

# INSTALLATION AND USER'S GUIDE



IMPORTANT SAFETY INSTRUCTIONS  
 READ AND FOLLOW ALL INSTRUCTIONS  
 SAVE THIS INSTRUCTIONS

## FLOWFRIEND® - HFP 90-1100W HIGH EFFICIENCY WATER PUMPS HIGH FLOW – MEDIUM HEAD



Name	Date	Description
Jos Huttenhuis	02.11.2025	Version 4.0 – Series 3 - Carbon wearing removed
Jos Huttenhuis	10.08.2024	Version 3.0 – Series 2 – FlowFriend logo changed and mechanical seal MG1>EMG1
Jos Huttenhuis	14.10.2013	Version 2.0 – Series 1 – Extended shaft changed
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## 1. Introduction

Congratulations on purchasing your FlowFriend® water pump. You have chosen a product designed for maximum efficiency, reliability, and durability.

This manual provides all the information needed to:

- install the pump safely,
- operate it correctly,
- maintain it properly,
- and troubleshoot possible malfunctions.

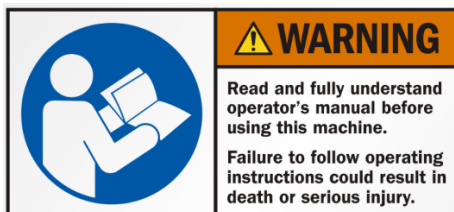
All FlowFriend® products are subject to the general terms and conditions of Stiloh B.V.

### 1.1 Target Group

This manual is intended for users, installers, maintenance technicians, and service partners. Anyone working with this product must read and fully understand this manual.

### 1.2 Important Safety Information

- Read the entire manual before installation and operation.
- Failure to follow the instructions may result in serious injury or damage.
- Children under 16 and persons lacking the ability or knowledge to assess risks must not use the pump.
- Improper use or deviation from the described procedures voids the warranty.
- The pump may only be used for its intended purpose.
- The manufacturer accepts no liability for misuse.
- Electricity and water can be a dangerous combination—handle with care during installation.



### 1.3 Responsibility

The user, installer, and maintenance technician are responsible for following all instructions and safety measures. The manufacturer cannot be held liable for damage or injury resulting from improper use or installation.

## 2. Defects, Liability, and Legal Notice

### 2.1 Product Responsibility and Scope

Stiloh B.V. guarantees that the delivered product meets the specifications stated in the official documentation at the time of transfer to the customer.

Minor variations in appearance or design that do not affect the intended function are excluded from warranty.

Only written specifications issued by Stiloh B.V. are binding. Any verbal information or advertising claims are not legally valid unless confirmed in writing by Stiloh B.V.

If the product is used for purposes other than those intended, the customer is fully responsible for verifying suitability. Stiloh B.V. accepts no liability for such use unless explicitly confirmed in writing.

Unauthorized modifications void all warranty rights. Users are solely responsible for correct installation, operation, and maintenance. Stiloh B.V. accepts no liability for damage or injury resulting from improper installation, misuse, or inadequate maintenance. Damage caused by lime deposits, sand, or other foreign particles is excluded from warranty coverage.

### 2.2 Warranty Coverage and Exclusions

For **business customers (B2B)**, the warranty is limited to repair or replacement of defective components, at Stiloh's discretion. If correction is not possible, the customer may withdraw from the contract.

For **consumers (B2C)**, the product is covered by a statutory two-year warranty period under EU law, starting from the date of delivery. During this period, any defect existing at delivery will be repaired or replaced free of charge, unless the defect results from misuse or external damage.

The warranty applies only to the product itself and does not extend to consequential or indirect damage such as flooding, livestock loss, or downtime. This exclusion does not apply in cases of intent or gross negligence by Stiloh B.V., or where prohibited by law.

### 2.3 Inspection and Reporting of Defects

The customer must inspect the goods immediately upon receipt. Any visible or transport damage must be reported to both the carrier and Stiloh B.V. within 24 hours.

Hidden defects must be reported as soon as they are discovered. Failure to report defects in time may result in loss of warranty rights.

### 2.4 Improper Use and Wear

Stiloh B.V. is not liable for damage caused by improper use, incorrect operation, insufficient maintenance, or unauthorized modifications.

Normal wear and tear and damage caused by thermal, chemical, or electrical influences are not covered by warranty.

### 2.5 Returns and Transport

When returning a product, the customer must ensure proper and protective packaging. Any damage during transport due to inadequate packaging is the sender's responsibility.

## 2.6 Claims and Limitation Period

For business customers, claims expire one year after delivery, except where prohibited by law (e.g., fraud, gross negligence, or personal injury).

For consumers, statutory limitation periods apply as provided by national and EU law.

If investigation shows that a reported defect resulted from misuse or negligence, Stiloh B.V. may charge reasonable costs for inspection and handling.

## 2.7 Spare Parts Availability

Replacement parts will be available for at least five (5) years after the date of product delivery, at prices published on Stiloh's website.

## 2.8 Product Modifications

Stiloh B.V. reserves the right to modify product design, specifications, or performance without prior notice, provided these changes do not affect the product's essential function or compliance with declared specifications.

## 2.9 Governing Law and Jurisdiction

These terms are governed by the laws of the Netherlands.

Any disputes shall be submitted to the competent court in the district of Overijssel (Netherlands), unless mandatory EU consumer protection law grants another jurisdiction to the consumer.

## 2.10 Possible Situations, Causes, and Effects (example table)

The following example situations are not covered by warranty

Situation	Example	Consequence
Dry running	Starting without a filled pump	Damage to impeller, bearings, and mechanical seal surfaces
Freezing	Storage or operation in freezing conditions	Cracks in pump housing or piping
Contaminated water	Sand, gravel, lime, or aggressive chemicals	Premature wear or damage
Incorrect electrical connection	Wrong voltage, frequency, or missing grounding	Electronic failure, safety hazards
Insufficient maintenance	No cleaning of impeller or seal	Reduced capacity, poor efficiency, overheating
Incorrect installation or setup	Excessive bends or varying pipe diameters	Flow resistance causing overload
Unauthorized modifications	Use of non-original parts	Warranty void
Unqualified personnel	—	Warranty void
Operation outside working range	NPSHa (available) must exceed NPSHr (required)	Cavitation damage

## 3.0 General Information

The FlowFriend® pump is designed for reliable, energy-efficient operation in various water circulation and filtration systems.

All components are manufactured to high quality standards and comply with general EMC requirements for household and similar environments.

Installation, operation, and maintenance must always be performed according to this manual. Incorrect handling, improper installation, or use outside the specified limits may cause damage and void the warranty.

### 3.1 Description

High-efficiency, electronically controlled water pump built for long service life and a wide range of applications.

The High-End FlowFriend Standard – HFP 90 is a true powerhouse, far ahead of its time and unmatched in proven performance, efficiency, and reliability.

It's advanced mixed-flow hydraulics enable the transfer of large water volumes at medium head with exceptionally low energy consumption.

Built like a tank, using precision-cast and machined stainless-steel components for outstanding durability and performance.

The pump easily handles particles up to 6 mm without clogging and automatically shuts down in case of blockage, overheating, or under voltage to prevent damage.

Designed for sustainability, it features replaceable components for easy repair and reduced environmental impact.

The perfect choice where reliability is essential—proven technology with thousands of units operating worldwide.

### 3.2 Safety Warnings








- Installation and maintenance must be carried out by qualified personnel only.
- Disconnect the power supply before performing any work.
- Do not touch the water while the pump is connected to power.
- Use a grounded outlet protected by a residual current device (max. 30 mA).
- Use only suitable, approved cables and accessories.
- Never pull the pump by its cable; keep cables dry and protected from heat or sharp edges.
- Do not open the pump housing or control electronics—service must be performed by authorized technicians only.

### 3.3 Symbols Used

Below are the main symbols and their meanings.

These symbols indicate important information, attention, or potential hazards.

Familiarize yourself with them before proceeding with this manual.

	WARNING – Risk of Serious Injury
	ELECTRICAL HAZARD – Risk of Severe Electric Shock
	MOVING PARTS – Risk of Entanglement or Cutting Injury
	HOT SURFACE – Risk of Burns
	INFORMATION – Important Tips
	PROHIBITED – Actions Not Allowed
	FROST HAZARD – Risk of Freezing and Component Damage

### 4.0 Applications

Never use the pump with any liquids **other** than water.

FlowFriend pumps are designed for pumping fresh water. They can handle clean and moderately contaminated water but are **not suitable for large particles**.

Maximum particle size: **5-6 mm**. In general, the pump should only be used for **clean-water applications**, meaning water free of solids that could damage the impeller, bearings, carbon ring, or pump housing.

Examples of unsuitable substances include:

- Sand
- Lime deposits
- Residues from potassium permanganate treatments (e.g., in ponds)

Damage caused by such contamination is **not covered by warranty**.

