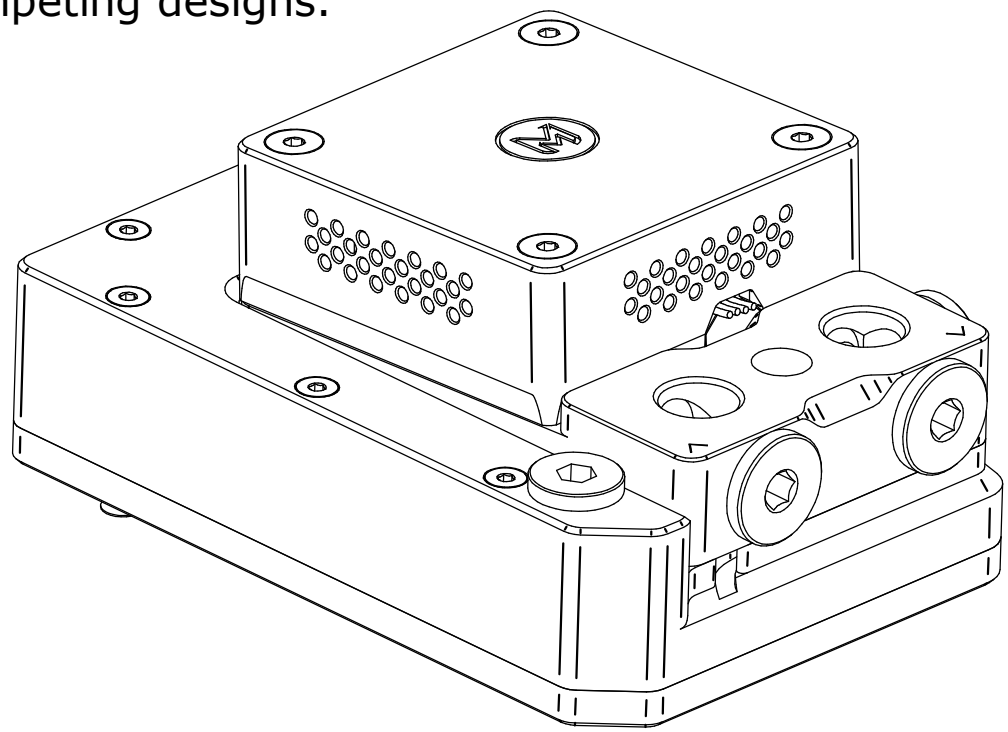
Modultra LORO pump reservoir user manual.

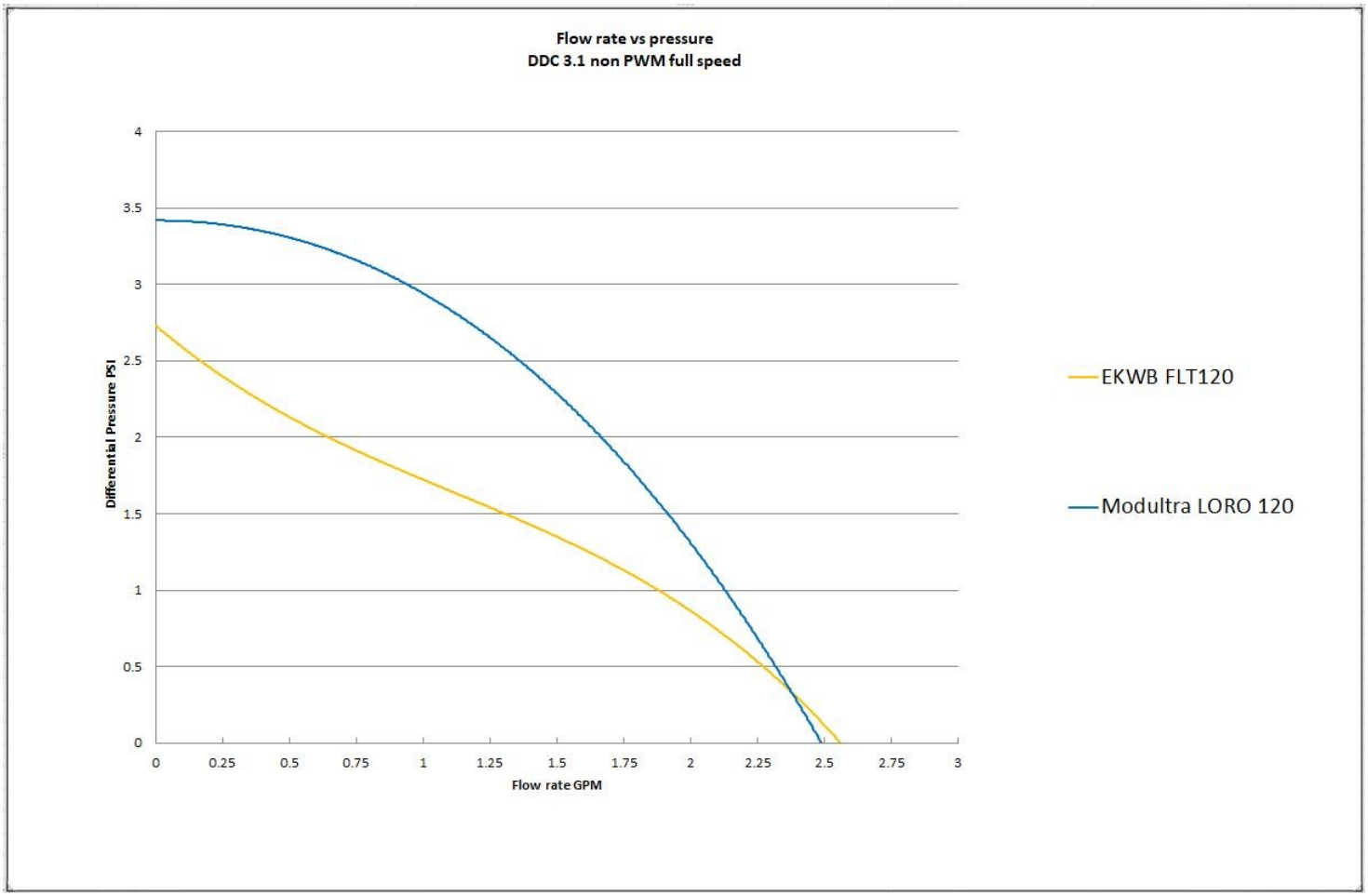
Thank you for purchasing Modultra products. We strive for quality and perfection in everything we do. All of our product line is designed and made in the U.S.A.

Please read instructions carefully before installation. If you do not fully understand these instructions do not attempt installation! Improper installation can lead to motherboard and or CPU damage!

The Modultra LORO short for “low reservoir” is a low profile CNC machined brass and cast acrylic pump reservoir. LORO is avalible in 80, 120 and 240mm versions. This manual covers all LORO versions.

The LORO series pump reservoirs are designed to be compact and efficent pump reservoirs with active pump cooling. Our pump housinsg offer best in class fluid dynamic performace. Our pump housing out flows the competition over 95% of the pump curve. With the LORO series you get better flow, better pressure, better pump cooling and ultimately a better product than competing designs.



