MCR "DRIVE" series radiators (Rev. 2)

INSTALLATION GUIDE

MCR220-DRIVE-B
MCR220-DRIVE
MCR320-DRIVE-B
MCR320-DRIVE

One or more patents pending

MCR DRIVE-B versions (without pump) for existing MCP350 or 355 pump owners MCP350 or MCP355 pump installation – skip this step if you have the MCR Drive with integrated pump version	
🇬🇧 Disassemble the MCP350 or MCP355 pump ports housing from the main motor housing by loosening and removing all 4 screws. Reassemble the pump body to the MCR drive radiator while making absolutely sure to keep the existing pump o-ring in place or the assembly will leak! To assemble, simply align the pump body with the MCR Drive pump housing, and fasten it with the supplied 8-32 x ¾" socket screws.	

MCR220 and 320 Drive installation
🇬🇧 **1. Installation of the fittings:** The MCR Drive heat exchangers are shipped with G1/4 x ½" barb fittings (12mm) . Use a 5/8" (16mm) flat wrench or preferably a socket wrench to fasten the fittings very tight to the radiator body so as to prevent leaks.

🇬🇧 2. Installation orientation considerations and guidelines

The primary consideration in the notes below is safety. Because this type of pump is not self-priming, it is essential to configure the liquid cooling system so that it remains self-purging, in other words, that any air travelling through the lines could never accumulate in the pump, thus causing coolant circulation to stall.

In its default configurations, in other words vertical and right-side up, or horizontal with pump ports facing down, the MCR Drive pump can never lose its prime unless the coolant level was abnormally low. Therefore, as in any other "open-loop" liquid cooling system it is essential to monitor the coolant level every few months.

Alternate orientations to the factory default are discussed below, and may require an additional reservoir to safely operate the MCR Drive.

(*1): Vertical upside-down orientation, typical of an installation behind the front bezel, or at the back of the PC. This orientation would require an external reservoir; however, it is not recommended because depending on the reservoir location there is a risk for the pump of losing its prime if a sufficient amount of air was to travel through the lines: this could result in catastrophic failure of the cooling system. Additionally, it is not recommended to run the pump upside-down.
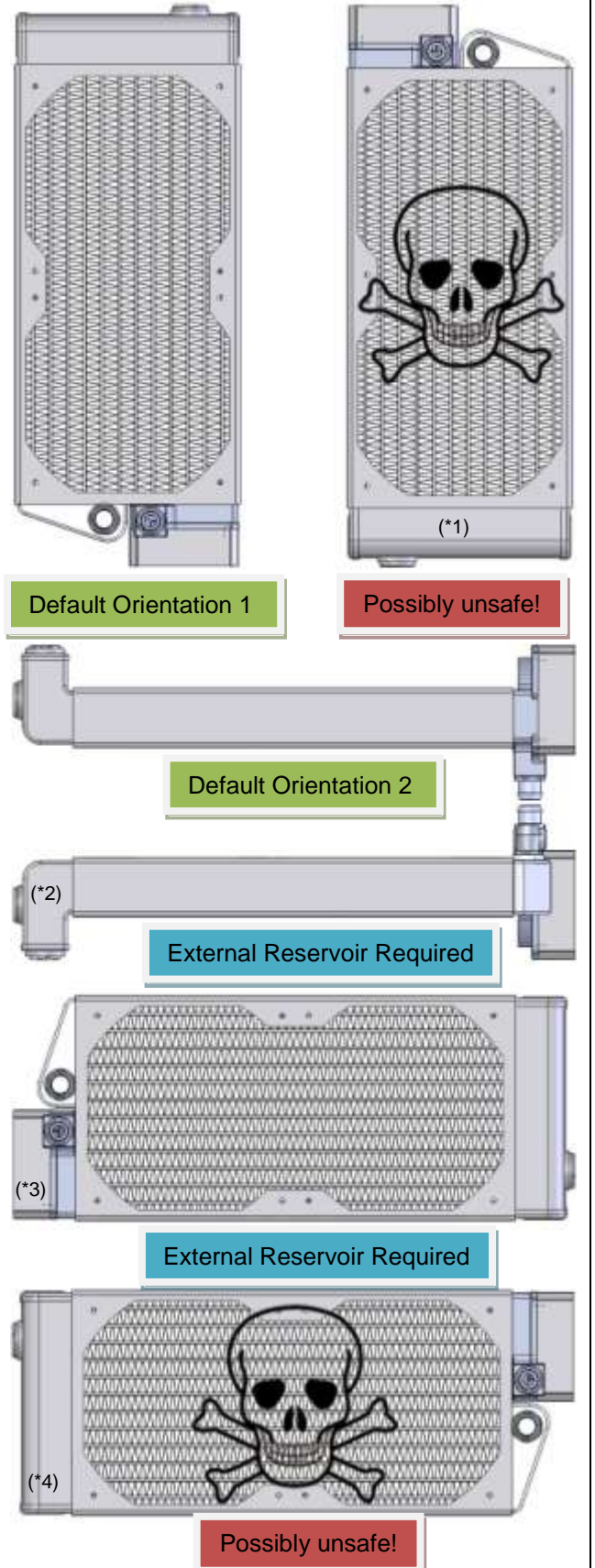
(*2): Horizontal & inlet/outlet ports facing up, typical of an installation at the bottom the PC. This configuration necessitates the use of an external reservoir but is fully acceptable as long as that such reservoir will always be located higher than the radiator.

