

DUTYPOINT **SETTING THE BAR**

UniBreak CAT 5 Tank and Booster Set



Operation and Maintenance Manual

DOC-OMUNIBREAK-1

DUTYPOINT

SETTING
THE BAR

About us.

Applied knowledge.
Shared know-how.
Fearless innovation.

Together, we are Dutypoint. Since 1976, we've been building up industry-defining expertise in fluid technology.

This knowledge means we solve complex challenges with straightforward solutions that are built around meeting and exceeding our clients' needs. We approach everything with the same philosophy: how will we go above and beyond?

Our commitment to collaboration and sharing knowledge galvanises and cements robust relationships. Relationships that are built to last, because our clients are our partners.

Our focus for the future? Innovation. We want to be the future of our industry, globally. Where we benchmark thought leadership, expertise and customer care.

We set the bar.

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Important Safety Information

Health & Safety at Work Act 1974

Section 6(a) of this Act requires manufacturers to advise their customers on the safety and the handling precautions to be observed when installing, operating, maintaining and servicing their products. The user's attention is therefore drawn to the following:

- The appropriate sections of this manual must be read before working on the equipment.
- Installation, operating and maintenance must only be carried out by suitably trained/qualified personnel.
- Normal safety precautions must be taken and appropriate procedures observed to avoid accidents.

Refer to Dutypoint for any technical advice or product information. It is the responsibility of the customer and/or the contractor:

- To ensure that anyone working on the equipment is wearing all necessary protective gear/clothing;
- Is aware of appropriate health & safety warnings and to read the information in this manual.

Safety Messages and Hazard Statement

Table 1: Hazard Notice Definitions

Message Level	Definition
DANGER	A hazardous situation which, if not avoided, will result in death or serious injury
WARNING	A hazardous situation which, if not avoided, could result in death or serious injury
CAUTION	A hazardous situation which, if not avoided, could result in minor injury or moderate injury
ELECTRICAL HAZARD	Risks associated with electricity will cause hazards if not properly avoided
Note	A situation which may arise resulting in undesirable conditions and/or will not cause direct hazards to persons

Qualified Personnel

WARNING

This product is intended for operation by qualified personnel only

- Only qualified personnel are allowed to install or operate this equipment
 - Qualified personnel are defined as trained staff, who are authorised to install, commission and maintain equipment, systems and circuits in accordance with relevant laws and regulations. Personnel must be familiar with the instructions and safety procedures described in this document.
 - This product should not be used by anyone with mental disabilities, or anyone without the relevant experience and knowledge, unless they have received instructions on using the equipment and on the associated risks, or are supervised by a responsible person.
 - Children must be supervised to ensure they do not play on or around the equipment.
-

Environmental Protection

All local regulations and codes regarding emissions and waste disposal must be followed. This may include:

- Reporting of emissions to appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills
- Separate disposal of electrical components from domestic waste

Mechanical Device Servicing

- Familiarise yourself with the relevant contents of this manual
- Installation, maintenance and repair work must only be carried out by trained, skilled and suitably qualified personnel.
- Disconnect or lock-out the power source to ensure that the item(s) will remain inoperative. Locking out the equipment by switching off the release mechanism or set value WILL NOT prevent accidental starting.
- Allow the item(s) to cool if over-heated.
- CLOSE the isolating valves on the suction and discharge connections of the affected item(s).
- If working on pump, VENT slowly and cautiously – Refer to the relevant section of this manual.
- DRAIN the pump(s).

Pump Hand Control Mode (Where Fitted)

In the 'HAND' position the pump(s) controlled by the switch will normally run at full speed and completely independently of any control devices, and can result in pump(s) running against a closed valve head if there is no draw. This can cause the system to be maintained at the maximum pressure produced by the pump plus any incoming pressure and additional pressure caused by water surge and can potentially damage the pump and other parts of the system.

The 'HAND' option should only be used with a competent operator in attendance, or when there is a continued demand sufficient to provide constant flow through the pumps to maintain the running pressure of the system to an acceptable level.

