

INSTALLATION AND USER'S GUIDE FLOWFRIEND PUMPS

FLOWFRIEND® - HFP90 HIGH EFFICIENCY WATER PUMPS HIGH FLOW - MEDIUM HEAD



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STILOH
FLOWFRIEND IS MANUFACTURED BY STILOH
THE NETHERLANDS**

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**NEVER USE THE DEVICE
! WITHOUT WATER THROUGHPUT !**

1. Foreword

This guide aims to provide you with correct and complete information.

**PLEASE KEEP THIS USER GUIDE IN A SAFE PLACE!
WHEN CHANGING OWNERSHIP, PASS ON
THE COMPLETE USER GUIDE!**

Read this guide carefully before you start to install the product. If you are uncertain about the contents of this guide or do not fully understand the assembly instructions and/or anything regarding this product, please contact the shop where the product was purchased.

This manual is intended to inform you correctly and comprehensively, i.e. also over potential risks caused by the pump. The user, fitter and maintenance technician is responsible for checking compliance with the procedures and advice in this manual. This pump is built using state-of-the art technology and to ensure compliance with existing safety regulations. Nevertheless this device may cause risks for individuals and for property if it is used improperly or not according to its designated use or if safety advice is ignored.

If the pump is used improperly, the liability of the manufacturer and the operating permit are void. For safety reasons, children and juveniles under the age of 16 and people who do not recognise the possible risks or who are not familiar with this manual may not use the device.

The combination of water and electricity can cause serious threat to life and limb when not installed according to the directions or when used improperly.

The General Terms and Conditions of Air-Aqua apply to all products.

2. Defects and claims for compensation, disclaimer

2.1 Defects and claims for compensation

Except in the case of a further claim, we are only liable for defects to the delivered goods until the risk has been transferred to the purchaser. Minor deviations between the appearance and workmanship of the product delivered and the specifications in the contract or minor limitations of usability will be deemed insignificant.

The warranted condition, endurance and usability of the product are solely subject to the specifications agreed in writing, in the product specification and/or

in this guide. Further verbal agreements, especially from preliminary talks, advertising and/or in related industrial standards, are only valid as an integral part of a written contract. Only conditions and specifications specifically laid down by us are valid. We do not accept conditions or specifications laid down by third parties. The specifications laid down in this guide are valid. If the customer wishes to use the product for a purpose other than the intended purpose, he or she is obliged to thoroughly explore the suitability of the product for this other purpose. We give no warranty and accept no liability for any use other than that explicitly approved by us in writing.

Any changes made to the product will result in the loss of warranty and all claims and rights will lapse.

The user is held responsible for the proper use of the pump. The user guide does not discharge you from your liability for the proper and safe application, installation, operation and maintenance of the pump.

On using this guide, you agree that in no circumstances can or will the manufacturer be held liable for any personal injuries or damage to property that might result from using the device. This applies specifically to any damage caused by improper piping or plumbing. Damage due to failure to regularly clean or maintain the pump is not covered by the warranty.

This applies especially to calcinations and accumulated foreign particles such as sand or gravel, which can damage rotors, bearings, rotor housing or motor housing that are not covered by warranty.

2.2

Our warranty for defects is strictly limited to supplementary performance. We will eliminate any defects or deliver substitute goods at our discretion. Where supplementary performance fails or is disputed or impossible, the customer has the right to withdraw from the contract. Air-Aqua and the manufacturer explicitly limit the warranty to the pump itself. We are not liable for any consequential damage or damage caused by a malfunction or failure of the pump, such as loss of animals.

The customer is responsible for providing back-up devices in the case of a potential malfunction or failure of the pump.

2.3

The customer is required to conduct a detailed inspection of the goods immediately after delivery. Any defects should be reported immediately in writing. Hidden defects should be reported immediately after their discovery. The customer should report any damage caused during transport within 24 hours to the carrier and/or the delivery service. If the customer fails to meet the requirement to inspect the goods and report any defects or damage, this will result in the loss of warranty.

2.4

We accept no liability for the improper application, use, maintenance or handling of the product by the customer or its subsidiaries, or for normal wear and tear. This applies specifically to the consequences of thermal, chemical, electrochemical or electrical influences as well as for infringements of our use and maintenance guides. The same applies to damage resulting from changes or adjustments made by the customer, which have not been approved by us beforehand.

2.5

In principle, the customer is responsible for damage directly attributed to the improper use of the product. If the customer returns the product, break-proof packaging should be used. The customer is liable for any damage that can be attributed to inappropriate packaging.

2.6

Claims against us expire within a year after the initial delivery of the goods to the customer. The same applies to damage claims, regardless of their legal cause. The limitation period does not apply to claims based on the malicious concealment of damage, injury to life, body or health or any other damage resulting from intent or wanton negligence.

2.7

If it becomes apparent during our examination of damage reported by the customer or in the course of repairing defects that the reported damage or claims were made wantonly or were unwarranted, we may charge for inspecting and repairing defects. The customer has the right to reject a necessary repair and to demand the return of the pump. In general, every inspection of damage is bound to lump sum compensation if it appears that the customer is responsible for the damage.