(*3): On-the-edge orientation with pump at the bottom, typical of an installation in a lower compartment of the PC. When used in this orientation the radiator integrated reservoir will only be fully functional if completely filled-up. Furthermore as the coolant level drops over time, the uppermost radiator channel(s) may not circulate fluid, resulting in cooling performance degradation. Use of an external reservoir located above the radiator is required to avoid this risk.

(*4): On-the-edge orientation with pump at the top, typical of an installation in a lower compartment of the PC. This orientation would require an external reservoir; however, it is not recommended because depending on the reservoir location there is a risk for the pump of losing its prime if a sufficient amount of air was to travel through the lines: this could result in catastrophic failure of the cooling system. Such orientation is ONLY acceptable if an external reservoir was located completely above the radiator.

Advanced/Extreme applications:

It is also possible to install two MCR Drive in series. In such case it is recommended to install one of the units in the factory recommended default orientation; this will allow installation of the second unit in ANY orientation, including the orientations listed above as not recommended. The reason is that the primary unit in default orientation will naturally and safely purge any air going thru the lines, thus eliminating any risk that the second pump might stall.

Default Orientation 1

(*1)

Possibly unsafe!

Default Orientation 2

(*2)

External Reservoir Required

(*3)

External Reservoir Required

(*4)

Possibly unsafe!

3. Installation of the fans and to a panel:

See schematic to the right.

The 2 conventional methods to attach the fans and the assembly to a panel are:

Standard:
Using the provided four long screws (2) per fan thru the fan guard (3), the computer panel (1), and thru the fans (6) to fasten the entire assembly to the panel.

Acceptable thread types:
The original thread size is M3,5; standard US 6-32 thread can easily be used. Once 6-32 type screws have been used, going back to metric is not recommended.

Long screw length tolerance specifications are:
- Min/Max inch size: 1 1/4"
 -Metric: 30mm
The above are the only adequate sizes available in this length range for 120x25mm fans.

Use 6-32x1 5/8" or M3,5 x 40mm for 120x38mm fans.

Alternate:
Using the provided four 6-32 x 3/8" short screws (1) per fan to fasten the lower lip of the fans to the radiator body first, and then another fastener of your choice (not provided) to secure the radiator/fan assembly to the computer panel (1). Standard fan screws (4) often provided with the fans work well to attach the radiator/fan assembly to the panel. Other acceptable choices are 8-32 x ½" screws with nut (or M4 x 12mm + nut), or Snap-rivets

Short screw length tolerance specifications are:
Min/Max inch size: 3/8"
Min/Max Metric size: (8mm~10mm)

WARNING: do not exceed the maximum recommended screw length or irreversible damage to the radiator will occur, and will not be covered under your warranty.

You are now ready to connect tubing to the MCR Drive inlet and outlet fittings, using the provided hose clamps, and to complete the loop by a waterblock of your choice.