Personal Protective Equipment

Use personal safety equipment according to the site conditions and employer regulations. This may include, but may not be limited to:

- Hard hat
- Safety goggles with side shields
- Protective footwear
- Protective gloves
- Respirator
- Ear protection
- First aid kit
- Safety devices

Precautions Before Commencing Work

Ensure that the following safety precautions are complied with before commencing work:

- Provide a suitable barrier around the work area
- Ensure all safety guards are in place and secure
- Ensure you have a clear path of exit
- Ensure that the product cannot roll or fall over and cause damage to persons or property
- Ensure all lifting equipment is in good condition and rated for the intended task
- Use a lifting harness, safety line and respirator as required
- Allow hot components to cool before handling them
- Ensure that product has been thoroughly cleaned
- Disconnect and lock out power supply, ensuring that it cannot be accidentally re-connected
- Check for any risk of explosion before using hand tools

Precautions During Work

- Never work alone
- Always wear protective clothing and hand protection
- Stay clear of suspended loads
- Always use appropriate lifting devices
- Beware of risks of sudden starts of any automated equipment such as level control
- Beware of starting jerks of electric motors - these can be powerful
- Do not exceed the stated operating limits of equipment
- Do not remove vent plugs from a pressurised system - ensure pressurised components are relieved of pressure before disassembly
- Ensure guards are in place during operation

Hazardous Fluids and Chemicals

If hazardous chemicals come into contact with skin or eyes, use the following procedures:

Condition	Action
Chemicals or hazardous fluids in eyes	1) Hold your eyelids apart forcibly with your fingers 2) Rinse the eyes with eyewash or running water for at least 15 minutes 3) Seek medical attention
Chemicals or hazardous fluids on skin	1) Remove contaminated clothing 2) Wash the skin with soap and water for at least 1 minute 3) Seek medical attention

Electrical Safety - High Voltages

This information is especially applicable when Variable Speed Controllers (Inverters) are fitted to pumps. When the inverter variable speed drive head is connected to the power supply the components of the power unit as well as certain components of the master control unit – are also connected to the power supply.

DANGER!

Touching these components can seriously endanger life!

- Before removing the frequency inverter cover, the system must be disconnected from the power supply
 - After switching off the power supply wait at least 5 minutes before starting work on or in the inverter drive head - the capacitors in the intermediate circuit must be given time to discharge completely via the discharge resistors.
-

ELECTRICAL HAZARD

Up to 800V can be present - if there are faults this can be higher

- All work carried out when the frequency inverter is open must be performed only by suitably qualified and properly authorised personnel.
-

ELECTRICAL HAZARD

THE SYSTEM MUST ONLY BE OPERATED WHEN IT HAS BEEN CORRECTLY EARTHED AND PIPES BONDED TO EARTH IN ACCORDANCE WITH IEE REGULATIONS

- When connecting external control wires care must be taken not to short circuit adjacent components. Bare cable ends which are not in use must be insulated.
-

Electronic Safety Devices

- Inverter drives contain electronic safety devices which switch off the control element in the event of a fault developing.
 - A motor can also be stopped by 'mechanical blocking'
 - If it is switched off electronically, the motor is disconnected from the mains voltage supply via the electronics in the inverter drive.
 - Voltage fluctuation and power failures (temporary outages) can cause the motor to switch itself off.
-

WARNING

A motor will have zero current but will remain energised as it stops

- Take necessary precautions - the motor is not voltage-free in the circuit itself
-

WARNING

Repair of faults can cause items to start up again unexpectedly

- Ensure the motor is isolated before commencing any work
-

WARNING

High voltage tests of inverters may damage the electrical components.

- Bridge before the incoming/outgoing terminals L-L2-L3 and U-V-W.
 - To avoid incorrect metering by capacitors incorporated in the electronic circuits, isolate the motor from the inverter drive head.
-

Spare Parts

WARNING

Use of non-genuine spare parts may cause damage to equipment, damage to property and voiding of warranty

- Use genuine, Dutypoint-approved spare parts only
 - If in doubt, contact Dutypoint Service on 01452 300590.
-