FlowFriend pumps are mainly used in **filtration or recirculation systems** (aquariums, ponds, breeding systems, and swimming pools), **industrial circulation systems**, and **streams or waterfalls**. The pump is **not self-priming** and it is not recommended to **install the pump above the water level**.

**Limitations:**

Water temperature: 2–40 °C

Ambient temperature: 0–50 °C

Maximum static pressure: 2 bar

Motor protection class: IP55

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**Protect the pump from direct sunlight and rain.**

Always install the pump under a shelter or cover.

Direct sunlight and rain can overload and cause irreversible damage to the pump.

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#### 4.1 Industrial Applications

**Cooling Water / Heating HVAC:** Water is used extensively in industries for cooling and heating purposes. In HVAC systems, water circulates through heat exchangers to maintain optimal temperatures. Cooling towers often rely on water circulation to dissipate heat.

**Water Supply:** Industrial facilities rely on a steady supply of water for their operations, including process cooling, cleaning, and manufacturing.

**Pressure Increase:** Water circulation systems are often used to increase pressure for industrial processes, such as in pumps or pressurized systems.

#### 4.2 Water Features

**Waterfalls, Streams, Fountains:** In landscaping and decorative architecture, water circulation is used to power water features like waterfalls, streams, and fountains. These systems often rely on pumps to circulate water continuously.

#### 4.3 Sanitary Water Use

**Sanitary Water Systems:** In residential or commercial buildings, water circulation ensures that sanitary water is delivered to faucets, showers, and toilets.

#### 4.4 Swimming Pools and swimming Ponds

**Swimming Pools:** Water circulation in swimming pools helps maintain cleanliness and temperature. Filtration systems circulate the water through filters to remove debris, and pumps keep the water moving to avoid stagnation.

**Swimming Ponds:** Similar to swimming pools, swimming ponds use circulation systems for water quality management. They often incorporate biological filters to maintain the ecosystem.

## 4.5 Aeration

**Aeration Systems:** Used in various applications like wastewater treatment or aquaculture, aeration ensures the water has enough oxygen to support aquatic life and promote microbial digestion of organic waste.

## 4.6 Agriculture

**Water Circulation for Irrigation:** In agriculture, water circulation is crucial for irrigation systems. It ensures water reaches plants evenly, whether through drip irrigation, sprinklers, or canals.

## 4.7 Livestock and Zoos

**Water Circulation for Livestock:** Livestock require fresh, clean water for hydration and health. Circulation systems help maintain water quality in troughs, tanks, and reservoirs.

**Zoos:** In zoo environments, water circulation is often part of habitat design for animals that need aquatic environments, such as fish, amphibians, or aquatic mammals.

## 4.8 Aquaculture

**Aquaculture Filtration Systems:**

**Bead Filter:** A type of mechanical filtration used in aquaculture to remove suspended solids.

**Trickle Filter:** A biological filter that provides a large surface area for beneficial bacteria to grow, converting toxic substances like ammonia into less harmful compounds.

**Drum Filter:** A rotating filter that captures particles from the water by using a mesh drum.

**Multi-chamber Filter:** A filtration system with multiple chambers that can handle both mechanical and biological filtration to maintain water quality.

**Belt Filter:** Used for continuous filtration of larger quantities of water, often employed in industrial-scale aquaculture systems.

## 4.9 Fish Ponds

**Fishpond Circulation Systems:** Maintaining water circulation in fishponds is essential to keep oxygen levels high and remove waste products. Aeration, filtration, and regular water movement are key components of pond management to ensure a healthy environment for fish.

## 4.10 Aquaponics

Aquaponics is a sustainable agricultural method that combines aquaculture (fish farming) and hydroponics (soil-less plant cultivation) in a closed-loop system. Fish waste provides organic nutrients for plants, while plants naturally filter and purify the water, which is recirculated back to the fish tank. This system conserves water, reduces the need for chemical fertilizers, and allows for the simultaneous production of both crops and fish, making it an efficient and environmentally friendly method of food production.

These systems rely on pumps, filters, and often energy-efficient technology to ensure that water is continuously circulated, ensuring it stays clean, healthy, and properly managed for both industrial and recreational uses. Would you like to dive deeper into any of these specific applications? Don't hesitate and contact us.

## 5.0 Features

Highly efficient	PMSM motor and high-tech hydraulics, very high efficiency even on low speeds
Low noise fan	Extreme quietly operation
Precision casted Stainless steel	Robust, no bending due to tension in the piping Easy control: By display or external devices using optional accessories.
Built to last	Reliable pump construction, build like a tank
Optimized hydraulics	Using state of art CFD (Computed Fluid Design) and scaled model test
	Frost protection: No risk of frost damage due to the use of stainless-steel type 316L
Low NPSH	Smaller chance of cavitation and pump damage
Low energy consumption	Savings of up to 85% possible compared to traditional pumps.
Efficient:	Highly efficient at both low and high discharge heads and flows.
Dry running rotor technology	Compared to wet-running submerged motors, the dry-running rotor is superior in terms of efficiency and reliability, with no rotor blockages due to scale or solid particles.
Safety	Much safer than a wet runner (canned motor type), a submerged motor can result in motor voltage on the water.
Impeller wearing	Replaceable filled carbon wearing for consistent performance over time and reduced operation cost.
Available spare parts	Replaceable spare parts.
Low vibration	Almost vibration-free due to high balancing and vibration dampers Mechanical seal: High performance shaft sealing with high-end mechanical seal Bearings: Heavy duty bearings, sealed and lifetime lubricated > maintenance free.

## 6.0 Installation



### Attention:

Read this manual carefully before installing the pump. Damage resulting from failure to follow the instructions is **not covered by warranty**.

When unpacking, check that all components are complete and undamaged. Any visible damage must be reported to your supplier within **24 hours of purchase**.

Inspect the pump before operation and **do not use it if damaged**. Using a damaged pump voids all warranty and liability.



During installation, the pump must **not be connected to the power supply**.

Unplug the unit and ensure it cannot be accidentally switched on.

To prevent injury, make sure your hands or fingers **cannot reach the pump opening** while it is connected to electricity.

## 7. Commissioning the Pump

### IMPORTANT:

**Never operate the pump without water flow.**

The pump may **start automatically** when connected to the mains.

The pump can be installed **horizontally or vertically**.

The **preferred position** is **horizontal**, allowing automatic venting.

Always place the pump on a **stable surface**.

Lay the piping to avoid **air pockets**, which can occur when the line rises and then falls. Air accumulation increases flow resistance and will not easily clear at low speeds.

### Suction side:

Install the pipe horizontally or slightly upward toward the pump.

### Discharge side:

The pipe should always rise to allow self-venting.

The pump must be installed **dry (not submerged)** and protected from **direct sunlight**.

Position it as **close as possible to the inlet**, keeping suction pipes **short, straight, and with minimal bends**.

Maintain at least **10 cm clearance** from walls and ensure **adequate ventilation** to prevent condensation.

### 7.1 Pump Placement

The FlowFriend has **protection class IP55**.

This rating does **not** mean the pump may be exposed directly to rain. IP55 only refers to temporary water-spray testing.

Electronics and water do not mix — always **protect the pump from rain**. Water damage is **not covered by warranty**.

Install the pump **above floor level** to prevent flooding in case of leaks.

It is recommended to install the pump **below the water level**.

If installed **above the water level**, a **check valve is mandatory**, and the suction line must be **filled with water before startup**.

If the check valve fails, there is a **high risk of dry running**, which is **not covered by warranty**.

A **small sump pump** in the pump chamber is recommended to remove any leakage water.

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## 7.2 Inlet (Suction Side)

Excessive suction resistance can cause **cavitation**, recognizable by a crackling sound (like small stones inside the pump).

Prolonged cavitation can cause vibration and impeller damage.

If cavitation occurs:

Reduce pump speed.

Decrease suction line resistance.

Use a larger suction diameter (preferably **PVC 90 mm** or better **110 mm**).

Minimize bends.

Ensure at least **7× pipe diameter of straight pipe** before the pump inlet for smooth flow.

Adjust head height as needed.

All joints must be **completely airtight**.

If a flexible hose is used, it must have a **smooth inner wall** and be rated for suction use.

If the suction line exceeds **10× its diameter**, use a **1–2 sizes larger pipe** than the pump inlet.

## 7.3 Outlet (Discharge Side)

The discharge pipe must be **at least the same diameter** as the pump outlet to minimize pressure loss, flow noise, and resistance.

Avoid sudden diameter changes and use **as few bends as possible** — and only **large-radius bends** when necessary.

For discharge lines longer than 10 m, increase the pipe diameter immediately after the pump.

**Never reduce the outlet diameter.**

A well-designed piping system lowers dynamic losses and improves energy efficiency.

## 7.4 Electrical Connection

Verify that the **voltage and frequency** match the values on the nameplate.

The installer must ensure proper **grounding** according to legal standards.

The circuit must be protected by a **residual current device (RCD) ≤ 30 mA**.

## 8. Maintenance and Cleaning



Always disconnect the pump from the mains before performing any maintenance.

