

NetGain Controls, Inc.

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WarP-Drive™

Liquid Cooling Kit

By: NetGain Controls, Inc.
Powering the future!



Installation Guide

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Introduction

Thank you for purchasing a NetGain Controls *WarP-Drive* Liquid Cooling Kit. This set of components has been carefully chosen to provide you with practical, functional means of liquid cooling a WarP-Drive motor controller, or similar equipment. If installed properly, this kit should provide many years of cooling service. Please carefully read these instructions to ensure that everything is installed correctly.

Installation Overview

Estimated time: 2-4 hours to complete the installation.

1. Determine the location where the components will be installed. The proper locations will be discussed in more detail later.
2. Mount the individual components.
3. Connect the tubing between the components.
4. Fill the system with liquid and check for any leaks.
5. Power the pump and ensure flow through the system.
6. Top off the coolant and double-check that everything is secure.

Package Contents

When you open the package, verify that you received everything.

The package includes:

- Reservoir
- Pump with pump leads and connectors
- Snap-grip clamps (8)
- Radiator
- Radiator fittings w/ O-rings (2)
- Waterproof fans (2)
- Tubing (8 feet)
- Screws to secure fans to radiator (8)

Tools Required

The following tools might be required for the installation:

- Phillips screwdriver
- Tools to fabricate radiator brackets
- Wire strippers
- Connector crimpers

In addition, it is suggested that a relay (not included) be used to turn on the pump and fans.

Layout

Plan the layout of each component in the kit. The reservoir should be mounted at the highest “elevation” in the cooling loop. The other items in the kit can be at whatever position lower than the reservoir that is most convenient. In general, placing the pump at the lowest point in the system will make purging easier. Also, placing the pump close to the reservoir will help in priming the pump. Try to keep all of the components as close together as possible. Adding more hose than what comes in the kit will reduce flow rate and consequently decrease cooling performance. Conversely, using less tubing than what ships with the kit will increase performance of the system.

Even though the pump has been potted to protect against damage from moisture, it should be placed in a location that is as free from water and moisture as possible. Try to locate the components in a way that will not cause sharp bends in the tubing.

Choose a location for the radiator that allows air to circulate around it. Placing it in direct airflow from the movement of the vehicle will aid in cooling.

Mounting and Installation

The most challenging component to mount is the radiator. It is likely that custom mounts will have to be designed for your chosen installation location. The inlet and outlet should either be mounted upwards or to the side – not downwards. Be extremely careful when attaching brackets to the radiator to ensure that the screws do not penetrate into the fins of the radiator.

Install the two 220mm fans on the radiator using the 1 5/8” long screws included. Use the same caution as mentioned above to avoid piercing the radiator with the mounting screws. The fans can be switched on/off using a relay. The fans can be turned on with the same relay that is used to turn on the pump.

The pump can be installed in just about any orientation. The only orientation that should be avoided is to have the outlet facing downwards.

Connecting Tubing

With the reservoir, radiator, and pump securely mounted, the tubing can be connected to each of the devices.

The suggested routing is as follows:

1. Reservoir
2. Pump inlet
3. Pump outlet
4. WarP-Drive controller (or device to be cooled)
5. Radiator

As was mentioned previously, placing the pump lower than the reservoir will prevent problems priming the pump.

When the tubing has been securely fitted to the hose barbs of each component, tighten the snap-grip clamps to the connection by hand. It should not be necessary to use tools (such as pliers) to tighten the clamps.

Filling With Coolant

Once the tubing has been routed and the connections are secure, the system can be filled with coolant. Any high-quality automotive anti-freeze will work fine. The lower the concentration of coolant to water, the better the system performance will be. However, ensure that the mixture is correct to prevent freezing for your environment. The coolant temperature should not be allowed to exceed 170F. As long as that constraint is met, boiling of the coolant is not a concern.

Slowly fill the system through the reservoir. Check for leaks and adjust connections if needed. Fill the system until the reservoir coolant level is just below the inlet fitting (in the final step, it can be filled above this). **Do not turn on the pump as it has not been primed with liquid!**

The easiest way to get the pump primed is to follow the previous instructions for mounting the pump below the reservoir. As you fill the reservoir with liquid, it will naturally flow into the pump. When you see liquid coming out the exit side of the pump, you know that the pump has been sufficiently primed. At this point, you can turn the pump on. Liquid should quickly fill the entire system, and large bubbles will disappear. Verify that there is sufficient coolant in the reservoir. When the pump is powered, coolant should begin to immediately flow. If this is not the case, ensure that coolant has flowed from the reservoir to the pump, and that the reservoir is at least half full. When the coolant is flowing at full force (about 1.5 GPM) the liquid will have enough momentum to almost strike the opposite inside wall of the reservoir

Final Steps

The tubing can now be secured (if desired) to the chassis. Verify that the pump turns on when desired. If the previous suggestion of leaving the coolant below the inlet of the reservoir was followed, you can watch the flow through the inlet to ensure that the coolant is flowing properly. It can be difficult to determine if there is flow by watching the tubing once all the bubbles have disappeared from the system. Watching the flow through the reservoir inlet can give assurance that things are working properly. Once this has been done, it is acceptable to fill the reservoir to just above the reservoir inlet.

Maintenance Procedures

It is recommended that the coolant level be checked regularly. The coolant can go long periods of time without being changed.

Physical Specifications

Package Weight: 6 lb, 8 oz
Package Dimensions: 13" x 13" x 5"

Electrical Specifications

Pump Voltage: 8-24V
Pump Current: 1.9A (peak)
Pump Watts: 3-33W
Pump Connector: Tyco Mate-N-Lok p/n 794896-1
Pump Harness Connector: Tyco Mate-N-Lok p/n 794894-1