2.8 Spare parts

Our liability to deliver and stock spare parts is limited to the period of 5 years after initial shipment of the product. Our respective list prices apply to spare parts.

2.9 Subject to alterations

The manufacturer is entitled to change the product at any time without prior notice being required, as long as these changes improve the reliability or quality of the product. No claims can be made if, for example, the design, functionality or performance of the pump fundamentally changes. The confirmed pump specifications are always guaranteed.

3. General

3.1 Pump and drive description

The synchronously driven, highly efficient, stainless steel pump FlowFriend® consists of a permanent magnet motor, a complete electronic drive with an integrated power module (IPM) and controller hardware

and software with digital signal processor (DSP). The mains inputs are supplied with a power factor correction (PFC) and EMC filters. All drives comply with the EN standards 61000-3-2 the EN 61000-2 and 61000-3 corresponding to the limit value class B according to EN 55011 for single and three phase devices.

The FlowFriend® pump is especially designed and manufactured for high flow and medium head water systems.

3.2 Type codes

FlowFriend®HFP90

H - HIGH

F - FLOW

P- PUMP

90- 90 mm Mixed Flow Impeller

3.3 Warning Notes

Only appropriately trained personnel may commission and maintain Synchronous Compact Drives. These personnel must be familiar with international accident prevention regulations.

Connection and setup must be carried out in compliance with the electricity regulations.

3.4 Symbols used

WARNING – ELECTRICAL HAZARD! DANGER OF DEATH!

Electrical shocks can cause death or serious physical injury to personnel as well as pose a risk to equipment. Ensure that no unauthorised persons are able to gain access to or come into contact with the device. Disconnect the device from the power supply before opening the device or the terminal box. Due to DC link capacitors, hazardous high voltage may remain for up to 3 minutes after disconnecting from the power supply. Never operate the device when the mains is not properly connected to earth.



CAUTION! ROTATING PARTS! AUTOMATIC RESTART!

Please take every precaution to ensure that all rotating parts, including the internal fan, are safe from contact while the motor is running. Operating the device with automatic restart can be a source of danger to operating personnel. After power failure, the motor will only start automatically if it was running when the power failure occurred.





WARNING! HOT SURFACES! RISK OF INJURY! RISK OF FIRE!

Heated surfaces can cause serious physical injury to personnel or ignite material in the near vicinity.



CAUTION!

Before connecting the device, make sure there is no damage. Check the power cable mains plug carefully before connecting.



After plugging in the power cable for the first time, the motor is waiting for input of the desired speed. Please note, the motor will set and store the start up speed automatically after 4 seconds of manually setting the speed. After connecting to the power mains, the motor performs a self-test for about 3 seconds.

4. Use of the pump

Only use the device when no body parts are in contact with the water! Before you reach into the water, always disconnect the pump from the power supply. Compare the electrical specification on the type label of the device with the specification of the power supply. Make sure that the device is connected to an ELCB (earth leakage circuit breaker) with an assigned leakage rating of max. 30 mA (DIN VDE 0100T739). Only operate the device on a correctly installed power plug.

Keep the power plug and the wiring dry! Install the wiring protected in order to avoid damage.

THE WIRING OR THE POWER PLUG MUST NOT BE CUT. DOING SO WILL IMMEDIATELY INVALIDATE ALL WARRANTY AND LIABILITY OF THE MANUFACTURER.

Only use wiring, installations, adapters, extension cables and connection cables with grounding-type plugs, which are approved for outdoor usage (DIN VDE 0620) with sufficient cable diameter. Do not pull on the wiring of the device or use the wiring to carry the device! If the wiring is damaged or broken, the device may no longer be used! Take care that the power plug never falls into water or gets wet. If the plug gets wet, it must be opened by a professional and cleaned by purging with demineralised water. Protect the plug and the wiring from heat, oil, UV light and sharp corners. The manufacturer is not liable in any way for any damage caused by improper installation or by the carelessness of the user or installer.

In general, when put out of service, the pump must be cleaned extremely thoroughly. The pump must be stored in a dry, warm place to prevent condensation/ moisture getting into the electronics which could cause damage when used again.

Before it is put into operation, the ease-of-movement of the impeller must be manually checked. If the impeller cannot be moved round by hand, the pump must be disassembled and cleaned completely. The plug may not be disconnected from the pump whilst the device is in use. This can result in serious damage to the electronic components and cause dangerous situations due to grounding problems.

The wiring may not be modified or replaced. Electrical installations on garden ponds must always comply with national and international directives and requirements. Never open the case of the device or of the appending parts if this is not explicitly suggested in the user manual. Never apply technical modifications of the device. Only use original spare parts and accessories. Only allow authorised customer service facilities to conduct repairs. Never use the pump with any other liquids than water.

If you have any questions or problems, consult an electrician, your dealer or Air-Aqua BV.

5. Fields of application

The FlowFriend pump is suitable for freshwater, brackish water and for pumping other non-aggressive, non-explosive liquids that do not contain oil. It can pump clean as well as – to a certain extent – polluted water. The pump is not suitable for water with larger particles. The pollutants may not exceed 10 mm in size. In general the pump should be used for applications with clean water. Clean water in this case is defined as water not containing solid particles, which could damage the impeller/bearings and/carbon ring/pump housing. Examples of particles or pollutants which are not suitable are sand, lime precipitation or pyrolusite after a manganese peroxide treatment in a pond. Damage caused by such pollutants in the water does not fall under warranty or service.

