

T@B Camping Trailer Winterization

Jim Engel

Everything should be made as simple as possible, but not simpler.
Albert Einstein

As winter approaches in northern areas everyone with a camping trailer falls under the shadow of the most dreaded task in camping, with the possible exception of wheel bearing lubrication, winterization to prevent damage when water retained in pipes and tanks freezes and expands. Those in the business of profiting from uncertainty and doubt encourage this fear, conjure up tales of hundreds or even thousands of dollars spent to replace and repair what expanding water has damaged.

In reality this can be, and for those with experience is, a relatively straightforward part of the fall routine. The problem is that what is provided in the way of guidance is in many instances self-serving, annoyingly vague, unclear, incomplete and sometimes flat out wrong, sometimes bordering on outright obfuscation. One wonders if the purpose is to help or to create dependence, to bring in business to service departments. As a novice trailer owner a couple of years ago I got caught up in all of this, and found the lack of real support frustrating. Over time, through diligent research and experience, a workable maintenance protocol and system understanding has evolved; these notes bring this together in the hope that others will find it useful. It of course goes without saying that there are many valid variations and options, once the principles and choices are understood we are all free to adapt our process according to our own resources, needs and opinions.

While this is directed at current production T@B units with the inside kitchen sink and shower/toilet, the principles apply to all similar units and brands. The key difference is the precise number and location of drain valves.

In the beginning we are faced with the fact that there are two generally used methods of winterization, both described in the current T@B manual, but without recommendation, any guidance at all on which church to prey in.

The original method was to apply air pressure at the city water entry point, which is a simple hose coupling similar to an outdoor faucet. The idea was that after draining the fresh water system air pressure can completely clear out potentially dangerous residual water.



Air compressor hook up. Here the standard water pressure regulator is screwed into the city water connection; a right angle adapter is next, followed by the air adapter and finally the air hose.

More recently an alternative has been to introduce several gallons of non-poisonous (but apparently foul tasting) antifreeze to displace the residual water after draining.

After careful consideration and a talk with one of the T@B factory guys, my decision has been to go with the original method—that is to omit the antifreeze. In my view the antifreeze is essentially just a marker, if the stuff flowing out of a drain or faucet is completely pink then there is high certainty that that particular path from the pressurized city water connection is clear of potentially damaging water. Just as in clearing the system with air under pressure,

if the entire system is not completely flushed with antifreeze then individual lines or tanks with water can still freeze; there is no guarantee or reasonable expectation that antifreeze in one part of the system is going to migrate to protect other areas.

Water under pressure is similar to electricity; it seeks out and follows the path of least resistance. If you simply apply air pressure and open all faucets and drain valves air (or antifreeze) may very well flow only through one or two lines, but not through longer paths or those with more flow resistance. This could easily result in water left in the system to do damage. But if you apply pressure with all valves and faucets closed and then open one at a time virtually all water will be purged from the system.

My T@B unit, 2016 vintage with the S floor plan, has one water tank drain valve under the unit, three drain valves under the seat with the Alde heating unit, and hot and cold faucets in both the kitchen sink and the toilet/shower. The drains under the seat are the hot water drain, the cold water drain and the drain for the Alde hot water tank. (These are shown in the photo at the end of these notes.)



Air compressor set up. Supply tank pressure on the left gauge, output pressure controlled by knob below on the right.

As an aside, note that there are one way valves in the water lines under the seat by the Alde unit, which is probably why it has its own private drain, which also acts as an automatic pressure release valve.

A very important point is that since the trailer water system is made up of plastic tubing and fittings it is essential that air pressure be limited to 50 psi (pounds per square inch). Since the typical small compressor is capable of producing twice this level it is essential that it have a regulator valve for pressure

reduction and that the control knob is used to set the appropriate (50 psi) level.



Blow out plug (air adapter)

In order to clear the system of residual water all you really need is a garden variety air compressor with a functioning regulator valve (to limit air pressure to 50 psi) and an air hose to garden hose adaptor to hook up the compressor to the city water entry point on the outside of the trailer. This connector is less than ten dollars and if not conveniently available locally Amazon has a wide

choice. You also still need some antifreeze for the sink and shower drains, although I am thinking about ways to clear this out with air also.