FlowFriend pumps require **minimal maintenance**. Regular checks are usually limited to inspecting the impeller for **blockages or contamination**.

Remove debris from the impeller with a thin, pointed tool. A reduced flow rate is often caused by dirt or lime scale inside the pump or piping.

Any lime scale can be removed using a **mild acid**, such as vinegar.

The **pump head of the FlowFriend Standard** can be fully and easily disassembled for cleaning.

### 8.1 Rotating and Removing the Pump Head

The **FlowFriend HFP90-1100W** pump housing can be rotated in **45° increments**, allowing the discharge outlet to be positioned horizontally or at various angles.

The impeller does **not** need to be removed to rotate the pump housing.

For convenience, place the pump vertically on a workbench with the **motor facing upward**.

Unplug the power and carefully remove the pump from the installation.

Unscrew the **eight bolts** at the back of the housing and gently remove the pump head.

Inspect the impeller and housing for contamination.

If buildup is present, clean the impeller carefully.

**Note:** Damage caused by blockages or incorrect disassembly is **not covered by warranty**.

### 8.2 Descaling and Cleaning the Impeller

Descale the pump **only with mild acids**.

**Never use hydrochloric acid**, even when diluted, as it can severely damage the pump.

Suitable products include **formic acid, vinegar, or household descaling agents** (such as those used for coffee machines).

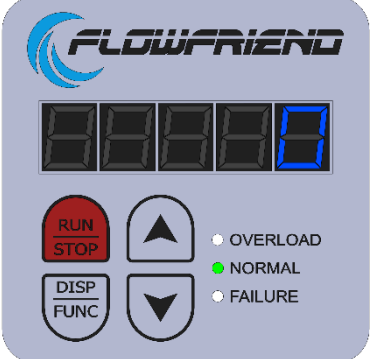
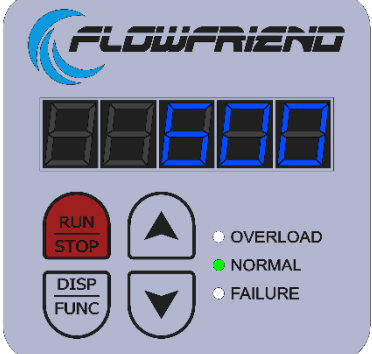
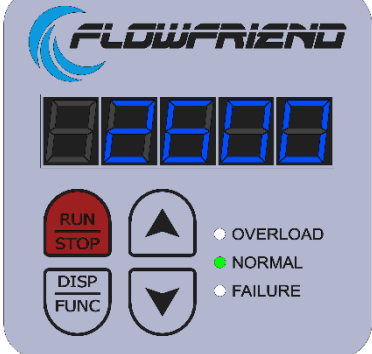
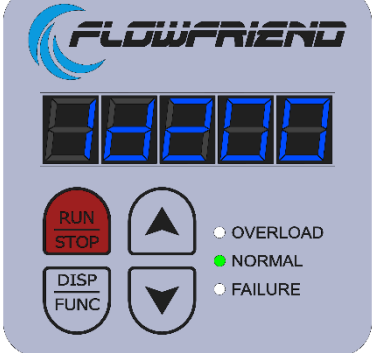
Before descaling, remove heavy deposits with a **soft brush** and **lukewarm water**.

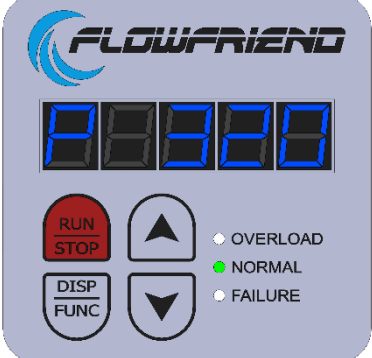
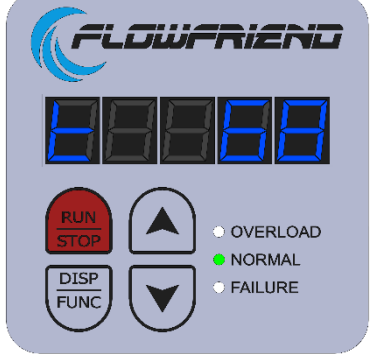
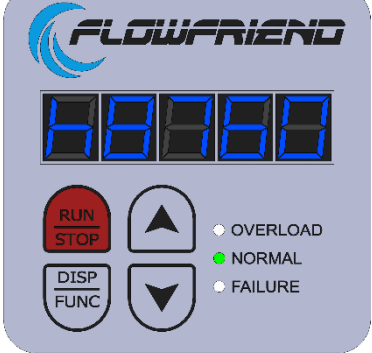
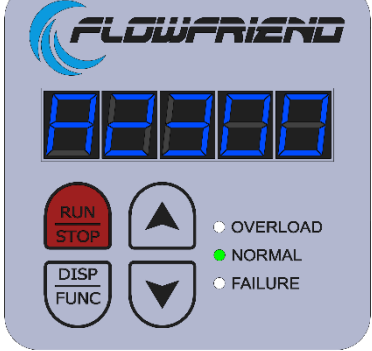
Always observe **safety precautions** when handling acids — wear protective clothing and safety goggles.

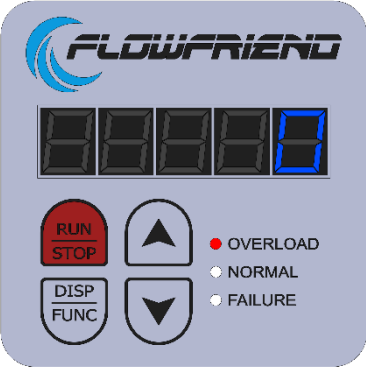
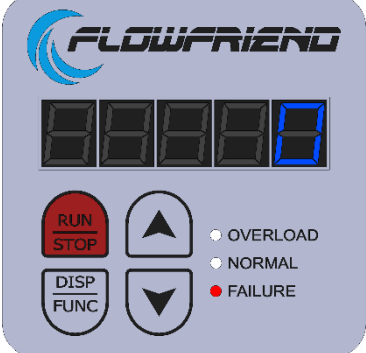
Regular maintenance ensures **optimal performance** and **extends the pump's service life**.

## 9. Touch Buttons – Menu

The FlowFriend is equipped with a keypad and a digital display featuring five 7-segment digits.

	<p>The pump is in <b>STOP</b> mode and on <b>standby</b> for operation. The displayed <b>0</b> indicates that the pump is not running.</p>
	<p>Press the <b>RUN   STOP</b> button to start the pump at the preset speed — in this case, <b>600 rpm</b>, the lowest possible speed. Use the <b>▲ (up)</b> arrow to increase the speed in <b>10 rpm steps</b>, up to a maximum of <b>2600 rpm</b>. It is recommended to <b>start at the lowest speed (600 rpm)</b> and carefully monitor the system during ramp-up to prevent <b>filter overflow</b>.</p>
	<p>Be cautious when increasing the pump speed too quickly — <b>excessive pressure</b> may develop that the piping system is <b>not designed to handle</b>. In particular, commonly used <b>rubber couplings</b> may detach from the piping if the pressure becomes too high.</p>
	<p><b>DISPLAY   FUNCTION Button</b>              Pressing the <b>DISP   FUNC</b> button cycles through different information values on the display. <b>id200</b> indicates the <b>software version</b>, for example: <i>Internal Data V2.0</i>              This information is for reference only and may be requested during <b>service or support</b>.</p>

	<p>Press the <b>DISP   FUNC</b> button again to display a <b>P</b> followed by a numeric value.              This value, for example <b>P320</b>, represents the <b>power consumption in watts</b> — the actual electrical usage of the pump.</p>
	<p>Press the <b>DISP   FUNC</b> button again to display a <b>t</b> followed by a numeric value.              This value, for example <b>t68</b>, indicates the <b>motor temperature in degrees Celsius</b>, measured at the motor windings.              If the motor temperature becomes too high, the pump will <b>shut down automatically</b> and <b>restart only after cooling down</b>.              At <b>ambient temperatures above 50 °C</b>, or if the pump is exposed to <b>direct sunlight</b>, <b>damage may still occur</b> despite this protection.</p>
	<p>The pump is equipped with an <b>hour counter</b>.              It starts counting as soon as the motor is powered — even when the pump is not running.              The hour counter <b>cannot be reset</b>, not even by the manufacturer.              After one year of continuous operation, the display will show <b>h8760</b>.              At <b>h99999</b> (approximately 11.5 years), the <b>9</b> will blink, followed by an <b>h</b>, indicating that the counter limit has been reached and <b>no further hours will be recorded</b>.</p>
	<p><b>Optional 0–10V Analog Input</b>              When an external control voltage between <b>0 and 10V</b> is connected, the display will show an <b>A</b>, indicating that the pump is operating in <b>analog mode</b>.              In this mode, the <b>speed is controlled by the external signal</b>, not via the display buttons.              This option is explained in detail later in this manual.</p>