FlowFriend pumps are most commonly used in filtration systems (aquariums, ponds or swimming pools), industrial circulating systems and/or to supply a beck/ creek or waterfall. The pump is not self-priming and may not therefore be used above the water surface.

Temperature of the liquid: +2 to +40 °C.
Environment temperature: 0 °C to +50 °C
Max. static pressure: 0.5 bar
Protection class: IP55

6. Installation/Fitting

CAUTION:

Before you install the pump, read the manual carefully.

Damage caused because the manual was not read thoroughly does not fall under warranty.

When unpacking the pump, check whether all parts have been delivered completely and undamaged. Any damage detected must be reported to your retailer within 24 hours of purchasing the pump. When unpacking the pump, the inside of the pump may be wet. The pump is tested before it leaves the factory. The pump has to be purged with water thoroughly before usage.

Please check the pump for damage before you operate it. Do not use the pump if it is damaged. Please inform your retailer immediately if the pump is used despite being damaged. Any warranty and liability will then be invalid.

Remove the plug from the electric socket and make sure that the pump cannot be switched on. During the course of the installation, the pump may not be connected to the power supply. To avoid injury, take care not to reach into the opening of the pump with your hands or fingers when the pump is connected to the power supply.

7. Operating the pump

NEVER USE THE DEVICE WITHOUT WATER THROUGHPUT.



THE PUMP CAN AUTOMATICALLY START WHEN THE POWER CONNECTION IS ESTABLISHED.

The pump may only be used in a horizontal position. It must stand on a stable, solid base. The inlet pipe is connected to the suction side of the pump.

It must be assured that the pump can be de-aerated through the outlet. The pump should ideally be placed below water level.

The pump can be only placed out of the water (dry). Adequate air ventilation must be assured. Furthermore the pump may not be exposed to direct sunlight. Place the pump as close as possible to the actual water connection. The inlet piping must therefore be as short as possible.

We strongly recommend placing the pump below water level. If the pump is placed above water level, the installation of a back pressure valve is mandatory. In this case, the inlet piping of the pump must be filled with water before the pump is operated. In such a setup, the risk of the pump running dry is very high, if the back pressure valve does not work properly.

Damage caused by the pump running dry is excluded from warranty.

7.1 Siting the pump

The FlowFriend has a protection class IP55. **IP55 water protection does not mean that the pump can be mounted outside unprotected from rain. The IP55 is a specific test involving specific spraying of the pump for a specific time.**

Remember that electronics and water are enemies. Provide good protection from rain if mounted outside. Damage caused by water is not covered by warranty.

Siting is preferably at a minimum of 10 cm above ground level. This will prevent the pump being 'drown-ed' if a connection becomes loose and water spills on the floor.

7.2 Inlet pipe (intake side)

If a sufficient amount of water does not reach the pump because the drag of the inlet pipe is too strong, the pump will use a lot of power and the electronics might become overheated in the long run.

Any coupling must be 100% air-proof. If a tube is used as inlet, this must fulfil the requirements of a suction pipe.

It is very important that the initial inlet at the pump is straight. (Minimum distance of 3-5x the diameter of the inlet pipe from the housing to the first bow). This maximises the efficiency factor because the water enters more laminary at the impeller.

If the inlet piping is longer than max. Ø x 10, the inlet piping must be 1 size larger than the intake of the pump.

7.3 Pressure pipe (Pump outlet/pressure side)

The pressure pipe must have the same diameter (3"/90 mm) as the intake of the pump in order to minimize pressure loss, high flow speeds and noise.

The best thing is if you enlarge the pressure pipe directly after the pump outlet (4"/110 mm) if the outlet piping exceeds 10 meter, in order to maximize the pump capacity and to save energy.

Reducing of the diameter of the pump outlet is at the FlowFriend pump to avoid.

7.4 Electrical connection – setting-up operation

Check whether voltage and frequency on the type label of the pump match the supply voltage. The person responsible for the installation must check whether standard grounding is available.

It must be checked whether the electrical installation has a highly sensitive earth leakage circuit breaker (ELCB/GFCI) (30mA – DIN VDE 0100T739).

8. Maintenance and cleaning

Disconnect the pump from the power supply prior to any maintenance work.

FlowFriend pumps should essentially be classified as low maintenance. The necessary maintenance work is usually limited to checking the impeller for obstruction.

Remove obstacles from the impeller with a slender, pointed tool. A decreasing supply rate is often the result of dirt. Possible calcinations must be removed with a very soft acid like vinegar. Avoid applying pressure to the sides of the impeller or the rotor. The pump head can be disassembled completely for cleaning.

In freshwater applications, calcification only appears in very hard water and after a complete re-filling of the pond. The majority of carbonate will then disappear within 2-3 days.

