reducing the cost of a "powered" jack. The Quick Draw is capable of supporting 2,000 pounds, features a black powdercoat finish to resist corrosion and comes equipped with a removable foot with locking pin.

The handle is hinged on a sliding sleeve that engages the jack screw nut when the handle is up. When folded down, the jack screw nut is exposed for driving with a drill motor and a ¾" socket.

The Quick Drop is easy to install with a basic ratchet set, although you will need to support the front of the trailer to swap the jacks out. You can do this with jack stands or by just hooking it up to your tow vehicle. Don't use the front stabilizer jacks for this; they're not designed to carry the weight of the trailer.

One point about the Quick Drop is that it's only available in a top-handle version, so clearance to the propane cylinders is a concern. If your trailer has a front crank jack you may need to move the LP-gas cylinders in order to manually crank this jack. Some trailer designs may prevent installing a top crank jack altogether, so check everything out before you buy.

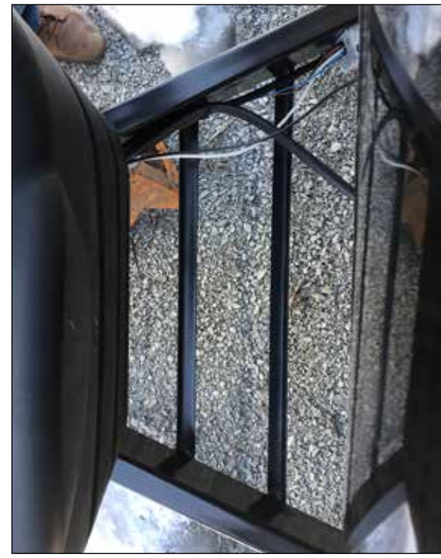
We installed a Quick Drop jack at Tim's RV in Erving, Mass., on a new Cruiser RV Fun Finder travel trailer, and found it necessary to move the tray for the LP-gas cylinders back for clearance. We made the swap in about 15 minutes; even with a bit of tool-chasing, most RV owners can effect this upgrade in about a half-hour. **RVE**

Source

Lippert
(574) 535-1125
www.lci1.com

(Right) Bolt the new jack in place with the original bolts. Attach the foot to the jack and you're ready to go. Test to make sure everything functions correctly before removing the jack stands.

(Below) We found that we had enough room to move the tray for the LP-gas cylinders aft just enough that we would have room to use the handle with the cylinder cover in place.



(Bottom left) After safely supporting the trailer, the old jack is retracted and the foot is removed. Then, the three bolts are removed and the jack is pulled straight up. After moving the propane tray, touch up all the paint with a rust-stop gloss black paint like Rust-Oleum.

10 Things You Gotta Have!

Time Required:
1.5 hours
Difficulty:Moderate

Air Apparent

Installing a MaxxFan Plus 4500K Powered Roof Vent and FANMATE cover for easier breathing inside your RV

By Chris Dougherty

Imagine you're laying on the bed in your RV at a beautiful coastal campground. The window by your bed is open, and you can hear the ocean in the distance as a nice breeze flows over your body. Or perhaps you're camped in the desert, where your RV sizzles under a relentless sun. Wouldn't it be nice to be able to draw in more fresh air, or push stale, humid air out? You can. This is known as ventilation control — it's the "V" in "HVAC" (Heating, Ventilation and Air Conditioning). When it comes to keeping RVing enjoyable, or for that matter, tolerable at any time of year, good ventilation is key.

Good RV ventilation occurs when fresh air is directed or drawn inward through one opening and allowed to exit via another. This can be achieved via one of two basic methods: natural and forced.

•*Natural ventilation* is when the atmosphere inside the RV is replaced either by the wind or via convective heat transfer. For example, when an RV is sitting in the sun, the heat warms the roof and exterior panels — which in turn heats the air inside the vehicle. If the RV has its roof vents and windows open, the hotter air escapes through the top vents and is replaced by cooler air rushing in from the windows.

•*Forced ventilation* is when air movement is accelerated by mechanical means — usually an exhaust fan or a positive pressure fan blowing into the space through one opening while the air escapes through another.

Ideally, we want a combination of natural and forced ventilation for our RVs because of the constant changes in weather and the environmental extremes we put them (and ourselves) through. Sometimes natural ventilation will suffice, and you'll experience comfort with no expenditure of energy. At other times, using an efficient fan-forced ventilation system can aid in keeping the inside comfortable while minimizing energy drain.

Go With the Flow

If you took physics in high school or college, you learned that hot air rises and cold air sinks, and that heat moves to cold. It's a simple concept — and, once you grasp it, you'll always be able to keep your RV comfortable.

In almost every instance, ventilating your RV will involve drawing cooler air in from a relatively low point and exhausting warm air at a high point. Even if your RV is sitting in a sunny hot parking lot, air drawn in from below will be more comfortable than the air at roof level. And, when it's cold outside and you need to remove humid, moist air from the interior, the warm air will draw cooler air in as it rises and escapes through an open roof vent.

To aid in the process, RVs are usually equipped with crank-up vents on the roof. Often times these are simple screened vents. While they do offer natural ventilation, they have a couple of drawbacks. First, you can't open them in the rain or while you're driving. Second, there's no real mechanism for assisting ventilation, with the exception of some bath vents which incorporate a small fan in the vent opening. These help but are largely ineffective.

Another concept to consider is balancing airflow. You do this by directing the airflow so that you can use the physics of heat transfer to aid in ventilation.

Let's consider the attached graphics of a 40-foot fifth-wheel as an example — but remember, this applies even to a camper van.

In the first example, the unit has its rear roof vent and windows open. If there's enough of a temperature differential, cooler air will draw in from the windows and exhaust through the roof. The problem? No one inside the rear of the unit will in fact feel any airflow — and even with a fan in the room it will do nothing to aid in cooling the rest of the interior.

As the graphic illustrates, the same process was used for the front of the unit — with little to no improvement. While airflow has increased both fore and aft, anyone in the main cabin would continue to suffer and the entire RV isn't properly ventilated. Beyond that, with two fans now trying to circulate air, the amp draw on the battery has increased dramatically.

To make the Gulf Stream more comfortable, the owner initially chose to have the MaxxFan Plus complete with LCD remote and the MaxxAir II installed. He later opted for a FANMATE cover to maximize airflow. MaxxAir vent covers come in three sizes: the original for regular vents, the MaxxAir II for standard powered vents and the FANMATE cover which maximizes the flow for high-output fans. Colors include white, black and smoke see-through.

The problem? Too many open windows and not enough vent opening in the roof. As a result, the air exchange has been stalled.

The second illustrates one potential fix to help keep the entire unit comfortable: Run a powered exhaust fan at one end of the RV and open a window or windows at the opposite end until you get the airflow you want.

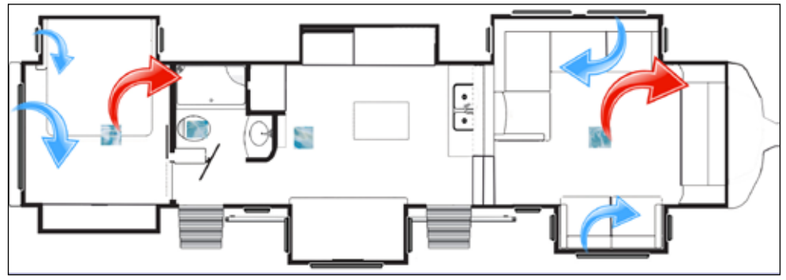
To be clear, this is not an exact science in RV-land. Differences in construction, location, insulation and other environmental factors can upset the apple cart. But if you get the concept and practice it, you'll find you can really improve the inside comfort of your RV while conserving energy and enjoying the fresh air.

Cool Comfort

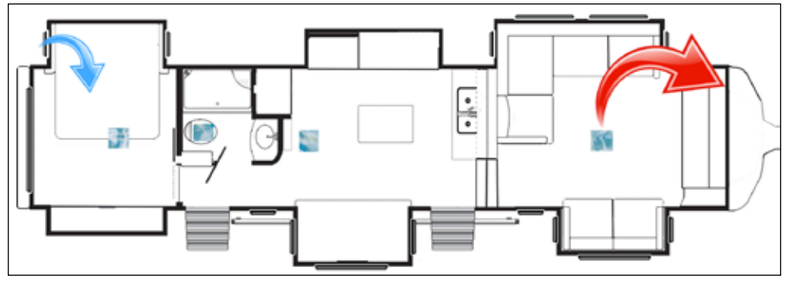
To truly enjoy your RV, you'll want to do the best process for maintaining a comfortable interior environment at all times — even if you're out of the rig for a bit. This is especially important if you have pets or items in your RV that are sensitive to heat.

When MaxxAir vent covers were first introduced decades ago, they radically changed RVing for the better. By covering the vent opening while providing enough room to open the hatch, roof vents could be open all the time, rain or shine, driving or parked. Later, high-efficiency 12-volt DC roof ventilation fans came to the market, which made the next big jump in keeping RVs comfortable on or off the grid. As you might imagine, the combination of the two was a logical progression.

MaxxAir, now a division of Airxcel, offers vent covers in three basic styles and in up to three colors (black, smoke and white) to fit RV style and airflow requirements. The basic cover is adequate for standard vents or those with the small bathroom fan common in so many RVs. The brackets are bolted to the vent's



This graphic illustrates the limitations of simply relying on open windows and roof vents to cool an RV. While doing so creates low airflow in the specific areas it doesn't cool the entire interior — and anyone inside won't notice any airflow.



An easy "fix" is to run an exhaust fan at one end of the RV and open a window (or windows) at the other end. You'll have to experiment a bit to achieve the desired airflow.

Up on the roof, carefully remove the sealant around the existing fan. Using heat may help but be very careful not to damage the roof membrane or surface. Remove all the screws and peel up the fan. Once up, again try to remove as much of the old sealant as you can without damaging the roof.

exterior housing, and the cover is bolted to the brackets with included stainless-steel hardware. The MaxxAir II is a larger model with internal bug screens that work with any powered vent fan. It also has more vent surface area to allow for increased airflow without a big difference in the cover's footprint on the roof. Lastly, if you're using a high-output fan such as the MaxxFan or Fan-Tastic Vent, the FANMATE cover allows the most airflow.

As noted earlier, one or more high-output fans will make a huge improvement in the interior comfort of your RV. Top models, like the MaxxFan Plus installed in this project, offer a host of benefits including exhaust and intake, multiple speeds, white- or smoke tint-colored lids, a rain sensor (which automatically closes the lid when raindrops start to fall) and an infrared remote control with temperature settings.

These can be fitted with vent covers like the MaxxAir II or FANMATE, the latter of which attaches to the MaxxFan without tools. Alternatively, the MaxxFan Deluxe has the cover "built-in," which eliminates

Pre-drill the corner holes in the MaxxFan to allow for easier mounting.

the need for an additional cover and reduces the roof profile when the vent is closed.

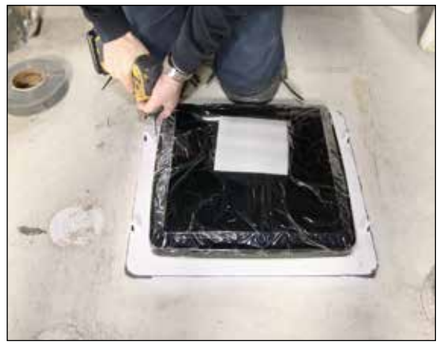
If you have pets, MaxxFans and covers are baseline protection for their comfort and well-being, and are a must if they'll be staying in the RV when unattended. If the interior of the RV gets too warm and, as an example, the air conditioning should fail, the properly adjusted MaxxFan will come on automatically to keep the RV's interior safe and comfortable. Just keep a window or two cracked open to allow airflow.

While visiting Tim's RV in Erving, Mass., we followed the installation of a MaxxFan Plus 4500K Smoke with a FANMATE cover on a Gulf Stream Coach Class C motorhome. The existing bathroom fan did nothing to aid the comfort in the RV; replacing it with the new technology not only allowed the coach to be vented at all times, but the infrared (IR) remote control provided the rig's owners with the ability to set exact temperature settings — even from the dinette bed.