Winterization process

1. With the water pump off open the fresh water tank drain under the unit, other drains and the faucets to allow the bulk of the water to flow out. Flush toilet a couple of times. This could take some time if there is a lot of water in the tank. On my 2016 unit the tank drain is to the left of the door step, but the location is different in earlier years and other models.
2. Close all faucets and drains and then one at a time open faucets and the three drain valves, running pump, until no water flows. Flush toilet. The three drain valves are under the seat with the Aldi unit, see photo for exact location. (Slight configuration changes are found in older units or the clam shell version.)
3. Attach the air compressor to city water fitting. Close all faucets and drains. (Caution, you need to keep the pressure below 50 psi.)
4. One at a time open each of the three drain valves and 4 faucets, until no water flows or sputters out. (The four faucets on my unit are sink hot and cold, shower hot and cold.)
5. Flush toilet a couple of times.
6. Repeat as needed, until no water flows.
7. Open black and grey water drains to flush the waste water.
8. Pour about a cup of anti-freeze in sink and shower drains.

I leave all the faucet valves open, but this probably does not make any difference.

In general it is a good idea to drain the system — fresh water tank and Alde hot water tank — at the end of each trip. In addition to minimizing the proliferation of bacteria, the Alde manual indicates that there needs to be an air cushion at the top of the hot water tank to act as a shock absorber and create even flow. They recommend draining the tank monthly to maintain this, so habitually draining both tanks at the end of each trip makes sense and provides a bit of safety margin in case of an unexpected early freeze.

Spring Cleaning

In the spring, close all drain valves and faucets and then add water to the tank slowly and run each faucet (sink and shower, hot and cold) until they run clean without sputtering. Flush toilet a couple of times. Running a lot of water cleans out the system, tends to dissipate any accumulation of odor or bacteria. There are serious people who recommend purging the system with a 10% bleach solution.

This gives you completely fresh water and getting all of the air out of the lines makes the pump run quieter and shut off more reliably. (Apparently getting the taste of the anti-freeze out of the system can be a bit of a chore.)

Summary

This approach is simple, quick, reliable and does not involve paying for, carting and storing gallons of antifreeze and then facing the daunting task of getting the nasty taste completely out in the spring. The description has a number of steps, but once you are set up, that is have the air compressor and adapter fitting available, it is simply a matter of hooking up and turning on the compressor, checking the 50 psi pressure and then going through the various faucets and drain valves a couple of times, running the pump once in a while, all of which is within easy reach inside the trailer cabin.

Actually, once you are set up draining and clearing the system is quick and easy, just drain the tank, plug in the air and open the valves one at a time.

Sanitary Considerations

Bacteria growth is ongoing in stagnant water, especially in warm conditions, and thus sanitary maintenance is of paramount importance in water system management. Possible consequences of excessive levels of bacteria can be as serious as Legionnaires' disease. Although at least one article in a scientific journal recommends periodic chlorine disinfection, other camping experienced people with a relevant scientific background are less extreme and endorse draining between trips and less drastic disinfection, typically using ordinary household bleach.

The first line of defense in maintaining water purity and safety should be draining the water system, both the fresh water tank and the hot water tank, at the end of each trip. With an appropriate air compressor available a complete purge, fully equivalent to winter storage preparation, need take only a few minutes. Many people consider this sufficient under normal circumstances with no indication of a specific problem.

The next line of defense is disinfection by the introduction of substances that kill off bacteria remaining in water drops and mist after complete draining and air pressure purge. A ten percent bleach solution is a common recommendation.

The normal disinfection protocol is to fill the empty water storage tank with the ten percent household bleach solution and run water through all of the lines, particularly the hot water lines, and let it stand for an hour or so. This is completed by a thorough flush of the system with clean water.

As a cautionary note, there have been statements that bleach can potentially harm the stainless steel in the Alde system, but there is no mention of this that I can find in the Alde manual or other sources. (If anyone has more definitive information on this, please let me know!)

At the extreme end of the spectrum periodic chlorine disinfection is recommended by some:

"To safeguard the quality of tank water and prevent the possibility of Legionella infections, RV owners should implement regular chlorine disinfection of their water tanks..."

<https://www.hindawi.com/journals/criid/2013/286347/>

Our T@B units are small and compact, making a routine complete flush relatively easy and practical. More extreme disinfection protocols would seem to be more potentially applicable to much larger systems and those with full time occupancy. If city water is the primary source it is normally chlorinated, which would seem to be adequate.

The Anti-Freeze Fad

At this point in my research it has become apparent that most of this anti-freeze business is propaganda from the service operations and the guys that sell anti-freeze. The fact that the Alde system should not be subject to this makes the process of using the anti-freeze much more complex and difficult to understand, and if the simple air pressure purging approach is suitable for this major segment of the system, why should it not be entirely adequate for the entire system?