Transportation and Lifting

WARNING: LIFTING HAZARDS

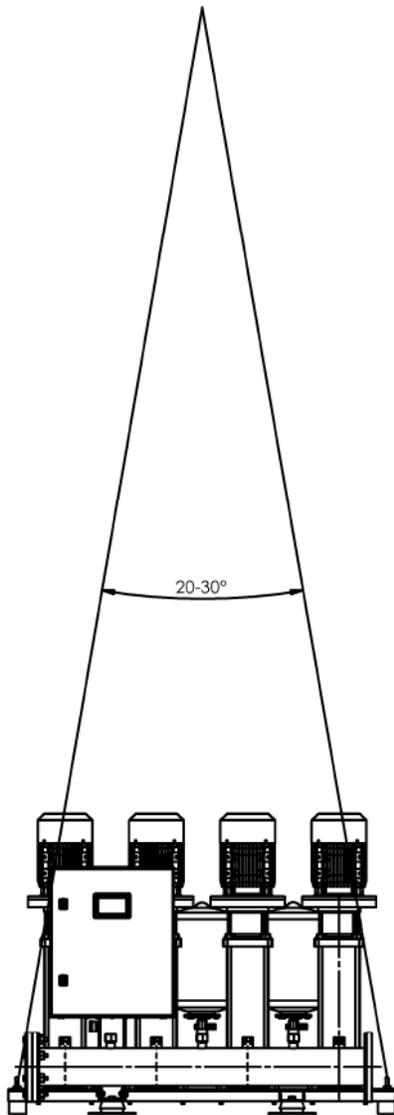
- Stay clear of suspended loads
 - Observe accident prevention regulations in force
 - Do not damage the cables during transports; so not squeeze, bend or dray the cable
 - Always keeps the cable ends dry
 - Secure the unit against tipping over and slipping until it is mounted and fixed in its final location
 - Lift and handle the product carefully, using suitable lifting equipment (stacker, crane, crane mounting device, lifting blocks, sling ropes, etc.)
 - Always lift the unit by its lifting handle
 - This equipment has not been designed to lift people, and should not be used in this way.
-

WARNING: ASSEMBLED SYSTEMS ARE HEAVY

- This equipment has been designed to be lifted by crane
 - Failure to properly lift and support this equipment can result in serious physical injury and/or equipment damage,
 - Lift equipment only at the specifically identified lifting points.
 - Lifting devices such as eye bolts, slings and spreaders must be rated, selected and used for the entire load being lifted
 - Select the appropriate lifting points
 - Slings should be sized in accordance with the gross weight of the product that is being lifted.
 - To minimise tension in legs a sling angle of 20-30° is recommended & appropriate lifting shackles should be used. See [Figure 1: Lifting best practice](#) (p. 8).
-

- 1) Inspect the package
 - a) Inspect the package for damage or missing items upon delivery
 - b) Note any damaged or missing items on the shipping paperwork and contact Dutypoint immediately
 - c) File a claim with the shipping company if anything is out of order
 - d) If the product has been picked up at a distributor, file a claim with the distributor
- 2) Inspect the unit
 - a) Remove packing materials from the product
 - b) Dispose of all packing materials in accordance with local regulations
 - c) Inspect the product to determine if any parts have been damaged or are missing
 - d) If applicable, unfasten the product by removing any screw, bolts or straps. For your personal safety, be careful when you handle nails and straps.
 - e) Contact Dutypoint if you have any issues.
- 3) Attach appropriate lifting equipment

Figure 1: Lifting best practice



Storage

The product must be stored in a covered and dry location free from heat, dirt and vibrations.

NOTE: Protect the product against humidity, heat sources and mechanical damage

NOTE: Do not place heavy weights on the packed product

Disposal

At the end of its working life, this product should not be disposed of with standard household waste, but rather dropped off at a collection point for the disposal of Waste Electrical and Electronic Equipment (WEEE) for recycling.

Figure 2: Waste Symbol



This is confirmed by the *Waste Symbol* found on the product, user manual or packaging.

Depending on their characteristics the materials may be recycled. Through recycling and other forms of processing Waste Electrical and Electronic Equipment, you can make a significant contribution towards helping to protect the environment.

Please contact your local authorities for information on the collection point nearest you.

Potable Water Safety

According to HSE guidance, all water systems should be cleaned, flushed and disinfected as specified in BS EN 806 and BS 8558.

A risk assessment should be performed before commissioning to identify and take into account the potential for stagnation as this may lead to microbial growth where buildings are not to be fully occupied immediately.

WARNING

The temperature of stored water must be kept below 23° to prevent bacteria growth.

- Storage cisterns should be regularly checked for signs of stagnation or microbial growth
 - See HSE guidance for more details: www.hse.gov.uk/legionnaires
-

System Specifications

UniBreak is a cost-effective combined break tank and end suction booster pump system designed for category 5 applications. The set is a free-standing, quiet-running unit with integrated electronic pressure controller mounted on top of the tank. The tank is constructed from 25mm insulated GRP with a Cat 5 'AB' air gap and ½" equilibrium inlet float valve. The unit also features low level protection.

standard technical features

- MA15 controller
- WRAS approved stainless steel end suction booster pump
- Common fault volt-free contact
- Electronic pressure controller
- IP55 rated
- GRP insulated tank
- Low level protection
- Cat 5 AB air gap

