



# MCR "DRIVE" series radiators

## INSTALLATION GUIDE

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



One or more patents pending

### MCR DRIVE-B versions (without pump) 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 3/4" socket screws.

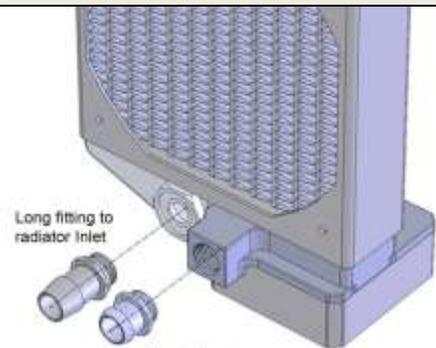


### MCR220 and 320 Drive installation



#### 1. Installation of the fittings:

The MCR Drive heat exchangers are shipped with 2 sets of fittings: 1/2" (12mm) and 3/8" (10mm). Each set is composed of two different fittings: a long fitting that screws into the radiator inlet identified by an "IN" label, and a short fitting that screws into the pump housing outlet identified by an "OUT" label. 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.



Use 5/8" (16mm) wrench or socket to fasten tight.



## 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 configuration, in other words vertical and right-side up, 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 by simply checking the reservoir fill-cap gauge.

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 & flat face-up orientation, 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.

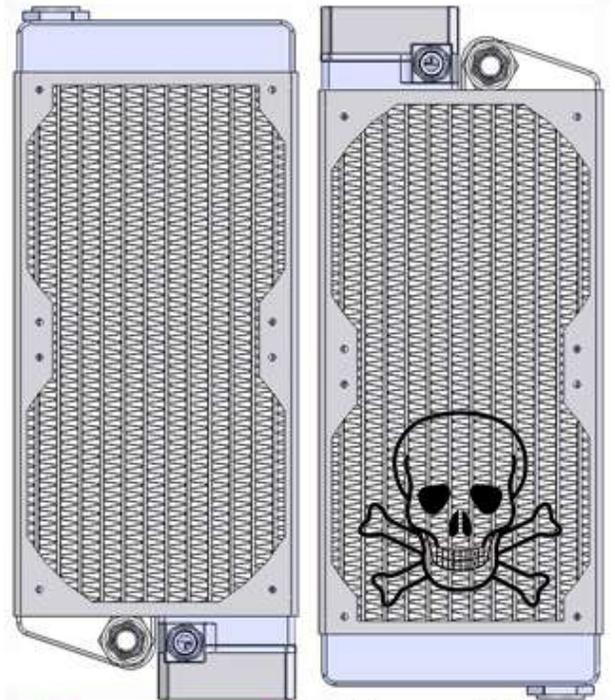
(\*3): Horizontal & flat face-down orientation, typical of an installation on the upper panel of the PC. This orientation would require an external reservoir; however, it is not recommended because depending on the reservoir location there is a risk for the pump of losing its prime if a sufficient amount 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 above the pump, but this is typically impossible since the radiator is already located at the highest point of the PC.

(\*4): Side orientation and fill-port facing up, 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 recommended to avoid this risk.

(\*5): Side orientation and fill-port facing down, 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  
fully functional

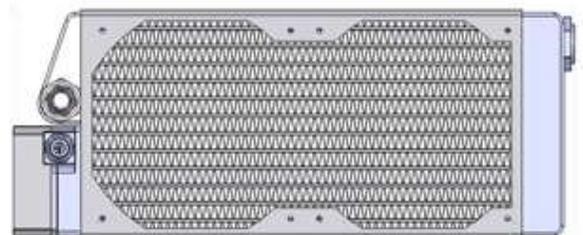
Not recommended for use  
in this orientation (\*1)



Acceptable orientation - non functional reservoir (\*2)



Not recommended for use in this orientation (\*3)



Acceptable orientation - partially functional reservoir (\*4)



Not recommended for use in this orientation (\*5)



### 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:

**Either:** using the provided four M3.5 short screws (1) per fan to fasten the lower lip of the fans to the radiator body, and then another fastener of your choice (not provided) to secure the assembly to the computer panel (3). Standard fan screws often provided with the fans work well to attach the assembly to the panel.