Reading between the lines it seems apparent that there has been dissension between the Alde and T@B technical and marketing people. Why is Alde so staunchly opposed to anti-freeze?

One offered explanation is that the bleach commonly used in sanitation, as in spring cleaning to remove the anti-freeze, can corrode and weaken the stainless steel in the Alde hot water tank.

My speculation is that winter operation with no hot water function requires that the hot water tank be air filled and preferably vented, and the presence of any liquid, which would expand and contract significantly as the system cycled from inactive with temperatures possibly far below zero to relatively hot as the glycol was heated, mechanically stressing the system, especially if it was relatively full of anti-freeze.

T@B technical and marketing people seem to be between a rock and a hard place, the anti-freeze fad has a lot of push behind it and the Alde people will not bend on warranty issues and believe that their credibility and reputation would suffer from anti-freeze related failures. So T@B has been backed into a corner and introduced this complex and unnecessary system of by-pass valves resulting in perpetual, ongoing user confusion and doubt.

In the big picture our T@B units are relatively compact and well designed with short, relatively straight pipe or tubing runs and drains at all of the low points, and thus well adapted to the use of a careful application of air pressure. Other units and applications, such as larger RVs, can have much longer runs, more twists and turns and sections of tubing below the drain points. In such situations a credible case can be made for the use of anti-freeze to insure that there is no residual water at low points in the system.

Every situation requires its own open minded and fact based selection of an appropriate protocol, and the realization that other variations are often also entirely valid.

Notes

- One might think that you could open all of the faucets and then apply the air pressure. This is not a good idea because the air might just flow through the shortest or least resistance line, leaving water in some of the others. It is best to apply air pressure and open one faucet and drain valve at a time.
- Some people advocate elaborate precautions to raise and lower the front of the trailer and/or tip it from side to side in order to get the last of the water out of the tank. But if the drain is clear and the pick-up line for the pump is clear a little water laying on the bottom of the tank can most likely freeze without doing any harm, expanding water forming ice can only do damage when expansion is contained. The Alde tank seems to be shaped for good drainage, and the air pressure should clear it out. If you are concerned, one suggestion is to open the water tank drain valve before the final drive home. Kind of like the old fashioned road draft tube on cars; and up and down hill driving will provide more drainage.
- Sometimes there is a recommendation to disconnect the hose at either end of the water pump to let water drain out. I have not done this, but I do run the pump several times during the process to clear out any air. It might be a good idea to flip on the pump for a moment at the very end, when all lines are clear. (This could turn out to be a mistake, use your own best judgement.) Note that there is a screw end filter on the pump which can be dismantled to clear out debris.

- The fresh water pump incorporates a valve to keep water (and air) from just going in the city water fitting and right back out of the fresh water tank fill.
- If you don't have an air compressor, the cheapest units will work just fine, and will run other things around the house such as pneumatic staplers and nailers. (Note that is very important that the compressor has a working pressure regulator valve that can be set to 50 pounds per square inch.)
- When connecting the T@B camper to city water it is necessary to use a device to limit the water pressure to 50 psi. Some people seem to think that this will also limit air pressure, but although I am not absolutely certain I very much doubt that this is valid; I think you still need an air compressor which can be set to 50 psi.
The pressure regulators work because fluid passing through a small orifice is restricted, which reduces pressure as it flows. While both water and air are fluids, air is much less viscous and thus likely to be much less restricted as it flows through the orifice.
If anyone has conclusive information resolving this one way or the other, please contact me and let me know!
- Sometimes the point is made that an air compressor could introduce oil into the system, leading to unpleasant contaminated water. Perhaps this was a potential problem at one time, but I have three air compressors and all of them are "oil less" and you do not commonly see compressors on the market that have oil present in the air. I think this is pretty much a non-issue, but it would not hurt to check a unit before buying or using it. Be aware that sometimes an oil injector is added to a compressor to lubricate pneumatic tools such as grinders and so forth.
- In addition to the interior kitchen version of the T@B described here, there is also a clam shell version with the kitchen in the back under a lift up lid. To the best of my knowledge the components and operation of the various utility systems such as water and gas are the same, but the lay out, that is especially the location of the various drain valves, is different. If I come across the appropriate photos I will include them.

The Alde Compartment

The Alde heating and hot water unit utilizes 120 volt electricity and/or natural gas to provide hot water and trailer cabin heating. It is located under the right rear seat cushion, along with the necessary support plumbing for operation and maintenance.