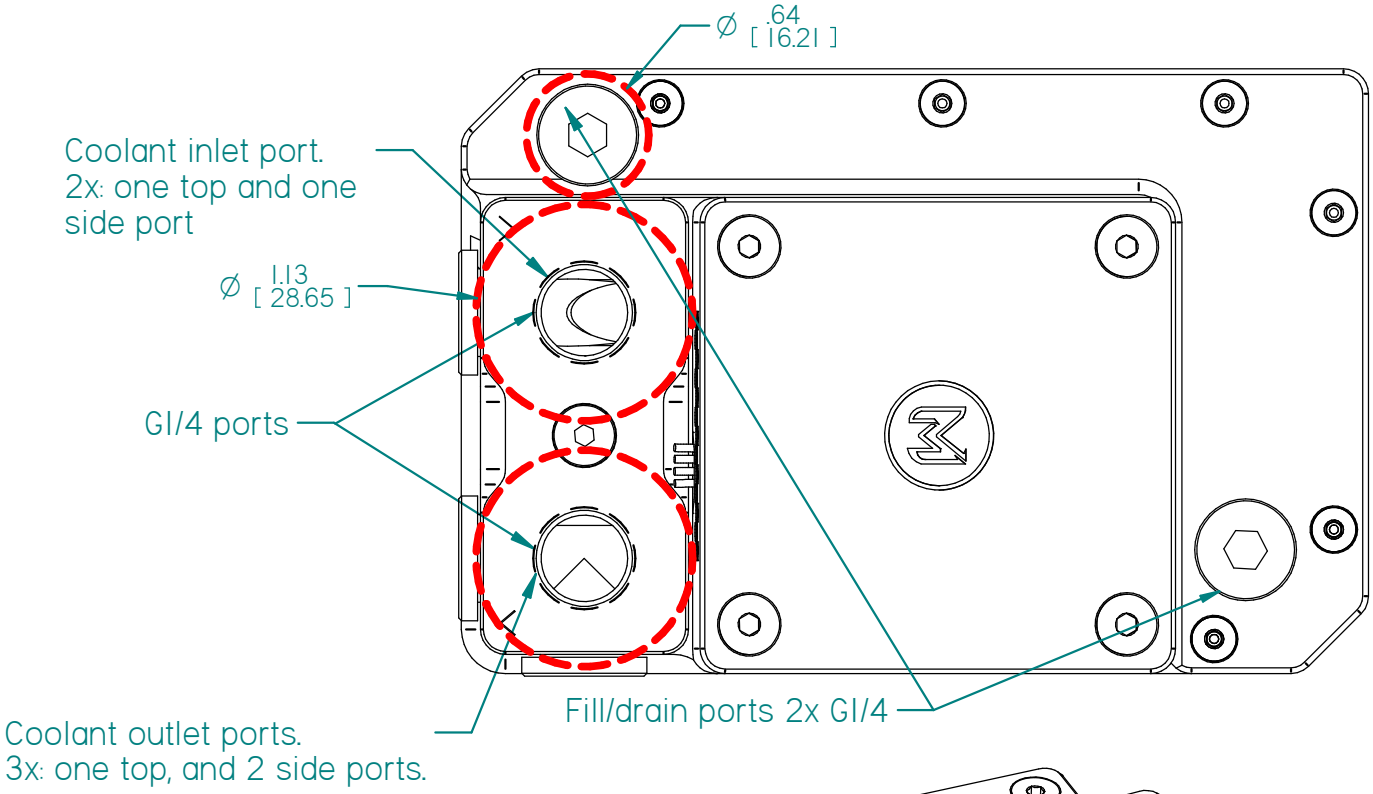


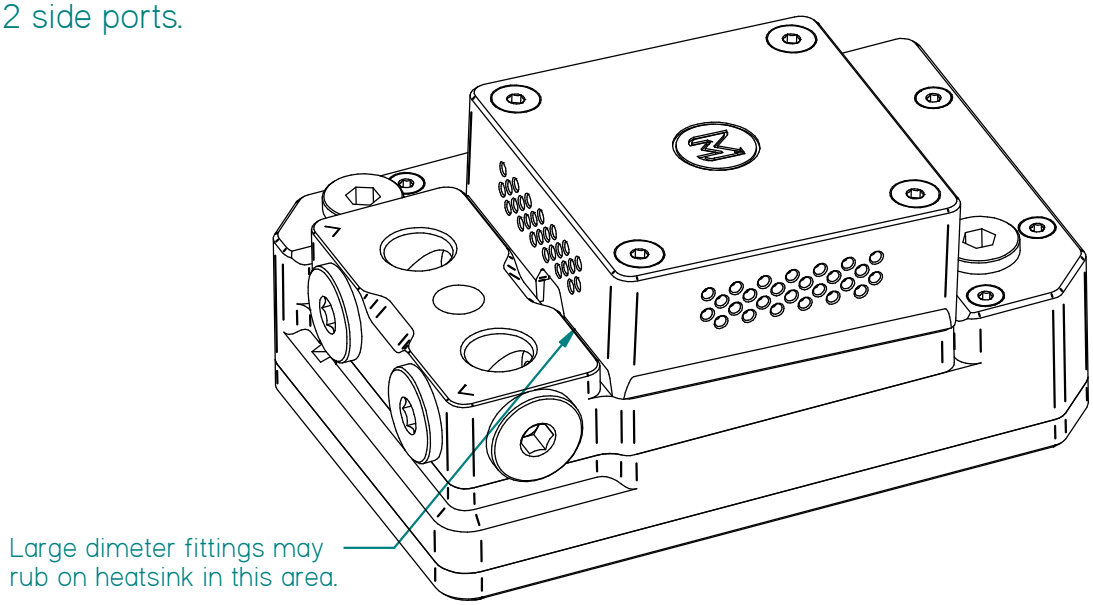
At Modultra we have gone to great lengths to optimize performance on the LORO series pump reservoirs. The design is an accumulation of 6 months of testing and revisions in order to bring this design to market. And the test data says the effort was worth it. Flow testing on the LORO 120 shows that at 1 GPM (3.78 LPM) we offer an 80% improvement in useable pressure head compared to the competitor. Higher head pressure means you get better flow rates on restrictive loops with lots of fitting, blocks and radiators. Or alternatively you can run your pump slower and still achieve the same flow rate as the competitors unit at any given pump speed. Slower pump speeds ultimately mean lower noise, vibration and improved pump life span.

Quick note on fittings sizes.

