

WELCOME TO “KRISTOFF”

2021 Dutchmen Kodiak Cub 175BH



CAMPER'S GUIDEBOOK



Quick Reference

Key Contacts

- Boundless RV 425-296-2622
- Outdoorsy 877-723-7232

Safe Towing Numbers

- Trailer max speed = 65 MPH
- Trailer max axle weight = 5,100 lbs
- Trailer max gross weight = 5,500 lbs
- Trailer tongue weight = 10-15% of trailer gross weight
- Trailer weight as-rented (approximate): 3700-3900 lbs gross, with 10% on the tongue
- Always abide by your tow vehicle manual
- Trailer height = 11'
- Ball size = 2 5/16"
- Trailer brake controller required on your tow vehicle (available for rent)

Remember To

- Always operate within weight and balance limits
- Trailer max speed is 65 MPH
- Keep food and debris out of the sinks, drains, and toilets
- Ensure battery never discharges below Low Threshold (pg 12)
- Ensure camper is kept from getting too cold (pg 20)
- Never let people or pets inside the camper while it is moving
- Before return, dump both waste tanks and empty all debris/food from camper to avoid charges
- Have tons of fun!

Welcome!

Thank you for choosing “Kristoff the Kodiak” - we hope you find him as reliable, cozy, and fun-filled as we have! After decades of tent-camping and backpacking across the Pacific Northwest, in early 2020 our family decided to purchase our first camping trailer. We spent several dozen nights RVing that summer at destinations near and far. Collected in this book are a few of the tips and notes we’ve picked up along the way. If you need more details, we’ve also included hard copies of the appliance and equipment manuals in one of Kristoff’s cabinets. Wishing you a fun and memorable camping adventure!

- The Kneale Family

A Bit About Kristoff

- Born: August 2020 in Goshen, Indiana (Model Year 2021)
- Height: 11’ (ground to top of roof-mounted accessories)
- Length: 22’6” (ball coupler to spare wheel)
- Width: 8’ (wheel to wheel)
- Weight: Up to 5,500 lbs fully-loaded
- Water Tank Capacities: 46gal Fresh, 39gal Grey, 28gal Black, 6gal Hot
- Propane Capacity: up to 40lbs
- Battery Capacity: up to 58AH usable
- Sleeps: 5 adults, or 7 with kids. Plus your pet!
- Superpowers: Enclosed underbelly with ducted furnace and electric tank heaters enable 4-season camping comfort, including when the snow starts falling
- Favorite Destination So Far: Lake Wenatchee State Park, in the Cascades west of Leavenworth

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A Clean and Fully-Equipped Camper

Before each trip Kristoff is prepared to the same high standard we'd expect for our family. All mechanical components of the trailer, wheels, and suspension have been inspected and maintained at frequent intervals. The exterior has been cleaned. Inside, all contents were removed so every surface could be fully cleaned and disinfected, bedding/towels laundered, and dishes/cookware washed. Kristoff is equipped with everything you need for your adventure. Don't hesitate to reach out with questions!

Included – Cook & Eat

Place settings – Corelle plates and bowls, Stainless Steel cups, forks, knives, spoons	Compostable place settings and utensils (bowls, plates, cups, forks, knives, spoons)
Large pot w/lid	Can opener
Medium pot w/ lid	Wine opener
Pan	Knives - steak & 1 chef
Mixing bowl	Salt, pepper
Kettle	Ziplock bags
Colander	Pen
Collapsible wash tub	Scissors
Cutting board	Hot pad potholder
Spatulas	Kitchen towels
Cooking spoons	Aluminum foil
Tongs	Lighter
Pour-over coffee filter & paper filters	Extra paper towels

Included – Bed & Bath

Extra RV toilet paper	Bedding sets (sheets, pillow w/ cover, blanket)
Towels	

Included – Cleaning & Comfort Supplies

Cleaning cloths (yellow/orange)	2 foaming soap dispensers
Broom	Trashbags
Bronner's soap (dilute per instructions)	Undersink trashcan
Bathroom spray cleaner	Sponge
Thetford bio tank treatment	

Included – Trailer Equipment

Wheel chocks – 1 or 2 pair	10 "stacker" leveling blocks OR 2 leveling ramps
Fresh water hose (blue) and pressure regulator	Sewer tank dump hose & elbow fitting
Black tank rinse hose (black) (if equipped)	Small household toolkit
30A power cord and surge protector	15A-30A power cord adapter
Spare fuse set	Propane tank level gauge
Sewer hose support "slinky"	Flashlight
Camper's Guide & Manuals	Tasty treats & rental paperwork

Optional – Tow Gear Package

Borrow whatever you need from our available equipment, including:

- Portable Brake Controller – Curt 51180 Echo Mobile Electric Trailer Brake Controller with Bluetooth-Enabled Smartphone Connection, Proportional
- Hitch – Selection of drop hitches with various ball sizes
- Weight Distributing Hitch – The Blue Ox TrackPro hitch improves safety and handling by reducing sway and redistributing weight. Strongly recommended for most tow vehicles.