8.1 Disassembling/changing the pump housing

By plugging/unplugging the power plug, the pump can be made ready for operation again. Do not circumvent the electronics to make the pump run again by constantly plugging/unplugging the power. If the FlowFriend pump switches off, there is always a problem which must be remedied. This is usually a cleaning interval that is to be implemented. Continuous circumventing of the pump electronics may cause motor damage which is not covered by guarantee or goodwill. Furthermore, major impurities may generate vibrations.

We recommend checking the FlowFriend pump after three months to determine the possible maintenance intervals. Depending on precipitation, this may be between 2 and 24 months.

Unplug or disconnect the power plug and gently remove the pump from the system. Remove the 8 bolts on the back of the pump housing. Then gently remove the pump housing itself. Check the impeller for snail shells, mussels, active carbon pellets, filter cotton or residual food. In the case of larger accumulations, please clean the impeller. For complete step-by-step dismantling of the hydraulic parts, see the pictures in Section 12.

FlowFriend pumps are generally low maintenance. All in all, FlowFriend pumps only need to be inspected for calcification and deposits in the stator space and the impeller at regular intervals and cleaned or decalcified if required.

Calcification is generally a problem when the ponds are topped up with tap water at an initial water hardness of over 10 dh. When initially/refilling ponds with tap water with a high lime content, sudden lime precipitation may occur within 2-3 days.



The following maintenance instructions describe the disassembly of a FlowFriend pump step by step. Please observe the maintenance instructions precisely. Pump damage caused by blockages or forceful disassembly is not covered by warranty services.

8.2 Decalcification and cleaning of the impeller

Please decalcify the impeller using appropriated calcification baths.

Never use hydrochloric acid, not even if diluted! This may damage the pump. Suitable media are: formic acetic phosphoric acid or common decalcifying agents for water purification appliances such as coffee makers. Coarse, greasy plaques must be removed under ordinary tap water prior to decalcifying using a medium-coarse brush.

Please observe the relevant safety regulations attached to every sales package prior to using decalcifying acids. Wear protective clothing and goggles.

We hope you enjoy your FlowFriend pump. Regular maintenance guarantees a long running time and service life.

9. Quick user guide Keyboard

The FlowFriend is equipped with a membrane keyboard and a digital display with five 7-segment digits.



9.1 Run/Stop Mode

Use this key to change the operation mode. While the motor is running, the display shows the current speed. When the motor is switched off, the display shows "0"

9.2 Keys "UP" and "DOWN"

These keys are for changing the set point speed. Once one of the keys is pressed, the speed can be adjusted. Note that the value can be increased or decreased in steps of 10 rpm from a minimum of 600 rpm to a maximum of 2550 rpm. While pressing the key permanently, the value changes more quickly.

9.3 Showing the current power consumption

In normal mode, the display shows the set point speed. After pressing the DISP/FUNC key, the display will show the current power consumption in Watts ($\pm 10\%$), prefixed by a 'P' for Power.



9.4 Operations hour counter

By pressing the key again, the operating hours are shown, prefixed by the letter 'h' and the display shows the counter value alternately. The operations hour counter will overflow when exceeding 99.999 hrs. (11½ years).



9.5 Software Version

The display shows "Id" on the left and software version on the right, i.e. "100" for software version 1.00.

9.6 Power Module Temperature

The display shows "t" on the left and power module temperature in °C on the right.

9.7 Led Indicators

● NORMAL	Normal operation
● FAILURE	Motor failure is detected
● OVERLOAD	Motor is overloaded during operation

9.8 Show internal parameters

While power consumption is displayed, press the key 'disp/func' for 3 seconds to show the internal parameter settings. This mode is for internal test purposes only. It is not possible to change values.

10. Failure Mode Description

The FlowFriend is protected against overload and overheating.

10.1 Overheating

To protect the power module from overheating, the junction temperature should not exceed 150°C. When reaching 105°C, the motor will slightly reduce the output power. In the case of overheating, the motor will stop showing "Oload" and restart when the temperature is below 95°C. The LED "Overload" is blinking. Try to identify the reason for overheating and remedy it, i.e. by cleaning the fan cover and SCD surface. After pressing the RUN/STOP key, the drive is stopped and the drive can be started manually by pressing the RUN/STOP key again with reset error counter.

Warning: Be careful: the surface of the electronic control box may be hot. Do not touch the box directly before verifying the surface temperature.

10.2 Stalling

If the motor stalls, the controller will try to restart the drive 5 times within 2 minutes. The display will show the message "RSTRT". After failing to restart the pump, the display will show an error message "Er20". After acknowledging the error by pressing RUN/STOP key, the motor will start again. The counter is reset during the next start procedure.

10.3 Communication error

During normal operation mode, the electronic controls the motor. If there is no response from the power module electronic, the control unit will stop the motor and show "Er98" communication error. The LED "Failure" is blinking.

10.4 Internal electrical failures

In the case of an internal failure caused by a defect component or short-circuit, the drive will stop running and display the occurred failure.

