

Keyser Manufacturing Engine Warm Up Unit



Owner's Manual and Quick Reference Guide



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Disclaimer

The information provided in this manual is to help ensure proper use of the Keyser Manufacturing engine warm up unit. Failure to follow the instructions within may result in damage to personal property or serious injury to the user. Keyser Manufacturing is not responsible for any property loss that is directly or indirectly caused by the use of the engine warm up unit or products related to it.

What's in the Box

- Engine Warm Up Unit, Assembled with 50/50 Antifreeze
- 3/8" NPT Male to Male Quick Connect Fitting
- 3/8" NPT Male to Female Quick Connect Fitting



Figure 1: Engine warm up unit with quick connect fittings.

- Owner's Manual

Recommendations for Usage

- Extension Cord 50' or Less
 - 10 to 12 gauge wire is recommended for the amount of amp draw from the unit (20 amps)
- Inline Flapper Valve Option
 - 100 16600-16
 - -16 AN Male inline fitting
 - 100 16600-20
 - -20 AN Male inline fitting
 - 100 16600-1
 - 1-3/4" Hose end inline fitting



Figure 2: From left, 100 16600-1, 100 16600-20, 100 16600-16

- Radiator Neck Flapper Valve Option
 - 100 16600-2
 - Bottom radiator neck flapper valve
 - This is an add-on that can be built on to a Keyser radiator

Gauge Panel Overview

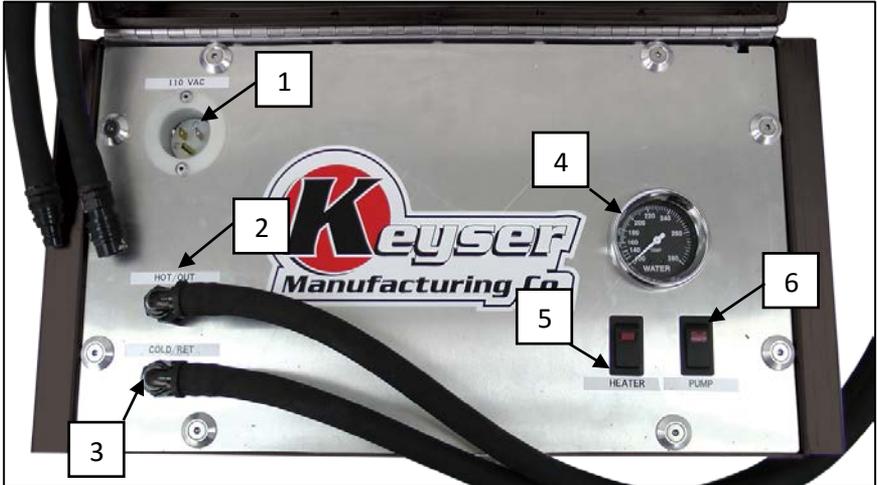


Figure 3: Gauge Panel

Item #	Description	Notes
1	110 VAC Plug	Standard 3-Prong Plug
2	Hot/Outlet/Flow to Block	Pressure line
3	Cold/Return/Flow from Block	Suction line
4	Water Temp Gauge	Reads temps above 100 °F
5	Heater On/Off Switch	Lights up when on
6	Pump On/Off Switch	Lights up when on

Warm Up Unit Setup

Note: Upon receipt, inspect unit for any damage that may have occurred during shipping. If any damage has occurred, document it with photos and contact a sales representative from Keyser Manufacturing for further assistance.

1. Open the lid and unwind the hoses. Check to make sure the switches for the heater and the pump are both switched in the off position as shown in Figure 4. Remove any packaging or protective covering from the unit or hoses.



Figure 4: Switches shown in off position.

2. At this time, plug a 10 to 12 gauge extension cord into the 110 VAC outlet as shown in Figure 5. DO NOT switch the pump or heater on at this time. Doing so may result in damage to the pump, heating element, or plumbing contained within the unit.



Figure 5: Plug for unit is included. Extension cord sold separately.

3. Remove the quick connect fittings supplied with the unit from their packaging. There should be two different fittings. Each fitting has a 3/8" NPT Male end and the other end is a quick connect style end. There will be one male and one female quick connect end to make connecting the warm up unit easier and to avoid confusion once everything is installed on the vehicle. See Figure 6 for reference.