Table 2: Range Specifications

Supply voltage	230V 1~ 50Hz
Ambient temperature	1 - 50°C
Cut-in pressure	1.5 bar
Maximum system pressure	10 bar
Electrical protection	IP55
Liquid	Clean water
Inlet	½" BSP
Outlet	1" BSP
Storage capacity	100 litres

Table 3: Models and Specifications

Model	Max Flow	Max Head (m)	kW Rating	FLC(A)
FP1-30M	1.25	33.5	0.45	3
FP1-40M		44.5	0.55	3.7
FP1-45M		55	0.75	4.3

Figure 3: Layout and Dimensions FP1-30M

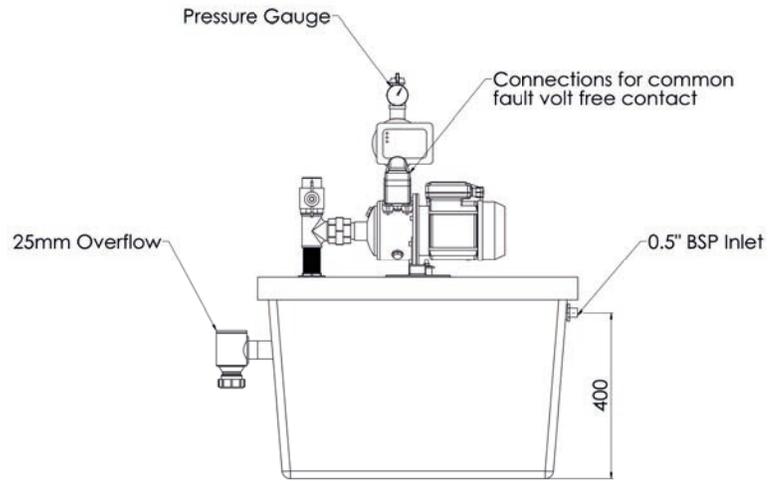
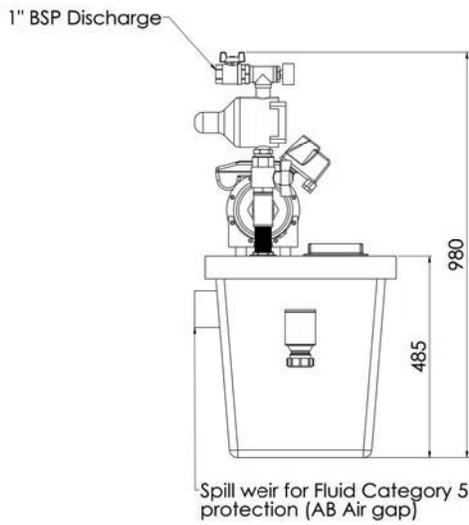
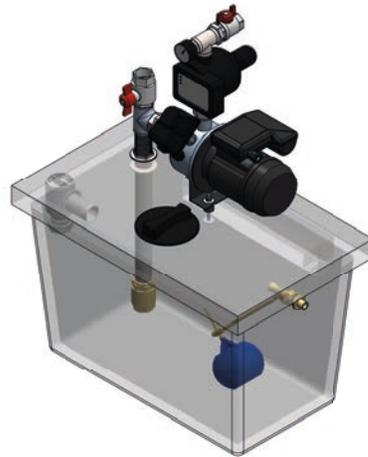
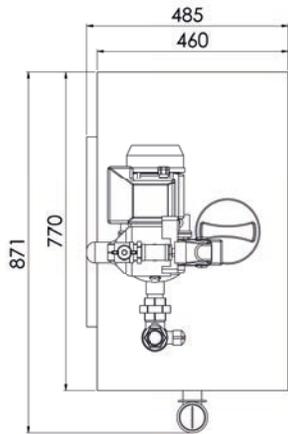
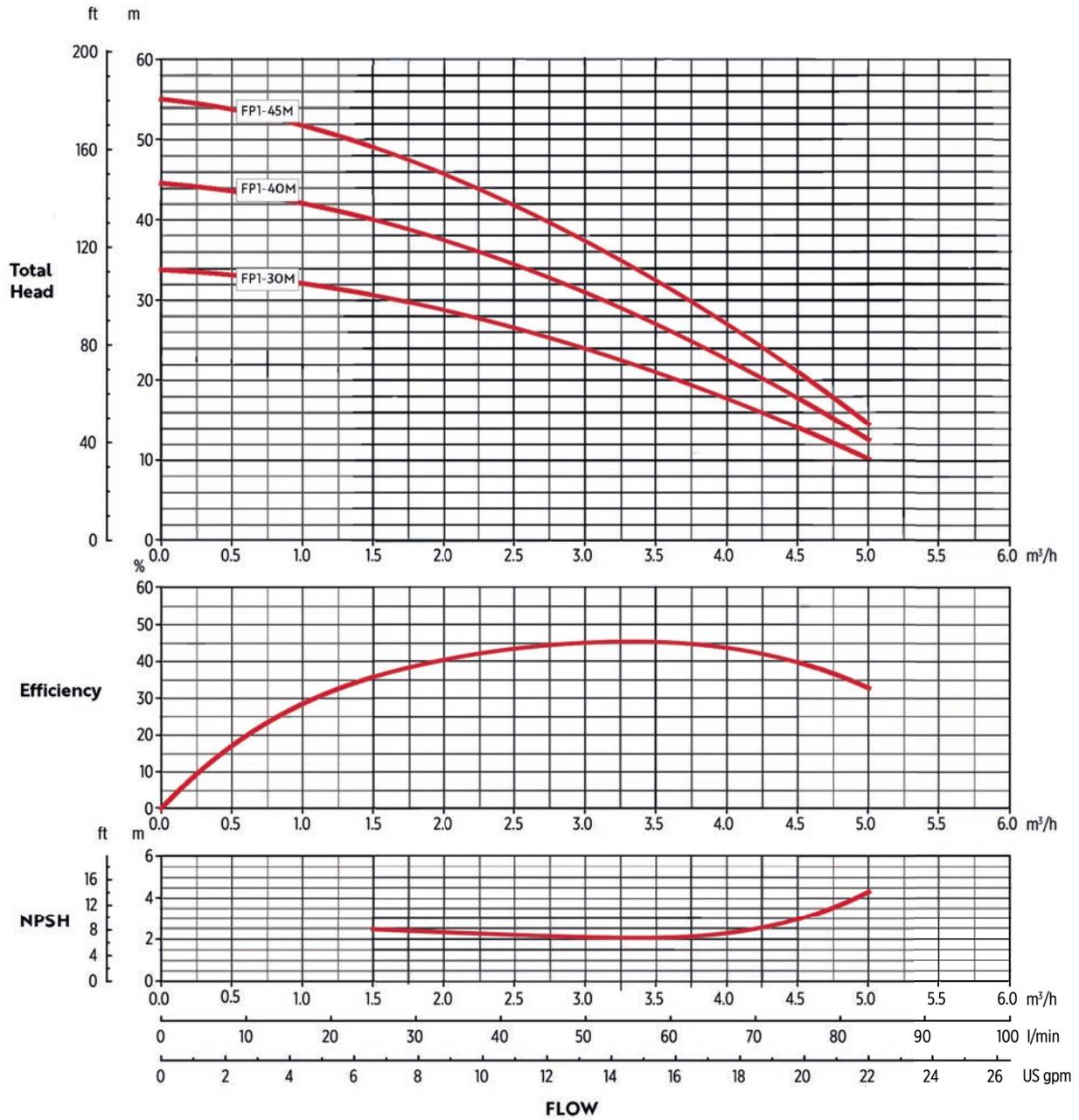