Error number	Description
1	undervoltage on DC link
2	overvoltage on DC link
10	current measurement fails permanently
20	overload during start up process
64	short-circuit failure
97	multiple errors at the same time, i.e. undervoltage and overload error
98	communication failure from controller

11. Technical Information

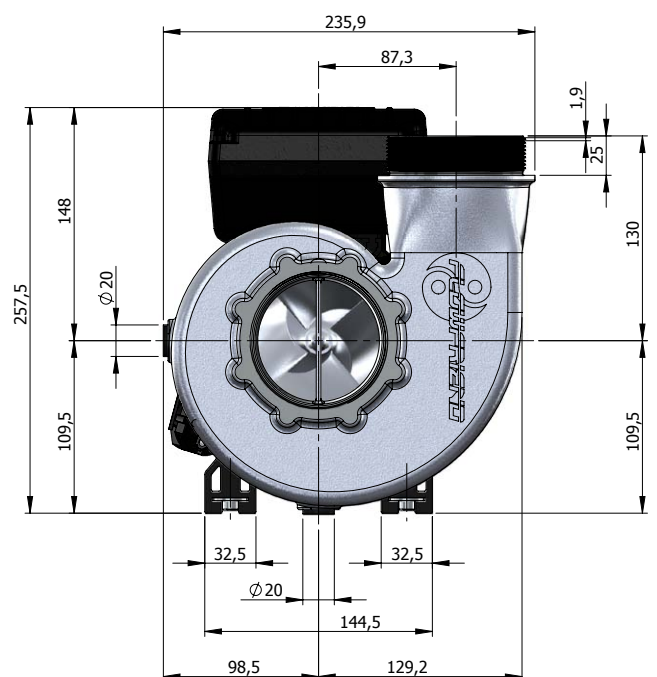
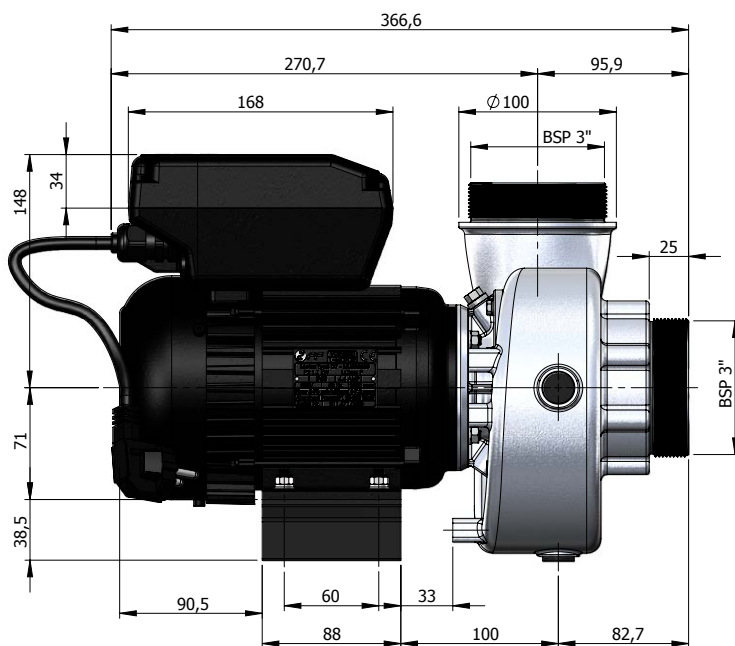
Power: 20-750 Watt
Voltage: 100-240 VAC
Max. current: 4.4 A
Frequency: 50-60 Hz
Isolation class: F
Protection class: IP55
Max. rpm: 2550
Motor torque: 2.4 Nm (from 800 rpm)
Motor efficiency: IE4 88-94% (600-2550 rpm)
Capacity: 5-70 m³/hr
Pump head: 0-7.2 m
Hydraulic efficiency: 36-82%
Certificates: CE/VDE 0530
IE4 A++
Mechanical Seal: Eagle Burgmann MG1Q1Q1VGG
Connection Suction: G 3" x 20 mm - Outer thread
Connection Pressure: G 3" x 20 mm - Outer thread

12. Dismounting

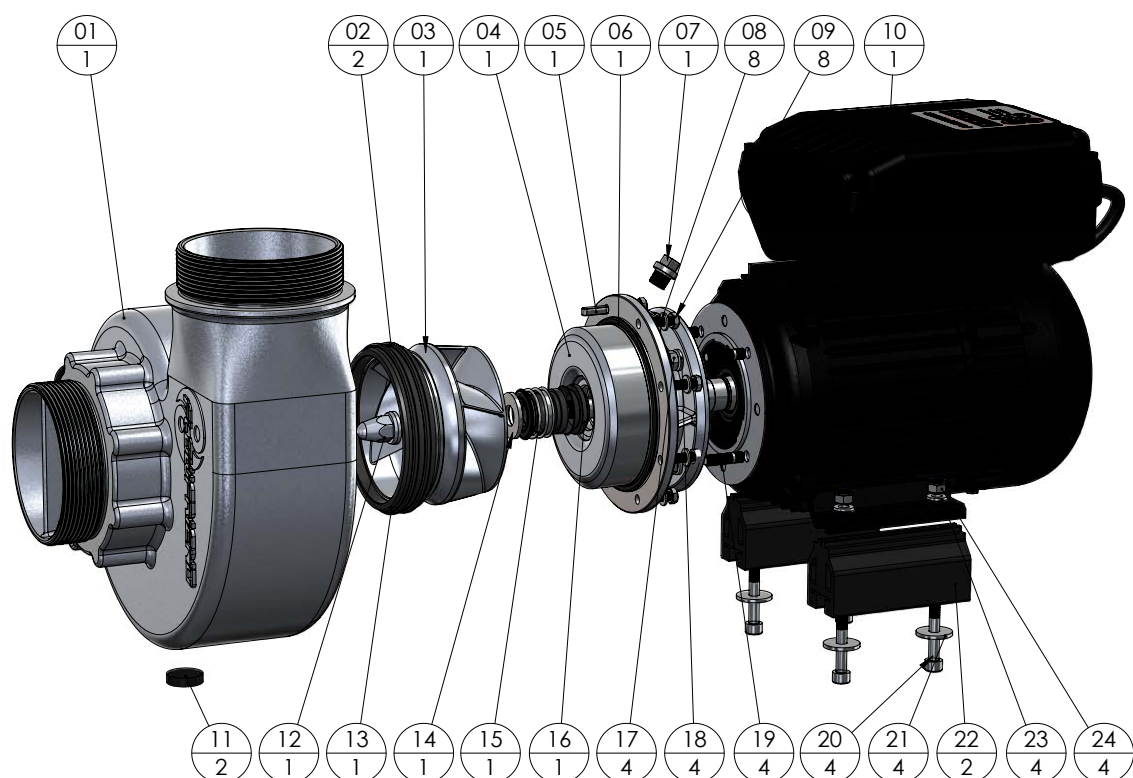




13. Dimensions

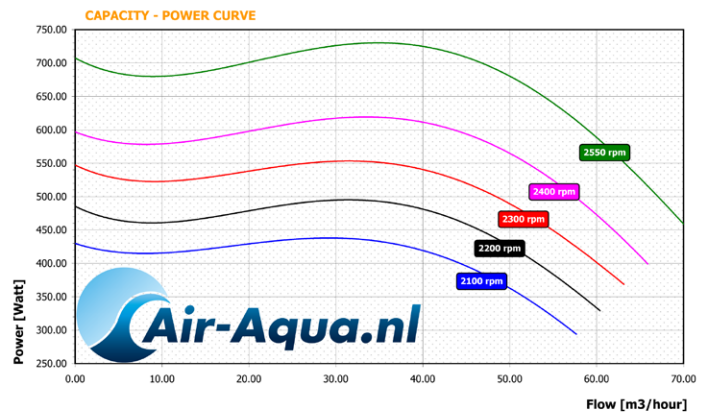
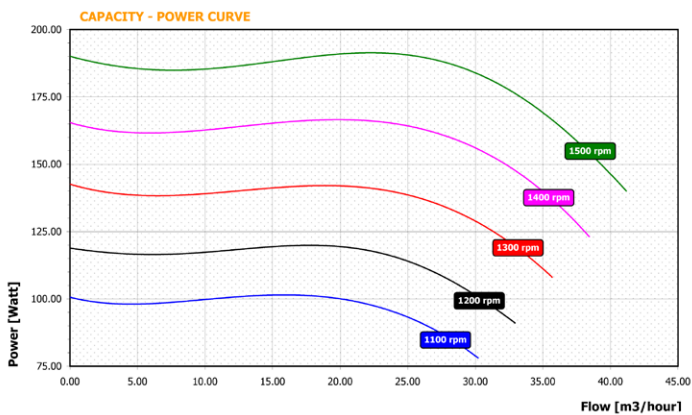
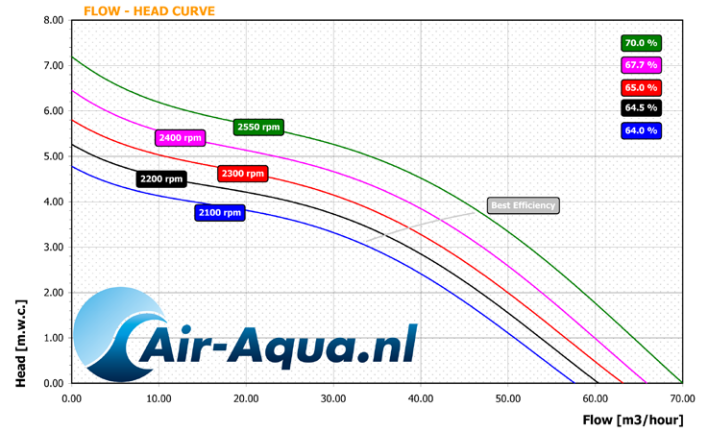
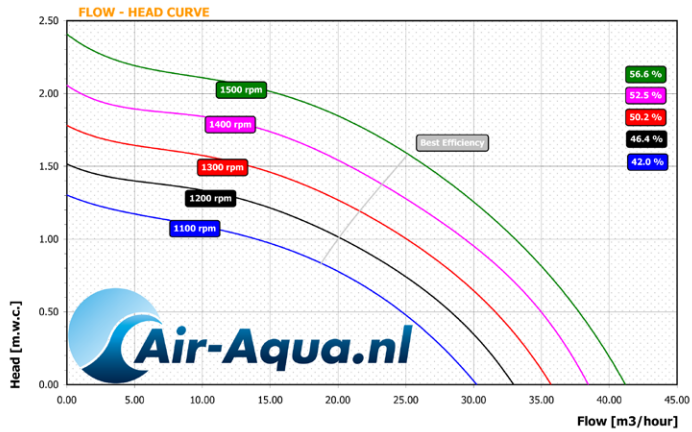
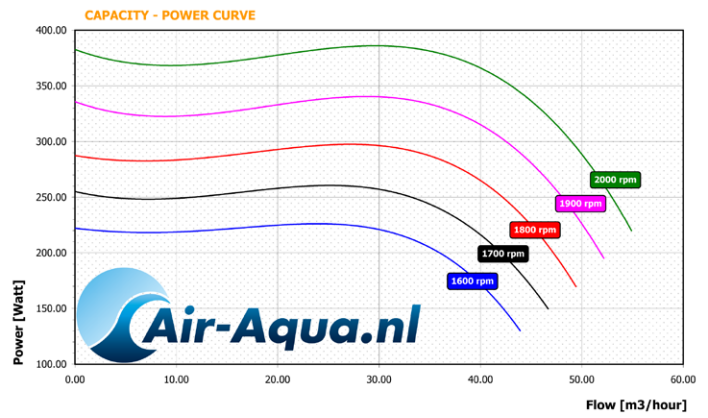
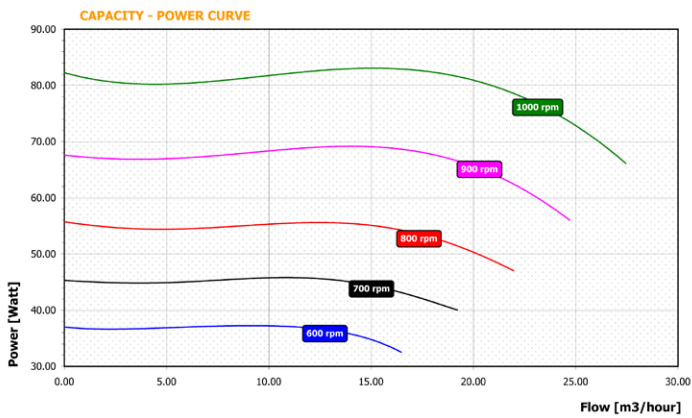
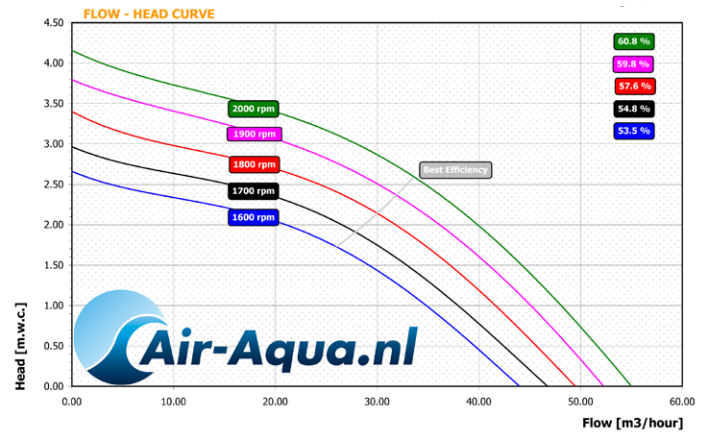
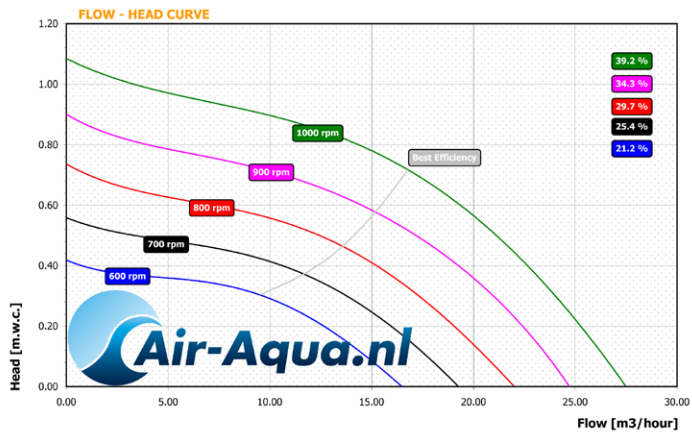