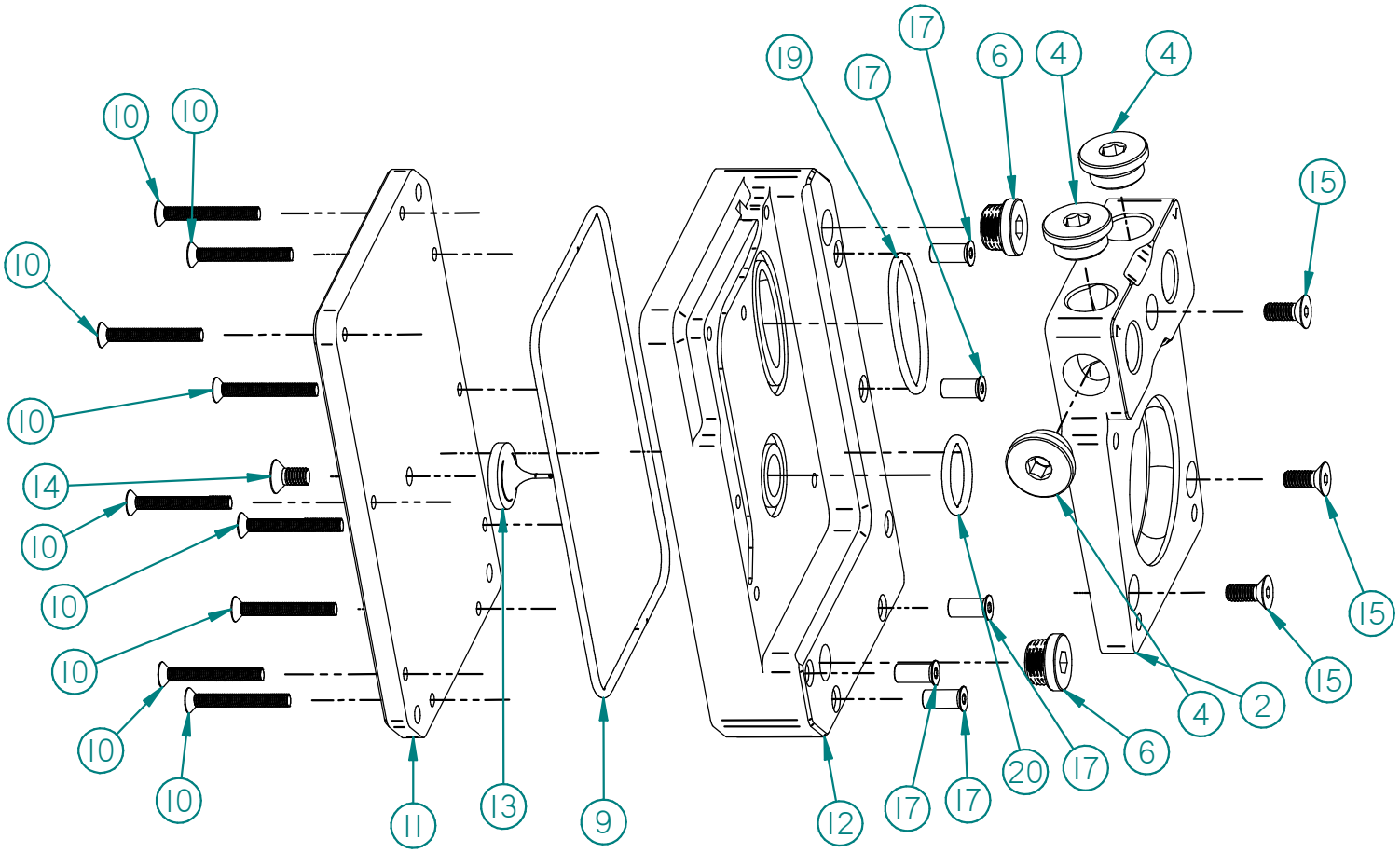
Due to the compact nature of the LORO pump block, top fittings used for cooling loop should not exceed 1.125 inch [28.5mm] in diameter, otherwise fitting may rub on pump hosing, reservoir or heatsink. Pump heatsink may be shifted slightly away from fitting if more space is needed. Side port fittings should not exceed .950 inch[24.1mm]in diameter. Fill/drain port fitting should not exceed .640inch [16.25mm] in diameter.

If pump it shifted too much toward fittings, pump impeller may rub or hit on the volute water cut. If noise or rattling is heard during pump operation, shift pump away from fittings slightly.