Legend

1 : Computer panel
2 : Long screw M3,5 x 30mm or 6-32 x 1 ¼" (4 per fan)
3: Fan guard (not supplied)
4: Fan screw (not supplied)
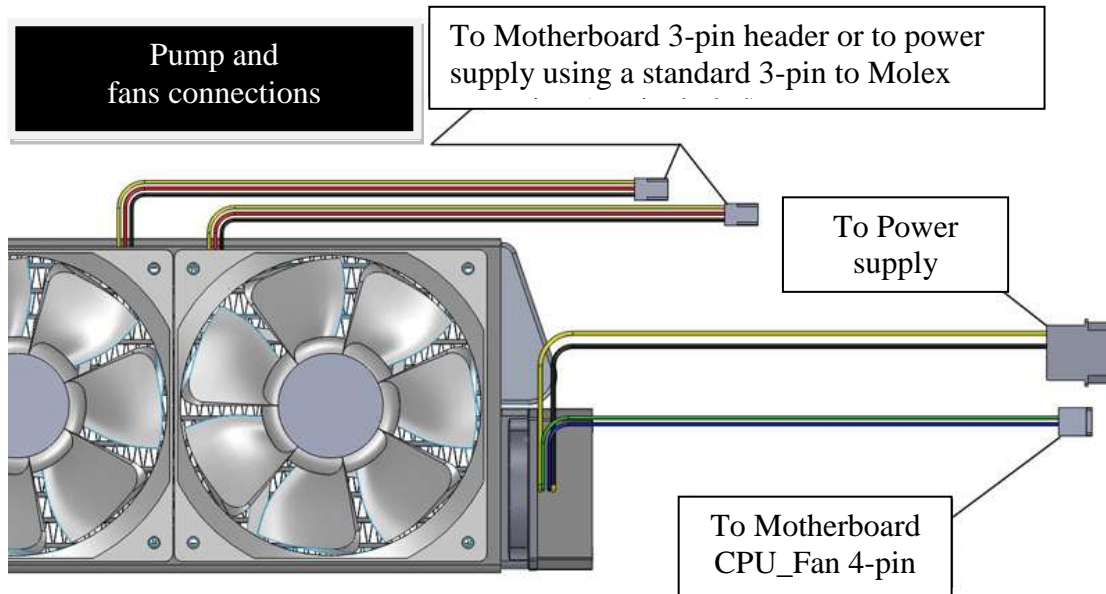5: Short screw (4 per fan)
6: Fan (not supplied)
7: MCR Drive
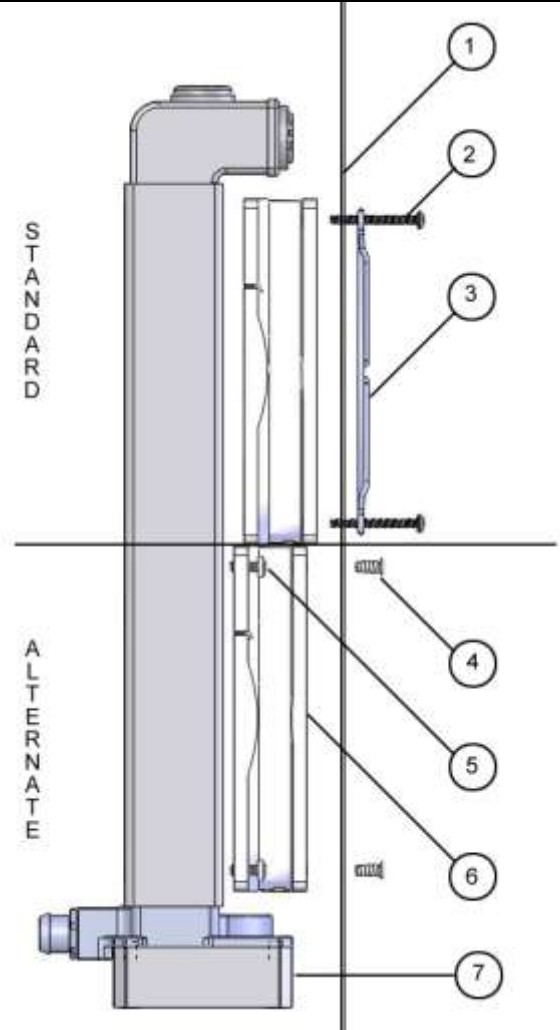
a/ **Electrical installation:**

The pump uses two connectors: a standard Molex 4-pin (2 wires are used only) which connects to the PSU power connectors, and a standard 4-pin (2 wires) which typically connects to the motherboard CPU_Fan 4 pin header.