14. Exploded View/Parts List

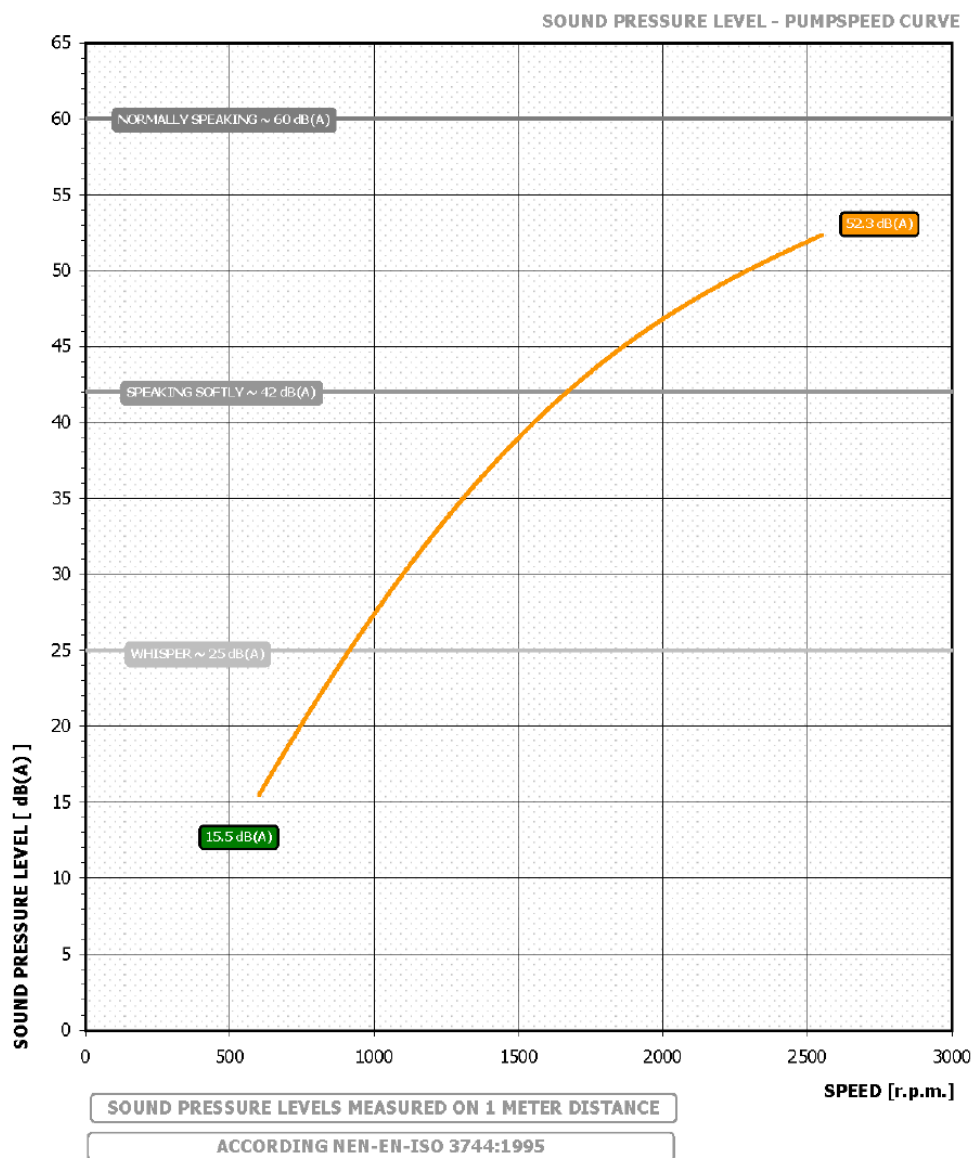


Pos	Description	Number	Article no.	Material	Remarks
1	Pump Housing	1		1.4408	RVS AISI 316L
2	O-Ring	2		NBR 70 SHORE	
3	Impeller	1		1.4408	RVS AISI 316L
4	Flange	1		1.4408	RVS AISI 316L
5	Featherkey	1		RVS 316 L	
6	O-Ring	1		NBR 70 SHORE	
7	Hexagon Plug	1		RVS 316 L	
8	Flat Washer	8		RVS A4	
9	Hex Bolt	8		RVS A4	
10	Electrical Motor PMSM	1	10404	ALUMINIUM	PERMANENT MAGNET P2 = 1.1 KW
11	Vibration Damper Pump Housing	2		NBR 60 SHORE	
12	Nut Impeller	1		1.4408	
13	Casing Wear Ring	1		JP 1300	
14	Spacer	1		1.4401	RVS AISI 316L
15	Mechanical Seal	1	10403	AQ1VGG	BURGMANN MG1-14 / g6
16	V-Ring	1		NBR	
17	Hex Bolt	4		RVS A4	
18	Flat Washer	4		RVS A4	
19	Stud	4		RVS A4	
20	Hexagon Head Screw	4		RVS A4	
21	Flat Washer Heavy Duty	4		RVS A4	
22	Vibration Damper Electrical Motor	2		NBR 60 SHORE	
23	Flat Washer	4		RVS A4	
24	Self-locking Hex Nut	4		RVS A4 - NYL	

15. Pump Performance Curves



16. Noise Data



17. Distributor's declaration

Titles against Air-Aqua BV concerning the products described in this manual address the Air-Aqua BV guarantee clauses and general terms and conditions. Specifications may vary due technical improvements.

17.1 Distributor

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7951 SK Staphorst
The Netherlands

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www.air-aqua.com

Thank you for purchasing a FlowFriend pump. This pump is a high quality product with the highest

manufacturing demands. This manual is intended to help you set up the pump for use and provide advice on the required maintenance procedures.

To ensure long-lasting satisfaction with this product, please read this manual carefully and follow our guidelines.

Air-Aqua guarantees 5 years of spare part availability for the FlowFriend pump.

If the device fails to meet the high demands you expect from Air-Aqua BV, please contact the dealer from whom you purchased your FlowFriend pump. This is usually the best way for product support. However you may feel free to contact us.