Figure 6: Quick connect fittings with 3/8" NPT male ends.

4. Because the units need to be tested and primed, all units are shipped with antifreeze in case shipping conditions cause the temperature of the unit to drop below freezing. The antifreeze that Keyser Mfg. uses is 50/50 ethylene glycol/water solution. If the cooling system for the motor is already setup for use with 50/50 antifreeze, skip to step one of vehicle setup. Otherwise continue on to step five of the warm up unit setup.
5. To flush the antifreeze from the unit, two five gallon buckets will be required. Fill one bucket $\frac{3}{4}$ of the way full of water and leave the other bucket empty.
6. While holding the end of the cold/ret line over the bucket full of water, attach the female quick connect fitting with the 3/8" NPT end to the male quick connect fitting on the cold/ret line. Drop this line into the bucket so the end is submerged in water. Some

antifreeze may spill out into the bucket but this is normal. Repeat this step for the hot/out line and the male quick connect fitting with the 3/8" NPT end on it, except drop the end of the line in the empty bucket.

7. While holding the lines in place, turn on the pump. If done correctly, the hot/out line in the empty bucket should have water running out of it. This pump moves water at around 10 gallons per minute so be ready to shut the pump off. Let the pump move $\frac{3}{4}$ of the water from the full bucket to the empty bucket, but don't empty the bucket completely or the pump may lose its prime.
8. The fluid leaving the end of the hot/out line should be clear once the flush is complete. If it is not, repeat steps 5 through 7 as many times as required to be sure to remove all of the antifreeze. Dispose of the antifreeze solution properly. Remove the quick connect fittings with the 3/8" NPT ends to contain the fluid within the lines and system. As a side note, it may be beneficial to store the antifreeze for reuse during the colder season or for storage. This will help prevent corrosion of any of the components and prevent the unit from cracking due to freezing.

Vehicle Setup

1. If a radiator neck flapper valve is being used, skip to Step 4. Assemble the quick connect fittings to the inline flapper valve unit as shown in Figures 7 and 8. The male quick connect fitting should be screwed into the bung so that the valve will close once pressure and flow are introduced by the warm up unit.



Figure 7: Assembled inline flapper valve cutaway. The valve is open as if during normal engine operation, and the quick connect fittings seal shut.

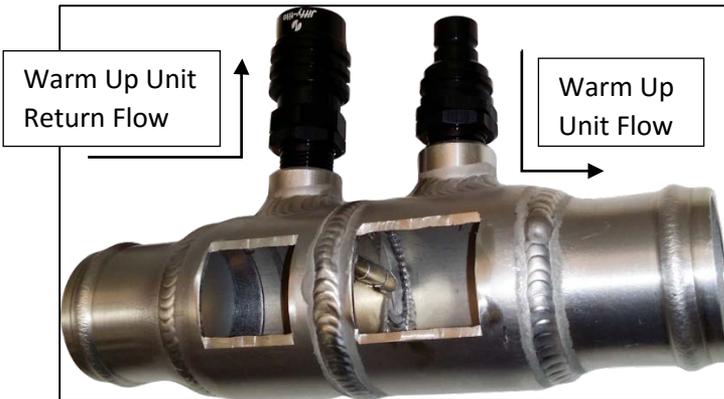


Figure 8: Assembled inline flapper valve cutaway. The valve is closed as if the engine warm up unit is being used.

2. Screw in the male quick connect fitting to the pipe bung that is attached to the radiator neck and the female quick connect fitting into the pipe bung that is attached to the tank. This will ensure that the valve will open during normal engine operation but will close when the warm up unit is being used.
3. Reconnect all engine cooling lines and make sure the system is full of water. Depending on the location of the inline flapper valve or the type of flapper valve used, additional hose cuts or fittings may be required.
4. Connect the lines for the engine warm up unit to their corresponding fittings on the flapper valve. The line labeled HOT/OUT should have a female quick connect fitting on the end of the hose. This should be plugged into the male quick connect fitting that is attached to the flapper valve. For the line labeled COLD/RET, the quick connect fitting on the end of the hose should be a male style. Plug this into the remaining fitting on the flapper valve unit. A schematic is shown in Figure 9.