As Brandon Turner, service manager at Tim's RV, pointed out, replacing a vent fan — especially one that already has power — is a straightforward DIY project. Just make sure you follow the directions exactly

Back down below, wire the fan according to the directions and test. If there is no wiring in the opening, you may be able to pull power from a nearby light or other 12-volt DC source. Make sure the new circuit is fuse protected. Polarity counts, so test on both intake and exhaust.

Apply sealant tape to the flange around the inverted fan. The technician at Tim's RV used double-sided EternaBond tape, but regular butyl tape will work also. Make sure the tape goes all the way around.



Carefully center the vent in the hole. A helper down below may help to make certain it's centered and the wires are clear. Slightly lift one side at a time and peel the paper or cover away from the tape. Screw down the four corners, then install the remaining screws.

Once the fan is screwed down, seal all the screw heads and seam with a self-leveling sealant that is compatible with your particular type and brand of roof. DO NOT use silicone on a membrane roof!

The new garnish is designed for even the deepest RV roof, so the new one will likely need to be trimmed. Measure all four corners and then mark the cover appropriately to cut. The cut can be up to ¼" short, as the garnish sits in a groove in the fan. Note that some roofs are crowned on top, which means the inside garnish will have to be cut to match the angle of the fan housing.

and use appropriate safety measures when you're working on ladders or on the roof of an RV. Also, be sure to use the right sealants for the roof type of your RV.

One thing's for sure: If you follow these simple tips and add a high-output fan and cover, your RV will be a lot more comfortable. **RVE**

Source
Airxcel Inc./Maxxair Division
(316) 832-3400
www.airxcel.com/rv/maxxair

Tim's RV Inc.
(413) 522-3410
Timsrvinc.com

The garnish is reinstalled in the ceiling, carefully tucking the wiring in on the sides. Special painted screws are included for a nice finish.

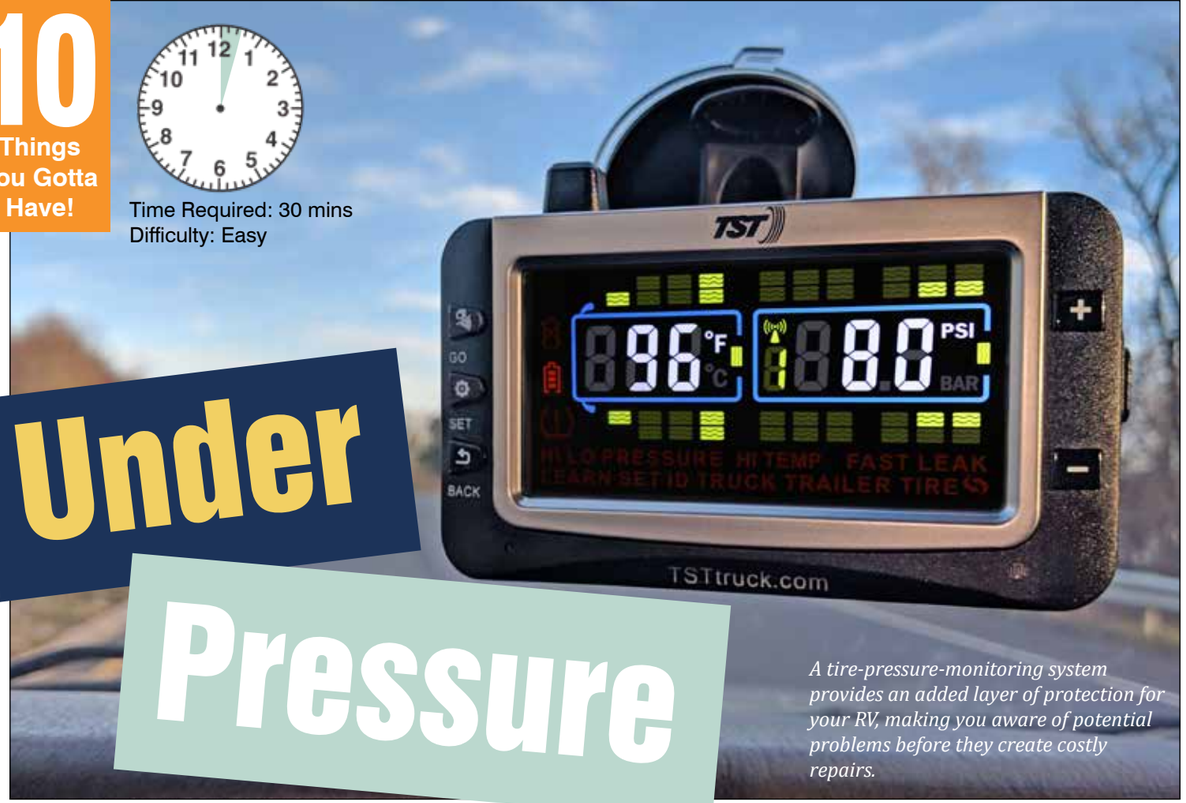
The completed fan is installed, as is a bracket for the LCD/IR remote. The remote can be used anywhere within sight of the fan, making it convenient for use while in bed, etc.

The FANMATE is ideal for the MaxxFan install, as it offers the best air flow, and installation and removal for cleaning is tool free. The cover is simply lowered onto the mount and the stainless steel pins are slid in place. Bracket kits are included for use with other fans. Whichever cover you use, follow the directions for best service, and to prevent the cover from being ripped off the roof or allow excess water intrusion. The cover does not seal to the roof!

10 Things You Gotta Have!

Time Required: 30 mins
Difficulty: Easy

Under Pressure



A tire-pressure-monitoring system provides an added layer of protection for your RV, making you aware of potential problems before they create costly repairs.

Everything in — and on — an RV is riding on your tires. Adding a tire pressure monitoring system can improve tire life and help prevent unwelcome surprises.

By Bruce Hampson

Most of us don't give a lot of thought to our tires. Other than periodically checking them for the correct inflation pressure and giving them a quick scrub when washing our vehicles, tires are basically taken for granted. So long as they have adequate tread and aren't outside the recognized aging window — Michelin, for example, allows for 10 years if the RV has been stored indoors but requires an annual inspection after five years, while other manufacturer's recommendations may vary — they are just expected to perform.

The TST tire-monitoring system includes the full-color display with power cord and adapter for the dash power outlet plus dash and window mounts, 2-, 6- or 8 sensors, signal repeater and installation wrenches.

When they don't, however, all sorts of things can happen — none of them good.

"Air carries the load," said Thomas "Bear" Musgrave, vice president of Pressure Systems International (PSI) and business unit director for Truck System Technologies (TST). "If there's a problem and the driver isn't aware of it, it can be catastrophic."

As Musgrave noted, most people think blowouts occur because the tire swelled up or hit something and literally exploded. While that can happen, it's rare. Most frequently, the problem can be traced to low air pressure.

"Unlike a passenger car tire, where the contact patch between the tire and the road gets wider as the air pressure is reduced, travel trailer tires elongate because of the heavy sidewalls needed to support the load," he told *RV Enthusiast*. "A longer contact patch creates more friction — and that creates more heat."

According to Musgrave, a trailer tire is put together like a commercial vehicle tire; it has a tread package vulcanized to a tire carcass. The process utilizes a liquid rubber glue and everything is heated to about 212 degrees Fahrenheit.

"Running down the road on a hot summer afternoon, a typical trailer tire might see temperatures of around 170 degrees," he said.

"A loss of 10 psi tire pressure from the manufacturer's maximum cold tire pressure can raise that by up to 40 degrees — near to where the vulcanization process can start to break down. The tire gets hot, the rubber gets hot and the tire explodes — because you have 20 or 30 pounds of steel-belts flying around in a warm rubber cavity that can no longer hold it together." In and of itself, a blowout can create a scary situation–but on an RV, it can also cause thousands of dollars in damage as pieces of tread tear through exterior panels.

The simple solution is to oversee what's going on with vehicle tires using a tire-pressure-monitoring system (TPMS). It's a technology Musgrave is quite familiar with; PSI's Automatic Tire Inflation Systems (ATIS) are used on most of the top 100 truck fleets in the U.S. and, he said, are used in 45 countries.

The sensor replaces the stock valve stem cap. Prongs inside the sensor press down on the stem core, allowing air to flow to the sensor to monitor pressure and heat.

The flow-through sensor allows RV owners to add air to the tire without removing the sensor.

The company got involved in the RV industry when it acquired TST about six years ago. "It was not on our radar," he said. "We manufacture ATIS for commercial vehicles."

PSI initially purchased the smaller company to test vehicle components. However, after TST National Sales Manager Mike Benson pointed out the company's ongoing success in the RV market, PSI explored the possibilities and soon realized that very few new RVs come equipped with tire-pressure-monitoring systems — and there are literally millions of older RVs on the road without such systems in place.

Ultimately, the company removed TST products from the market, reengineered the products to bring everything — tire sensors, displays and signal repeaters — up to commercial vehicle standards and put the product back into production.

"What is now available through TST is the exact same system we sell, under a different label, on the commercial vehicle side," Musgrave added.

Upgrading the components also allowed the company to extend the warranty on TST products to three years. According to Musgrave, TST is able to utilize real-world testing — measured in the millions of miles — by partnering with PSI's commercial vehicle companies it supplies ATIS product to.

With its products dedicated entirely to the RV market, TST offers two different types of tire-pressure-monitoring systems: an internal design, where the sensor is attached to a metal band wrapped around the center of the wheel — generally used on RV OEM installations — and aftermarket kits using sensors that thread onto the tire's valve stem.

The externally mounted sensors are available in a number of styles, including cap sensors (which require removal to inflate the tire), flow-through units (which allow tire inflation through the attached sensor) and a hybrid sensor that's approved for salt-water immersion.

"The sensors are interchangeable," said Musgrave. "Our system doesn't care which sensor is used — everything works together."

Kits are priced according to the number of sensors included and range from the high $200s for a two-sensor kit to about double that for an eight-sensor package. All kits include the sensors, installation wrenches, signal repeater and display monitor with dash and window mounts and, to power and charge the monitor's lithium-ion battery, an adapter with micro USB cord that plugs into the dash power port. All kits also include extra hardware used during installation and extra O-rings used when opening the sensor to replace the battery. Additional sensors can be purchased separately.

Installing an aftermarket kit is, said Musgrave, a straightforward affair that only requires about 20 minutes to complete. After removing the stock valve stem cap, a hex nut is threaded

The sensors come equipped with a coin-style battery that will last 12-18 months. It can be replaced easily by disassembling the sensor. Removing the sensor and changing the battery will not void previous information programmed into the display.

The full-color display monitor utilizes five buttons along the top — Set, +, -, Mode and Code — for programming air pressure and heat values.

Once the sensor is fitted to the valve stem, hold the display monitor near the stem to initiate the connection. When a tire location is programmed, the display assigns it a six-digit code. Data is read by the sensor every few seconds and transmitted to the display monitor every few minutes unless the system detects a problem or a change, in which case the data is transmitted instantly.

onto the stem, followed by the sensor. Once the sensor is snug — when air stops leaking and it bottoms out on the valve stem — it's given another quarter-turn (do not over-tighten). The hex nut is then reversed until it hits the bottom of the sensor and is tightened with the wrench. This is a safety feature that allows the sensor housing to spin on its mount; the actual sensor is difficult to remove without the wrench.

With the sensors in place, the monitor is held near each one and parameters are set to code each tire location to the monitor. The monitor allows the operator to set high/low alarms when tire pressure changes from normal and can also be set to trigger an alarm when temperature surpasses the user-selected limit. The full-color monitor will identify the location of the problem and includes visual and audible alarms. Pressure and temperature data is read every few seconds and transmitted to the display monitor every few minutes unless the system detects a problem or a change, in which case the data is transmitted instantly.

The display will also highlight low battery life. Each sensor incorporates a coin-style battery that's good for between 12 and 18 months (battery life can be extended by removing the sensors from the tires when the RV is parked for extended periods). Replacing the battery requires removing the sensor housing from its baseplate, then using the supplied wrench to remove the inner cap from the sensor. The old battery is pushed out, a new one pushed in and the procedure is reversed using a new supplied O-ring between the base and housing. Changing the battery will not affect the data previously programmed in the display and the system includes small labels to affix to each sensor so there's no confusion if more than one is removed at a time.

Other than mounting the display on the vehicle dash or windshield and routing its power cord, the only other part of the installation is connecting the signal repeater to a 12-volt DC power source. The short wiring harness includes terminal ring connectors to place on the positive and negative battery terminals, while the small waterproof repeater housing can be attached to a wall inside the battery housing location using the supplied hook-and-loop pad or by screwing it in place.

"The repeater boosts the signal out approximately 105 feet omnidirectionally, which covers even the longest RV," Musgrave said. "And its parasitic power draw is just 0.06-amp."

The sensors, by the way, can also be installed on tow vehicles or dinghy vehicles already equipped with sensors from the factory. This not only ties the entire system together but affords an extra layer of protection since factory sensors oftentimes only indicate low tire pressure. Consider it cheap insurance. **RVE**

Source

Truck System Technologies

770-889-9102

tsttruck.com

Every TST kit includes a signal repeater, which is connected to a 12-volt DC power source (usually one of the house batteries) and affixed to an interior storage bay wall. The repeater boosts the signal out approximately 105 feet omnidirectionally, which covers even the longest tow vehicle/trailer or motorhome/dinghy vehicle combination.

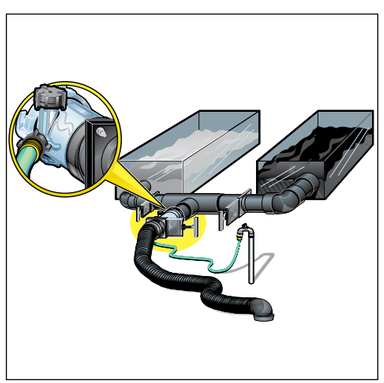
10 Things You Gotta Have!

Time Required: 30 mins
Difficulty: Easy

The Art of Hooking Up

Upgrading how you attach your RV to utilities is the best way to avoid messy problems later

By Chris Dougherty



This graphic shows the typical gray- and blackwater tanks and plumbing on an RV. Quality connection won't make dumping them a dream job, but can prevent problems. Illustration courtesy Camco

Most of us work hard, so it's not surprising that we all probably put forth an effort to save money, as well — or, at least, not spend it foolishly. That might translate into using generic paper towels, looking around for the best price on truck fuel and comparing prices for online purchases. It's simply smart shopping.

One place you absolutely shouldn't cut back on, however, are essential RV accessories like power connectors, water and sewer hoses and assorted adapters.

RV parts and accessories can, for the most part, be separated into three categories: fluff, nice to have and essential. That latter list is the most important: "Essential" items should include everything you need to connect your RV to utilities at a fixed-base operation, such as a campground, Flying J or home. The utilities are what make your RV what it is and failure to have what you need — or to have them fail at the

Premium sewer kits, extension hoses, fittings and gray utility hoses make sewage disposal much cleaner and safer.

If your RV has two sewer connections, you'll need a way to bring the hoses together for a single dump connection at the campground.

A clear elbow or union connected to the sewer outlet lets you see what is coming out of your tanks, and to see if your black tank is clean while flushing. This Valterra model has a black-tank flusher connection for RVs with a straight 3-inch pipe run directly into the tank.

Be sure to use a good quality potable water hose and filter for freshwater connections. Use these only for potable water and use them both whenever introducing water into your RV (tank or city water connection). Notice the short connector hose with the spring? You should have one on the RV side, too, to reduce kinks and reduce strain on the city water connection on the RV.

wrong time — can be a trip-ending affair.

Sewage Handling

If you've ever been exposed to RV sewage, you know it's not very pleasant. A cheap hose can fail in mid-dump, creating a ruinous fountain of excrement that you are unlikely to forget anytime soon.

Obviously, this isn't a product where you want to cut corners. Sure, you can buy a sewer hose for $15 and in an emergency, for one or two uses, it'll probably work. Don't tempt fate. Instead, buy a good, heavy-duty kit. It'll work for just about every RV you'll own.

Heavy duty hose kits are made from higher-grade materials that won't leak, rust through from cheap springs or crush. The fittings lock together firmly and lock to the RV using a 4-pin connection instead of two. The fittings also have leak-resistant gaskets that can be serviced, and the kits have a fitting for inserting into any dump station receptacle. Most of these hoses have a smoother interior surface which makes them easier to rinse and some are collapsible, reducing storage space.

Because many campsites have the sewer connection far away from the RV's other connections (and because many RVs have more than one discharge, requiring a Wye fitting and additional lengths of hose), it's recommended having at least 25-30 feet of matching hose for your kit, in 5- to 15-foot sections. This way, if you're at a dump station that's right near the RV's discharge, you only need to wrestle a 5-foot hose — but if you're at a site where the sewer connection is at the front or rear of the RV, you can still reach.

You should also carry a hose dedicated to sewage cleanup and supplying your black tank flush. It should be a short length and a different color than your drinking water hose.

A clear sewage hose elbow or straight union also is a good thing to have. Attached at the discharge port on the RV, it allows you to see what's happening in case of a blockage as well as when flushing the tank is successful.

Of course, the ultimate sewage transfer device is a macerator system. A macerator grinds and pumps the effluent through a 1- to 2-inch hose. Most can pump uphill and for an extended distance. In fact, some RVers use them to connect to a sewer cleanout outside their home for their own RV dump station!

Macerators are available as portable models and built-in units. Because of their size and weight, they're not ideal for smaller RVs unless they're built-in, as seen on on some Class Bs.

Lastly, there are still some RV parks with gray pits on the sites instead of full sewer connections. With these, your gray water goes into a pit, which really extends your time between dump station visits. You'll need an RV sewer cap with a hose fitting, as well as a dedicated hose for gray water dumping.

A water pressure regulator is an important add for your RV as water systems can sometimes have in excess of 100 psi pressure. The small cylindrical models are less effective than this model from Camco or similar models from Valterra or Watts.

Here's a pro tip: Use one of these — Camco just calls it an 'RV water tank filler' — when gravity-filling your freshwater tank. You'll thank us later.

Fresh Water

While not as critical as the sewage hoses and fittings, your fresh-water hoses and fittings are important. Spending a little extra here can pay dividends in longer life, be easier to use and microbial resistance (which has nothing to do with RVing and everything to do with your health).

First and foremost, only use hoses that are sold for drinking water use. Most are marked as RV/Marine hoses. Your garden-variety hoses do nothing to prevent internal bacterial growth, are dark in color (masking dirt and growth) and can leach chemicals into the water — especially when they sit in the sun.

Second, pay attention to the hose diameter, especially for larger RVs. Hoses aren't perfectly smooth inside and they create friction as the water passes through them, reducing pressure and flow at the discharge end. RV hoses come in ½-inch and 5/8-inch diameters in varying lengths up to 50 feet. As you might expect, the bigger the hose and the shorter the length, the better the flow.

Third, take a close look at the hose fittings. While all hose ends reduce the diameter of the hose to some extent, some reduce it down to ¼-inch! You won't be getting much flow from that. Also, the higher the quality of hose, the better the quality of the ends. This is almost always the first point of failure on a cheap hose and leaks can ensue.

It's best to carry varying lengths of hose instead of one long one, but still carry 50-100 feet in total if you can. Again, some campsites have a long run to the water spigot, especially if you like to camp at rallies and other special events without traditional hookups. Plus, if one of the lengths fails, you'll have a backup. By the way: If the ends fail, don't throw out the hose. It's easy to replace ends purchased at your favorite hardware store.

You should have an assortment of washers (screened and plain) as well as nozzles and connectors in your RV. Quick-connect fittings make hook-up and take-down much quicker.

Just like shorepower, it's important to have surge protection on your CATV connection. These from Amazon are inexpensive and provide some protection.

Cable TV and Satellite

While cord-cutting is getting more and more popular, Internet service away from home is still dicey, sometimes leaving streamers high and dry. Being able to connect to park cable or your own satellite TV is another good way of getting service.

Just like with sewer and water, CATV connections can be a distance from the site. For that reason, I carry a long length of RG-6 on a plastic reel, plus a couple of shorter lengths and a dedicated length for the portable dish. The ends have Cable Grips on them to make connecting easier. I also have a few barrel connectors for joining multiple lengths together if needed, and a tool kit at home for making my own cables. If you use the cables enough, the ends will break, so being able to strip and press new ends on is, as they say, priceless. Ideal tools and fittings are available at home-improvement stores.

I also have a couple of RG-6 surge protectors in the rig. This have proved invaluable — I've rewired at least three RVs that have had lightning surge enter through the CATV. You can buy two of these protectors for $12.99 on Amazon and you can even install it behind the CATV plate on the RV for out of sight, out of mind convenience.

These quick connectors and similar hoses are available to connect a grill or griddle to your RV's low-pressure propane system. You'll need to bypass the regulator on the appliance (if it has one) for this to work.

Propane

If your RV is equipped with propane — otherwise known as LP-gas — you might also have a grill quick-connect already on your unit. If you don't you can add one, which makes grill and griddle hookup and use a cinch.

The parts for hooking up to this are specific but universal and widely available online or through dealerships. Want to hookup more than one device at a time? No problem: Amazon (and other online sources) sells a ¼-inch Y-splitter that you can mate with a couple of hoses to have both the grill and the griddle going at the same time. The same types of fittings also can be used to hook up a propane generator to the onboard system.

Quick-connect propane hoses come in various lengths, and you can build a custom-length hose by attaching quick-connect ends. Be sure to use thread tape designed for use with gas (yellow) where needed (not with compression fittings).

Are there other things you need to improve your life on the road? Absolutely. There are more options than we could list here — and RVers love to customize their rigs and come up with their own hacks for handling their RVs. But at least this list of "must haves" will get you started. RVE

Sources
Camco Mfg.
(800) 334-2004
Camco.net

Valterra Products
(818) 898-1671
www.valterra.com

10 Things You Gotta Have!

Time Required: 30 mins
Difficulty: Easy

Are We There Yet?

Garmin's new RV 1090 GPS device sports a handsome 10-inch screen and is loaded with practical features — including listings of RV parks and ancillary services designed specifically for RVers

By Bob Livingston

Let's face it: The co-pilot always gets the brunt of any argument stemming from getting lost. It usually begins with something like, "Can't you read a map? I'm driving, so I can't be the only one figuring out where to go. Now I'll never get this thing turned around," or words to that effect.

Fortunately, the Global Positioning System (GPS), a gift from the military, has changed the way we navigate, taking most of the stress out of traveling unknown routes. Now we talk to an electronic co-pilot who, frankly, doesn't take any guff from the driver. Not that many years ago, talking to a device would qualify one for a sanity check — but times have changed. Now it's hard to imagine life without a familiar robotic voice telling you which way to turn.

Garmin is a world leader in the GPS navigational space and has been marketing portable devices for a long time, gradually adding features that have become popular with RV owners. Its latest offering, the RV 1090, raises the bar when it comes to screen size, design and performance. It also boasts enhanced RV park listings and the ability to input personal profiles to make routing safe for large and tall vehicles.

What looks like a modern tablet, the RV 1090 is actually a powerful navigational tool with a handsome 10-inch touch screen for those too shy to talk to an unfamilar mechanical guide. (If you're using a tow vehicle or prefer a slightly smaller screen, the RV 890 is another option; it has the same features and programming as the 1090 in a more diminutive format.)

The RV 1090 handles like a tablet, the image is crystal clear and, most importantly, the screen is easily visible for drivers who need to concentrate on the road. Link the RV 1090 with a smartphone loaded with the Garmin Drive app (available on the Apple App and Google Play stores) and this navigational tool gives the driver and co-pilot command of the road and valuable information on RV service facilities, fuel stops, weather, traffic (and road closures), interesting places, RV parks, National Parks and, of course, step-by-step directions to your destination.

This is an amazingly powerful device, packed with features that ensure road travel will be stress-free. But, like most sophisticated electronic devices, there is always an acclimation period.

The Highlights, Please

There are two ways to approach using the RV 1090. You can limit use to just the basics, which is fairly intuitive, or dig deep by studying the 30-page comprehensive owner's manual (downloadable from the Garmin site) and taking advantage of computer-level functions. (If you get stuck, just find a 10-year-old and they'll show you how it's done.) If you are already familiar with a previous Garmin model, acclimation will be quicker.

The most basic function of any GPS device is to guide the driver to a destination unscathed. The RV 1090 does this with aplomb, and the execution is pretty user friendly. Once the RV profile is entered into the programming and the routing will make sure there are no unsuitable roadways, low bridges or size prohibitions, which prevent unwanted delays and embarrassments.

Loading the RV profile information is one of the first steps after mounting the screen. You'll enter the type of RV, followed by maximum height, width, length and weight. Once that information is input, you'll get a prompt whether to use the GPS for a car or RV by tapping the appropriate spot on the upper right portion of the screen after start-up. If you're driving a dinghy or tow vehicle, you won't need restrictive routing.

Pairing the RV 1090 (MSRP: $699.99) to a smartphone is equally simple. Once the Garmin Drive app is loaded and you are set up as a user, you'll be prompted to pair the devices. If you are already a Garmin Connect participant through another device like a bicycle computer, you can just sign in. Teamed up with the Garmin Drive app, the amount of information gleaned from the screen is mind-bending. A special magnetic mount (part #010-12982-02; $49.99) is needed to receive over-the-air road conditions and traffic problems, but that's only if this service is available in the area where you are traveling. Staying connected to the phone provides the highest level of reliable road information.

On the simple side, users can input an address or RV park, push Go and the navigation starts. Along the way, information on fuel stations, live fuel prices, places to park, traffic conditions and distance and time to the destination, among other features, can be read on the screen. Want to know arrival time? Just say, "OK Garmin, when will we arrive?" You'll get an answer. This is perfect when traveling with youngsters who constantly hound the driver with, "Are we there yet?" There are a number of other verbal commands that can be used by the driver, so his/her eyes can stay on the road.

Magnetic mount has enough pull to seat the big screen so that the electrical contacts will make a good connection. There's no adjustment necessary when placing the screen and it can be removed to use as a tablet.

Heavy duty suction-cup bracket makes it possible to mount the screen to a window or any other smooth surface. The bracket holds the screen tightly but expect some wiggle if the screen is not supported by a dash or other surface. The RV 1090 is powered by a nearby 12-volt DC power outlet. Garmin recommends that only the provided power cable is used to operate the GPS.

As mentioned earlier, the navigation screen is big and easy to follow at a glance. Roadways are clearly marked, along with information on distance to the next road or highway, current roadway name or number and direction to turn. When approaching intersections or highway transitions, a screen feature called Active Lane Guidance expands the details, making it easier to get over in plenty of time to change lanes. Between the voice directions and road details on the screen, it's hard to make mistakes that can lead to getting lost.

Drivers will be warned of impending issues like sharp turns, steep grades, lateral wind, narrow roads, railroad crossings, school zones, state/country borders and even to shut down the propane when necessary (providing this setting is activated). It can also annoy you with speeding alerts; the device displays current speed and provides notice when speed limits are about to change. Routing can also be set to avoid toll roads.

While the RV 1090 has way too many features to list in this article, we'd be remiss not to mention its capability

to function as a Bluetooth device for a cell phone. Calls can be made and answered using voice commands, and texts can be displayed on the screen, if desired.

Mounting the Screen

Garmin provides a number of components for mounting the screen, the most common of which is a suction cup bracket. It will stick to the windshield or other slick surface and stay there for a while — but intense heat can cause the suction cup to lose its "stickiness" and allow the screen to fall. Owners will have to determine whether the screen takes up too much windshield space on tow/dinghy vehicles, which can impede the view to the road (mounting a navigation unit on certain areas of the windshield may also be illegal in certain parts of the country). If using the suction cup bracket, it's best to support the bottom of the screen on the dash or other surface that can provide stability. This is especially important when traveling in a heavy-duty tow vehicle (think dually truck) on rough roads, where the bouncing can dislodge the suction cup bracket or at least cause the screen to wiggle in concert with the bumps on the road.

Another option is to mount the other bracket in the kit to the dash using the provided screws. We're not fans of the putting holes in our dash, so that option was tabled. Both brackets employ a magnetic mount that allows the screen to be pulled away at will. Removing the screen from the bracket allows the GPS to be used like a tablet, but battery life is said to be around two hours. Connecting the screen to vehicle power is simply a matter of plugging the cable into a 12-volt DC utility outlet.

For the test installation, the dash bracket was bolted to an aftermarket articulating arm mounted to the floorboard in the truck cab. It allowed the screen to be positioned for good driver ergonomics and visibility. Unwanted screen movement while on the road was mitigated by resting a portion of the screen on the truck's center console. Plan on some customization when using aftermarket brackets.

Adding to the convenience factor is the ability to monitor a wireless backup camera and connect a dashcam to the screen base. A data storage card can also be pushed into the screen base. The backup camera (BC 35; $169.99) is suitable for trailers and fifth-wheels, as long as the transmitter can be placed within 45 feet of the GPS screen. Owners can also choose from one of the diminutive dash cam models offered on the company's website; prices start at $129.99 for the mini model.

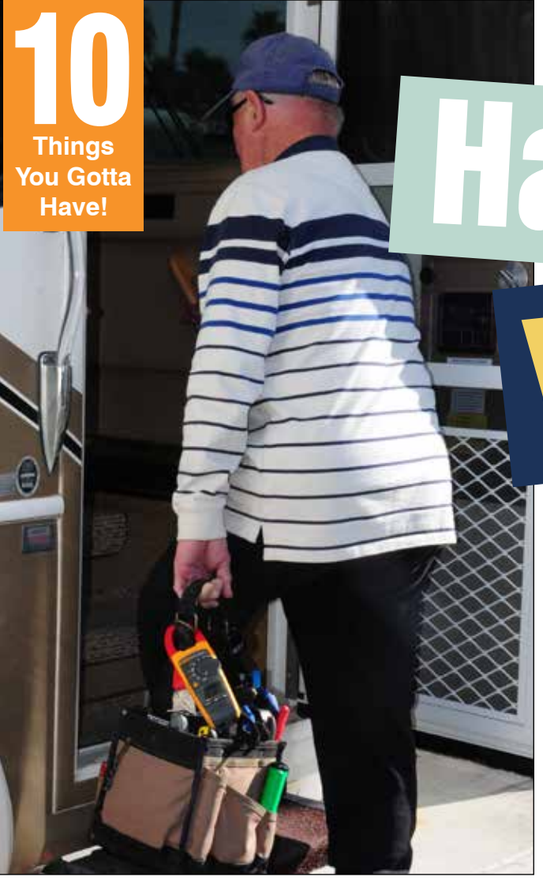
Having a co-pilot that doesn't argue is a beautiful thing. Big screens in vehicles are all the rage these days and owners without this feature can opt for the Garmin RV 1090 and enjoy similar visibility and ergonomics. RV-specific information and routing makes this navigational device even sweeter.

RVE

Source
Garmin, Ltd
800-800-1020
www.garmin.com

An aftermarket articulating arm, designed for electronic components, was used to mount the screen by modifying the dash mount (provided in the kit) and attaching it to the articulating arm via a small metal strap. The set-up holds the screen securely to the arm, but to prevent wiggling on rough roads it is also supported by the center console. It adds to the installation time but the final result is a screen that is easily touched by the driver, with information clearly visible.

Garmin's RV 1090 10-inch display rivals big screens that are showing up in tow/dinghy vehicles and motorhomes. Garmin Drive app is installed on a smartphone and paired to the GPS. Keeping the phone paired makes the GPS even more powerful, providing current weather and road conditions.



10 Things You Gotta Have!

Have Tools Will Travel

Electrical problems in your RV can range from annoying to devastating. Here are some inexpensive tools to diagnose and prevent them.

By Mike Sokol

Southwire meter kit

One of the challenges of being on the road with your RV is how to perform the occasional repair or troubleshooting when you may be hundreds or even thousands of miles away from home. You're not about to take along your eight-drawer tool chest to ensure you can address any situation — but with some forethought you can assemble an easily stowable tool tote filled with enough of the right tools to get you out of most jams.

As seen in this photo of an outlet being tested in the author's test lab, a multimeter can be used to check voltage in your RV as well as checking the proper voltage in a park's electric pedestal.

Along with the expected array of hand tools — and, in particular, those that are capable of adjustment to replace several tools with one — your "grab bag" needs to include a number of small electronics to track down what might be ailing your RV.

Here's a look at a list of the tools and meters that, through trial and error and a lot of miles, I learned to take with me on the road. Many of them have saved my bacon — more than once.

3-Meter Kit

When an electrical failure occurs it's possible to lose your lights, refrigeration, climate control — even the ability to pull your slides back in so you can break camp and move. I highly recommend that every RVer carry a basic 3-piece meter kit. This $30-$40 investment will let you accurately measure your RV battery's charge level, find a blown fuse in your slide motors, determine if the outlet you're plugging into has proper voltage, polarity and grounding and even do a quick check to confirm that your RV is properly grounded and doesn't have a hot-skin condition (see "The Shocking Truth" elsewhere in this section).

There are a number of inexpensive, quality meter kits available from companies such as Southwire and Klein Tools, both of which are available at major home-improvement stores as well as Amazon. Both kits include a manual digital meter, 3-light tester and a NCVT (Non-Contact Voltage Tester). Manual digital meters are actually much safer to use than many auto-ranging meters that can be confusing due to their additional measurement functions and settings.

Southwire AC-DC clamp meter

Clamp Amp-Meter

While voltage measurements are an essential part of troubleshooting any electrical system, there's an even even handier way to measure actual current flow in the circuit: the clamp ammeter. This cool tool will let you confirm things like charging amperage going to your batteries, how much current your inverter is using, why a circuit breaker is tripping and lots more. However, be aware that the least-expensive clamp ammeters can only measure AC current in their jaws. You want one that's listed for both AC and DC current using the clamp. With an AC only version, you won't be able to measure 12-volt DC amperage — and that's really what you need to troubleshoot any converter or battery circuits.

Current Splitter

For anyone who has never used a clamp amp-meter, you can't just put the jaws around the entire wire and expect it to read the amperage. That's because the current flowing in the line and neutral (or plus/minus) conductors cancels out. You need a way to separate the conductors, and the easiest way is with a current splitter. I recently found a version from Italy that not only splits out the hot and neutral wires, it measures leakage current from either the "Line to Neutral" or "Line to Ground."

See the Light

You can't fix what you can't see, so pack a headlamp as well as stick light. These designs leave both of your hands free so you can work more safely, and the modern LED lights run for many hours on a few AA batteries or a USB charge. A Klein Tools headlamp is a great choice, with its rubberized strap to keep it in place, plus spotlight and floodlight functions.

Sokol with a current splitter clamp

A Cat Work Light, meanwhile, is versatile in that you can hang it off your shirt pocket or use its magnetic base to stick it on any ferrous metal. It even has a tilt function and low/high brightness levels. Working on anything electrical in the dark can be very dangerous, so please use a light.

continued on page 78

PHOTOS BY BOB LIVINGSTON

DEALING WITH DIRTY LAUNDRY

Installing a Splendide stacking washer and dryer in a closet pre-prepped at the factory will take the sting out of keeping clothes clean and fresh during extended travels

By Bob Livingston

Traveling in an RV gives one a sense of freedom to explore and the ability to leave the hubbub of daily routines. While it would be nice to chuck all responsibilities and chores, reality suggests that one of our regular routines — washing clothes — follows us like a lovesick puppy. The majority of owners likely rely on laundry facilities in RV parks and local communities. While making use of a laundromat has its social benefits, there is a lot to dislike when using public facilities, from dirty or broken equipment to long wait times for available washers/dryers. Having your own washer and dryer inside the RV adds "loads" of convenience to any trip, and if the trailer, fifth-wheel or motorhome has been prepped for such equipment, Splendide has a stacker washer/dryer set-up that will bring smiles to whoever is responsible for keeping clothes clean.

A washer and dryer (or combination unit) are typically offered as a factory option in many larger RVs, and even more models offer "washer/dryer prep," with all of the necessary plumbing and electrical connections already in place. While it may be tempting to modify an existing RV without washer/dryer prep, such a project is not recommended without tons of experience, the stomach to tear things apart and monumental patience. In most cases, it simply cannot be done — but if the RV is factory prepped for a washer and dryer, the project is achievable for those with a decent mechanical aptitude.

For this project, a 24-inch Splendide Ariston model washer and matching dryer, the most widely used units in the RV industry, were installed in a 40-foot fifth-wheel with a closet in the front bedroom that was washer/dryer prepped. Even though the closet was designed to house these appliances — and a tape measure confirmed that they would fit within the allocated space — closer examination before starting the project revealed that the tight closet dimensions would create an installation side show, requiring precise choreographing to successfully complete the project.

In other words, the appliances would fit in the allocated space, but there was little "wiggle room" for tools and hands needed to connect the water, drain and dryer vent hoses. Discovering that there was not enough room to turn the water faucets on and off after the washer was in place drove us to replace the less-durable plastic faucets with brass counterparts. Appropriate brass fittings were used to connect the factory water lines to stainless-steel braided hoses, and then to the new faucets. The installation was sweet, and maybe a little overkill, but when you come from the "let's do this only once" school of thought, the more reliable hardware just raised the fifth-wheel owner's comfort level.

Drilling a 4-inch hole in the side of the fifth wheel for the dryer vent can be disconcerting for some do-it-yourselfers, but we've done this a number of times, which helped us avoid a major potential mistake. That said, the factory provided a "drill-here" label that made no sense. After scratching our heads for a while, we decided to reach out to the fifth-wheel manufacturer for

1 *First things first: The door opening to the bedroom was measured to make sure the washer and dryer would fit. While the proper clearance was expected because the fifth-wheel was prepped for a washer and dryer, it never hurts to confirm the fit.*

2 *Stock, plastic faucets were cut off using a hack saw blade. There was not enough slack in the Pex tubing to pull up through the mounting plate in the wall to cut off the faucet below the hose clamp. Once separated from the hose, the plastic faucet was discarded.*

3 *Ends of the Pex tubing were accessed through a round plate in the lower wall, giving us plenty of room to cut off the remaining faucet barb.*

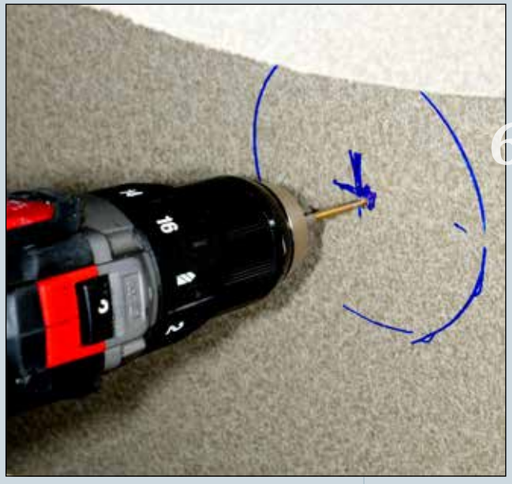
4 *A brass, barbed fitting was installed in the end of each Pex tubing. This fitting allows attachment of the new faucets (turn-off valves). Adding stainless steel hoses made it easy to attach the new faucets and mount them back in the original housing in the wall. Replacing the faucets is not mandatory, but the added reliability of the brass fixtures, and the fact that they could not be opened and closed once the washer and dryer were in place, instilled greater confidence for the owner of the fifth wheel.*

5 *Routing for the dryer vent was marked on the back wall so the panel could be cut out to make room for the larger diameter, heavier duty hose. This step is also not necessary but requested by the owner who was looking for a more durable set up. Cuts were made with an oscillating cutting tool that was purchased at Harbor Freight specifically for this job. Inexpensive tools are not designed for daily use by professional mechanics but are certainly reliable enough for most do-it-yourselfers. Lightweight paneling was easy to cut and remove to make way for the heavier dryer vent ducting.*

direction and learned that we needed to shift the hole location. Once we were comfortable with the location, a small drill was used for a pilot hole to confirm we were in the right spot before cutting the bigger hole, which went very smoothly. (Remember, you only get one shot for this step, and mistakes will lead to costly repairs.)

From here, it was a simply a matter of mounting the vent hardware to the exterior wall.

The next step was to route the dryer vent hose. The dryer comes with a suitable hose, but the owner wanted one that was on steroids. In order to make the bulkier hose work when the dryer was in place, a channel needed to be cut in the back panel

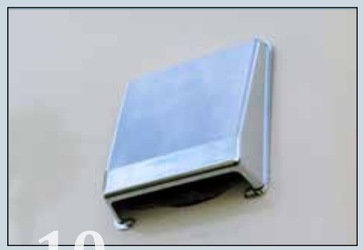


6 *Once the location for the dryer vent tube — which goes through the wall — was determined and marked, a pilot hole was drilled to show where to cut the 4-inch hole from the outside.*

7 *Painters tape was applied liberally around the pilot hole location on the outside wall. A new, high-quality hole saw was used for this project to make sure the cut was clean; you only get one chance to cut the hole properly.*

8 *Butyl tape, provided with the kit, was placed around the flange that rests against the surface of outside wall.*

9 *The vent tube fit perfectly. To prevent moisture intrusion self-drilling screws were coated with a silicone sealant before securing the flange of the vent tube against the outside wall.*



10 *A chrome cover finishes off the installation of the vent tube and provides a clean look.*

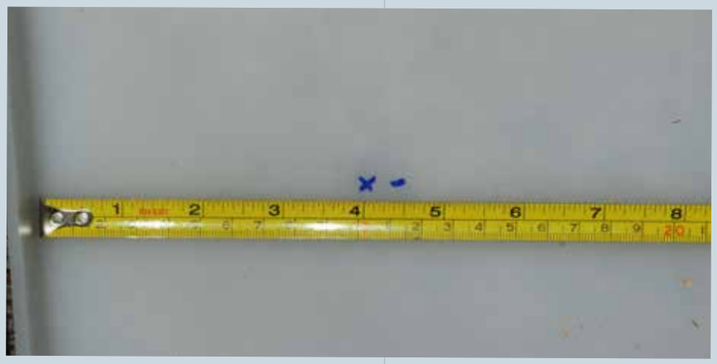
11 *Pre-assembly of the Drain-A-Way pan PVC plumbing made it possible to determine the exact location for the drain pipe that was routed through the floor. Since the raceway had a large open space and a second "floor," a long wood drill bit, also purchased at Harbor Freight, was used to cut the holes for routing the drainpipe. We rarely use this type of bit, so the inexpensive set made perfect sense.*

12 *Mounting the Drain-A-Way pan was like working a jigsaw puzzle. PVC pipe and fittings were assembled to construct and route the drain through the floor. The fit needed to be perfect before gluing the pieces together.*

Available space behind the dryer was limited and even the vent hose that came with the dryer would require some head scratching to facilitate routing and the connection. We made the heavier vent hose work, but it added quite a bit of time to the project. After routing the vent hose, aluminum-clad insulation boards were used to cover the raceway and clean up the back wall.

Before placing the washer and dryer in the closet, we mounted an optional Drain-A-Way pan on the floor. This allows water to be routed outside in the event of a leak, which also played to the owner's comfort zone. Not all RV manufacturers use the pan when installing the washer at the factory, but we think it's worth the small $60 investment and additional installation time. A drainpipe had to be routed to the outside; for this installation it was placed through the floor, existing in the vicinity of the kingpin box. A threaded PVC fitting was added at the exit point so it could be sealed with a plug when the fifth wheel is not being used. Of course, the owner has to remember to remove it before running the washer in order provide the benefits of the pan.

Once the closet prep was complete and the stacking brackets mounted (using the provided template), it was time to shoehorn in the washer and dryer into the closet following a precise order. It was not possible to connect the water and drain hoses after the washer was in place. Fortunately, there was enough hose length to make the connections before moving the washer



13 *The Drain-A-Way pan was premeasured for location of the hold-down screws, which were driven by a screw gun after a hole was first drilled into the pan. The optional pan will route water to the outside in the unlikely event of developing a leak. It's cheap ($60) insurance to protect from water damage.*

Having your own washer and dryer inside the RV adds “loads” of convenience to any trip.

14 *A longer-than-needed PVC pipe for the Drain-A-Way pan was routed through the floor, exiting near the kingpin box. A hacksaw blade was used to cut the pipe so that a pipe-to-threaded fitting could be glued to the end while providing a close fit against the exterior fiberglass. A plug is screwed to seal the pipe when the fifth wheel is in storage.*

15 *The dryer vent is connected to the tube that goes through the wall using a standard hose clamp (top).. The vent ducting was then routed through the opening cut in the forward wall and connected to an articulating elbow purchased at a home improvement store.*

16 *Four screws and the plastic hardware provided by the washer manufacturer for unit protection while shipping were removed from the washer and the holes plugged with plastic fittings. These shipping parts should be saved and replaced before moving the washer to another RV later on, if desired.*

onto the drain pan. After placing the washer and dryer, the front lip of the drain pan was secured using the provided putty tape and screws.

Since we employed a more robust vent hose, there was no way to connect it before positioning the dryer on the washer stacking brackets. An access hole was cut in the adjacent wardrobe closet to allow an arm and hand to reach the vent

17 *Metal stacking brackets are mounted to the top of the washer. A template, provided with the kit, is used to confirm location for drilling pilot holes to accommodate the screws. Drill bit depth must be marked to prevent penetrating too far into the washer.*

18 *Aluminum-clad foam insulation panels, cut to size and mounted on the front wall inside the washer/dryer closet, cleaned up the holes cut for the dryer vent. Here, the washer is in place, ready to have the dryer stacked on top.*

19 *The hot- and cold-water lines are long enough to make the connections before mounting the washer on the Drain-A-Way pan. There was no room to do this after the washer was in place. The washer drain hose was installed at the same time. Chrome-plated brass faucets (1/4-turn valves) replaced the stock plastic counterparts. The flexible drain hose was wedged inside the pipe provided with the washer/dryer prep option.*

elbow, jockey it in place and tighten the hose clamp. A few choice words were blurted after dropping the ratchet wrench and socket behind the washer, but a telescoping magnet saved the day. The hole was also necessary to reach the rear stacking bracket and tighten the fastener.

Dealing with the tight fit required a lot of forethought before making cuts and drilling holes. Consequently, we took our time to contemplate the procedures and prevent costly mistakes. Overall, the job was not that difficult, but taking the additional steps like we did for this installation is not for the squeamish.

By the way, we did measure the door opening to the bedroom before starting the installation to confirm that there's was enough room to move in the washer and dryer, and the closet doors were removed temporarily to allow adequate clearance.

One final consideration: a washer and dryer can contribute greatly to humidity and heat inside a closet. The closet doors were not louvered, which is common when the washer and dryer are not opted for at the time of case, the owners simply left the doors open when operating the machines.

The washer and dryer retail for $1,000 and $794, respectively. Beyond the Drain-A-Way pan, the owner added the chrome vent kit, 90-degree elbow and clamp for the dryer and the stack kit for mounting the dryer on the washer. That, along with the additional hardware to customize this installation, added about $240 to the overall cost of the project. Those not seasoned with this type of an installation should expect to devote most of the weekend to the project — and even longer if running around for parts consumes additional time.

The convenience of a washer and dryer inside an RV will exceed your expectations and allow the dreaded memories of lugging clothes to and from a public laundry facility to fade quickly. And you'll save lots of quarters.

RVE

20 *In order to reach the connection point for the vent hose in the rear of the dryer, an access hole, large enough to fit an adult hand and arm, was cut in the closet wall adjacent to the washer/dryer compartment. Not sure if even Houdini could have made the connection without the access hole.*

21 *The front hardware in the stacking kit secures the dryer to the washer, once both appliances are in place.*

22 *The final step required the installation of the front lip that completes the Drain-A-Way pan. Butyl tape and self-drilling screws are employed to complete this task.*

Source
Westland Sales
www.westlandsales.com
503-655-2563

23 *Washer and dryer fit nicely in the front closet and are easy to load and unload. Closet door must be left open when washing and drying clothes. Adding louvers to the existing door (or installing a new louvered door) is an option, but in actual use, leaving the door open presented no issues.*

Real World Testing

There is one big difference between the machines at the local campground's laundromat and the machines you can install in your RV: the park's washers and dryers are usually "commercial quality" in both size and capacity. Don't add a washer and dryer combo to your RV thinking it's a match; what you are really adding is complete convenience.

To provide some insight to the capabilities of the machines, the owner provided an overview of of a few cleaning cycles, documenting what was washed/dried and how long it required. The units provide a number of cycle options and the instruction manual provides sample dry loads, which are very helpful. Splendide-brand powder laundry soap, ordered from Amazon, was used and, based on the small amount needed for washes, should last for quite a while. It's a good product and cleans the clothes well.

The dryer works very well although it takes a bit longer to dry towels and heavy cotton shorts, but otherwise is very efficient. After using the dryer for a while, the timer was set based on experience, rather than using the automatic feature. High heat was used predominately for the dryer and it seemed to work well without shrinking any clothes. The clothes came out of the dryer without excessive wrinkling and some items could be folded and ready to wear.

There is little to no movement in the RV when the washer is spinning, and the process is relatively quiet.

1. Heavy Soiled Whites and Resistant Colors
Maximum weight allowed (natural fibers — 13 pounds)
This cycle takes 122 minutes
Water temperature pre-set to Hot - RPM MAX
Water temperature changed from hot to warm.
•2 bath towels
•4 hand towels
•3 dishcloths
•4 facecloths
This load was put in the dryer on hot setting for 80 minutes and it was completely dry when finished.

2. Mixed Load (30 minutes wash for lightly soiled garments)
Maximum weight allowed is 6.6 pounds
NOTE: This cycle is designed to save energy and time allowing lightly soiled garments of different fabrics to be washed together.
Water temperature pre-set to warm and RPM at 800
•4 women's t-shirts
•1 pair men's shorts
•1 tank top
•1 pair women's shorts
Set the dryer to high heat on automatic cycle. When cycle was complete the clothes were not dry. Set the dryer to additional 40 minutes to dry.

3. Jeans
Maximum weight allowed is 6.6 pounds
This cycle takes 55 minutes
Pre-set to Warm water – changed to cold – RPM 800
Reduce wrinkle cycle
•3 pairs of women's jeans
•1 pair women's shorts
This load dried on high heat in 60 minutes.

Baby, it's Cold Outside

Adventurous RVers will be treated to another level of beautiful scenery, solitude and outdoor activities when winter camping. Proper planning will conquer many of the inherent challenges — including staying warm.

By Bob Livingston

Winter travel opens up so many new and adventurous opportunities that, at one time, were mostly avoided by RV enthusiasts. Conventional wisdom relegated RV travel to only three seasons, with winter reserved for hearty souls who didn't mind struggling with nature to stay warm. Times have changed, and RVs are more capable than ever of taking on cold-weather challenges — but they're not perfect. Proactive winter RVers can protect vulnerable systems and accessorize to make journeys to their favorite winter destinations not only possible, but downright comfortable.

As snowmobile and cross-country skiing/snowshoeing fanatics (somewhat of an anomaly for Southern California residents), traveling to snow country was an annual rite of passage for my family. Early trips were interesting, sans many of the modern technological advancements and accoutrements to keep us warm. Portable generators were not that portable and solar systems were way out of our budget back in the 1970s when we first started traveling to snow country, so we relied on batteries and some "Rube Goldberg ingenuity." We were early adopters of 6-volt golf-cart batteries; to keep them charged in the field, we ran the tow vehicle at a high idle using a rock to hold the accelerator in place. Crude, but it worked.

First Things First

Before wandering out during winter, RV owners must make sure their rigs can handle slick roads. Motorhomes fare better in this department, but chains might be required. Those towing trailers and fifth-wheels must understand the limitations on icy, snow-covered roads and be prepared to stay off the road in terrible conditions. Don't get lured into complacency because you have a four-wheel-drive tow vehicle, a similar drivetrain on a truck camper set-up or even on a Class B or Class C motorhome. Four-wheel-drive certainly helps but will not prevent sliding on icy roads if the vehicle is driven too fast for conditions. Always carry chains for all drive and trailer wheels — and make sure they fit before you head out. Many places allow passage without chains with four-wheel-drive and M+S-rated tires, but be prepared for severe conditions when chains will be mandatory regardless of the drive system.

Descending icy mountain roads can be particularly hazardous and requires precise driving manners to remain in control. When towing a trailer, especially without chains, slow down; sudden braking can send the trailer sliding out of control.

The bottom line: Respect the terrain and road conditions and don't get in a hurry. I vividly remember one crossing over Donner Summit on California's infamous Interstate 80, headed for Reno, Nevada. By the time we reached the summit, the weather had turned for the worst. Wind gusts were clocked close to

Back Seat Heat is a compact, portable heater that operates on 12-volt DC power. It's perfect for taking the chill out of cold spots and is used commonly by truckers. This diminutive heater can also be employed to thaw out pipes and valves, but it's not waterproof, so make sure it is covered when outdoors.

than a slight view of clearance lights on the commercial truck trailer we were following — and we were crawling. At the summit check point, I was cleared by the Highway Patrol to continue, but the driver of the truck in front, my only visible landmark, was required to pull over. We arrived at our destination in the wee hours of the morning, and even though I was piloting a four-wheel-drive truck with a camper on board, my fingers, literally, had to be pried off the steering wheel after arriving at the RV park.

The moral of the story: Be prepared for anything when crossing mountain passes by having enough water, food and warm clothing should you become sidelined while waiting for the weather to clear. We've had to do this many times and hanging out inside a toasty RV, sipping on hot coffee, is a lot more palatable than being in a passenger car, shivering under blankets.

Winter-Worthy Assessment

While "arctic" or "four-season" packages from the factory are becoming more common, it's important to take a closer look at how the RV is outfitted and protected from extreme temperatures. For example, many four-season packages do not include dual-pane windows, a key component for successful cold-weather travel. Buying a new RV?

Clear plastic sheeting in Frost King's Window Insulation Shrink Kits can be applied to windows to create a vapor barrier. Once the plastic is cut and stuck to the window frame, a common hair dryer is used to shrink the plastic into a tight fit.

Dual-pane windows will be one of the best investments you can make, providing increased comfort and temperature moderation, even in hot weather.
It's not practical to retrofit an RV with dual-pane windows, but there are a few procedures that can help with heat loss and sweating window frames. For example, plastic film provided in commercially-available kits from companies including Frost King can be attached to the frames and stretched tight using a standard hair dryer. Adding the second

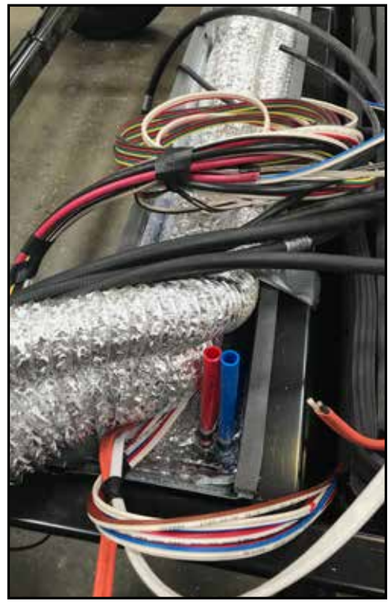
Insulating the areas below the floor with sheets of aluminum-backed foam helps prevent tank and plumbing freezing. This practice is becoming very popular with manufacturers as they transition their RVs to four-season capability.

layer provides a decent vapor barrier, without restricting light penetration and the view to the outside. The film can be removed when warmer weather arrives.

Adding foam insulation boards and heavier window covers will help, but of course restricts visibility. Foam RV vent/skylight insulators also help and are readily available at RV supply stores and online.

Preventing water-system freeze-ups is just as important as regulating heat loss. Freezing temperatures can burst pipes and fittings, and at the very least, stop water flow. Plumbing routed in heated compartments, usually part of a factory winter package, will usually not freeze as long as warm air from the furnace keeps the temperature above 32 degrees F. Pipes, fittings, valves and the demand water pump exposed to sub-freezing temperatures are susceptible to freezing and must be protected with additional insulation. This is not a difficult job as long as the pipes and pump are accessible. Fiberglass batting, spray-foam insulation (must be fireproofed) and commercial pipe wrappings work well. Electric holding tank pads (12-volt DC and 120-volt AC models) should be added if the tank compartments are not heated and access is possible. Power heat wraps are also available for water pipes, and in some cases are the only defense against freeze-ups.

Hooking up to water and sewer presents another issue in extreme cold weather. Count on the water hose freezing — which will obviously stop the flow — at the most inopportune times. Special heated hoses, like those made by Pirit, Camco and Valterra, work really well if power is available. And there is nothing more infuriating than a frozen dump valve and sewer hose. If you insist on leaving the sewer hose connected overnight, make sure it's drained with the valves closed or it's well insulated with a wrap designed for this purpose; otherwise, morning departures will be delayed until thawing. If you screw up (which we have done in the past by mis-



Strategically routed furnace ducting and registers, usually part of a cold weather package from the factory, help keep space between the floor and underbelly warm, which helps prevent tank freezing. In many cases the storage compartments are also heated.

judging overnight temperatures), a hair dryer can facilitate thawing as long as you have a source of 120-volt AC power. We've actually strategically placed a small catalytic heater, commonly used by people in tents or hunters trying to stay warm in duck blinds, to thaw frozen dump valves.

Keeping The Lights On

If you're in an RV park with an electric hookup, power is not much of a concern unless there is a temporary outage. Disconnecting the utility "umbilical cord," however, allows for so many new adventures. Having your own mobile chalet in snow country with cross-country ski trails only steps away from the door will keep your spirits high — unless you run out of power. Onboard and portable generators temper the stress of relying on batteries, but advanced technology in DC power makes self-reliance possible without the inherent challenges RVers faced in the early years.

Lithium batteries are game changers and, fortunately, have come down in price enough to make them affordable. They are lighter, can withstand more lifetime charging cycles, are more efficient and provide consistent voltage during deeper discharging sessions. Tied to a properly configured solar system and power inverter, owners can rely on clean power for extended periods of time. There are limitations, though, like a lack of sunshine due to cloudy weather and/or a snowpack on the solar panels. If you want interrupted power during winter travel, consider taking a portable generator along for those days when the solar panels are less active.

Hey, It's Toasty Inside

Most RVers rely on an LP-gas-fired furnace to keep the interior, storage compartments and underbelly warm. Cracking open interior compartments and cabinets where plumbing is routed will help keep the pipes from freezing. In many cases the ducting from the furnace will heat exterior compartments and holding tanks, which is usually a feature included in a cold-weather package from the factory. Combustion chambers in most RV furnaces are typically only fired by LP-gas, although there is an aftermarket kit, CheapHeat by RV Comfort Systems, that can be added to utilize 120-volt AC power.