Optional – Campsite Supply Drop

Necessities for around camp

- Cooler
- Propane Camping Grill
- Lantern
- Table cloth
- 4 Camp chairs
- Bundle of Firewood

Optional – Generator Package

Plan to camp off-grid? The Craftsman CMXGIAC3000 gasoline-powered generator provides 2300W of running power – enough to run a high-draw appliance or quick-charge a depleted camper battery.

Pre-Trip: Load, Weigh, and Balance

To provide a safe journey to your destination it's critical that both Kristoff and your tow vehicle are correctly loaded and operated at all times within the requirements set by the manufacturers.

Know Your Tow Vehicle's Capabilities

Since tow vehicles vary greatly, you'll need to refer to your vehicle's manual or the manufacturer to understand the tow limits, axle limits, and gross weight limits of your tow vehicle. You'll want to know how much the vehicle weighs (full gas tank) and how much weight (people & cargo) you want to carry.

Know Kristoff's Capabilities

During trailer manufacturing the official weights and limits were printed on the body.



TIRE AND LOADING INFORMATION PLACARD

Max Axle Weight: 5,100 lbs

Max Gross Weight: 5,500 lbs

Tongue Weight: 10-15% of Gross

To ensure you stay within these requirements, you'll need to limit the weight you're adding to the trailer, and be strategic on how you pack it.

Verify Kristoff's Gross Weight Meets Limits

The camper (including the provided equipment, 6gal in the hot tank, and ~10gal in the fresh tank) weighs approximately 3700-3900 lbs gross, with about 10% of that weight on the tongue. You can add no more food, clothing, water, and gear than the limits provided by the trailer and tow vehicle. If in doubt break out a scale to weigh your cargo, and don't hesitate to drive onto the commercial truck scale in Northbend.

Verify Kristoff Balance Meets Limits

To maintain acceptable tongue and axle weights, you'll need to thoughtfully decide where cargo can be stored. Generally, you want to add cargo to the forward half of the camper as opposed to the back. The forward passthrough compartment is a great spot for larger items, and the forward cabinets are handy for clothes and food.

Watch the Water!

Kristoff's blessing and his curse are the large-capacity tanks - he can go days without a refresh but also requires careful weight management. Each gallon of water weighs 8.4 lbs, so a full 46gal tank will weigh nearly 400 lbs! As some tanks drain and others fill, the weight distribution will change (fresh & hot tanks are forward of the axle, grey & black tanks are aft). While specifics depend on your loading situation, in general you'll usually dump tanks before towing, and travel with black, grey, and fresh tanks no more than about 1/2 full.



LARGE "PASSTHROUGH" STORAGE AREA

On the Road

Towing demands more attention and care than normal driving - read your tow vehicle's manual carefully and abide by it. Review online articles such as <https://www.boundless-rv.com/towing-safely/> on trailer towing or take a peek at YouTube. Take a few minutes pre-trip in an open parking lot to try out driving, cornering, and parking. Slow and steady will win this race! Of course, having your own kitchen and bathroom with you means you can take your time – enjoy the journey!

General Tips

Brakes – If you've towed smaller trailers in the past, this may be your first experience with electric trailer brakes. The electric brakes on the trailer are designed to work in unison with your tow vehicle, and need to be controlled by a car-mounted or portable brake control unit.

Speed - Obey the speed limit for all roads (truck speed if posted). Particularly watch out for turns that require reduced speeds. **Under no circumstances should you exceed 65MPH due to tire speed rating.**

Cornering – Remember to keep turns wide like a truck, and that the camper back end will swing out.

Handling – Be cognizant of your increased width - narrow roads (for example in construction zones, and some 2-lane rural roads) sometimes allow only a couple inches of clearance on each side. Take it slow.

Reversing – You have no rearward visibility - have a spotter outside help guide you!

Height – Kristoff is **11' tall!** Keep an eye out for anything overhead- low bridges, tree branches, or roadside signs to name a few. He is too tall for almost all drive-thru lanes.

Look down the road and anticipate – you'll need to brake sooner to stop for obstacles or achieve cornering speeds

Hills and Mountains

Take it easy – you won't be the fastest one on the road here! Going uphill keep an eye on tow vehicle oil and coolant temperatures – if temperatures start getting too warm then back off the pedal. Simply slowing down and allowing the transmission to downshift does wonders! Don't be shy about using the slow lane to cross Snoqualmie Pass at 40MPH (hazard lights on). Downhill is easier on engine, but you must be careful to keep speed in check and not burn out the tow-vehicle or trailer brakes. Shift your transmission into a lower gear to allow the engine resistance to do the majority of braking for you. Gently pump the brakes in bursts as needed – **never ride the brakes** (they will burn and then fail).

The Unexpected

Trailer Sway – If you encounter the trailer swaying side-to-side, a good response is to activate the trailer brakes manually via the brake controller. Then slow down gradually and consider what caused the sway – is the trailer loaded correctly? Is your speed too high for the conditions?

Wind Gusts – Sudden bursts can come from terrain features, windy weather, or passing trucks. For most wind conditions I've had luck simply driving slower. In bad wind you'd want to wait out the weather.

Flat Tire – A full-size spare tire is mounted to the back bumper. Verify your tow vehicle's jack can hold the trailer's weight. After replacing the tire, step torque the lug nuts in a star-pattern to (25-60-115 ft-lbs). Calling your included **Outdoorsy Roadside Assistance at 1-877-250-6731** is a great option.

Let's Get Hitched!

Brake Controller Setup

A brake controller on your tow vehicle is required to operate Kristoff's electric drum brakes. If you have already purchased and installed your own brake controller, remember to recalibrate it for the new trailer. If you don't have one, using our Curt Echo portable brake controller may be a good option. Install the Curt Echo per the [manual](#) and install the app to your phone. Adjust settings as you deem best, I've previously set Max Output to 35 and Sensitivity Adjustment to 3.

Weight Distributing Hitch

Most travelers plan to utilize the optional Weight Distributing hitch. This hitch, the Blue Ox TrackPro 6000, improves safety and handling by redistributing weight and reducing sway. The manual is available at <https://www.blueox.com/wp-content/uploads/2021/02/TrackPro-7-Inch-and-9-Inch-Shank-Installation-Instructions-and-Owners-Manual.pdf>

Before hooking up, the **coupler head height must be adjusted** to fit your tow vehicle, and the bolts retorqued to 257 ft-lbs. Park the towing vehicle and trailer in a straight line on firm, level ground. Install the hitch head/receiver mount assembly into the towing vehicle receiver tube and secure with the 5/8" x 3" pin and clip. Couple the trailer to the hitch head. Install both spring bars into the pivot tubes (notch on bar faces up) and install locking pins (from the inside towards outside) and cotters (Fig1 & Fig2).

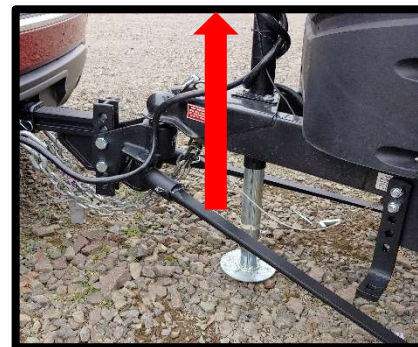
FIG1: NOTCH UP



FIG2: PIN FROM INSIDE



FIG3: RAISE EVERYTHING WITH JACK



Confirm that both L brackets are secure against trailer frame. Support the trailer tongue weight with the trailer jack to allow for easier hook-up (Fig3). Place spring bar into dip on lift tool (Fig4). Then place hook end into the square hole in L bracket. Raise lift tool upward until spring bar securely snaps into place. Place bar locking pin into square hole on L bracket and secure with hair pin. Do this on both sides of the trailer. Complete hitchup by stowing the tongue jack and attaching the chains, brake lanyard, and wiring to your tow vehicle.

FIG4: SPRING BARS IN



Checklist - Prepare for Towing

- **Trailer Weight & Balance – Verified Within Limits**
- Tow Vehicle – weight & balance, fluids, tire pressures verified, see owner's manual
- Brake Controller – installed, calibrated/adjusted, operational
- **Interior Cargo – Secured**
- Thermostat – Off
- Vent Fan – Off
- Water Pump – Off
- Water Heater – Off
- Refrigerator - Off
- Tank Heaters – As Needed
- Windows, Doors, Overhead Vent – Closed & Locked
- Steps - Stowed
- Tires – pressure@65psi, no uneven wear
- Water & Electrical hookups – Disconnect & stowed
- Exterior Access Panels & Waste Valves – closed
- **Propane – Off**

Checklist – Hitch Up

- **Trailer chocks – Installed**
- **Trailer Stabilizers – Retracted**
- Trailer Coupler – Unlock & Open
- Tongue Jack – “Up” for ball to fit beneath coupler
- Hitch – Install to hitch receiver, pin & cotter
- Tow Vehicle – Back up to align ball under coupler
- Tow Vehicle Parking Brake – Set
- Tongue Jack – “Down” until full weight of trailer on ball
- Trailer Coupler – Close & Lock
- Install Weight Distributing Hitch per instructions on prior page
- Tongue Jack- Retract fully to tape line & pin
- Safety Chains – Install crossed
- Brake Breakaway Cable – Install to Tow Vehicle
- Wiring Harness – Install & test from Tow Vehicle
- **Visual Inspection for level trailer and proper connections**
- Trailer chocks – Remove & stow in passthrough
- Trailer passthrough compartment – close & lock

We're There!

As you arrive at your destination, you'll want to first ensure your campsite will work. Is it generally level? Is there room for Kristoff and the tow vehicle? Do you want to park at a certain end of the site based on the location of hookups, fire ring, or other considerations? Have your spotter get out and help you into that perfect spot.

Checklist – Unhitch

- Tow Vehicle Parking Brake - Set
- Campsite – Verify level & safe. Do not park on grade
- Trailer – verify level side-side, if not use stackers to level (see below)
- **Trailer chocks – Installed on front & back sides of both wheels**
- Safety Chains – Remove & stow
- Brake Breakaway Lanyard – Remove & stow
- Wiring Harness – Remove & stow
- Trailer Coupler – Unlock & open
- Tongue Jack – “Up” until hitch ball will clear and tow vehicle can drive forward
- Tow Vehicle – release brake and pull forward
- Tongue Jack – Up or Down as needed until trailer is level forward-back
- **Trailer Stabilizers – extend snug but not overtight (just firm to ground)**



To level Kristoff side-to-side use stacker leveling blocks. You can make a ramp 1, 2, or 3 levels tall depending on how much lift is needed to achieve level. This photo shows a 2-level lift. Snap the stackers together into a ramp and set just forward or aft of the low tire. Drive the camper onto the stack. Make sure to chock both the front & back wheels before unhooking the tow vehicle!



TONGUE ELECTRIC & MANUAL JACK

After leveling side-to-side, then level front-to-back by raising or lowering the tongue. This is typically accomplished by the electric tongue jack (button circled in photo). If the motor isn't working, install the small crank into the top hole to actuate the jack manually as shown in the photo. Extending the tongue jack past its extension or retraction limits will blow the motor fuse.

There are a pair of stabilizers on each end of Kristoff to keep him steady while you walk inside. Once he's leveled and chocked, then extend the stabilizers using the Extend/Retract buttons. One button is on the exterior aft right wall, the other is inside the right passthrough door. Be careful when moving the stabilizers to ensure the metal foot pads do not get hung up (rotate the pads with your hand if needed). If battery power is not available, the stabilizers can also be extended or retracted with the included slotted jack handle, by inserting it on the left side of the stabilizer jack pairs.

The stabilizers are not rated for lifting the full trailer weight, they just need to be snug.

To avoid tipping over, if the camper is not attached to your tow vehicle, **do not go inside until the stabilizers are deployed.**



ELECTRIC STABILIZER EXTENSION



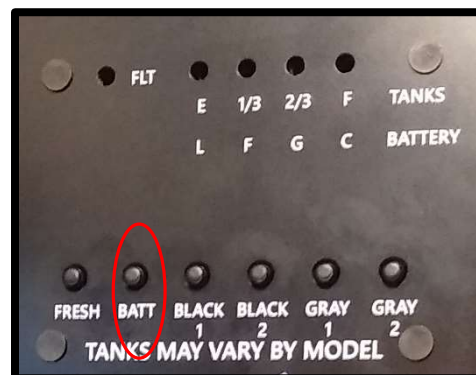
MANUAL STABILIZER EXTENSION

Powering Life at Camp

Kristoff is equally at home on a hot beach, a dry desert, or a snowy forest - each destination drives different considerations to maximize the fun! To keep your crew happy you will continually manage 4 resources: Electricity, Fresh Water, Waste Tank Capacity, and Propane. In a developed campground with full hookups this is easy! Just plug into shore power and water spigots, use what you like, then open up the waste tank dump valves when needed. In primitive campsites you'll need a much more refined approach, and will rely heavily on tools like generators, chargers, and techniques to minimize wasted water.

Electricity – Battery (12V DC) Power Management

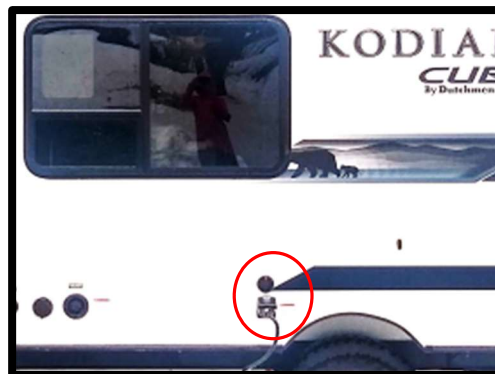
While traveling battery power is all that's available. The battery meter located just inside the front door tracks battery status - hold the "BATT" button and the LEDs will indicate if the voltage remaining is "Low", "Fair", "Good", or "Charging". Kristoff's dual Maintenance-Free Lead-Acid batteries have a total capacity of 116AH, and can be discharged up to 50%. This means you have 58AH of usable capacity from fully-charged batteries. A red disconnect switch on the battery box can be used to remove all DC power if needed.