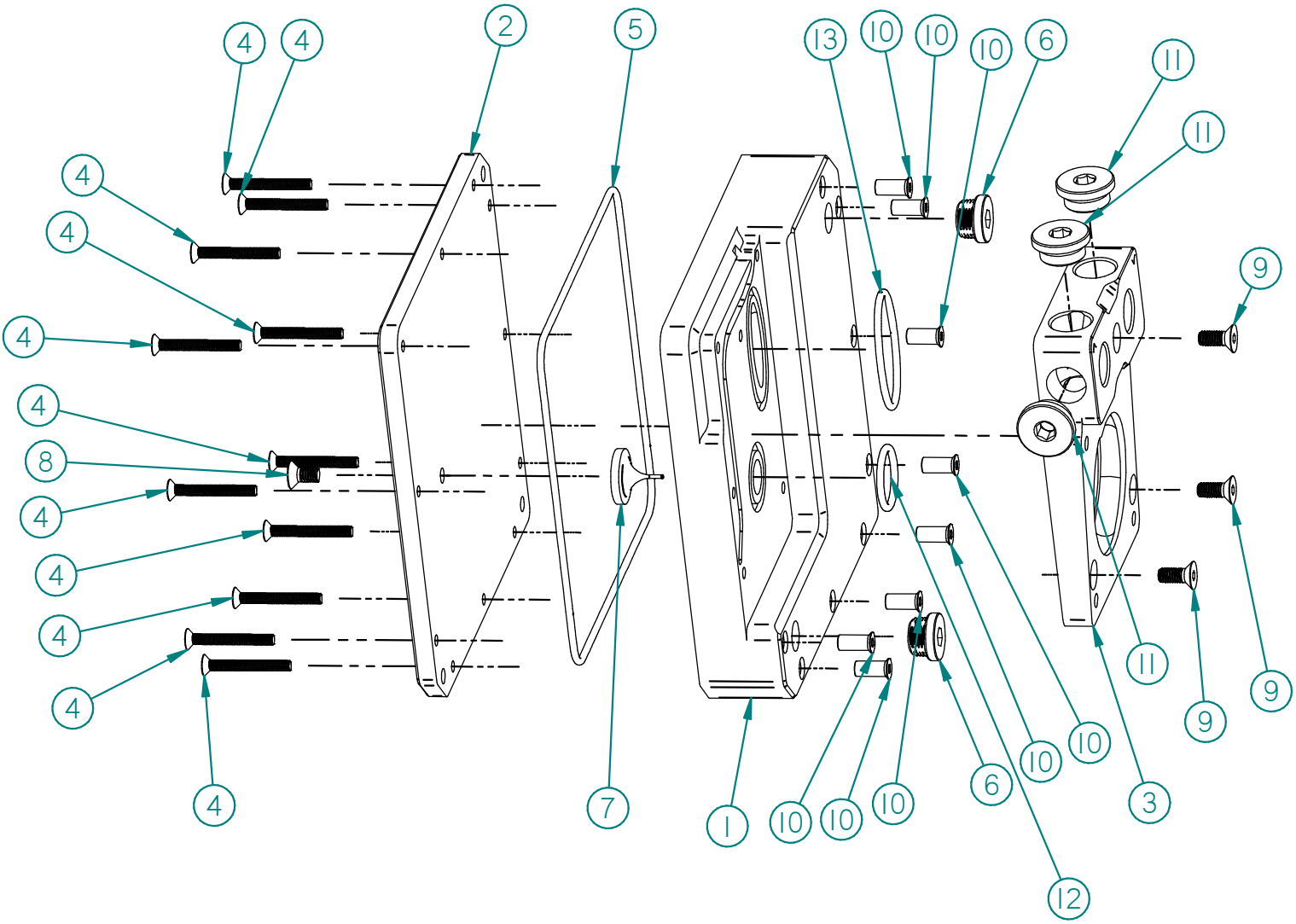


LORO 80 bill of materials



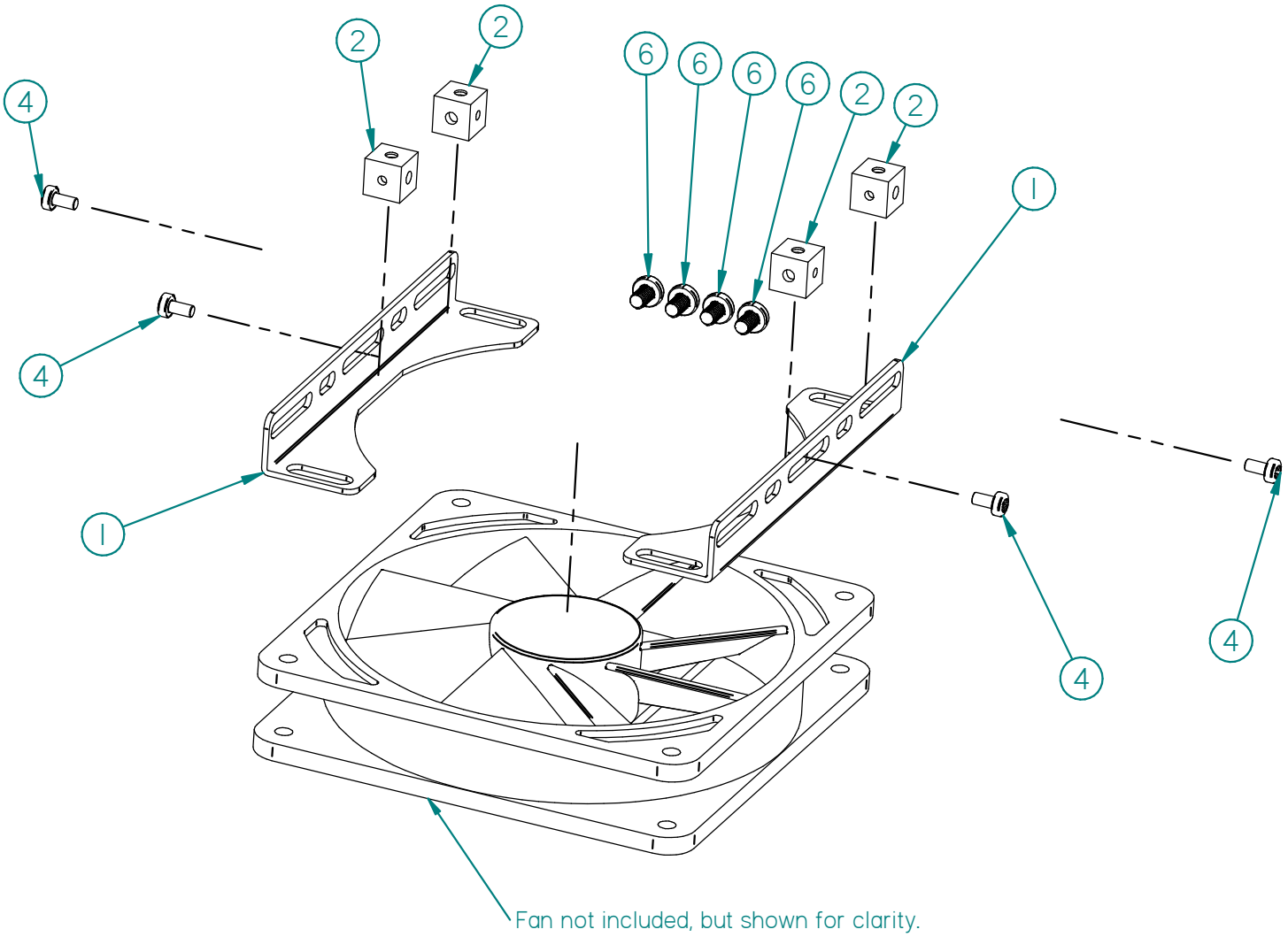
Item	Part #	Description	Quantit
2	MDLR-B-003	LORO Pump housing C360 Brass	1
4	GI-4 plug	G 1/4 plug	3
6	g 1-8 plug	G 1/8 plug nickel brass NPQH-BK-G18-P10	2
9	2x96mmm epdm oring	2mm oring ID = 96mm EPDM	1
10	M3 X 25mm PFH	18-8 stainless Steel Hex Drive Flat Head Screw M3X25	9
11	MDLR-80A-010	LORO 80 lid	1
12	MDLR-C-008	LORO 80 main body	1
13	MDLR-A-030	LORO volute spear	1
14	M4X8MM Flat head	M4 X 8mm flat head screw 18-8ss 92125A188	1
15	M4X10MM Flat head	M4x8 18-8 SS Hex Drive Flat Head Screw 92125A190	3
17	MDLR-B-021	M3 Sex bolt 303 stainless steel	6
19	2x25 epdm oring	2x 25mm epdm oring	1
20	2x15 epdm oring	2x 15mm epdm oring	1

LORO 120 bill of materials



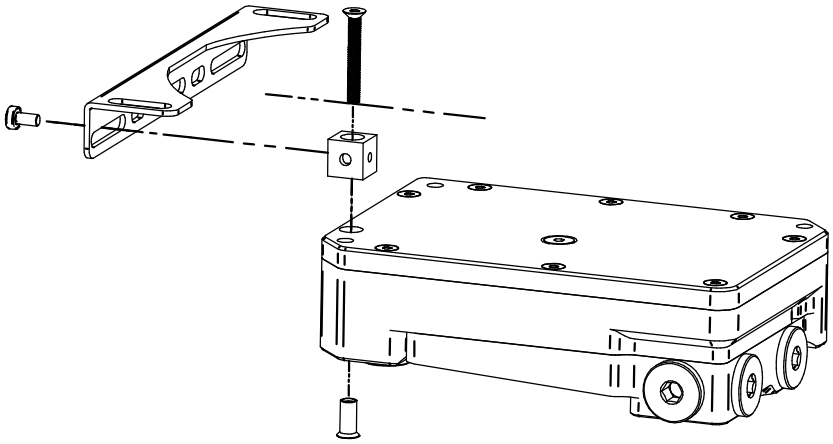
Item	Part #	Description	Quantit
1	MDLR-B-001	LORO 120 main body	1
2	MDLR-A-002	LORO 120 lid	1
3	MDLR-B-003	LORO Pump housing C360 Brass	1
4	M3 X 25mm PFH	18-8 stainless Steel Hex Drive Flat Head Screw M3X25	11
5	loro large oring	2mm x 123mm epdm oring	1
6	g 1-8 plug	G 1/8 plug nickel brass NPQH-BK-G18-P10	2
7	MDLR-A-030	LORO volute spear	1
8	M4X8MM Flat head	M4 X 8mm flat head screw 18-8ss 92125A188	1
9	M4X10MM Flat head	M4x8 18-8 SS Hex Drive Flat Head Screw 92125A190	3
10	MDLR-B-021	M3 Sex bolt 303 stainless steel	8
11	G1-4 plug	G 1/4 plug	3
12	2x15 epdm oring	2x 15mm epdm oring	1
13	2x25 epdm oring	2x 25mm epdm oring	1
14*	MDTR-A-050	DDC heatsink	1

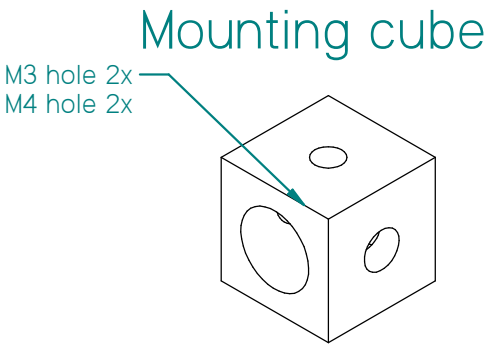
LORO hardware kit bill of materials

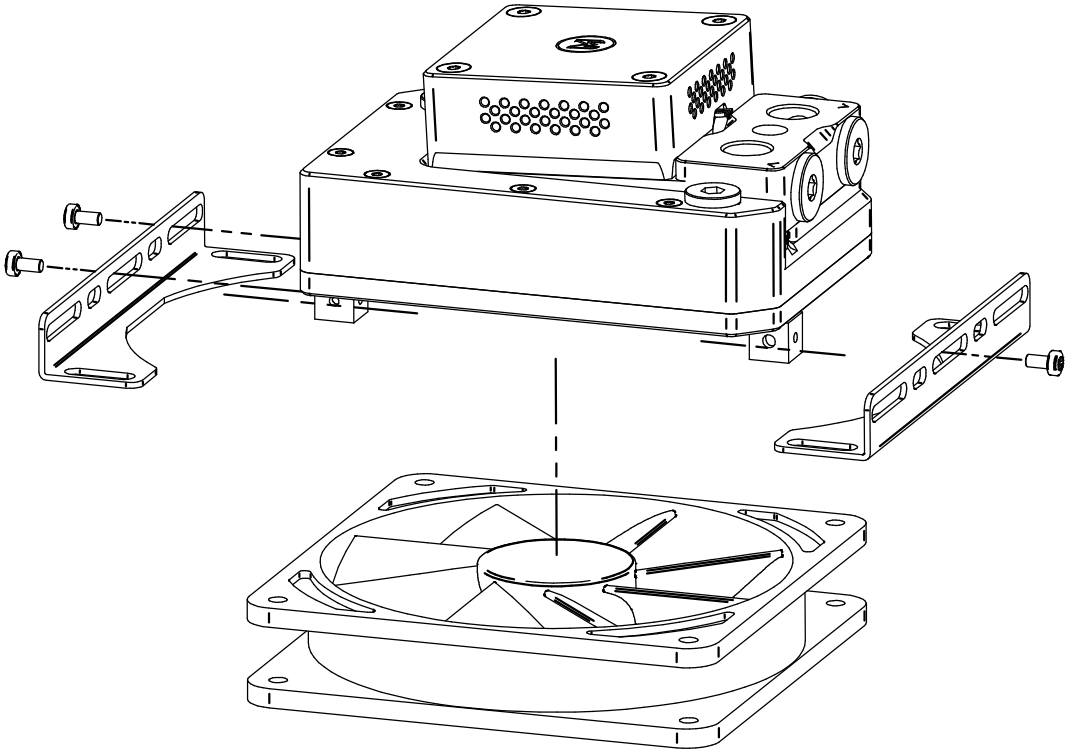


Item	Part #	Description	Quantit
1	MDLR-A-010	120mm Fan mounting bracket	2
2	MDLR-A-007	Mounting cube	4
4	M3 X 6mm PH Pan Hd	M3X 6mm PFH screw	4
6	M4 X 6mm PHS black	M4 black zinc Pan Head Phillips Screws 95836A333	4

L0R0 mounting bracket installation







LORO series pump reservoirs are designed with a high degree of flexibility in mounting. The included mounting cubes can be attached to any of the reservoir lid screw locations. LORO 80 will typically use 3X mounting cubes while LORO120 will use 4. Each mounting cube has 2 M3 and 2 M4 threads perpendicular to the larger mounting hole. Not all holes on LORO are in line with each other so be aware when attaching mounting cubes. Use included mounting screws to attach 120mm fan mounting brackets to mounting cubes after cubes have been installed on reservoir. LORO's also have 4x (LORO120) and 3x (LORO80) M4 threads in the rear for direct mounting on any 120mm fan pattern. Take care when tightening any hardware that threads directly into the LORO acrylic. Very light torque is advised in order to combat acrylic cracking. This applies to the fill and drain ports as well, see figure 6.3, 6.4. Seal oring only needs slight compression in order to seal. If there is a leak the most probable issue is a damaged oring. Further tightening will only increase stress in the acrylic and can leading to cracking over time.

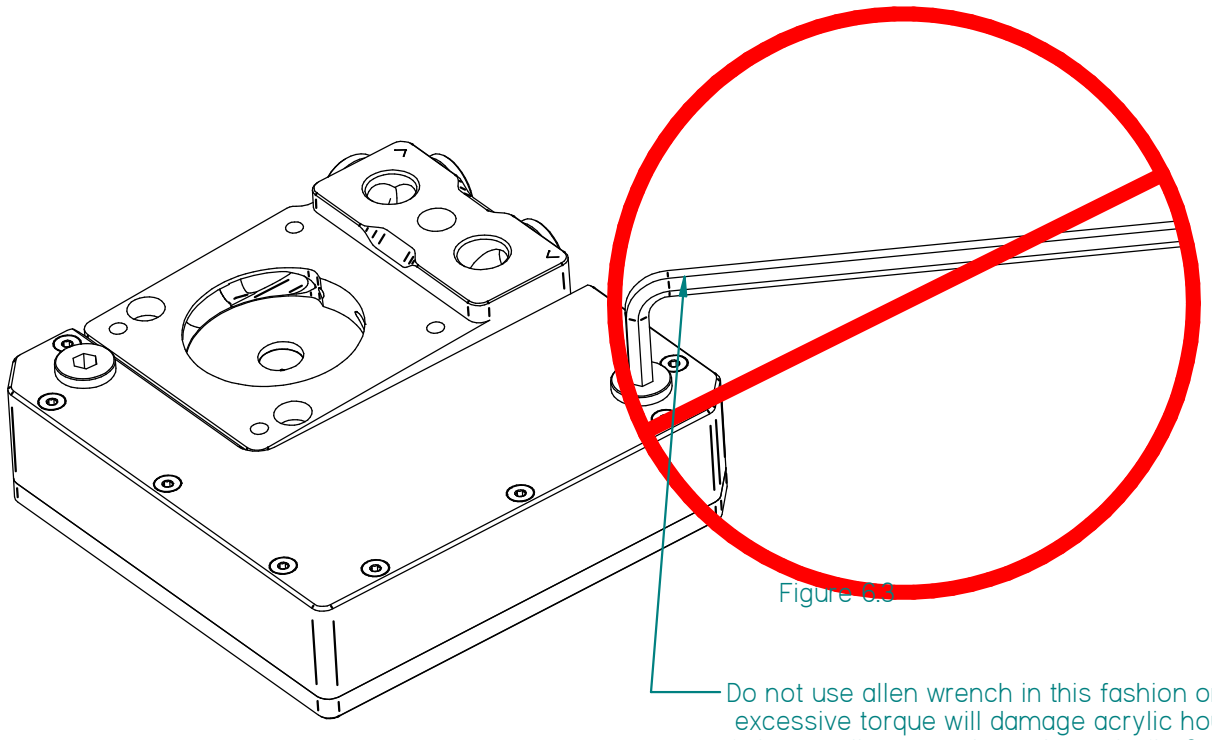
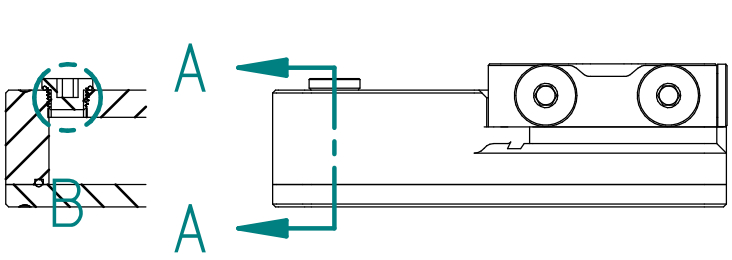


Figure 6.3

Do not use allen wrench in this fashion on fill or drain port.
excessive torque will damage acrylic housing.
Only use allen wrench as shown in fig 6.4



SECTION A-A

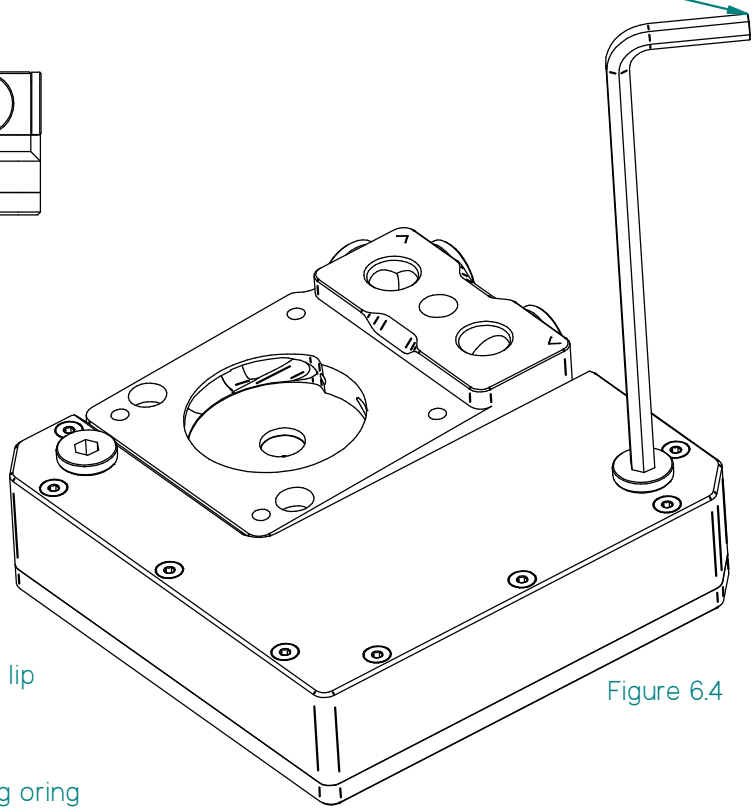
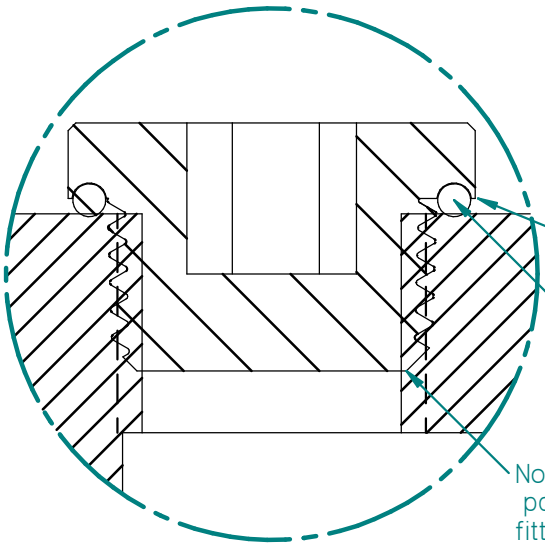


Figure 6.4



DETAIL B

Note on BSPP fitting sealing used in PC water cooling loops: British pipe parallel thread fittings are designed to seal on a captive oring on the fitting. When used in acrylic, BSPP fittings should never be bottomed out, to the extent that the metal lip touches the acrylic top surface. If the fitting is tightened to this extent, thread stress increases significantly. Increased thread stress increases the odds of cracks in the acrylic developing over time.

Pump heatsink installation

Item	File Name (no extension)	Revision number	Quantit
1	Laing DDC 3.1 pwm pump	Laing DDC or clone	1
2	MDTR-A-006	DDC thermal pad 2mm	1
3	Laing DDC oring		1
4	MDTR-A-012	DDC heatsink	1
5	M4 X 30mm PFH	M4 x 30mm flat head	4

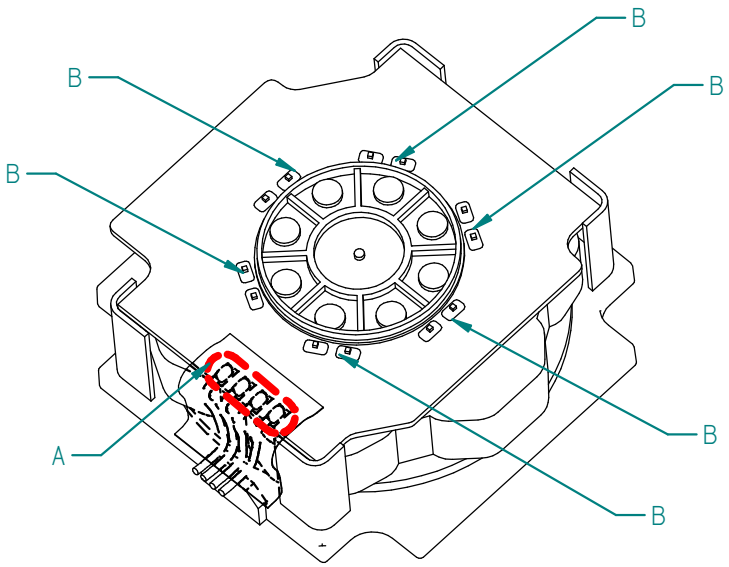
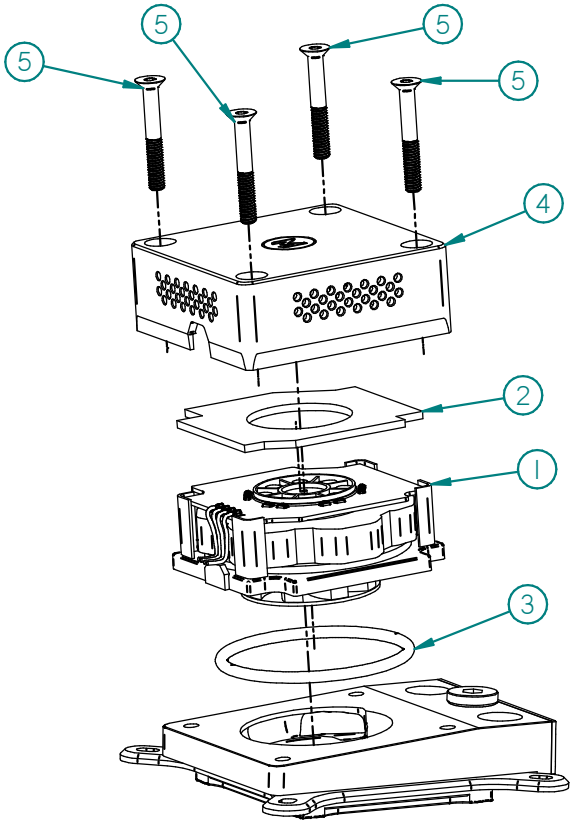


Fig 2.5



The Modultra LORO and heatsink are designed to be used with any Laing DDC or Laing DDC clone pump.

Pump heatsink installation

Step 1 Remove stock Laing ddc pump housing.

Step 2. Inspect pump circuit board area. Any solder leads or wiring protrusion over .078 in or 2mm must be trimmed before installing pump heatsink. Areas where solder leads should be inspected and or trimmed are marked with A and B in Fig 2.5. A small set of side cutters can be used to snip away any long solder protrusions. A small file can likewise be used to file down solder protrusions. In order to gauge heights, use supplied 2mm thick thermal pad for reference. If any solder joint is taller than the supplied thermal pad then trimming will be required.

Failure to trim tall solder joints can cause a ground short to heasink housing, Ground shorts can damage motherboard and or fan controller.

Step 3. Use 1 piece of supplied kapton tape to cover solder joints and pump wiring as shown in Fig 2.6 Detail C. Tape should be applied so that it covers pump wire solder pads and extends down pump wiring toward wire capture boss. If installed correctly, tape will extend slightly outside of heatsink when it is installed. Tape is provided as an additional layer of safety to prevent ground shorts between pump wiring and pump housing. 2 pieces of kapton are provided, one is extra.

Step 4. Apply provided thermal pad on top of pump circuit board. Thermal pad should go over kapton tape applied in previous step. Thermal pad should be oriented so that its perimeter matches the pump circuit board perimeter as shown in Fig2.6.

Step 5 Install heatsink onto pump, taking note that pump wiring will exit through relief cutout on heatsink.

Step 6. Place pump/heatsink assembly onto LOBO block. Do not forget to include pump Oring. Pump/heatsink assembly can mount in any one of 4 directions on LOBO. This can be used to orient pump wiring in preferred direction. After orientation is determined, use provided M4x 30mm flat head screws to attach pump/heatsink to LOBO. If heatsink is installed correctly there should be no gap between the heatsink base and LOBO block. Contact between heasink base and LOBO is essential for heat conduction into loop coolant.

Step 7. If user has a multimeter avalialbe it is good practice to test for ground shorts between pump wiring and heatsink. After installation remove one heatsink mounting screw. Next unplug pump connector. Use mulitmeter to check continuity between all pump wires and inside of removed screw hole. It may be nesscary to scratch paint off on wall inside screw hole to get proper contact.

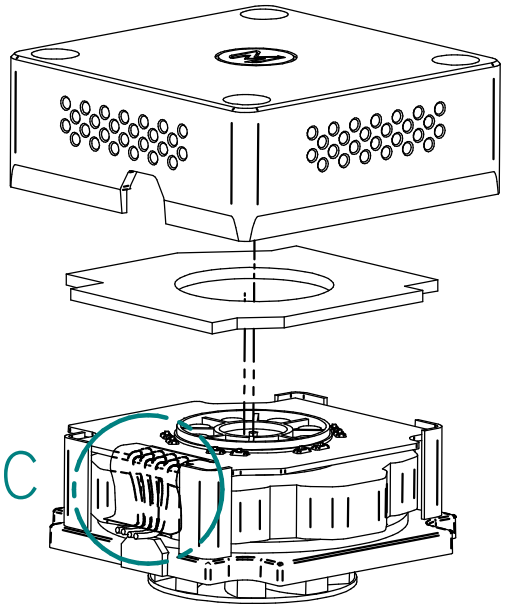
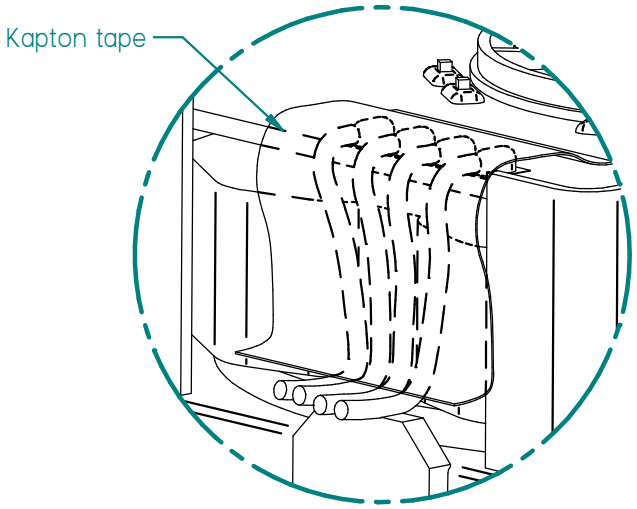
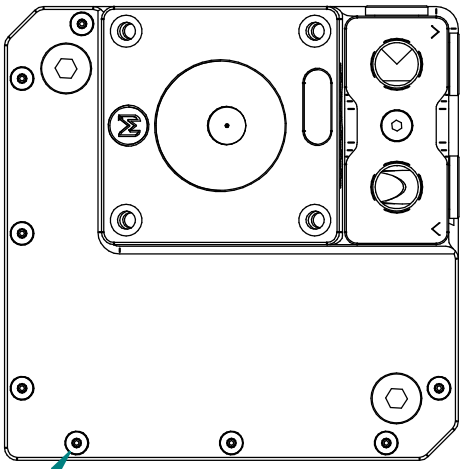