	<p>The pump is protected against <b>jamming or blockage</b>.                  If an object obstructs the rotor, the pump will <b>stop and attempt an automatic restart up to 3–5 times</b>.                  If the blockage remains after these attempts, the pump will <b>shut down permanently</b> and display an <b>“Overload”</b> message.                  The obstruction must be removed before the pump can restart.                  An <b>overload error</b> may also occur if the <b>ambient temperature is too high</b> or if the <b>motor cooling is insufficient</b>.</p>
	<p>In case of a <b>communication error</b> within the motor, the <b>failure LED</b> will illuminate.                  This may be caused by <b>water damage</b> or an <b>electronic malfunction</b>.                  Return the pump to your <b>dealer</b> for inspection and evaluation.</p>

## 10. Pump Specification

### 10.1 Pump

**Make:** Stihl

**Brandname:** FlowFriend

**Pumptype:** HFP 90 – 1100W

**Nickname:** Standard

**Hydraulic:** Mixed flow type

**Display:** 7-digit blue letters

**Analog 0-10V signal:** optional cable for external voltage for adjusted speed regulation

**Overheat protection:** PT100 in motor winding

**Torque protection:** 5 times restart after a rotor blockage

**Automatic restart:** after power failure to prevent fish mortality

**Hour counter:** Digital, cannot be reset

**Bearings:** Lifetime greased, lifetime calculated on >100.000h

**Wearing:** Replaceable

**Power measurement:** Absorbed power included in the software

**Failure:** Normal, failure and overload LED

**MEI > 0.7:** classed benchmark for the most efficient pumps in the market

## 10.2 Motor

**Motor type:** Electronically controlled Permanent Magnet Synchronous Motor (PMSM EC) - Sinewave back EMF (Not brushless DC - BLDC)

**P1 motor power:** 740 W / 1245W

**P2 motor power:** 629 W / 1100W

**Degree of protection:** IP55

**Efficiency index:** IE4+

**Magnets:** Neodymium Magnets (NdFeB magnets)

**Fan:** Low noise type

**Voltage:** 230V +/- 10% (115V on request)

**Frequency:** 50 Hz (60Hz on request)

**Certification:** CE (Others on request)

**Speed:** 600-2600 rpm (higher speed on request)

**Bearings:** Heavy duty lifetime grease lubricated

**Buttons:** Membrane keyboard

**EMC:** Class B (Household, commercial and industrial use)

**Cable:** Rubber, 5 meter, 230V EU Schuko (other type stecker on request)

## 10.3 Performance

**Capacity:** Max. 70 m<sup>3</sup>/hour - adjustable from 3 - 70 m<sup>3</sup>/hour

**Head:** Max. 7.2 m.w.c. - adjustable from 0.1 - 7.2 m.w.c.

**Speed:** adjustable speed 600 - 2600 rpm

**Motor efficiency:** 88-94%

**Controller efficiency:** >98%

**Hydraulic efficiency:** >87%

**Mechanical efficiency:** >88%

## 10.4 Connections

**Discharge side:** G3" x L=20mm threaded connection

**Suction side:** G3" x L=20mm threaded connection

## 10.5 Shaft seal

**Mechanical seal:** Eagle Burgmann, E-MG1, A/ESIC-Q7VGG/Y10

**Material stationary seat:** Silicon carbide

**Material rotary seat:** Carbon

**Material elastomers:** Fluor elastomer (Viton)

**Spring material:** 1.4571 - Stainless steel 316 Ti

## 10.6 Materials

**Pump casing:** 1.4408 - CF8M - Cast stainless steel 316L

**Pump cover:** 1.4408 - CF8M - Cast stainless steel 316L

**Impeller:** 1.4408 - CF8M - Cast stainless steel 316L

**Impeller nut:** 1.4408 - CF8M - Cast stainless steel 316L

**Wearing:** Replaceable - wear resistant filled carbon

**Elastomers:** O-Rings NBR 70 shore, Elastomers mechanical seal Viton

**E-Motor:** Aluminium

**Mechanical seal:** A/ESIC-Q7VGG/Y10

**Impeller key:** 1.4571 - Stainless steel 316 Ti

**Extended motorshaft:** Stainless steel 1.4122

## 10.7 Test

**Hydrostatic test:** 1.5 bar / 2 hours

**Performance test:** According ISO 9906 - class C

**PMI test:** Positive Material Identification (PMI test)

**Runout test:** Runout test pump rotor

**Balancing pump impeller:** Quality according DIN ISO 1940-1 Grade G2.5

## 11. Trouble Shooting

The FlowFriend is protected against **overload** and **overheating**.

### 11.1 Overheating



To protect the electronics from overheating, the internal temperature must not exceed **105 °C**. When this temperature is reached, the motor power is **automatically reduced** by the control unit. If the temperature continues to rise, the motor will **shut down** and display **“Oload”**.

The motor will **restart automatically** once the internal temperature drops below **95 °C**. The **Overload LED** will blink during this condition.

Identify and resolve the cause of overheating (e.g., dirt buildup, fan malfunction, or poor ventilation). **Direct sunlight** or **insufficient ventilation** in the pump chamber can also cause overheating.

Press the **RUN/STOP** button once to stop the pump, then press it again to restart and clear the overload warning.

**⚠ Caution:** The surface of the control module may be **very hot**. Do not touch it until the surface temperature has been checked.

### 11.2 Pump Shutdown

If the motor stops due to a **rotor blockage** (excessive torque), it will attempt to **restart 3–5 times** within two minutes.

During this process, the display shows **“Rstrt”**.

If the blockage persists after several attempts, the display will show an **error message** (e.g., **Err20**). Once the cause of the error has been removed, press the **RUN/STOP** button to restart the pump. The restart counter resets automatically during the next startup cycle.

### 11.3 Communication Error

During normal operation, the control electronics continuously monitor the motor.

If no response is detected, the controller will stop the motor and display **“Err98”** (communication error). The **Failure LED** will flash.

## 11.4 Internal Electrical Faults

In the event of an **internal fault**, such as a **defective component** or **short circuit**, the drive will stop and display the relevant **error code**.



### VERY IMPORTANT:

If the **residual current device (RCD)** has tripped, **always unplug the pump** from the power outlet **before resetting the RCD**.

The pump must first be **checked for water damage**.

If a short circuit has occurred and the pump is switched on again without inspection, this can cause **irreversible damage to the electronics**.

In case of **water intrusion**, the pump must be **immediately disassembled and dried** to minimize potential damage.

In case of water intrusion, the motor bearings need to be replaced **all** the time

If restarting the motor is advised (see table below):

Press the **RUN/STOP** button once to **clear the error message**, then press the **RUN/STOP** button again to **restart the pump**.

ERROR CODE	DESCRIPTION	ACTION	
Err 1	Under voltage	Failure LED Try to Restart drive	After pressing the RUN   STOP key, the error message is deleted and the drive can be started manually by pressing the RUN   STOP key again.
Err 2	Over voltage	Failure LED Try to Restart drive	
Err 3	Under voltage during start	Failure LED Try to Restart drive	
Err 4	Maximum temperature exceeded power module	Overload LED Speed will be reduced by Inverter	
Err 5	Over temperature motor	Overload LED Try to Restart drive	
Err 7	Maximum current exceed	Overload LED Try to Restart drive	
Err 10	Current measurement fails permanently	Failure LED	
Err 20	Overload during start up process	Overload LED Try to Restart drive	
Err 64	Short circuit failure	Failure LED	
Err 97	Multiple errors	Failure LED	
Err 98	Communication failure from controller	Failure LED Try to Restart drive	

## 11.5 Diagnostic chart for centrifugal pump troubles

PROBLEM	POSSIBLE CAUSES
Pump does not deliver water	1 - 2 - 3 - 4 - 6 - 11 - 14 - 16 - 17 - 22 - 23
Insufficient capacity delivered	2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 13 - 16 - 19 - 21 - 22 - 28 - 29 - 30
Insufficient pressure delivered	5 - 13 - 15 - 16 - 19 - 21 - 28 - 29 - 30
Pump loose prime after starting	2 - 3 - 5 - 6 - 7 - 8 - 10 - 11 - 12
Pump requires excessive power	14 - 15 - 16 - 17 - 18 - 19 - 22 - 23 - 25 - 26 - 28 - 32 - 33 - 36
Seal leaks excessively	12 - 23 - 25 - 31 - 32 - 33 - 34 - 35 - 37 - 38 - 39
Seal has short life	11 - 12 - 23 - 25 - 27 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39
Pump vibrates or is noisy	2 - 3 - 4 - 9 - 10 - 20 - 22 - 23 - 24 - 25 - 26 - 27 - 29 - 34 - 35 - 40 - 41 - 42 - 43 - 44 - 45 - 46
Bearings have a short life	23 - 25 - 26 - 27 - 34 - 35 - 40 - 41 - 42 - 43 - 44 - 45 - 46
Pump overheats and seizes	1 - 4 - 20 - 21 - 23 - 26 - 27 - 34 - 35 - 40