Acceptable replacement short screws types are: either US 6-32, or M3,5. Screw length specifications are: Min: 1/4" (6mm) - **Max: 5/16" (8mm)**

**Or:** using the provided four long screws (2) per fan thru the computer panel (3) and thru the fans to fasten the entire assembly to the panel.

Acceptable replacement long screws types are: either US 6-32, or the supplied M3,5.

Screw length specifications are:

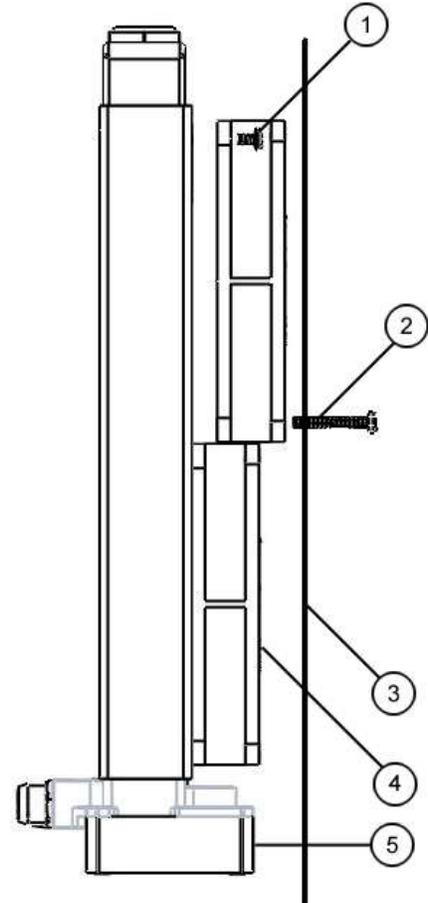
- inch **Min/Max: 1 1/8"** (30mm) this is the only adequate size available in this size range for 120x25mm fans. Use 6-32x1 5/8" or M3,5 x 40mm for 120x38mm fans.

**WARNING: do not exceed the maximum recommended screw length or irreversible damage to the radiator will occur, not 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 : Short screw (4 per fan)
- 2 : Long screw (4 per fan)
- 3: Computer panel
- 4: Fan(s)
- 5: MCR Drive



### 4. Electrical connections, pump general operations, specifications, warranty

#### a/ Electrical installation:

The pump uses two connectors: a standard Molex 4-pin (2 wires are used only) which connects to the PSU connectors, and a standard 3-pin (single wire) which connects to a 3 pin motherboard header, and allows the motherboard to read the pump rotational speed (RPM). This is merely a sensor, and it does not allow speed adjustments.

#### b/ Operating precautions:

**The MCP350 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:

Nominal voltage	12 V DC
Operating voltage range	Minimum 9 VDC to maximum 13.2 VDC
Nominal power (@ 12 V)	8.3 W
Nominal current (@ 12 V)	.69 amps
Motor type	Electronically commutated, brushless DC, spherical motor
Nominal head (@ 12 V)	13.05 ft (4 m)
Nominal discharge (@ 12 V)	~ 92.4 GPH (350 LPH)



Maximum pressure	22 PSI (1.5 BAR)
Temperature range	Up to 140°F (60°C)
Electrical connector	Molex 4 pin
Our noise measurement (non lab environment)	24 ~ 26 dBA in a quiet room @ 2'
MTBF (Mean Time Between Failures)	50,000 Hours
RPM sensor	3-pin connector

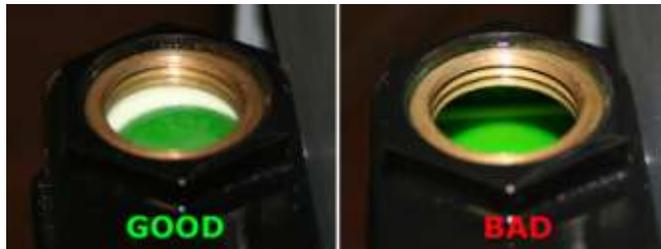
**WARRANTY:** This product is guaranteed for a period of **24 months** from date of purchase for defects in material, and workmanship. Guarantee consists of replacing defective parts with new or reconditioned parts. Guarantee is considered void in case of **improper use (\*)(\*\*)**, handling or negligence 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 INNAPPROPRIATE FLUIDS.**

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**5. Filling up the radiator:**

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



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