Electricity – Shore Power (120V AC)

Plugging into "shore power" with the included power cord will charge the battery while providing AC & DC power to numerous appliances. This is the fastest and most reliable method of keeping your camper fully-powered! It's also the only way to power the Air Conditioner and the Plugs. A blue light on the cord indicates its receiving good power.

- Shore Power Pedestal – Off
- Red 15A/30A Adapter- insert to Shore Power Pedestal if 30 Amp plug is not available
- Yellow Surge protector- insert to Shore Pedestal, cycle power briefly to check circuit (2 yellow lights should appear)
- 30A Extension cord – Align Female end to camper receptacle, align, twist clockwise, screw on ring
- 30A Extension cord – Install Male to Surge protector
- Shore Power Pedestal – On



Electricity – Craftsman Generator (Generator Package)

The optional inverter-generator is capable of providing 2300 running watts (3000W surge), enough to run any of Kristoff's appliances individually or to recharge his battery bank in 1-2 hours/day. Filling its 1-gallon tank (**89-octane gasoline or higher only**) will give you about 4 hours of run-time. It is relatively quiet and is certified for use in all states including California (CARB-compliant). **Never run a generator indoors or near flammable materials.** The [instruction manual](#) provides details on operation. The generator is provided to you with full oil, please check it periodically and top off as needed. It weighs 60lbs, so be careful with yourself! Keep it upright and tie it down during transport so it won't tip.

To hookup Kristoff to the generator, first start the generator and let it warm up briefly. Turn off the "Main" circuit in Kristoff's breaker box. Plug the female end of the Shore Power line into and use the red 15A/30A adapter to plug the male end into the generator. Flick "Main" back on – you should hear the generator load up and Kristoff's microwave beep on.

Portable Solar Panel (Off-Grid Package)

Unfold the optional portable solar panel in a sunny location. You can plug USB-powered devices directly into the panel's USB outputs. You can also charge Kristoff's house battery bank using the alligator clamps and charge controller (see photo).



SOLAR PANEL WIRED FOR RV CHARGING

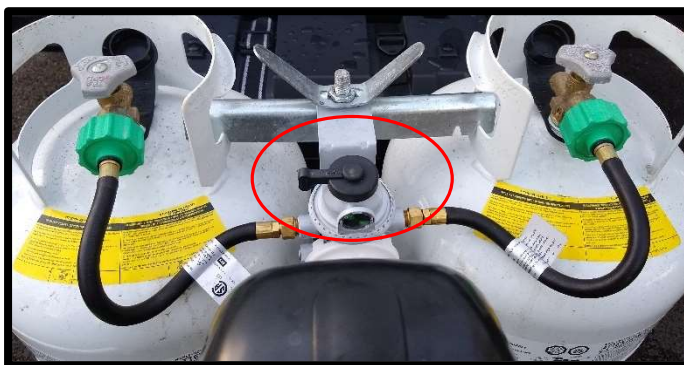
Propane Tanks

Kristoff carries two standard-sized propane tanks on the tongue – at delivery one will be full (15lbs+) and one partially full. If you need more propane during your trip, tanks can be refilled or exchanged at many gas stations and stores. To access the tanks, you will need to remove the black plastic housing by disconnecting one end of the bungee under the tanks.



DISCONNECT ONE END OF BUNGEE

The propane regulator is equipped with an automatic changeover valve that draws from the tanks sequentially; the black changeover lever indicates the primary tank the regulator will draw from first. When the primary tank becomes empty, the regulator will automatically start drawing from the second tank, and will turn the indicator red. To remove the empty primary tank, **move the changeover lever to point toward the full tank. Then disconnect the empty tank and replace it.**



AUTOMATIC CHANGEOVER REGULATOR

Water – Fresh Water Supply

Plumbing distributes water to Kristoff's sinks, showers, and toilet. If water is available at your campground, the best approach is to simply hookup to the spigot. **Turn off the Water Pump if hooked to City Water.** Attach the brass pressure-regulator to the spigot, then use the blue fresh water hose to connect the pressure-regulator to Kristoff's "City Water Connection". You may need to purge air from the lines by running the sink a moment.



If a water spigot is not available or if you are on the road, you'll need to draw water from the Fresh Tank. Fill the tank with the blue hose through the port labeled "Fresh Water", and check approximately how much water remains by pressing "Fresh" on the Tank Status Panel. For reference, most hoses fill at roughly 5gal/minute, but this varies based on pressure. Once there is water in the tank turn on the "Pump" to pull water from the tank into Kristoff's plumbing system.



Tank Heaters

To brave cold temperatures, Kristoff has 12V-electric Facon heating pads attached to the fresh tank, gray tank, and black tank. These should be turned on with the appropriate Ultraheat switch whenever water is in the tank and outside temperatures are below freezing. **Ensure there is enough water in the tank before turning that tank's heater on!**

Heater	Minimum Liquid Level to Use Tank Heater
Fresh Tank	15 gallons (Fresh shows 1/3 full on monitor)
Gray Tank	3 gallons in Gray
Black Tank	3 gallons in Black
Drain Pipes	1 gallon in Gray and Black

When turned On, the heaters' thermostat automatically cycles the element on and off to keep tank temperatures around 55 degrees. They can be used while driving, but be aware they draw significant battery power (up to 312W). There are also small electric heaters on the waste drain pipes – there is no thermostat on these drain pipe heaters so they will be heating anytime the switch is on (they draw only 12W).



Hot Water Heater

The RV is supplied with a full hot water tank (6gal capacity), which can be heated in approximately 10 minutes. To heat with Propane turn on the "Gas" switch near the front door (a red "FLT" light staying on means it did not light yet, verify the Propane tank valve is open and try again). Or to heat with Shore Power, turn on the "Electric" switch on the same panel. **Always ensure there is water in the tank before running the water heater** – heating a dry tank can overheat. **Turn off when not in use.**

Dumping the Black & Gray Tanks – It's Not Too Scary!

Waste water tank levels are monitored by pressing “Gray 1” or “Black 1” buttons on the Tank Status Panel just inside the front door. The Gray tank holds water from the sink & shower, the Black tank from the toilet. You can use the “Sidewinder” plastic supports when parked if you’d like to support the hose. **Keep an eye on tank levels, and never let them overfill**, which will cause very significant damage.

The black tank flush port is to inject fresh rinse water into the black tank while it is being drained, rinsing debris off the tank interior. It’s located on the opposite side of the camper from the waste drain valves, just above the right wheel. Ensure the black dump valve is open when flushing so as to not overfill the tank.

- Clean Gloves – on
- Black tank flush hose (black hose) – Install to rinse water source and RV black tank flush port
- Black & Gray Dump Valves – verify closed (“in”)
- Waste Hose – remove from storage beneath rear bumper, screw orange funnel onto clear elbow
- RV Waste Drain – remove drain cap & attach hose
- Waste Hoes Elbow – insert into septic drain hole
- Black Dump Valve – open ... verify drained keep open
- Black tank flush hose – Turn on & let run ~2 mins
- Black tank flush hose – Turn off
- Black Dump Valve – close
- Gray Dump Valve – open ... verify drained, close
- Waste Hose – Disconnect, clean, dry, stow
- Black tank flush hose – Disconnect, dry, stow
- Tank level – verify indicators show tanks Empty
- Black Tank Thetford Bio Treatment – drop one packet down Toilet with at least 1 gal water or Antifreeze



REMOVE HOSE AND ATTACH ORANGE FUNNEL FITTING



HOOUP HOSE TO DUMP VALVES

Enjoying Life at Camp

Doors, Windows, & Security

The purple-colored key with a pink paint dot locks the front door, the purple key the rear hatch-door, and the small metal key locks the passthroughs. Windows open and close from the inside only. Be sure to double check both emergency-exit latches on the dinette window are fully-closed and locked before towing. The trailer coupler can be locked in the “Down” position with the included lock, to ensure nobody runs off with the trailer while its unattended.

Stovetop

The 2-burner stovetop is powered by Propane, so be sure to open the Propane tank valve before use. Light the burner with a lighter from the kitchen drawer. Ensure the burners are fully cooled before closing the glass lid on top over the burners to avoid damage.

Refrigerator

The “2-way” refrigerator can be powered by Shore Power or Propane. Before your trip, precool the refrigerator using Shore or Propane, and precool your food in your home fridge. The fridge will be off while driving (like a cooler). At your campsite, quickly turn the fridge back On. To turn the refrigerator on press the button, to turn it off press-and-hold the button for 2 seconds. While the refrigerator is on, a green light indicates it's running on Shore Power, a yellow light indicates it's running on Propane, and a red light indicates it isn't working. If propane is not lighting, verify that the tank valve is Open and that there is not air in the line by lighting the stovetop for a moment. The refrigerator has been equipped with a cold-weather kit that (counterintuitively) heats the back coils whenever outside temperatures drop below 40-degrees, keeping it operating properly in all weather conditions.

Vent Fans

There are two DC-powered vent fans- one above the cooktop and another in the bathroom. You'll want to use them frequently while living in the camper to keep humidity levels down. The bathroom vent has a handle that can be cranked to open the rooftop vent, be sure to close that vent if its raining or before driving.

Furnace Heating & Thermostat

The camper is well-insulated and stays warm with body heat most nights. On particularly cold days, the furnace can be used as well. Ensure that the area in front of the furnace (black grill under refrigerator) is clear of obstructions. The furnace uses DC power to run the fan, and Propane to heat. It is controlled by the DC thermostat. To activate the furnace, slide the temperature lever to the desired level.

Air Conditioner Cooling

The camper is well-insulated and stays cool, particularly if the vent fan is used to draw outside air in. On particularly warm days and if Shore Power is connected, the air conditioner can be turned on as well with the unit-mounted controls.

Toilet

Flush the toilet (ensure water pump or city water is on) by stepping on the foot pedal - a half push will add water to the bowl, a full push will open the dump flap to the tank. The plumbing system is not like your home - be careful that only **special RV toilet paper** and tank treatment chemicals go down the toilet. Anything else will be stuck in the tank.

Sink

There is a large sink in the kitchen. To keep it smelling nice and flowing well, do not dump debris or food liquids down the drain, use the trash can instead. Remember to be water-wise and monitor water and tank levels.

Shower & Mini-Tub

To allow water to flow out of the shower head you may need to push the small On/Off slider valve on the shower head, in addition to turning on the water and diverter. Remember to be water-wise and monitor water and tank levels.

External Water Hose

An external hose is provided with Kristoff that is handy for rinsing people, pets, or anything else off outside the camper. Plug the included hose into the quick-connect port located between the City and Fresh water connection points on Kristoff's left side.

Convert Dining Table to Bed

The dining table converts into a bed measuring 71"x40". Bedding is located in the drawer. Fold the table legs down and rest the tabletop on the bench-mounted black support pads. The back cushions are held up by Velcro- remove and reposition them over the tabletop to complete the full mattress.



TABLE LOWERED ONTO PADS & READY FOR CUSHIONS

Indoor/Outdoor Stereo

Runs on DC power, press the Power/SRC button to turn it on, then press again to cycle through available inputs including Radio, USB, Aux, and Bluetooth. The Zone buttons activate the indoor or outdoor speakers. A remote control is in the kitchen drawer.

Fold Bunk Beds for Additional Storage

The bunk beds can be folded away to create additional storage space accessible from inside the camper or from the external rear hatch-door (hatch door opening is 26w x 41h). From inside the vehicle, each bed can be rotated into its upright position and latched on both sides using the slide pins into the receptacles in the wall.



BUNK LATCHING SLIDE PINS (4 PLACES)

Plugs

Powered by Shore Power only, the electrical outlets can be used for plugging in small electrical appliances. There are also USB plugs located near some of the beds. If you accidentally trip a breaker, they can be reset at the electrical box beneath the fridge or in the battery box compartment.

Cleaning

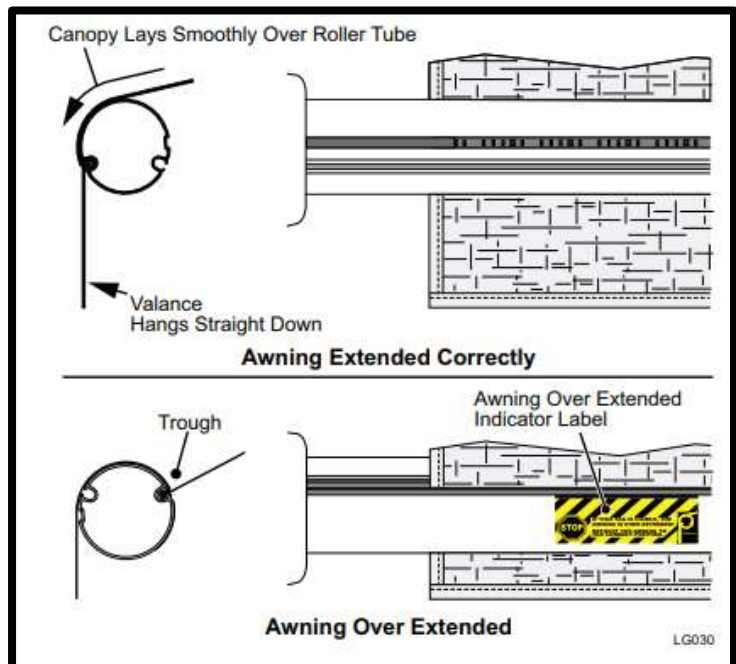
Yellow/orange towels and sponges are provided for cleaning the interior. Dr Bronner's soap can be diluted 1:3 with water and used for everything – your hands, your body, washing dishes, cleaning interior walls & surfaces of the camper. It's also a relatively environmentally-friendly soap that can be used outside in a pinch. Bathroom cleaner is for the bathroom walls, toilet, and floor; glass cleaner the windows and cooktop; and stainless-steel cleaner on metal surfaces. Commercial-grade disinfecting wipes are used by our staff between rentals but we are not able to provide them to you.

Microwave

Is powered by Shore Power, the instruction manual is included with the camper.

Electric Awning

The large awning can be extended when in camp to shelter the camper's door or your picnic table from rain, snow, or sun. Use the Awning button on the control panel to extend or retract. Be very careful not to catch the awning on the camper door or any other obstructions, and to not over-extend it. When it is extended the arms will be at head-height, so please don't bump yourself! If it's raining or snowing, you may need to adjust the awning tilt to shed water and keep it from sagging. The awning tilt can be adjusted by moving the pins on each arm (follow the instructions on the yellow sticker or the manual). Ensure the awning tilt is even on each arm before retracting it.



Cold Weather Operations

Kristoff is capable of operating in some below-freezing temperatures if precautions are followed.

Winterized Cabin Option

At your request November-February, we'll winterize Kristoff before your rental. This will keep his pipes and tanks from freezing without requiring the furnace or tank heaters be used. We will blow water out of the plumbing lines, drain the fresh, hot, black, and gray tanks, and add 3 gallons of special RV Antifreeze into the black and grey tanks. You will need to fill him up with water at your house or campsite once you're ready to start using the furnace and tank heaters. To do this, close the 3 underbelly drain valves (see pics) and then add at least 20 gallons of water into the fresh tank. Then run the water pump to fill the hot water tank and plumbing lines (purge air at the sink as needed). Once you've ensured sufficient water is in each tank, then start running the tank heaters and hot water tank. **Running heaters on a dry tank is not safe.**

3 UNDERBELLY DRAIN VALVES



Keep Internal Plumbing from Freezing

To reduce the chance of freeze damage to plumbing, the fresh, gray, and black tanks in Kristoff's underbelly are enclosed in 2 layers of insulation and have electric heating pads mounted on their bottom surface. Also, the furnace ducts air into the underbelly. **Once water is in Kristoff's lines or tanks, then you need to leave the Hot Water Tank (pg 14), Tank Heaters (pg 14), and Furnace (pg 16) on at all times.** If you are driving, you'll need to turn the Furnace and Hot Water Tank off temporarily.

Monitor Underbelly Temperatures

Battery-operated sensors are installed in Kristoff's underbelly so you can monitor temperatures near the water systems. Sensor 2 is near the fresh tank and Sensor 3 near the black tank. The display will show current temps and last 24 hour highs & lows.

Keep External Plumbing from Freezing

The waste tank dump pipes penetrate from the enclosed underbelly and are wrapped in insulation with electric heaters inside (pg 14). The 3 underbelly drain valves are also wrapped in insulation. Check these pipes periodically to ensure they have not frozen up. Run the drain line heaters as often as needed (or leave them on). It's not possible to insulate a water hose connecting Kristoff to city water supply, instead use a hose to fill his Fresh tank. On particularly cold nights, some people have built skirts from insulating material or snowbanks around the outside of the trailer to better insulate the underbelly and penetrations.

Staying Warm and Dry

Kristoff is well-insulated, so as long as the furnace has propane the cabin will stay warm. One issue you might face is condensation forming, particularly after cooking or when you wake in the morning. While it sounds counterintuitive, one tip is to leave a window or vent cracked to allow humid air out of the camper. Be sure to use the vent fans when cooking, or if you see moisture accumulating. Be sure to bring plenty of propane with you – typically people use about 1/2 a tank of propane each day during winter camping, although obviously this varies.

Road Trip!

Planning a trip cross-country? This is a great way to see new destinations, and Kristoff excels on long trips. There are a few considerations as you plan your adventure.

Route Planning and Campsite Selection

A good approach is to start with a high-level plan of the route and how far you expect to travel each day. You won't be traveling as fast towing a trailer, 200-300 miles will take 4-8 hours depending on conditions. Once you've targeted an area to stop for a night, you'll want to look for a good campsite. Some good resources are compendium.com, state park websites, and recreation.gov. You can typically find off-grid campsites during the week relatively easily, but for a spot with guaranteed power hookups or busy weekends you should consider reservations.

Maintenance

On extended trips you'll have to perform regular maintenance to keep Kristoff rolling – skipping these steps could be dangerous!

Regularly:

- Tires – check lug torque to 115ftlbs
- Verify works on propane – fridge, water heat, furnace
- Air Conditioning filters – remove & clean
- Smoke detector – push-to-test
- LP/CO detector – push-to-test
- Fire extinguisher – push-to-test
- Internal water lines – check for leaks, particularly at water pump and kitchen drain trap
- Water & sewer hoses – check for leaks
- Defrost refrigerator if >3mm ice thickness has accumulated on fins
- External panels (fridge, furnace, water heater) – cleanout insects/debris
- Battery box – clear of water/debris
- Exterior – wash off any bird droppings / tar / etc

Every 5000 miles have a professional:

- Repack bearing grease, inspect brakes, inspect wheels, replace as needed

Enjoy!! Thank You!!