Pump and fans connections

To Motherboard 3-pin header or to power supply using a standard 3-pin to Molex

To Power supply

To Motherboard CPU_Fan 4-pin

The 4-pin connector allows the motherboard to fully control the pump speed from 1300 rpm up to 4500 rpm. If not connected, the pump will run at full 4500 rpm speed by default. The following graph reports the pump speed response to % adjustments in the BIOS:

Swiftech MCP35X Typical PWM Response
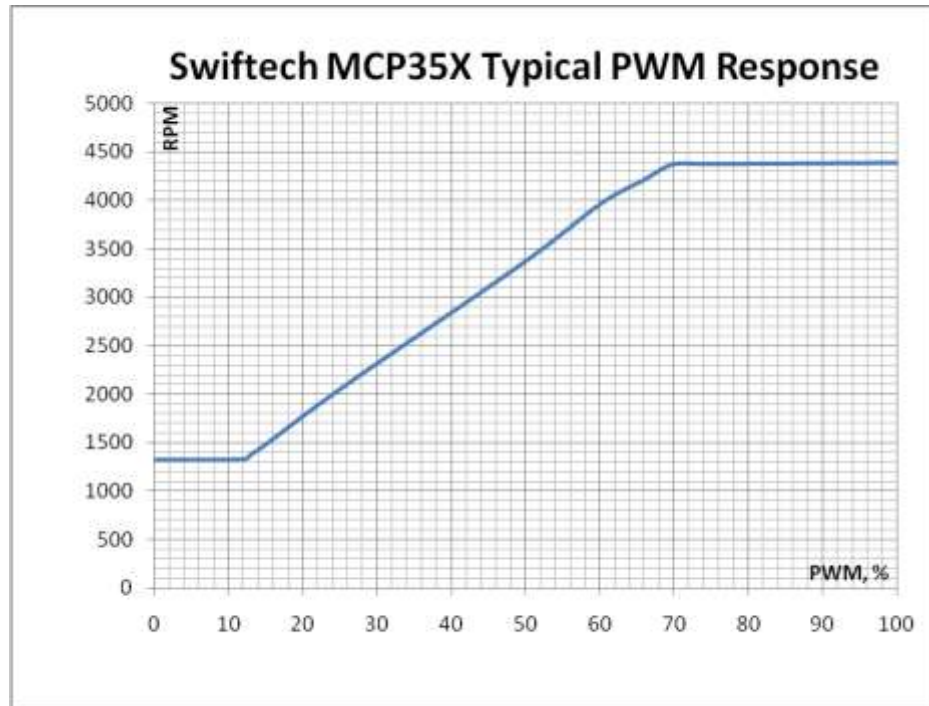
b/ **Operating precautions:**

The MCP35X pump should never be run dry, even for a quick test. You should always prime the pump by filling-up the MCR Drive radiator with fluid before you start operating it (see warranty note *).

Use of coloring die or fluorescent additives containing particulate fillers will cause excessive wear to the pump's impeller bearing (see warranty note **).

c/ **Specifications:**

Motor type	Electronically commutated, brushless DC, spherical motor
Nominal voltage	12 V DC
Operating voltage range	9 to 13.4 VDC
Max. nominal power (@12 V)	18 W
Max. nominal current (@12 V)	1.5 A
Max. nominal head (@12 V)	14.7 ft (4.4m)
Max nominal discharge (@12 V)	Max nominal discharge (@12 V)
Maximum pressure	22 PSI (1.5 BAR)
Temperature range	Up to 140°F (60°C)
Electrical power connector	Molex 4 pin
PWM + RPM signals	4-pin connector
ROHS	Compliant
Port thread standard	1/4
MTBF (Mean Time Between Failures)	50,000 Hours

WARRANTY: This product is guaranteed for a period of **24 months** from date of purchase for defects in material, and workmanship. Guarantee consists of replacing defective parts with new or reconditioned parts. Guarantee is considered void in case of **improper use (*)(**)**, handling or negligence on the part of user. Original invoice showing date and place of purchase is required for exercise of the warranty. *(*) WARNING: DO NOT ATTEMPT TO RUN THIS PUMP DRY. THIS WILL CAUSE IMMEDIATE AND PERMANENT DAMAGE TO THE PUMP. (**) EXCESSIVE WEAR DUE TO INNAPROPRIATE FLUIDS.*

DISCLAIMER: Swiftech assumes no liability whatsoever, expressed or implied, for the use of this product, and more specifically for any, and all damages caused by the use of this product to any other devices in a personal computer, whether due to product failure, leak, electrical shorts, and or electro-magnetic emissions.

5. Filling up the radiator:

Simply remove the reservoir fill-cap, and fill-up the radiator with a funnel. Adequate level is shown below: