

Series DDC

DC Electronically Commutated Spherical Motor
Centrifugal Pumps



Applications

Specifically designed for the following uses:

- Electronics Cooling
- Medical
- Water Circulation
- Chiller Systems
- Liquid Transfer
- General Purpose Pumping

Specifications

Pump

- Max Capacities: 2.3 GPM
- Max Head: 20'
- Pipe Connections:
1/4" NPT and 3/8" Hose Barb
- Maximum Working Pressure: 21.75 PSI
- Maximum Temperature: 140° F
- Rotation: counter clockwise when
viewed from the motor end

Motor

- Electronically Commutated DC Spherical Motor
- 8-13.2 DC Volt
- Automatic Overload Protection

Features

Compact Design

Unique, low profile space saving design provides easy installation.

Mounting

Pump is designed to be mounted horizontally with discharge.

Optional Tach

The tach signal is an open collector type max 20mA, max 24v, 2 pulses per revolution.

Motor Foot

Integrated plastic mounting feet available.

Construction

Available in 316SS fitted thermoplastic.

Ceramic Bearing Ball and Carbon Bearing Cap

High density ceramic bearing ball and graphite impeller bearing cap designed for high efficiency and long life.

Impeller

Highly efficient and dynamically balanced impeller with carbon bearing for smooth ultra quiet operation.

Casing

Casing is Volute type thermoplastic construction.

Mechanical Seal

Unique patented design has no mechanical seal which is a potential leak path.

Motor

High efficient spherical motor design, ultra quiet, ultra efficient. Pump is designed for continuous operation. All ratings are within working limits of the motor.

Electronics

Embedded microprocessor control is self regulating and available with variable speed with PWM input or dial control (potentiometer) on the pump.

Noise level

Whisper quiet, less than 40 db.

Weight

Lightweight construction weighs 7oz.

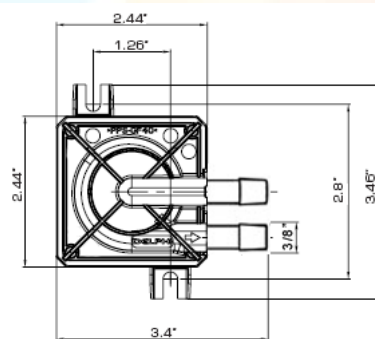
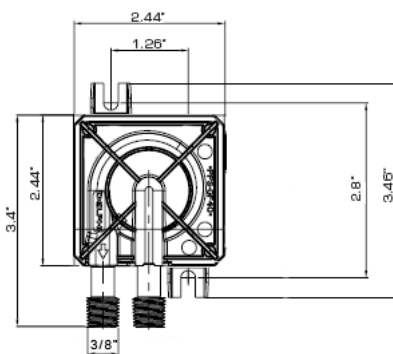
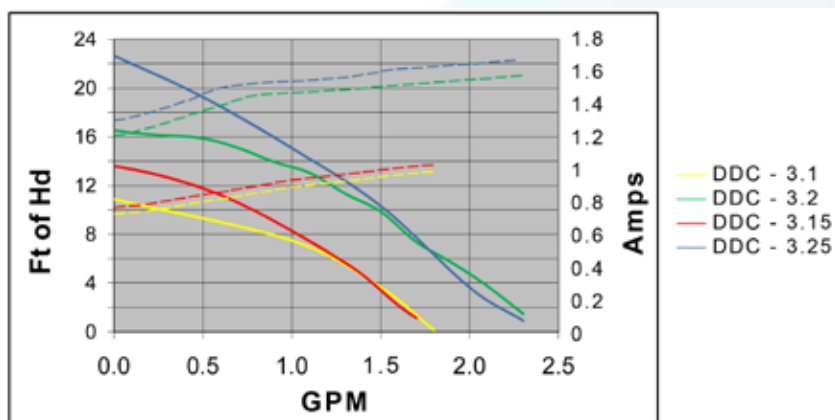
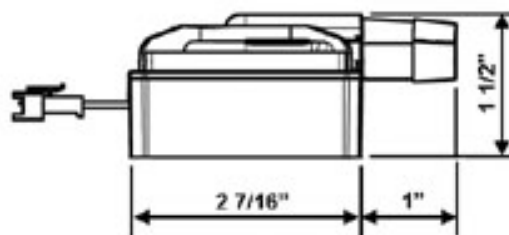
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Materials of Construction (Wetted Parts)

Part	Materials
Pump Housing	Nylon/PPO
"O" Ring	EPDM or Viton
Impeller	Nylon/PPO
Bearing	Carbon/Allumina Ceramic
All Other Wetted Parts	316 Stainless Steel or Plastic



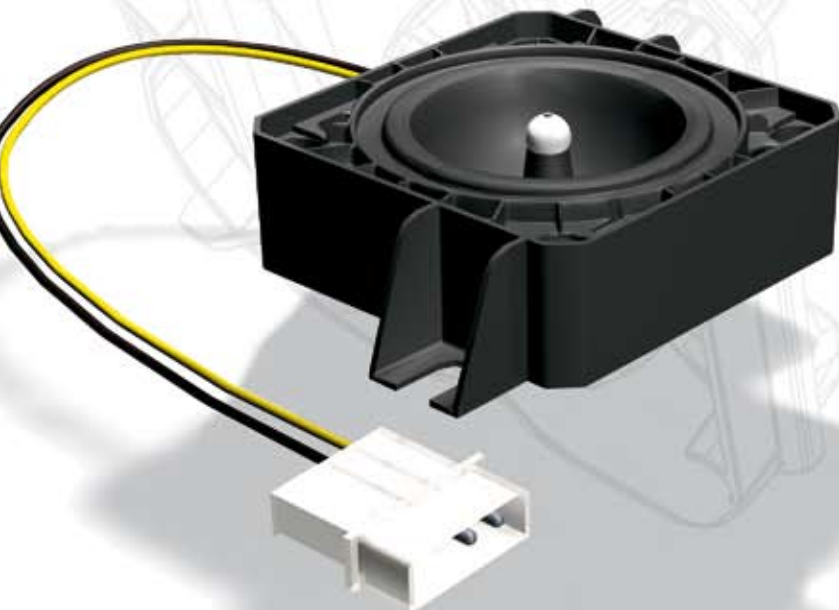
12 Volt DC pumps

ddc

Laing, leader in innovation,
supplies pumps for the world's
first mass produced liquid-cooled
workstation!



- Quiet
- Compact
- Powerful
- Durable
- Maintenance-free
- Low power consumption



The tiny heart of various
circulating systems:
**Fits wherever a
durable and quiet
circulator is required!**

LAING

simply the best • by design

12 Volt DC pumps

ddc

Application

The Laing DDC is the world's first pump to be used in mass produced water-cooled workstations, and presents an ideal solution for liquid cooling of processors and electronic components. Besides a lot of Online-Mentions, the Laing DDC is also awarded with the Innovation Award of Baden-Württemberg, known as one of the most innovative regions in Germany and Europe. Due to its size and output, the Laing DDC can also be used in a large number of applications.

Design

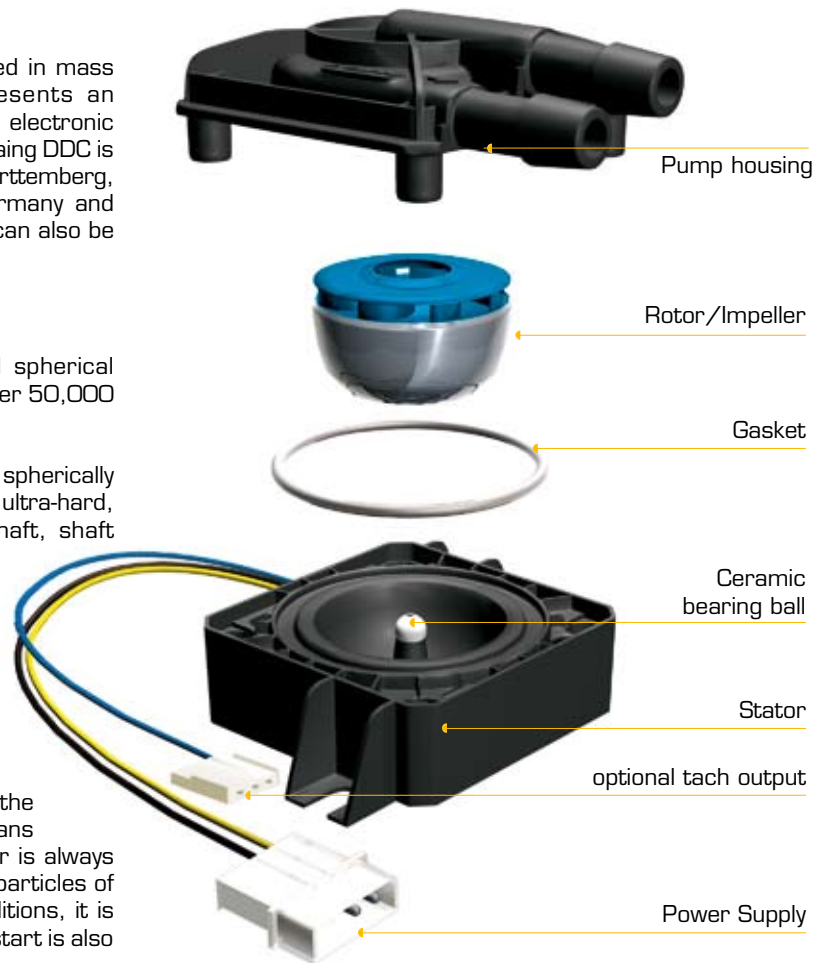
The Laing DDC is an electronically commutated spherical motor pump, with an expected service life of well over 50,000 hours.

The only moving part in a spherical motor pump is a spherically shaped rotor/impeller unit, which is seated on an ultra-hard, wear-resistant ceramic ball. The conventional shaft, shaft bearings and shaft seals have been eliminated.

The spherical bearing of the rotor/impeller unit on the ceramic ball offers a number of advantages. One such advantage is that the occurrence of bearing play – and the associated increase in noise – is not possible due to the principle involved. Consequently, the pump continues to work quietly throughout its entire service life. The bearing is self-realigning. It is lubricated directly by the medium being pumped (wet rotor design). This means that the pump is maintenance-free. Since the rotor is always magnetically held in the designated position, small particles of dirt do not present a problem. Under normal conditions, it is impossible for the rotor to become locked. Reliable start is also ensured even after long periods of shutdown.

The permanent magnet rotor/impeller unit is driven by the magnetic field generated by the surrounding stator. The stator is wrapped entirely around the rotor. As a result, the entire pump is only slightly taller than the rotor itself, measuring only 1.5" in height, perfect for applications where space is limited.

The spherical motor design permits economical operation with comparatively high output. Supply voltage variation provides a simple means of controlling the speed of the DDC pump over a large output range. All parts in contact with the medium are 100% corrosion resistant. With an optional tachometer output, it is possible to monitor the speed of the pump directly.



Technical Data

Motor design	Electronically commutated spherical motor
Rated voltage	12 Volt DC
Power consumption	DDC 3.1: max. 12 Watt DDC 3.2: max. 18 Watt
Voltage range	8 to 13,2 Volt*
Acceptable media	Water; Water-/Glycole Mixtures**, other media on request;
Max. system pressure	21.75 PSI
Max. system temperature	140° F
Wetted parts	Stainless steel 1.4571, PPS-GF40, EPDM gasket, Aluminium oxide, carbon; PA6.6 GF35

*minimum startup Voltage 9 Volt

** check pump performance for mixtures of 20% or more glycole

ddc DC pumps incl. 12 Volt power cord (2.4 ft)

Laing offers various models of the DDC pump.
Model designations*:



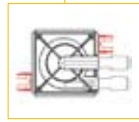
Model DDC 3.1 or
model DDC 3.2



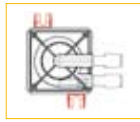
T: tach output
blank: no tach output



P: plug
blank: no plug



MP: Mounting feet parallel
MC: Mounting feet cross
blank: no mounting feet



NPT: 1/4" NPT
blank: 3/8" hose barb

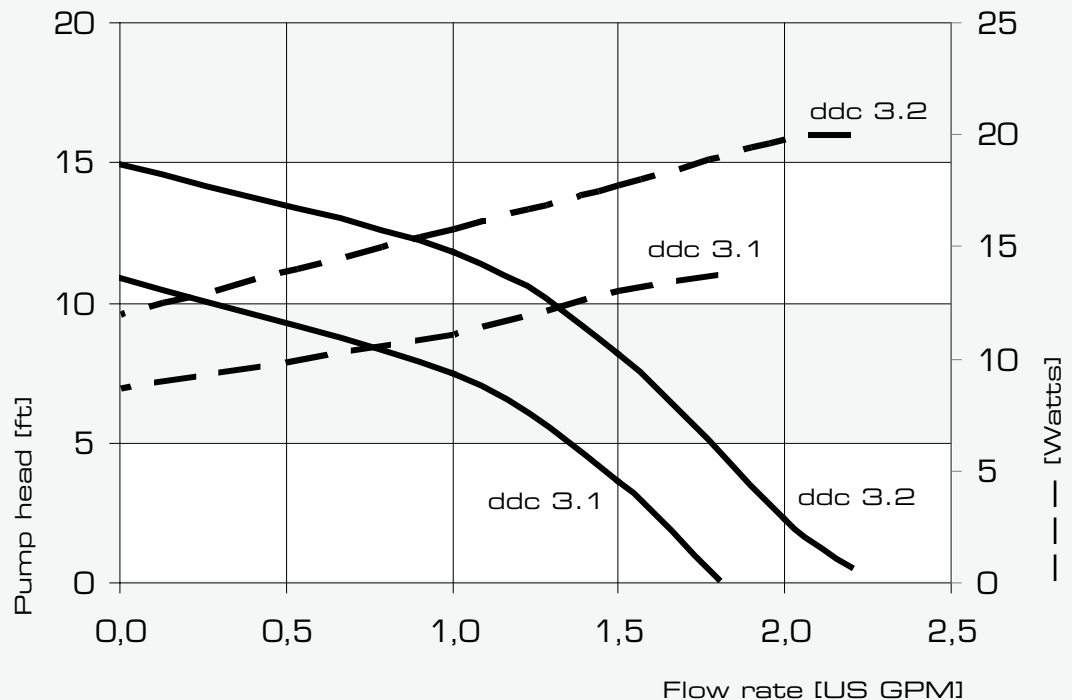
ddc vc

Inclusive pressurized expansion tank (optional feature for OEM use only)

For OEM use Laing also offers DDC pumps with integrated pressurized volume compensator.
Please contact us for further information.

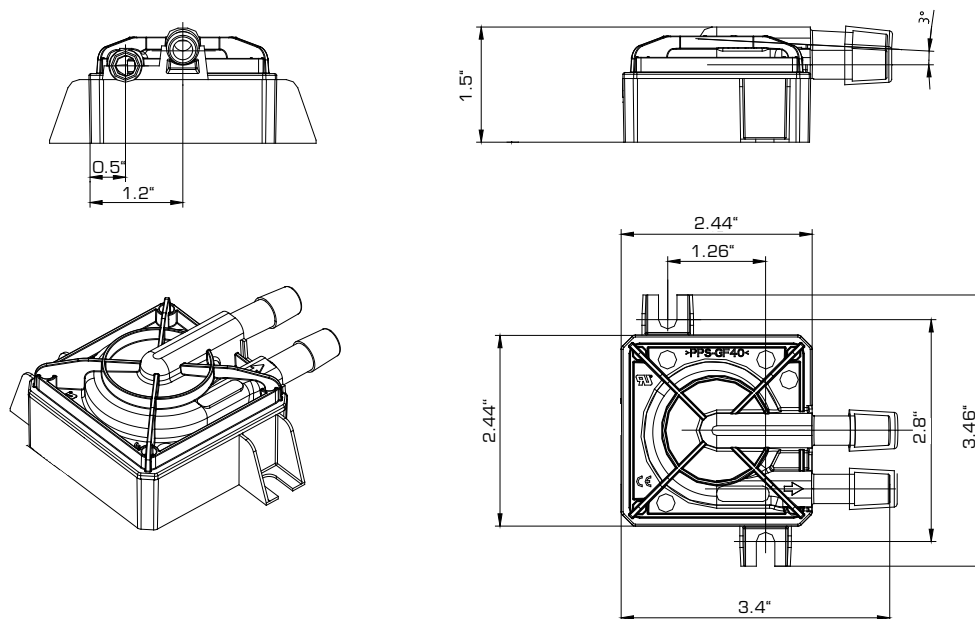


Pump curve

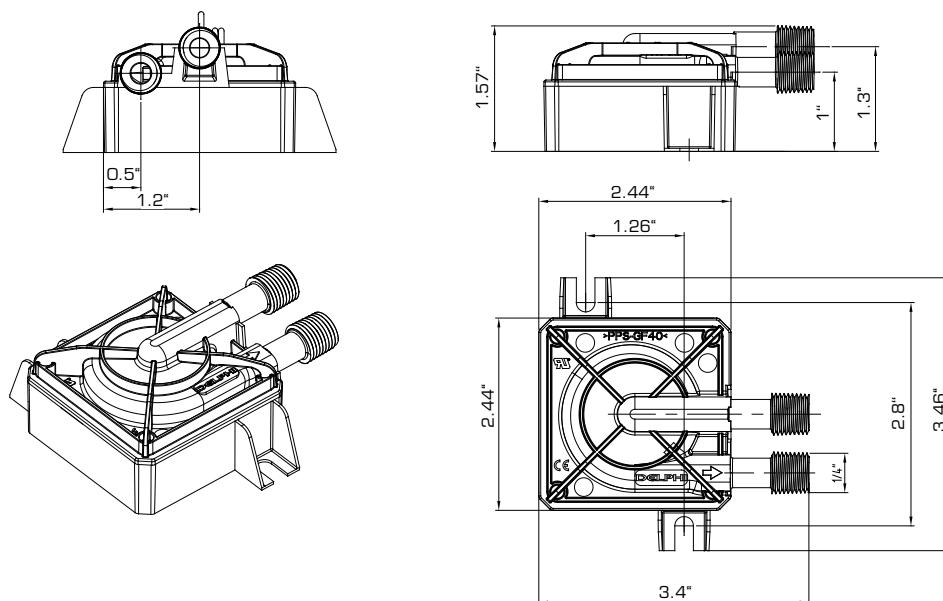


Dimensional drawings DC pumps Laing ddc 3.1 and ddc 3.2

With 3/8" hosebarb connection:



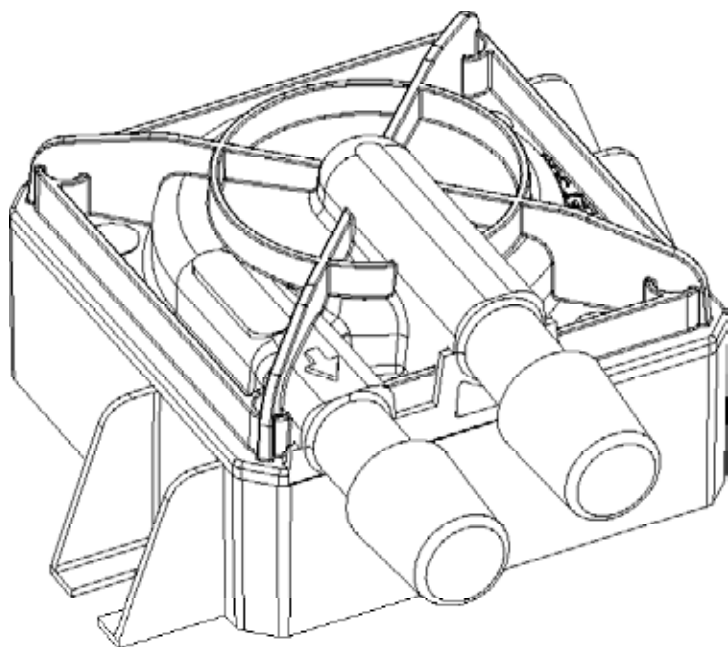
With 1/4" R male connection:



BR-23 (06/07) Subject to change without notice

LAING

Installation and instruction manual for Laing DDC-3 series pumps



LAING

simply the best · by design

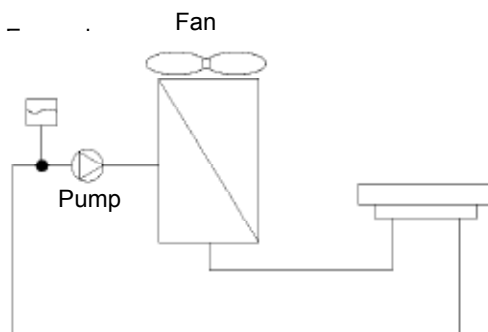
Application

The Laing DDC-3 series pumps are primarily used for the circulation of cooling liquid in liquid cooled computers.

Construction

- The Laing DDC-3 pumps are spherical motor pumps, which provide very quiet operation and long life.
- The motor is electronically commutated and the pumps consequently have a high efficiency.
- The electronic commutation creates a sine wave voltage, practically eliminating commutation noises.
- The DDC pump is supplied with and without mounting feet and either 3/8" hose barb or 1/4" male thread connections

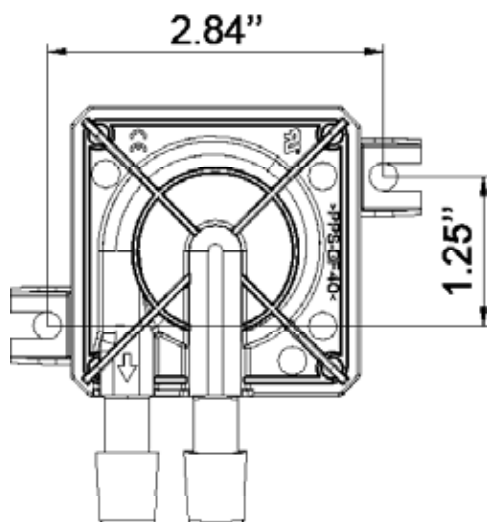
Installation



The pump is ideally installed in the cooling loop before the air cooled heat exchanger. In this way, the waste heat of the pump itself is added to the cooling loop downstream of the CPU

- An expansion tank needs to be mounted on the suction side of the pump. The expansion tank must be sized such that there is always sufficient liquid in the system.
- The pump must be mounted below the level of an open expansion tank.
- Ideally the pump should be placed at the lowest point of the system.
- The pump is mounted on a flat surface. Avoid bending the pump by over tightening of the screws.

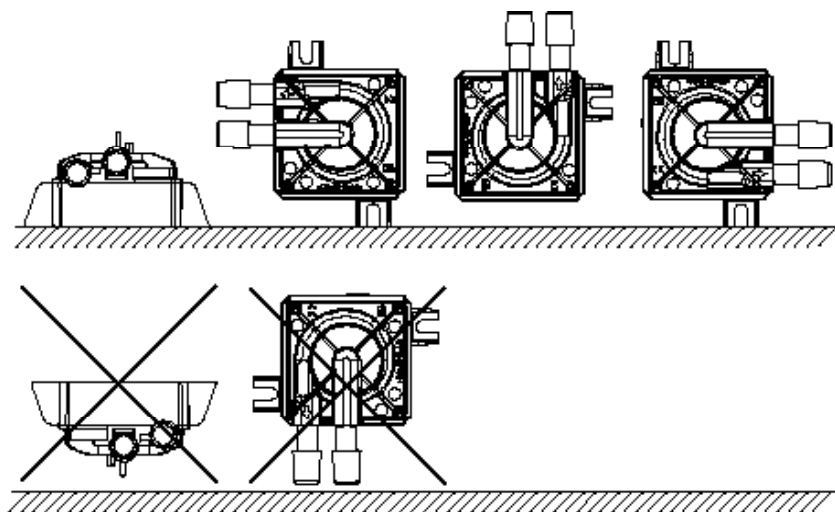
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Drilling dimensions for the mounting holes (inches)

Installation position

The pump can be mounted either to a wall or on the bottom of the computer. The pump must not be mounted with the motor pointing up and it must not be installed pumping downwards (Pump can be mounted through bottom plate with two 4mm x 10mm screws, trilobular for plastics, plastite).



Electrical connection

- The DDC pump runs on 12 Volt DC. If you install a pump without connector, make sure to observe the correct polarity.
- DDC-3P and DDC-3T are equipped with a connector for the power supply.
- The fan connector of the DDC-3T can be plugged into a fan receptacle on the motherboard to enable monitoring of the pump rpm.

Start-up

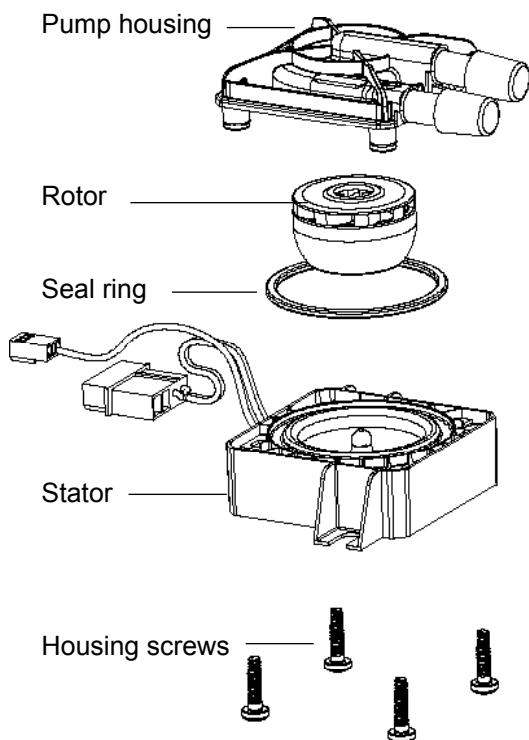
- The cooling loop must be fully operational before starting the computer because the CPU otherwise can overheat in a very short time and can suffer damage.
- Before starting up the pump make sure that the loop is completely filled.
- Start the pump
- If you can hear an audible noise, air is left in the pump. Switching the pump on and off several times can accelerate the purging of this air. Disconnect the power plug and reconnect it after approx. 2 seconds.
- While purging the air observe the liquid level in the expansion tank. If the liquid in the expansion tank is exhausted, air will be sucked back into the loop continuously.
- If the system does not run quiet after several minutes of purging stop the pump and re-fill the system.
- Avoid running the pump dry for prolonged periods since this will damage the bearing.

Maintenance

- The pump does not require any maintenance. There are no user replaceable parts in the pump.
- It is important for trouble free operation of the pump that there is always enough liquid in the pump, since dry run damages the bearing and leads to reduced flow or interruption of the pumping operation.
- Air in the system will cause audible noise and therefore can be easily detected.
- If there are foreign particles or deposits in the system, please follow the instructions listed in the troubleshooting section.

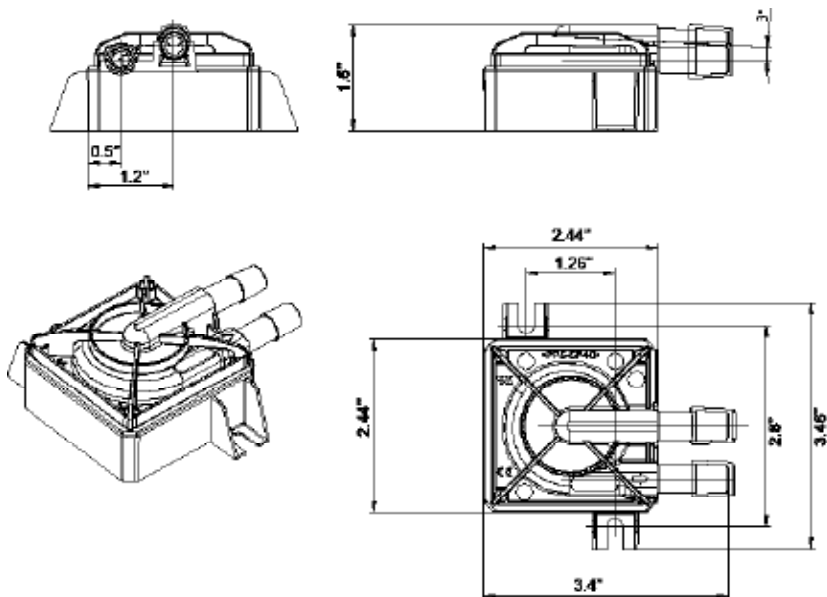
Troubleshooting

- If the pump does not operate, please check first whether the power supply is operating correctly.
- If this does not resolve the problem please unplug the pump several times.
- If this still does not result in the pump starting, it is probably blocked by particles or deposits in the system.
- Drain the system and remove the pump.
- Open the pump by removing the four housing screws at the bottom.
- Remove the pump housing and pull out the rotor.
- Clean the rotor and the stator with a clean cloth and purge all dirt from the pump housing.
- After reinserting the rotor into the stator perform a brief run test to make sure that the rotor is spinning up. Caution: To avoid the introduction of water into the electronics the pump should be completely dry before this test is done.
- If the rotor is spinning in the above test, remove the o-ring from its seat and clean it carefully.
- Re-insert the seal ring, place the pump housing on top of the motor and screw it in place using the four screws.
- If the pump still won't work or if the rotor does not run during the run test the pump needs to be replaced.

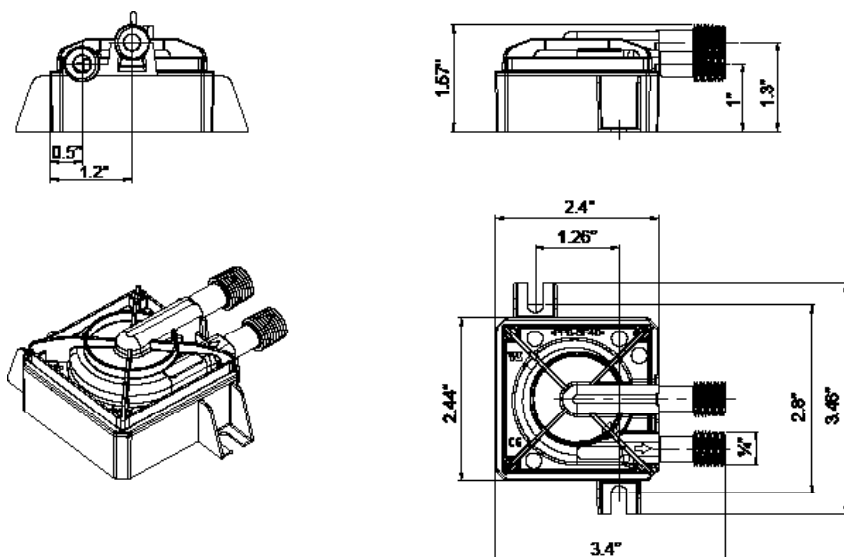


Dimensional drawings ddc 3.1 and 3.2

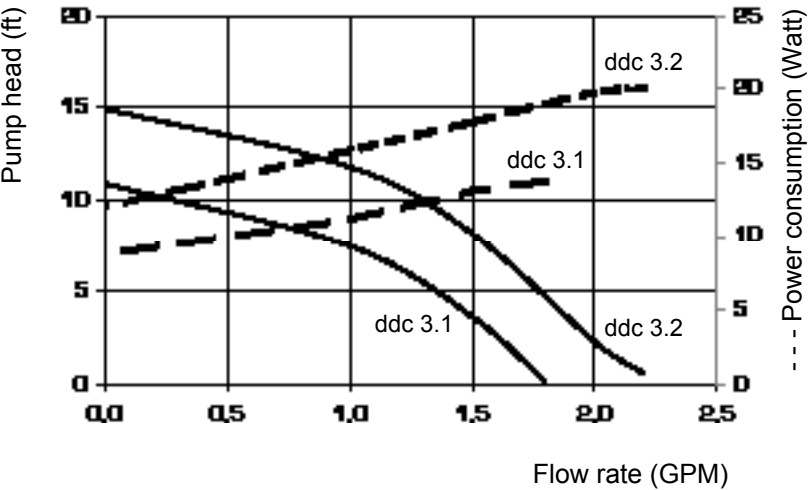
With 3/8" hosebarb connection:



With 1/4" R male connection:



Pump curve





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