Suction troubles			
1.	Pump not primed	25.	Shaft bent
2.	Pump or suction pipe not completely filled with water	26.	Rotating part rubbing on stationary part
3.	Suction pipe lift too high	27.	Bearings worn
4.	Insufficient margin between suction pressure and vapor pressure, check NPSHa and NPSHr values	28.	Wearing rings worn
5.	Excessive amount of air or gas in liquid	29.	Impeller damaged
6.	Air pocket in suction line	30.	Casing gasket defective permitting internal leakage
7.	Air leaks in suction line	31.	Shaft worn or scored at the housing
8.	Air leaks into pump through mechanical seal	32.	Mechanical seal improperly installed
9.	Foot valve too small or partially clogged	33.	Incorrect mechanical seal for operating conditions
10.	Inlet of suction pipe insufficiently submerged	34.	Shaft running off center because of worn bearings or wrong run-out of shaft
11.	Water seal pipe plugged	35.	Rotor out of balance resulting in vibration
12.	Seal cage improperly located in seal chamber, preventing sealing fluid entering space to form seal	36.	Air in the pumped water or pump casing not vented correctly
System troubles		37.	Mechanical seal elastomers not sufficient for the application
13.	Speed too low	38.	Wrong assembly of the mechanical seal
14.	Speed too high	39.	Dirt, grit or other abrasives in the pumped liquid, leading to scoring of shaft and/or mechanical seal
15.	Wrong direction of rotation	40.	Excessive thrust caused by a mechanical failure inside the pump
16.	Total head of system higher than design head of pump	41.	Excessive grease or oil in bearing housing or lack of cooling, causing excessive bearing temperature
17.	Total head of system lower than design head of pump	42.	Lack of lubrication
18.	Specific gravity of liquid different from design	43.	Improper installation of antifriction bearings (damage during assembly, incorrect

			assembly of stacked bearings, use of unmatched bearings as a pair, ect.)
19.	Viscosity of liquid different from design criteria	44.	Dirt or water getting into bearings
20.	Operation at very low capacity	45.	Rusting of bearings due to water getting into housing
21.	Parallel operation of pumps unsuitable for such operation	46.	Excessive cooling of water cooled bearing resulting in condensation in the bearing housing from moisture in the atmosphere
<b>Mechanical troubles</b>			
22.	Foreign matter in impeller		
23.	External forces on pump casing too high		
24.	Foundations not rigid		

## 12. Optional – External 0-10V Analog control

The FlowFriend can be operated using an **external 0–10 V control signal**.

In this mode, the **speed is no longer set via the display**, but by the **voltage** supplied from an external controller (e.g. PLC, flow controller, or climate computer).

### Function

At **0 V to 1.5 V** → The pump **ignores** the analog input.

In this range, the speed can still be **manually adjusted** using the keypad.

In case the voltage will drop or by cable damage, the pump will always return on the latest manual set speed.

At **1.5 V to 2.3 V** → The pump stops and is in **analog “standby” mode**.

At **2.3 V to 10 V** → The pump automatically switches to **analog mode**.

The motor speed is then controlled **linearly** according to the input voltage:

→ Every **1 V increase** raises the speed by approximately **260 rpm**.

→ 2.3 V ≈ 600 rpm      10 V = 2600 rpm (maximum speed).

Above **10 V** → The speed is **limited to 2600 rpm**.

Above **12 V** → Not allowed – may cause permanent damage.

When the analog control is active, the display shows an **“A”** before the speed value (e.g. *A1500*), indicating that the pump is controlled by an external signal.

### Connections

The analog input is located on the **12-pin connector** of the user interface (version 2.1):

**Pin 6 (brown)** = 0–10 V input

**Pin 8 (white)** = Ground (GND reference)

The input is read at **10 Hz** (ten times per second).

Small voltage fluctuations are ignored thanks to an internal **hysteresis**, preventing unnecessary speed variations.

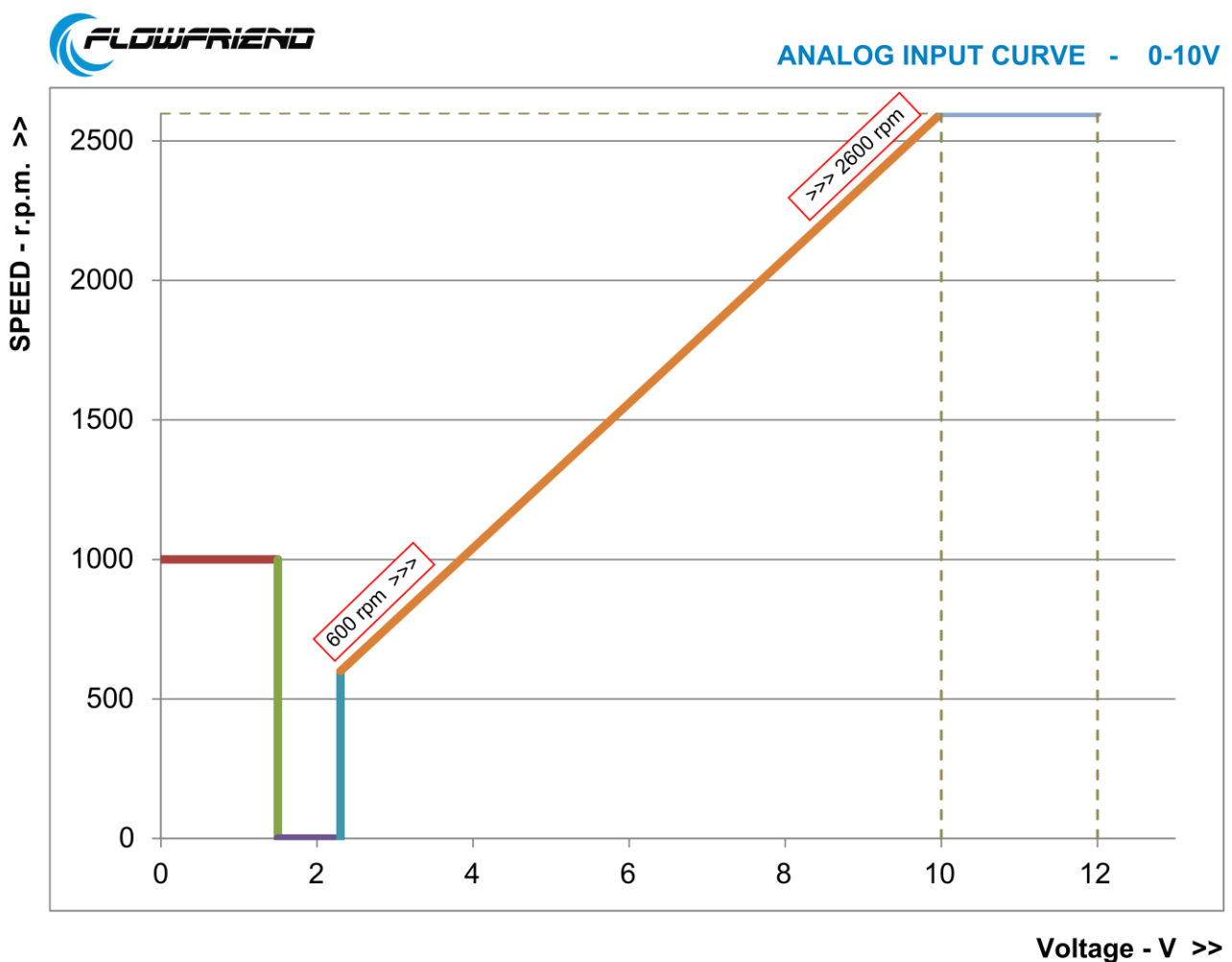
### Important Notes

The **RUN/STOP button** always has **priority** over the analog input.