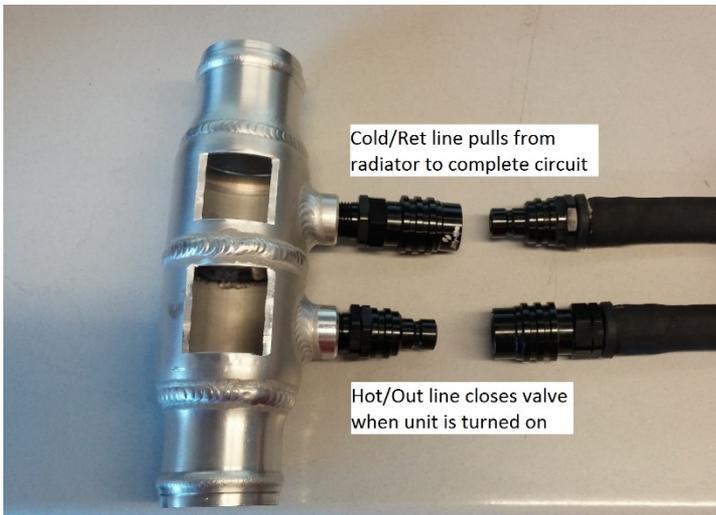


Figure 9: Connecting warm up unit to engine cooling system.

5. Once the quick connect fittings are locked in place, flip the switch for the PUMP ONLY into the on position (the switch should light up). It is important to make sure the unit is working correctly and the flapper valve is working properly before turning the heater on. An easy way to make sure the pump is pushing water is to remove the radiator cap and see if water is flowing through the system.
6. Once water flow is confirmed, replace the radiator cap and flip the switch to turn on the heater. Give the unit some time to work and the engine should reach 165 °F to 180 °F in an hour and a half to two hours. Time to reach maximum temperature will vary based on environmental conditions, block material, and components within the cooling system.

Tech Tip: Once the engine is up to temperature, it is possible to check valves and valve springs or any other temperature dependent engine components without firing the motor once.

7. Keep the engine heater running until it is ready to fire the motor. Be sure to check the water temperature gauge on the warm up unit and in the car intermittently to be sure water is still pumping through the system and the water temp doesn't get too high.
8. Turn the heater off. Wait 10 - 15 seconds and shut the pump off. Disconnect the lines for the warm up unit from the car. Now fire the motor with ease. Make sure the inline flapper valve is open by monitoring the water pressure and temperature for a few minutes.

Troubleshooting

Problem	Probable Reason	Possible Solution
Pump isn't moving water	<ul style="list-style-type: none">• Pump has lost its prime	<ul style="list-style-type: none">• Refill the lines with water to remove as much air as possible
When the heater is switched on, the unit trips the breaker	<ul style="list-style-type: none">• Breaker too small• Bad heating element	<ul style="list-style-type: none">• Use minimum 20 amp circuit• Call for replacement, return bad heater• Use larger gauge extension cord• Use shorter extension cord

If ever in doubt when troubleshooting issues with the engine warm up unit, call technical support at Port City Racing at (800)-472-2464. Knowledgeable staff will be happy to assist you.

FAQ's

- Will the warm up unit overheat or burn up my motor?
 - Between heat loss to the ambient air and heat input from the heating element, water temperature should never get above 180° F. Also even though the fan isn't spinning, the radiator will still dissipate some of the heat from the water.
- Will the warm up unit build up too much pressure in my system?
 - Once the water is up to temperature from the warm up unit, only about 7 psi is built up. If for some reason there is a pressure spike, the radiator cap will still work as it should and relieve the pressure in the system before catastrophic failure of any of the components within the cooling system.
- Will the inline flapper valve restrict flow in my cooling system?
 - The flow area on the open flapper valve is slightly larger than the flow area for a -20 AN fitting. Some minor flow losses may be caused by the sharper corners and edges from the flapper valve but these are negligible.
- Will the warm up unit remove water from my cooling system when I disconnect the fittings or add air when I connect them?
 - If connected and disconnected properly, the fittings will drip a very small amount of water. When the fittings are connected, the fittings immediately seal together to inhibit any air from entering the system.