Energy efficient furnaces from Truma Corp. have added versatility to heating appliances during the last few years. Its Combi and VarioHeat systems operate on LP-gas or 120-volt AC power and provide even heat distribution and are super quiet. Heated floors and hydronic, diesel-fired heating systems found in motorhomes and some higher-end fifth-wheels also provide quiet, evenly distributed heat. And on the more exotic side, Alde's hydronic radiant heating system keeps interior space and floors on an even keel without temperature fluctuation. The Alde system is usually reserved for smaller trailers and Class B motorhomes.

Standard onboard systems can be supplemented by a catalytic heater, powered by LP-gas. These heaters are efficient, quiet and require no electric power. The Olympian brand models from Camco have been a boondocker's staple for years and are easy to set up once a source of LP-gas has been established. These heaters provide soothing heat and are practical for those camping without hookups, a generator

Camco's Olympian catalytic heater has been used by boondockers for years. It runs silently on LP-gas, requires no electricity and provides an even, soothing heat. It's available in 3,000-, 6,000- and 8,000-Btu sizes and can be mounted on a wall or set-up on its own feet. Catalytic heaters consume oxygen, so make sure the RV is properly ventilated. These heaters should be covered when not in use.

or solar system. Catalytic heaters also consume oxygen; therefore, outside airflow must be maintained. Safety is paramount when using a catalytic heater and maintaining the required clearance from combustable items is also critical. If 120-volt AC power is available, there are a number of heat sources on the market that will take the chill out. Compact heaters with fans are easy to find and will provide maximum BTUs up to their standard power rating (usually 1,575 watts). I like the heaters made by Pelonis and the disc models offer effective heat in a small, easy-to-place housing. Generally they are safe, but

Winter Essentials & Pro Tips

*•**Long-handle ice scraper** — An absolutely universal tool for those who travel to cold regions during winter. To help melt ice, fill a spray bottle with windshield washer fluid rated to minus 20 degrees F.*

*• **Snow shovel** — Goes along with ice scraper. Don't travel in snow without one and make sure it has a folding handle to make storage easier.*

*• **Snow broom** — Helps remove snow from slide-out toppers; look for one with a collapsible handle.*

• Fire extinguisher — Make sure the fire extinguisher is mounted properly in its designated location (which is required by code). Check extinguisher expiration dates and condition and recharge or replace, if necessary.

*• **Traction device** — There are two types of snow-country travelers: those who have gotten stuck and those who will get stuck. Sometimes a snow shovel is not enough. Traction boards, which can be placed under the drive wheels, can be a lifesaver.*

*• **Back seat heat** — This is a handy device for heating cold spots. It runs on 12-volt DC power and is perfect for small areas like the cab of a truck or motorhome. While truckers use this heater all the time, there's only enough heat to handle cold spots, not large areas. Just type "Back Seat Heat" into a search engine and you'll find several vendors.*

*• **Waterproof flashlight** — Mandatory equipment for anyone needing more light at night than what a smartphone can provide. Rechargeable models with high lumen ratings work best, but make sure the battery is always charged.*

*• **High-quality sewer hose** — The more robust models, like the Camco Viper or Valterra Rhino, can better take the punishment of inclement weather. A bear stepped on a cheap model I was using many years ago. It didn't make it.*

*• **Fill the freshwater tank** — If the hose freezes, you'll need to draw from the freshwater tank with the demand pump.*

*• **Top off LP-gas before leaving** — Propane goes fast in winter, especially when running the furnace. Monitor tank/cylinder levels carefully.*

*• **Diesel fuel additives** — Winter diesel blends are more easily found in high-volume truck stops, but they're not always available. Use a diesel fuel additive to prevent gelling when traveling in extreme cold areas.*

*• **Monitor weather** — Pay attention to the media weather person, even though he/she is often wrong. A smartphone and weather apps are your friends (NOAA Weather Live and My Radar Pro are good options).*

*• **Focus on insulation** — If possible, use a foam board to insulate roof and outside sidewalls of each slide out. This will help with heat retention. Cut and tape the insulation material into foldable sections, since they can be a pain to store when not in use.*

*• **Elevate the dump hose** — Keeping the dump hose off the ground is mandatory in certain areas, and just plan practical when the ground is frozen or covered with snow. Better yet, don't use the dump hose if the temperature is too cold.*

*• **Don't be incognito** — Staying in touch is very important, especially if you get stuck or suffer a medical emergency. For the most part, a cell phone will save the day, unless there's no service out in the boonies. In that case, a tracking tool, like the Spot portable rescue device (www.findmespot.com) can inform others that you are in need of assistance.*

adequate clearance from furniture and other combustibles is required. Parabolic models and convection heaters that can be mounted on wall or structure are viable, as long as the safety requirements can be maintained.

Fireplace heaters provide comparable BTUs to the aforementioned portable heaters and are quite safe. Just make sure the fireplace heaters are kept clean, in much the same manner as taking care of a portable heater. Never use the oven as a heating source, because it also consumes oxygen. Always make sure the LP-gas and CO (carbon monoxide) detectors and smoke alarm are in good working order, replacing batteries annually if so equipped. A properly working CO detector is especially important when running the generator, as it is possible for carbon monoxide to enter the interior. Be sure the generator exhaust pipe is not restricted by snow buildup. The use of a dehumidifier will help purge moisture from the air and limit window frame and wall sweating. While there are a number of dehumidifiers on the market, moisture-absorbing crystals from Dri-Z-Air and DampRid will help keep the air dryer without requiring a power source.

Waking up to scenery enhanced by glistening show flakes is always nice, but accumulated snow on the roof, awning and slide-out toppers requires removal. In most cases, the snow will have to be brushed off of slide-out toppers before moving the RV. This is not necessarily difficult, especially if the snow is light and fresh, but it might require climbing on the roof to reach the slide-out topper fabric. This can be extremely dangerous, requiring the utmost care when climbing onto a snow-covered roof. And if it rained during the day and the topper collected water, overnight freezing temperatures can create a sheet of ice on the fabric. Removing the ice is not fun but must be done if you have to depart before thawing. In any case, never try to retract a slide-out topper or awning with ice or snow covering the fabric.

Remember, patience is a virtue when traveling in cold country. Winter excursions in an RV can be challenging and require a lot more work. But the rewards can be breathtaking, especially for those who enjoy winter sports. RVE

Heaters built into RV fireplaces offer comparable outputs to portable models commonly found on the internet and at home improvement stores. They provide a nice supplement to the furnace, as long as 120-volt AC power is available. The heater portion should be cleaned, using compressed air and a nozzle, at least once a year and even more often if used frequently.

Winter travel can provide unparalleled vistas, but it can also create havoc on slippery roads. The biggest problem many RVers face is that, in an emergency, they forget about all that weight they're pulling.

SOURCES:

Alde Corp.
(360) 597-3017
Alde.us

Camco Mfg.
(800) 334-2004
Camco.net

DampRid
(888) 326-7743
Damprid.com

Frost King/Thermwell Products
(201) 684-4400
Frostking.com

Pelonis Technologies
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Pelonistechnologies.com

Pirit Heated Products
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Pirithose.com

RV Comfort Systems
(425) 408-3140
Rvcomfortsystems.com

Truma Corp.
(855) 558-7862
Trumacorp.com

Valterra Products
(818) 898-1671
Valterra.com

WAY CEO Wayne Kaylor with the company's new 17-cubic-foot 12-volt DC refrigerator, marketed under the Everchill brand.

WAY's new A/C unit will be available in 13,500-Btu and 15,000-Btu versions.

The four-in-one microwave is designed to be installed in a lower cabinet, making it easy to access and reducing possible messes encountered when pulling food out of a typical unit.

WAY Introduces New A/C, Kitchen Appliances to the RV Market

While their names aren't emblazoned on the outside of travel trailers, fifth-wheels or motorhomes — and, as a consequence, are mostly unknown to RV owners — component suppliers are the lifeblood of the RV industry. They also tend to be one of the drivers of new technology cropping up regularly inside and outside new RVs that are helping to transform the camping lifestyle.

One such supplier, Elkhart, Ind.-based WAY, recently introduced a number of new kitchen appliances — as well as a new air-conditioning unit — to the industry. And, according to WAY CEO Wayne Kaylor, all will become available to the aftermarket — meaning do-it-yourselfers will soon be able to upgrade their existing components.

The new products include an expanding line of griddles, smaller slide-in stoves, a unique microwave with a pull-out drawer and what Kaylor describes as the largest 12-volt DC refrigerator to date, a 17-cubic-foot, three-door model.

The new A/C unit, marketed under WAY's proprietary Everchill nameplate, will initially be available in 13,500-Btu and 15,000-Btu versions. According to Chris Greer, vice president of product research and development, the development of the new Everchill air conditioner focused on improving airflow while reducing noise.

"It's difficult to maximize airflow without also increasing noise because the two are so interrelated," Greer pointed out. "What we were able to do is reduce air turbulence — that's really what the issue is, turbulence — while also working with our factory on the design of the blower motor fan. We also chose to use upgraded internals, including a Panasonic compressor."

The new A/C lineup was scheduled for full release in January and will be available in both ducted and unducted versions as well as in digital- and analog-thermostat styles.

Among other new products on display:

• New 24 inch- and 21-inch-wide free-standing ranges designed to fit within the size parameters of a typical drop-in stovetop, while offering more features and a residential appearance.

• A four-in-one microwave with a pull-out drawer instead of a typical door. Designed to be installed in lower cabinets, the unit functions as a traditional microwave, convection microwave, roaster broiler and air fryer.

WAY also introduced its largest 12-volt-powered refrigerator to date, a 17-cubic-foot model with French doors. WAY pioneered the use of 12-volt DC refrigerators, which reduce the potential for mishaps by eliminating LP- gas-powered units while increasing cooling using new technology. According to Kaylor, 12-volt technology also allows the refrigerator to continue operating during travel.

"Our 17-cubic-foot model provides the biggest footprint you can have for a 12-volt refrigerator — and can be run on battery only with no inverter," he said. "It cools faster, believe it or not, than a traditional residential 110-volt refrigerator — by over half."

The new refrigerator requires just 7 amps on startup, Kaylor added, and uses just one amp during operation. He also noted that during testing — which the company documented in a time-lapse video — the residential-size refrigerator ran for more than 40 hours on a single 27-series battery. And, he noted, "in 45 minutes, it's making ice." RVE

Protect Your Tail

General Motor's MultiPro and Multi-Flex tailgates can perform a lot of useful functions — but if the inner tailgate is released and allowed to swing down while there's a hitch in the receiver, costly damage could be the result. The CURT protective MultiPro/Multi-Flex tailgate sensor is the solution. The sensor is integrated with a standard hitch cap and disables the inner tailgate functionality when any shank is installed in the receiver. It is available in standard 2-inch and 2-1/2-inch receiver options and can be installed easily with no splicing required, according to the company. **Curt Manufacturing; www.curtmfg.com.**

Smart Solution

Diodes are frequently used in wiring kits to prevent the backflow of current to the electrical system of the towed vehicle (dinghy) or motorhome. However, some newer vehicles now use a multiplex wiring system, whereby multiple electrical signals may be sent down a single wire (brake and taillights, for example). If an ordinary diode is used in these applications, it can result in several light circuits activating instead of only the one desired. To solve this problem, Roadmaster recently released its new Smart Diode, which correctly modulates the voltage to activate only the intended circuit. Smart Diode kits are available for applications with incandescent bulbs (part #782) or LED lighting (#789). **Roadmaster, Inc.; roadmasterinc.com.**

A Strong Stance

A power A-frame jack (aka tongue jack) is a great addition to any RV, but the new Power Stance jack from Lippert changes the game with an industry-first 2-way- to 7-way plug powering system. By connecting the Power Swap Auxiliary Cord, the user can easily plug the jack into the tow vehicle's 7-way receptacle without draining the RV batteries or using a hand crank. Other features include four LED lights make to make it easy to see what you're doing, a chain storage ring to prevent chains from dragging on the ground and a storage compartment for the Power Swap cable cord. **Lippert; store.lci1.com**