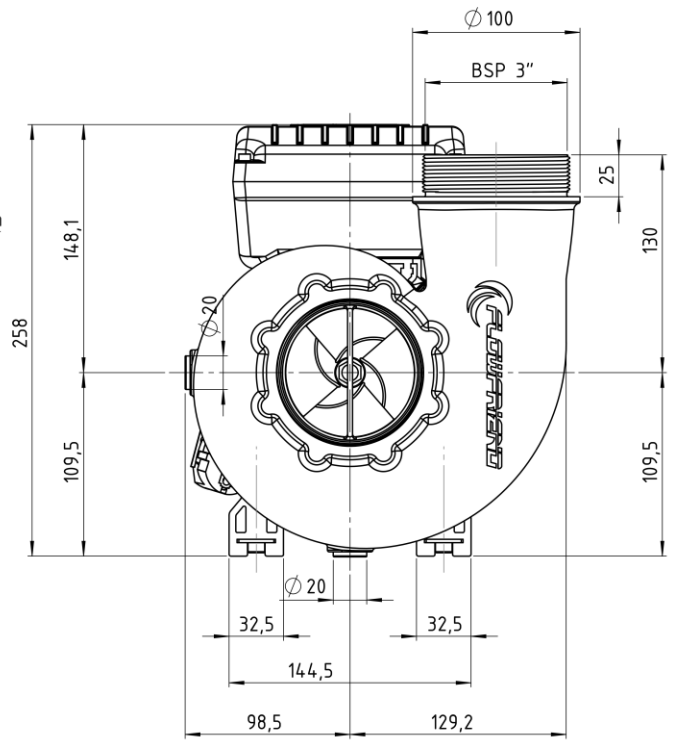
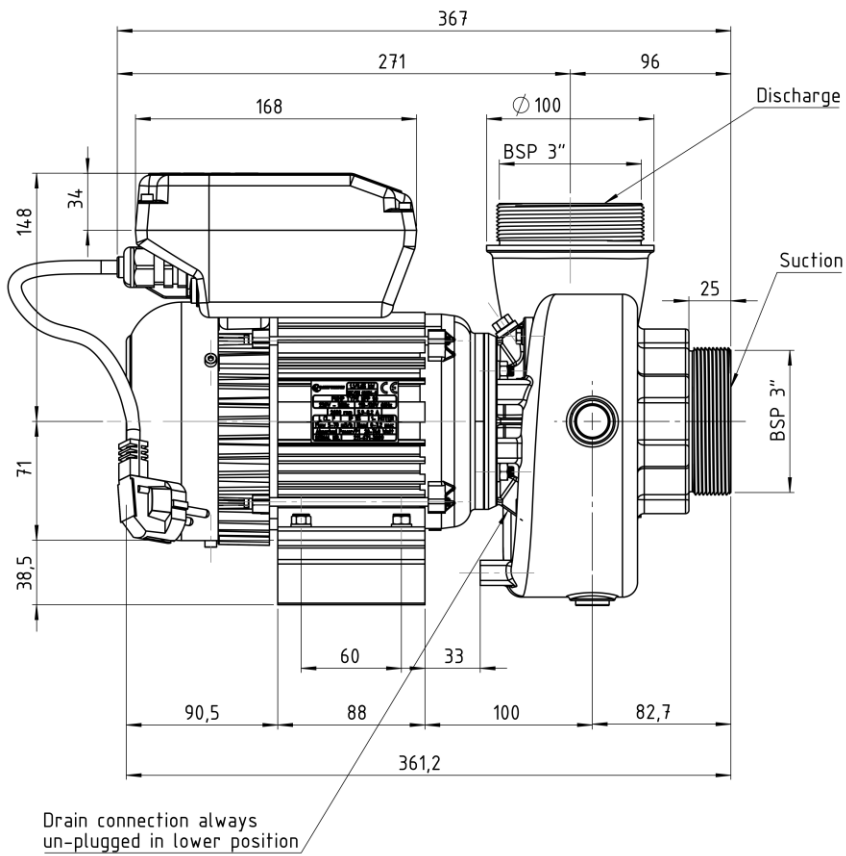
Use a **stable, noise-free power source** for the control signal.

Use **shielded cables** to avoid electrical interference.

When in analog mode, the speed **cannot be adjusted from the keypad**.

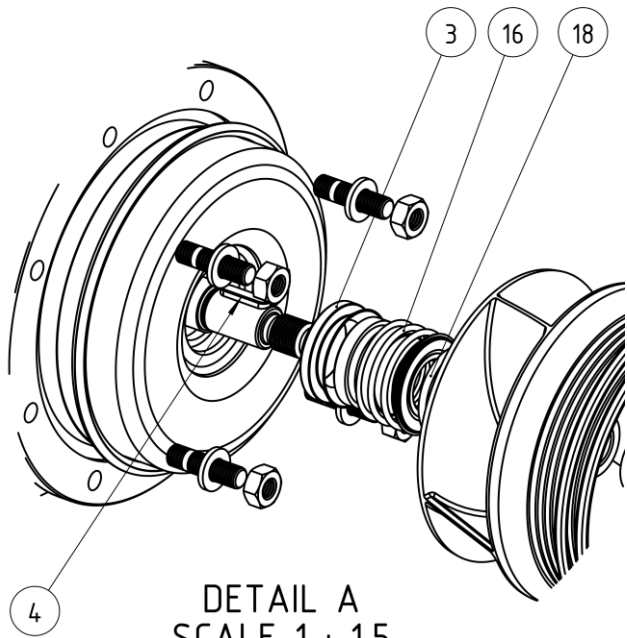
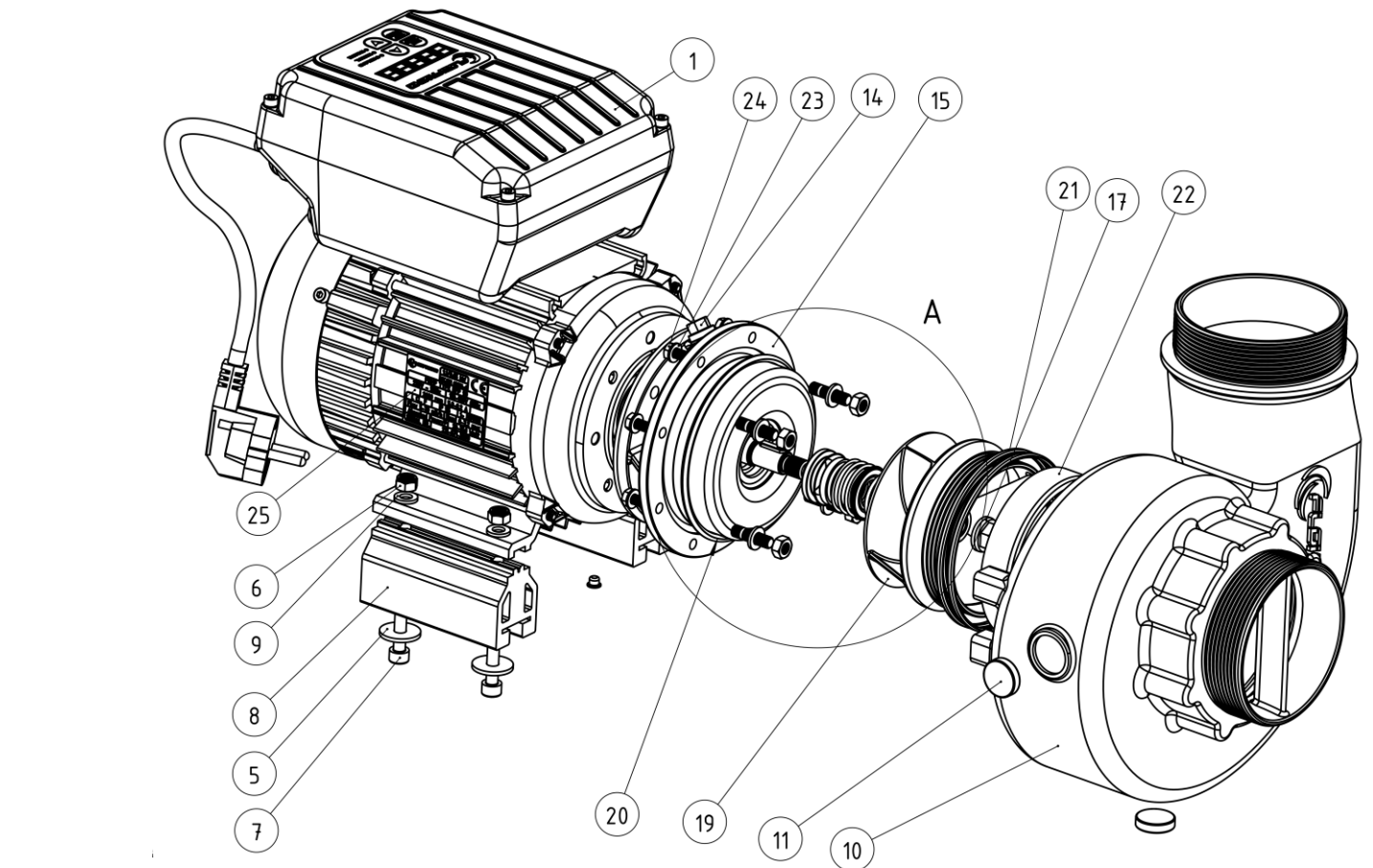


## 13. Dimensions



Pumpcasing can be rotated in steps of 45 degree  
 Standard discharge position is vertical

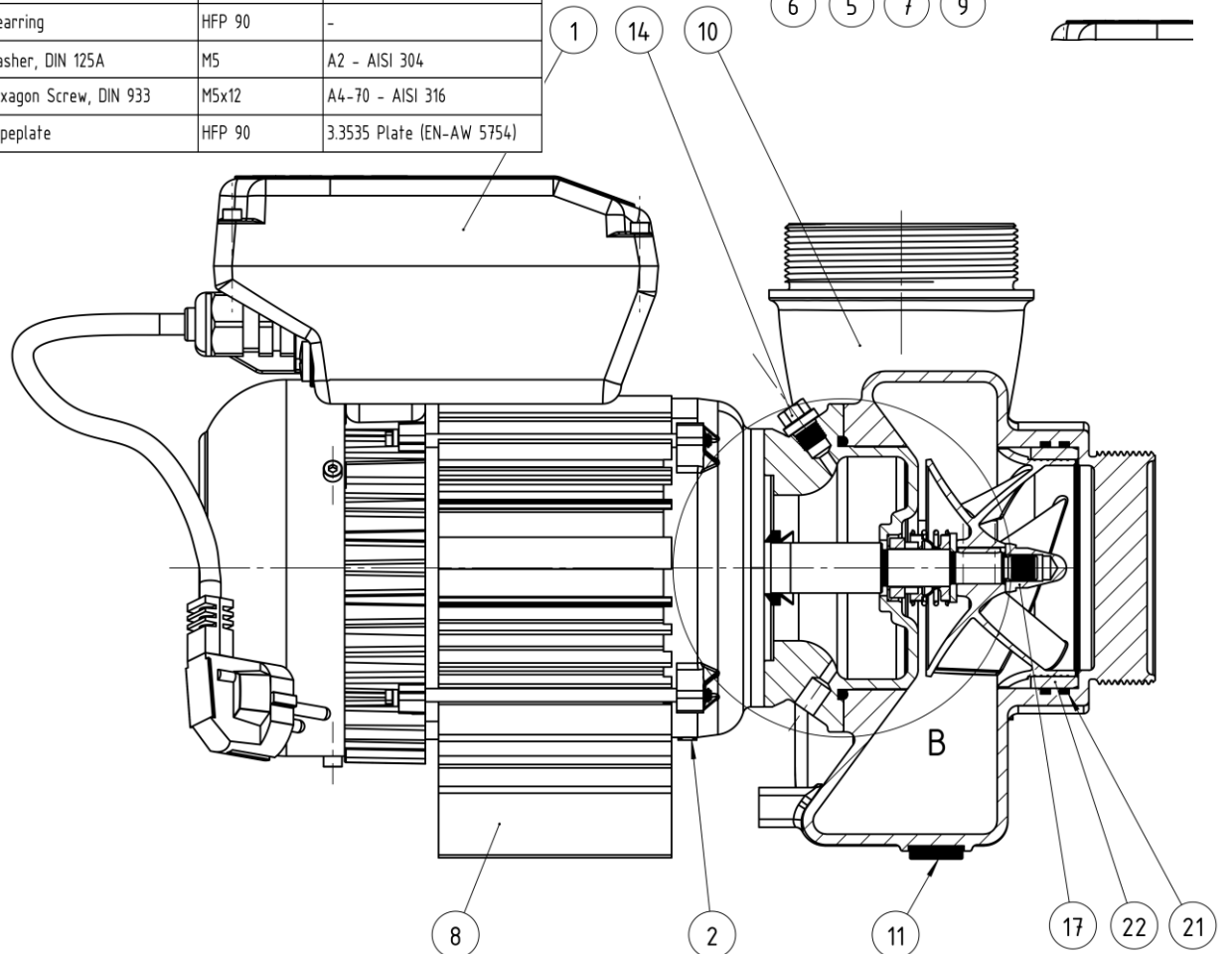
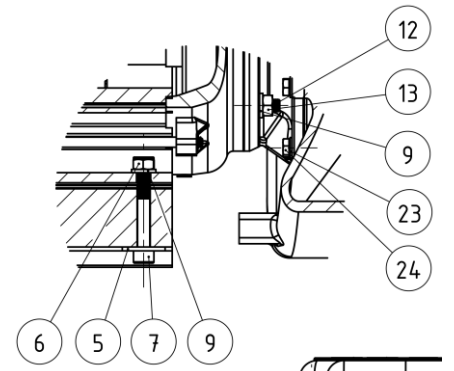
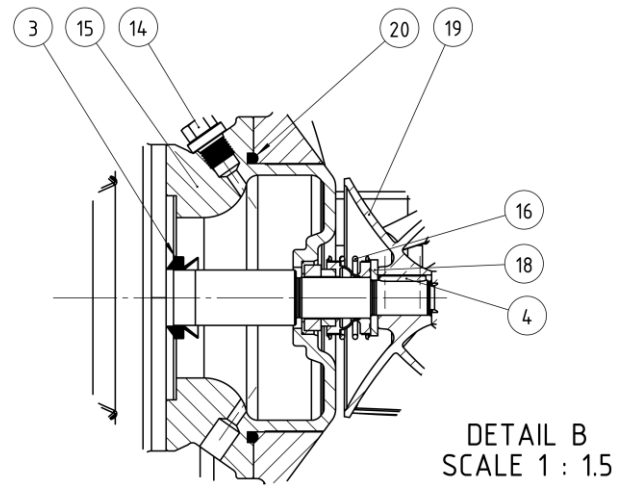
## 14. Exploded view and Parts list | BOM



POS	QTY	SKU NR.	DESCRIPTION	DIMENSION	MATERIAL
1	1	FP.589000	EC PM Motor 1.1 kW	IEC 71	-
2	1	FP.589005	Plug E-motor	5mm	-
3	1	FP.589017	V-Ring	V20-S	NBR 70 shore
4	1	FP.589058	Parallel Key	4x4x16	A4 - AISI 316
5	4	FP.589047	Washer, 440R	M6	A2 - AISI 304
6	4	FP.589053	Prevailing hexagon torque nut	M6	A2 - AISI 304
7	4	FP.589051	Socket head screw	M6x45	A2-70 - AISI 304
8	2	FP.589060	Anti vibration damper	HFP 90	-
9	8	FP.589049	Washer, DIN 125A	M6	A2 - AISI 304
10	1	FP.589037	Pumpcasing	HFP 90	1.4408 (A743 CF8M)
11	2	FP.589018	Disc, Rubber	20x5	NBR 70 shore
12	4	FP.589056	Stud, 1.25xD	M6x16	A4-70 - AISI 316
13	4	FP.589052	Hexagon Nut, DIN 934	M6	A4 - AISI 316
14	1	FP.589054	Hexagon head plug	G 1/8"	A4 - AISI 316
15	1	FP.589038	Lantern	HFP 90	1.4408 (A743 CF8M)
16	1	FP.589016	Mechanical seal	14mm	-
17	1	FP.589040	Impeller nut	M10x1	1.4408 (A743 CF8M)
18	1	FP.589039	Distance ring	14mm	1.4404 (X2CrNiMo17-12-2)
19	1	FP.589036	Impeller	HFP 90	1.4408 (A743 CF8M)
20	1	FP.589022	O-Ring	92.75x2.62	NBR 70 shore
21	2	FP.589021	O-Ring	91x2.5	NBR 70 shore
22	1	FP.589064	Wearing	HFP 90	-
23	8	FP.589048	Washer, DIN 125A	M5	A2 - AISI 304
24	8	FP.589055	Hexagon Screw, DIN 933	M5x12	A4-70 - AISI 316
25	1	FP.589062	Typeplate	HFP 90	3.3535 Plate (EN-AW 5754)

## 15. Section drawing and Parts list | BOM

POS	QTY	SKU NR.	DESCRIPTION	DIMENSION	MATERIAL
1	1	FP.589000	EC PM Motor 1.1 kW	IEC 71	-
2	1	FP.589005	Plug E-motor	5mm	-
3	1	FP.589017	V-Ring	V20-S	NBR 70 shore
4	1	FP.589058	Parallel Key	4x4x16	A4 - AISI 316
5	4	FP.589047	Washer, 440R	M6	A2 - AISI 304
6	4	FP.589053	Prevailing hexagon torque nut	M6	A2 - AISI 304
7	4	FP.589051	Socket head screw	M6x45	A2-70 - AISI 304
8	2	FP.589060	Anti vibration damper	HFP 90	-
9	8	FP.589049	Washer, DIN 125A	M6	A2 - AISI 304
10	1	FP.589037	Pumpcasing	HFP 90	1.4408 (A743 CF8M)
11	2	FP.589018	Disc, Rubber	20x5	NBR 70 shore
12	4	FP.589056	Stud, 1.25xD	M6x16	A4-70 - AISI 316
13	4	FP.589052	Hexagon Nut, DIN 934	M6	A4 - AISI 316
14	1	FP.589054	Hexagon head plug	G 1/8"	A4 - AISI 316
15	1	FP.589038	Lantern	HFP 90	1.4408 (A743 CF8M)
16	1	FP.589016	Mechanical seal	14mm	-
17	1	FP.589040	Impeller nut	M10x1	1.4408 (A743 CF8M)
18	1	FP.589039	Distance ring	14mm	1.4404 (X2CrNiMo17-12-2)
19	1	FP.589036	Impeller	HFP 90	1.4408 (A743 CF8M)
20	1	FP.589022	O-Ring	92.75x2.62	NBR 70 shore
21	2	FP.589021	O-Ring	91x2.5	NBR 70 shore
22	1	FP.589064	Wearing	HFP 90	-
23	8	FP.589048	Washer, DIN 125A	M5	A2 - AISI 304
24	8	FP.589055	Hexagon Screw, DIN 933	M5x12	A4-70 - AISI 316
25	1	FP.589062	Typeplate	HFP 90	3.3535 Plate (EN-AW 5754)