Fig 2.6

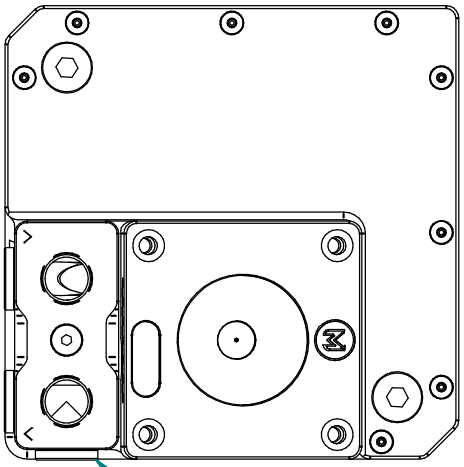


DETAIL C

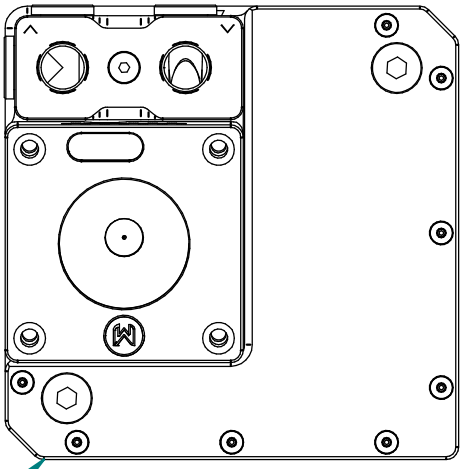
L0R0 orientations



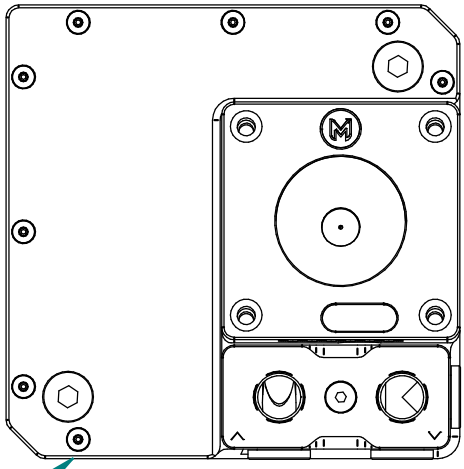
This orientation can be used but pump inlet will be close to reservoir top. Care must be taken to ensure reservoir does not run low. Low fluid level will mean pump can run dry and system can overheat.



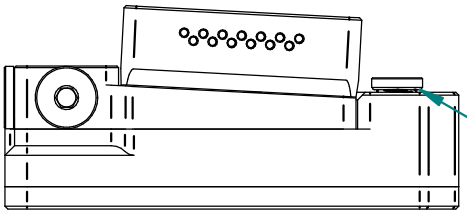
Best orientation



Good orientation, fluid leve must be kept above pump inlet.

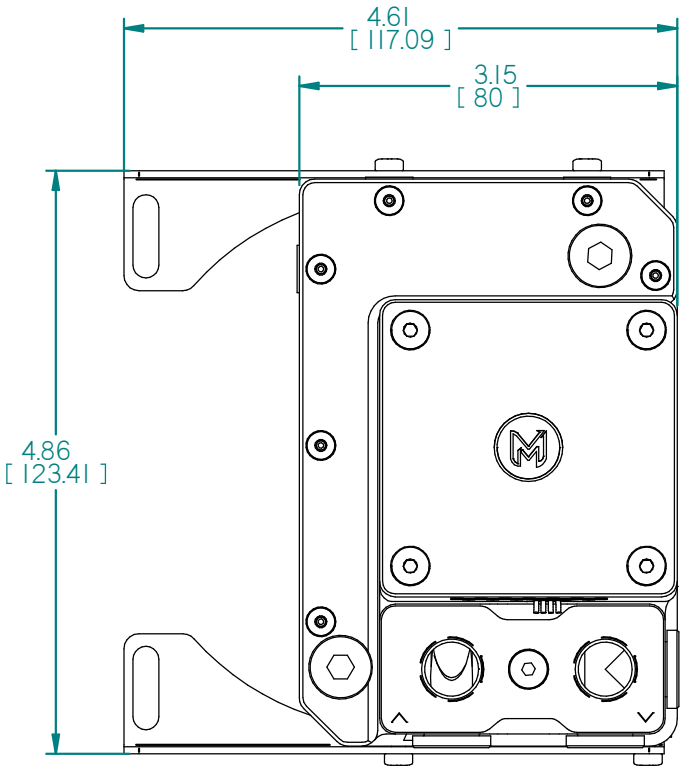


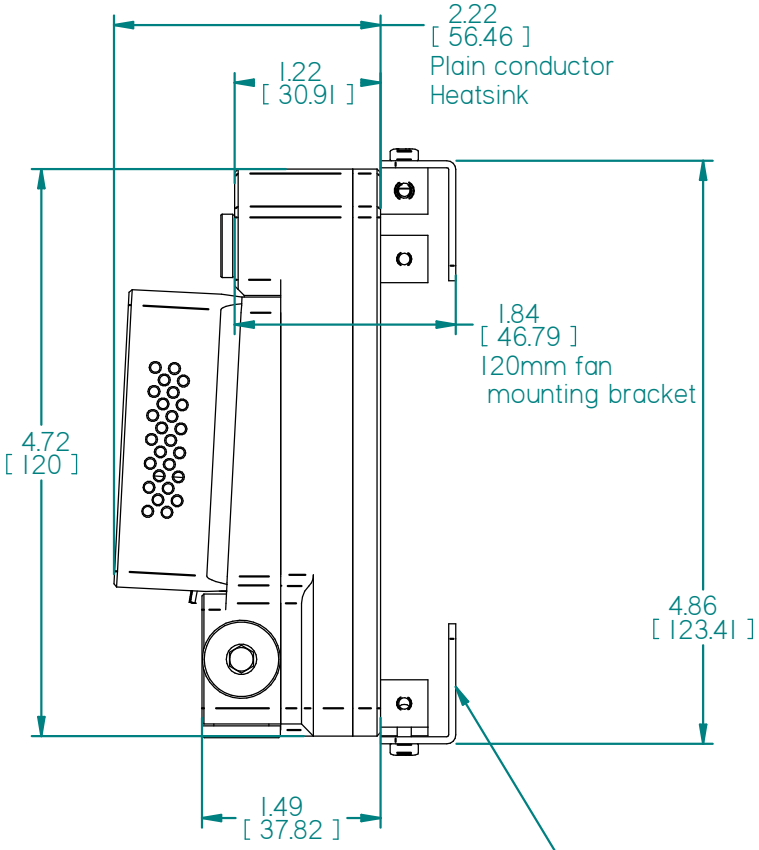
Good orientation, care must be taken during bleeding as air can be trapped in pump volute. Make sure to rotate chassis during bleeding procedure. Also fluid leve must be kept above pump inlet.



L0R0 can be used in this orientation, howerve pump manufacturer does not reccomend, as air pockets can be trapped inside pump impeller causing premature bearing wear.

L0R0 80





L0R0 120