In the photo below:

1. is the Alde drain valve, use it when you drain the system.
This is a "flip up" action valve, all others are twist or turn action, on when aligned with the direction of the tubing, off when at a 90 degree angle.
2. is the hot water shut off for the Alde, leave it alone.
3. is the actual Alde by pass, not used.
4. is the cold water shut off for Alde, leave it alone.
5. is hot water drain valve, use it when you drain system.
6. is cold water drain, use when you drain system.

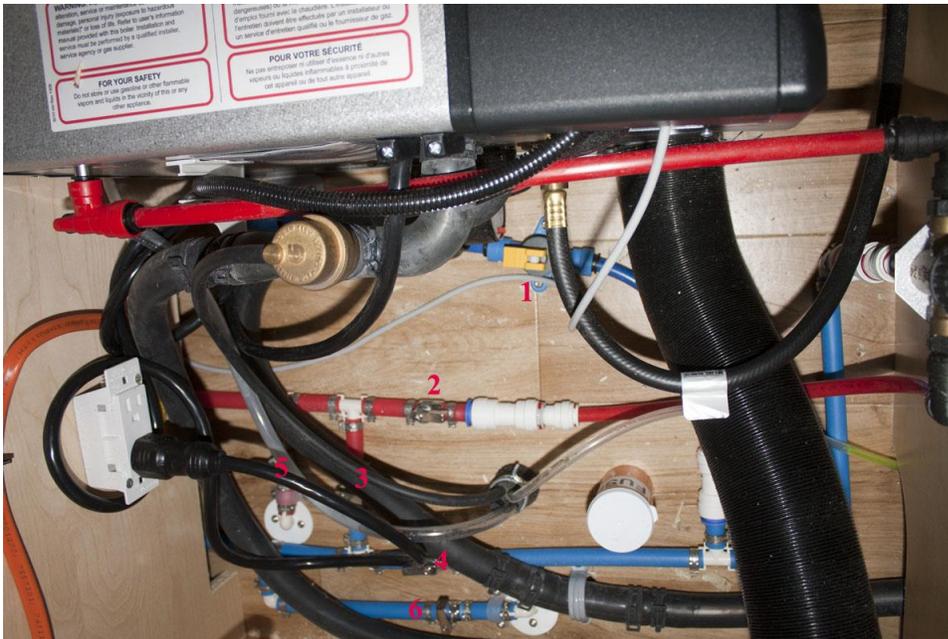


Photo is of T&B unit, 2016 vintage with the S floor plan, that is toilet and shower.

At the top is the Alde model 3010 unit itself.

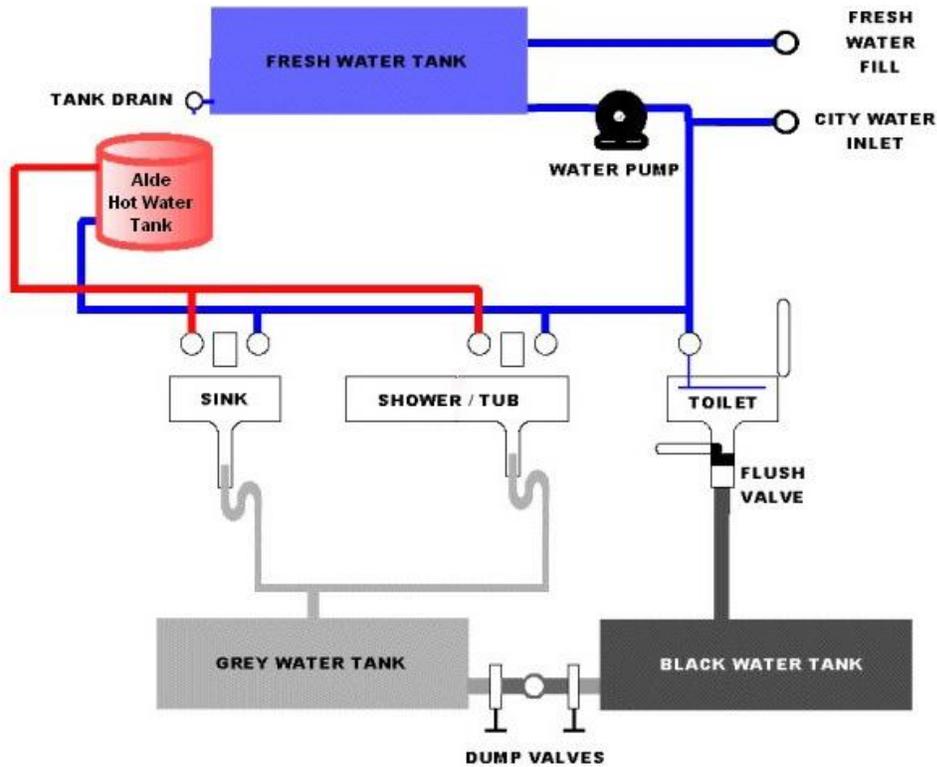
At the far right is the hot water mixing valve, which can be adjusted to provide the desired temperature to the hot water faucets.

To the left is the Alde 120 volt power plug. If you are not getting electric heat or hot water, check this plug and put on a 120 volt line tester to see if there is power. If no power, check the circuit breaker panel.

That pill bottle has the famous spare Alde fuses. The grey panel on the Alde unit on the upper right comes off and reveals two small green fuse holders, containing fuses which can mysteriously blow for no apparent reason. (Alde seems to be aware of this; my unit came with a spare fuse taped to the top of the cabinet. It might not be a bad idea to pick up a couple more.)

Plumbing and Propane Schematic Diagrams

A simplified view of the T@B water system:

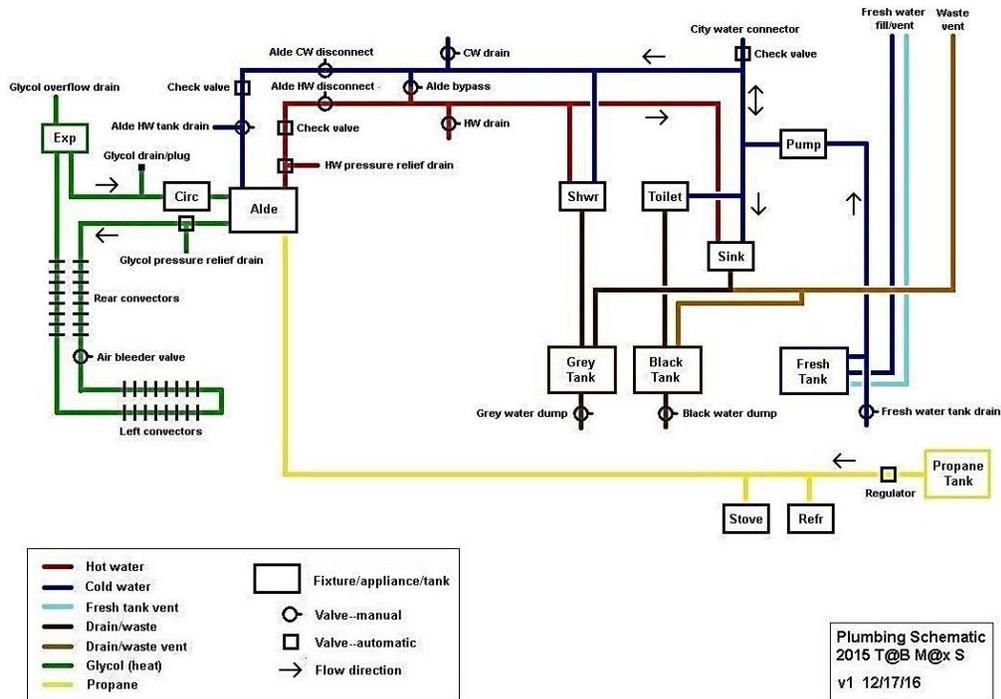


Drawing "Michigan Mike"

Things to know:

- The city water inlet will not fill the fresh water tank; the water pump incorporates a one way valve to prevent water, or air, from flowing into the city water inlet and right back out through the water pump.
- There is a mixing valve (not shown) between the hot water Alde output and the cold water supply to adjust temperature; the Alde water direct is very hot.
- There is a screw in filter incorporated into the water pump.
- The water pump takes water from the fresh water tank through a pick up tube and will "suck air" when the tank water level falls below the bottom of the tube, at about the 13 percent full level. This is probably to avoid picking up "bad stuff" from the bottom of the tank.
- Current units have an 11 gallon fresh water tank under the floor by the door; older units have a smaller tank in the space under the sink. The larger capacity is nice, but it would seem that the larger tanks are more subject to freezing in colder weather.
- Running the water pump briefly without air does not do harm. I am not certain, but would speculate that running it very long, minutes, might be harmful because the cold water provides the pump cooling.

A detailed view of the water, glycol and propane systems:



Drawing ScottG

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