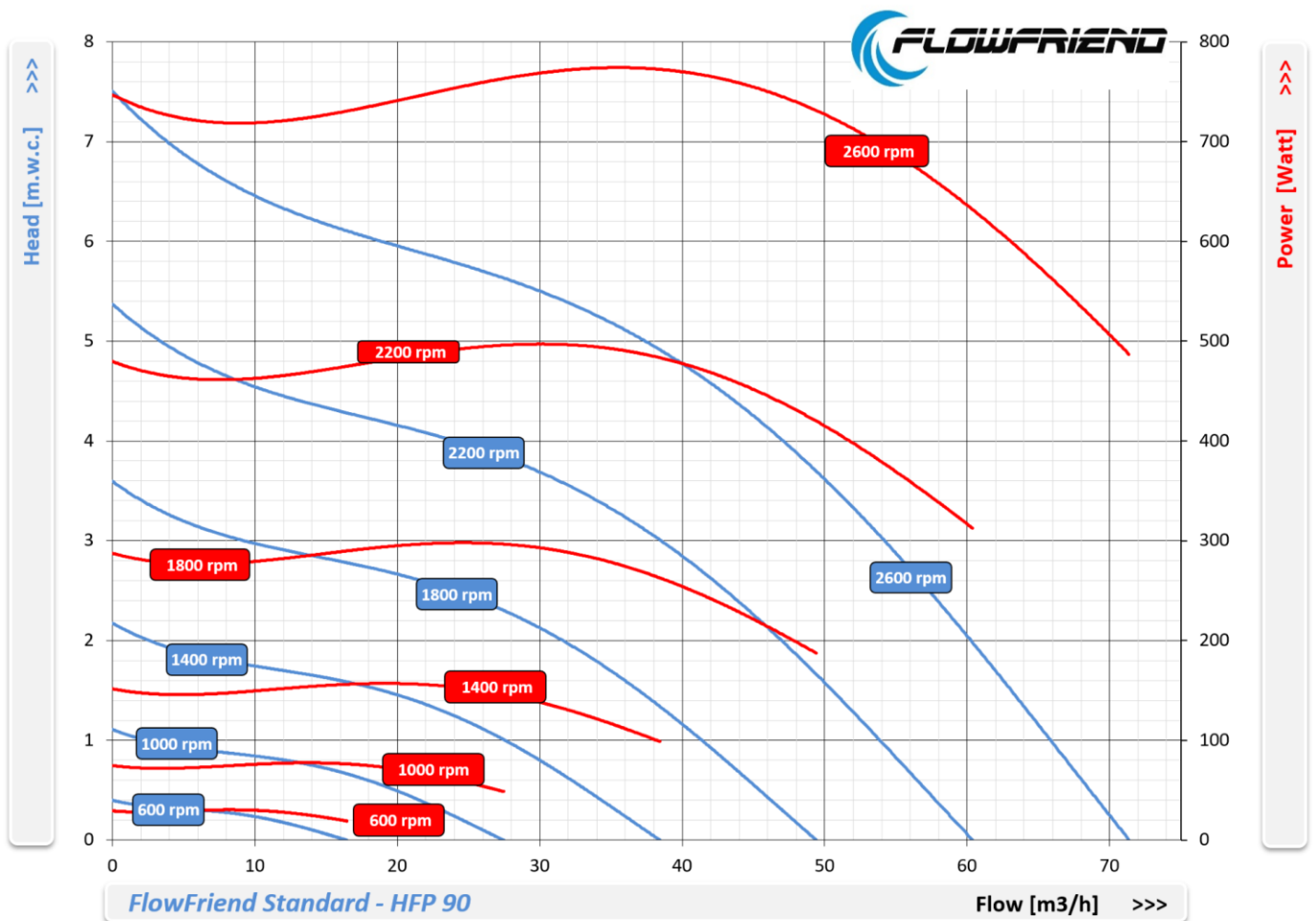
## 16. NOT detailed Performance curve

### Performance Curve Information

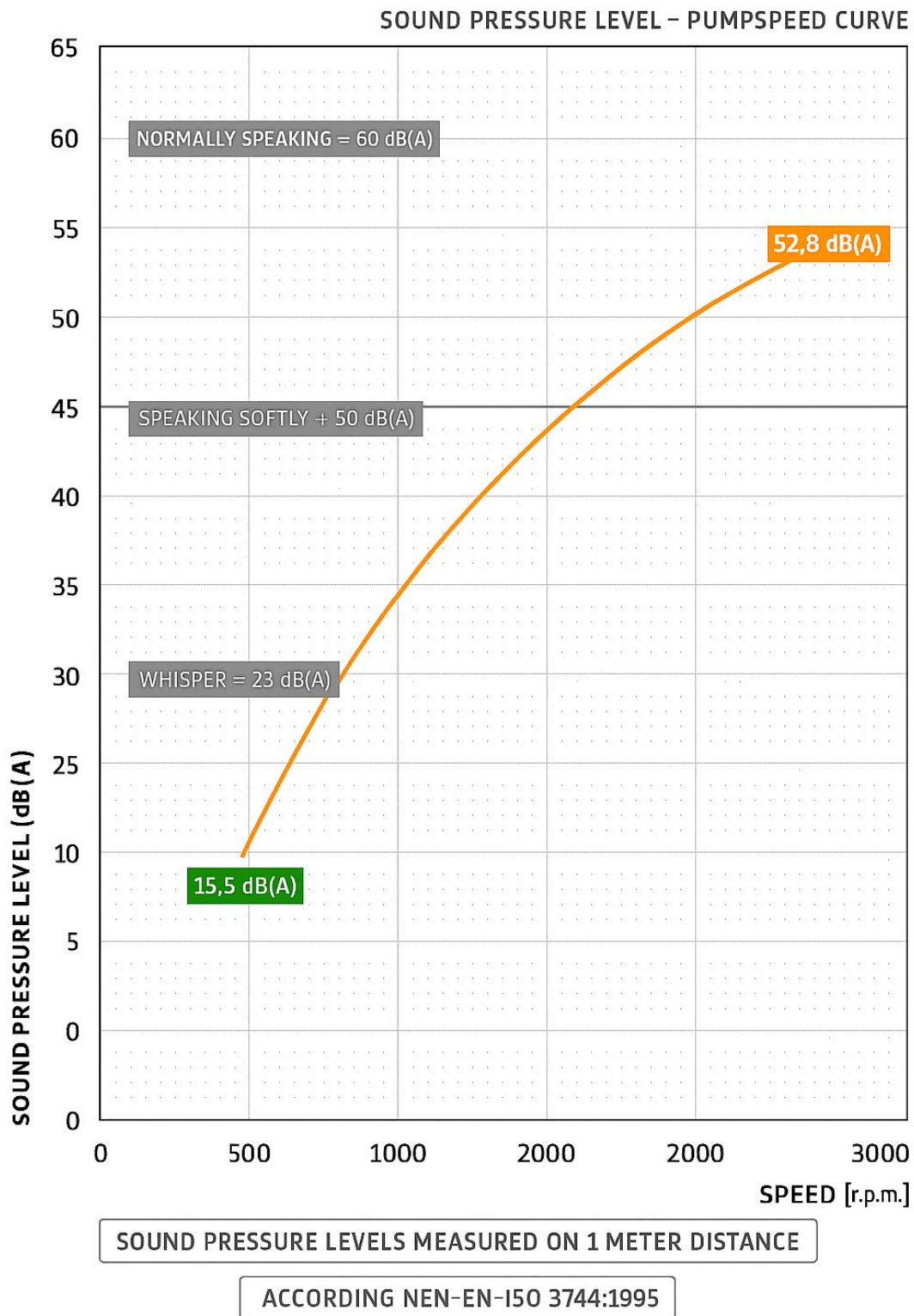
This curve provides only a **general performance overview**.

For detailed information, please refer to the **comprehensive performance curves (Q/Hman/Eta/Power)**, which are available for the entire speed range in increments of 100 rpm.

For the **NPSHr (required)** data, please refer to the **detailed NPSH curves**.



## 17. Sound levels



## 18. EU Conformity Declaration

The manufacturer:

**Stiloh B.V.**

Oliemolen 2

7587 SH

De Lutte

The Netherlands

Hereby declares under sole responsibility that the product:

**FlowFriend water pump**

Model: **FlowFriend HFP90-1100W**

complies with the following directives:

- 2014/35/EU – Low Voltage Directive (LVD)
- 2014/30/EU – Electromagnetic Compatibility (EMC)
- 2011/65/EU – Restriction of Hazardous Substances (RoHS)
- 2009/125/EC – Ecodesign Directive

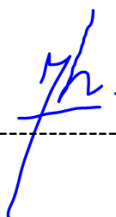
Applied harmonised standards include:

EN 60335-1, EN 61000-6-2, EN 61000-6-3, EN 50581

De Lutte, 02.11.2025

Authorized representative

J.Huttenhuis, R&D manager



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