Throwing Shade

MCD Innovations recently announced its new B1000 line of Powered Box Awnings designed for Class B motorhomes, overland Class C motorhomes and pop-up trailers. Available in three lengths, two box finishes and three fabric colors, B1000 Series Powered Awnings feature a durable aluminum case that mounts on the roof or side wall, depending on the model. They operate on 12-volt DC, 15A DC with a wired switch and incorporate a hand crank for manual override. The awnings are height-adjustable for optimum shade angle and the legs can be positioned against the RV's side wall with the included foot mounts. When not in use, the legs stow conveniently inside the awning's case. Integrated LED lighting is available on select models. **MCD Innovations; www.mcdinnovations.com**

Cool Customer

Truma is well-known for its RV heating systems — but it's only been until recently that the company began offering coolers. The Truma Cooler is offered in a wide range of choices, including the Weekender Series (36- or 44-liters, single zone) Traveler Series (60-, 73- or 105-liters, single zone) and Adventurer Series (69- or 96-liters, dual zone). The Class A++ rated energy-efficient coolers are suitable for solar operation and offer thoughtful features like an integrated bottle opener at either end, a removable basket insert to adjust contents, interior LED light, space-saving flush-mounted handles and an easy-to-clean drain. Other useful features include digital display, USB port, two 12-volt DC connections, a single 110-volt AC connection, three-stage vehicle battery protection and Bluetooth app control. **Truma Corp.; truma.net.**

Good Clean Fun

The new FlowMax Power Cleaner from Lippert has the benefits of a pressure washer without the hoses, cords or noise. Light weight and easy to store, the FlowMax is powered by a 40-volt lithium-ion battery and can produce up to 520 psi. A boon for RVers is that it doesn't even require a hose or spigot connection — just drop the included hose into a bucket or other water source and you're ready to clean. The FlowMax has both high- and low-pressure settings and comes with two batteries, a 6-in-1 spray attachment and a 25-ounce soap bottle. Expect a four-hour charge time for per battery, with each one providing up to 28 minutes of use, according to the company. **Lippert; store.lci1.com**

The Towing Elite

A trailer brake control is an important component of safe trailer towing — and they just keep getting better every year. Recently, Australia-based electronics manufacturer REDARC added the new Elite V3 to its Tow-Pro line of trailer brake controllers. Featuring inertia-sensing technology, the Elite V3 offers a "proportional mode" for highway conditions and a "user-controlled mode" for off road driving. The factory-looking remote head unit mounts cleanly in the dash or console, while the main module, with its three-axis accelerometer, can be mounted in any position or orientation underneath the dash, away from the driver's knee. A universal pigtail wiring harness is included and vehicle specific wiring harnesses are also available. **Redarc Electronics, redarcelectronics.com**

Light My Fire

Everyone loves to sit around a campfire, but firewood is heavy and consumes a lot of space — plus, some counties around the country enact burn bans to protect air quality. To help solve this problem, Suburban, a division of Airxcel, offers its Voyager Portable Fire Pit, which burns readily available LP-gas. A large, 15-inch-diameter burner provides up to 54,000-Btu of smoke-free heat and sets up in just seconds, according to the company. Lightweight and easy to carry, the Voyager features folding legs and a locking lid for ease of transport and storage. The kit includes the fire pit, locking lid, pumice stones, an 8-foot connector hose with regulator and an anti-tipping ring for a 20-pound propane cylinder.
Airxcel Inc.; airxcel.com

Have Tools

continued from page 61

Pack a headlamp. You'll be glad later when you don't have an extra hand to hold a light.

Contact Spray

The best contact cleaner out there in my opinion is called DeoxIT D5 by Caig Labs. While $15 for a little spray can may seem like a lot of money, it only takes a short spritz on your 7-pin connector or shore power plug to remove oxidation and leave a lubricating layer that makes plugging/unplugging easier. It dissolves corrosion, improves connections and protects surfaces. Yes, there are cheaper contact cleaners, but this is what I've used for decades on every important connection I've had to deal with. Never use WD-40 or Vaseline on an electrical connection.

DeoxIT D5

I carry a lot more tools than we've discussed above — and, eventually, you will to — so consider this a starting point. You don't need to buy a $1,000 meter when a $30 version will work just fine. However, the cheap giveaway tools generally are worth what you pay for them, so avoid junk tools if possible. Of course, make sure you carry batteries for tools and meters that require them. It's also a good idea to learn the basics of how to use any meters in the comfort of your home before you find yourself troubleshooting a blown fuse in the middle of the night. Just remember that you can never have too many tools — or too much knowledge on how to use them. RVE

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MAKING MEMORIES

PHOTOS BY AUTHOR

Moose grazing in Maroon Lake was taken in the mid-morning hours, before the site became occupied with tourists. Colorado's Moose populations are thriving nowadays, due to conservation efforts to protect wildlife in the state. The moose pictured here is a bull (male) moose and stands about 6 feet tall at the shoulder. The Maroon Bells peaks are a lovely backdrop to the scene. This shot was taken using a Canon EOS Rebel T7i digital camera at a 7.1 f-stop and shutter speed of 1/160s.

Unusual Photo-worthy Destinations Are All Around Us

You can discover great places to visit — by surfing the Internet and talking to fellow RVers — that can be easily captured through the lens of any camera, including a smartphone.

By Sue Strauss

Whether you are traveling with your RV for a short one or two-day trip or are a full-timer whose RV is your home, you still have to decide where to go. Perhaps you enjoy traveling to well-known places such as America's national parks, but for those looking to discover small, remote places, keep reading — I've spent most of my travels tracking down interesting destinations, many times off the beaten path. Along the way, I've also developed — and will share — alternative ways to find scenic and historical locations while also providing a backdrop for watching wildlife.

I like to explore remote settings and capture these memories through photography. The old expression, "a picture is worth a thousand words," could not be truer when it comes to learning about a location and remembering details often not described in words. I enjoy taking pictures of animals and nature, and I do a great deal of research and planning to find the proper location and time of year to get the best results. When someone is admiring one of my nature photographs, I often get asked the questions, "How did you get that shot?" or "How did you find that place?" Here's how I do it.

The National Wildlife Refuge System is a great resource for discovering wildlife refuges near your home or travel destination. You can search its website (fws.com) by state, zip code or refuge name. This website will also provide information on "things to see and things to do" at the refuge and provide specifics on what animals/wildlife you can expect to see at various times of the year. National Wildlife Refuges are quite inexpensive to visit: Around 30 national wildlife refuges charge visitors a nominal entrance fee (generally $3-$5 daily) to cover road and facility maintenance.

If you are a regular visitor or would like to see other public lands, you can save money by buying an America the Beautiful Federal Recreational Lands Pass, which is your ticket to more than 2,000 federal recreation sites (Golden Pass). A Senior Pass to the national parks can also be used to enter national wildlife refuges, as well.

Below is a wide-angle look at Crater Lake and the Maroon Bells Wilderness Area. Crater Lake is a high-altitude alpine lake located 1.8 miles from Maroon Lake and was formed by glaciers. The lake gets its unique blue-green hue from the algae growth in the water. I tried to angle this shot to also catch the reflections from the surrounding mountains. An Apple iPhone XS Max was called into camera service to get this image, recording at an f-stop of 1.8 and shutter speed of 1/689s.

My husband, Rich, and I spent the summer of 2020 in Carbondale, Colorado. We accepted work-camping jobs (in return for site and compensation) nearby at the Carbondale/Crystal River KOA. Our son was living and working in Glenwood Springs, and we thought it might be nice to spend the summer close by. While doing a Google search of nature preserves, I discovered the Aspen Center for Environmental Studies (ACES). If you check its website (www.aspennature.org) you will find a wealth of information on outdoor activities and places to visit in Colorado. ACES offers various programs and events including birding and other guided tours in the Aspen area, either for free or at a nominal fee.

While attending an ACES tour, I found out about The Maroon Bells-

Snowmass Wilderness nature preserve. This area, though remote, is quite popular with hikers and naturalists, and requires reservations to see it. Visitors can only drive up to Maroon Bells in their own vehicles before 8am or after 5pm, with a $10 entry fee and a guarantee of little to no parking spaces as the few parking spots there are usually filled by overnight hikers. Individuals wishing to explore the wilderness area during daylight hours must ride a shuttle bus to and from Maroon Bells. Shuttle buses depart from Aspen Highlands and travel eight miles up Maroon Creek Road to drop off passengers at Maroon Lake. Round-trip tickets ($15.95 per person) can be purchased online by visiting www.aspenchamber.org. There is an additional charge of $10-and-up per car for parking at Aspen Highlands (depending on how many hours you stay). It is well worth the time to plan and make reservations for Maroon Bells, as this is a pristine, scenic wilderness area and your memories of this visit will last a lifetime.

The Maroon Bells-Snowmass Wilderness is a 180,000-acre wilderness area in central Colorado, located in the Elk Mountains. The twin "claret-colored peaks" are made of soft mudstone filled with iron-rich materials that have rusted, creating the red hue on the mountains. The twin peaks, Maroon and North Maroon, are two of Colorado's "fourteeners," (14,000 feet-and-above elevation) towering high above the glacial Maroon Valley and surrounded by aspen forests and alpine lakes. This scenic wilderness area is considered one of Colorado's most-photographed locations.

Once you make reservations to visit Maroon Bells, you will need to locate a nearby campground and a place to park your RV. I often use a resource called Roadtrippers (www.roadtrippers.com) to find places to see and stay. After entering a starting point and destination, this website will help you locate not only campgrounds and food/drink establishments but also popular sites, including Attractions & Cultural Sites, Outdoors & Recreation Sites and Points of Interest. Another resource to locate campgrounds is the Allstays App on a smartphone, tablet or laptop. If you use Allstays, you will find the Carbondale/Crystal River KOA Campground, in Carbondale, Colorado. This is the closest campground to Aspen and is approximately 30 miles from the Maroon Bells. It is a very nice campground that can accommodate RVs up to 45 feet, but you will need to make reservations many months in advance to reserve a campsite here.

We made shuttle bus reservations for September 2020 and couldn't wait to see Maroon Bells. We planned on spending most of the day in this wilderness area and packed a lunch and plenty of water (there is nowhere to buy water or food once you board the bus). We reserved an early morning bus to Maroon Lake, in hopes of seeing wildlife. The best times of the day to "capture" wild animals digitally are either in the early mornings or just before dusk. Our planning paid off as we saw a large moose wading in Maroon Lake, feeding on grasses near the shoreline when the bus arrived. A U.S. Forest Service Ranger was nearby to ensure people didn't get too close to the moose, but I came prepared with my Canon EOS Rebel T7i digital camera and a 28-200mm zoom lens. I got some beautiful images of the moose, the Maroon Bells peaks, and later, from our hike on the Crater Lake Trail. The images will last forever — and our visit to Maroon Bells will be added to our memories. RVE

With the use of a zoom lens, I was able to capture a close-up look at the moose grazing in Maroon Lake. A U. S. Forest Service ranger standing nearby told me that the experts estimate this moose to be around 4 years old, and that it had lost its left antler a few years ago possibly during a fight with another moose. A new antler has grown in its place but is obviously shorter than the right one. This shot was taken using a Canon EOS Rebel T7i digital camera with an 8 f-stop and shutter speed of 1/500s.

You don't need a fancy camera to capture images of scenes like this one showing the shuttle stop for boarding the bus to Maroon Bells in Aspen Highlands, Colorado. This shot was taken with an Apple iPhone XS Max with a 1.8 f-stop and shutter speed of 1/1088s. Smartphones are getting better every year, so there's no reason to miss a shot if you forget to pack a camera.

Sue Strauss

Suzanne Strauss and her husband, Rich, have been full-time RVers for about four years. They started out camping on weekends in a pup tent and progressed to cross-country jaunts in their little hatchback. Eventually, they bought a small single-axle travel trailer to "test the waters" and fell in love with RVing. They bought two more travel trailers before selling their home, acquiring a diesel-pusher motorhome, and heading out as full-timers. Their winters are now spent in Palm Springs, California, and they ply the roadways most of the year in search of beautiful and interesting places — many times little known and out of the way.

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