Figure 4: Pump Performance Curves UniBreak Range



Installation and Operation

Installation and Commissioning

WARNING

Prior to installation, to ensure safety, ensure you:

- Read Section [Important Safety Information](#) (p. 1)
-

- 1) Inspect the package for any damage or breakages prior to installation
- 2) Check that all connections are tight
- 3) Check that the overflow weir is clear from debris
- 4) Site the unit in a suitable location, which must:
 - Provide a stable, level surface capable of supporting the weight of the unit when filled with water
 - Provide sufficient space to maintain the unit
 - Have sufficient ventilation to prevent the ambient temperature rising above the maximum operating temperature of the unit
- 5) Check that all the isolation valves operate correctly
- 6) Connect the inlet, outlet and overflow points of the unit as appropriate. Ensure the inlet and outlet valves are closed initially
- 7) Open the inlet valve to allow the unit to fill with water
- 8) Prime the pump using the priming point
- 9) Connect to the electrical supply in accordance with local regulations. Check that the supply voltage is within tolerance. Note that upon initial connection of electrical supply, the pump will run for a few seconds to pressurise the system. See [Electrical Connection](#).
- 10) Open the discharge valve
- 11) Verify correct operation by operating a tap supplied by the unit. Check for correct operation as shown in the following section.

Electrical Connection

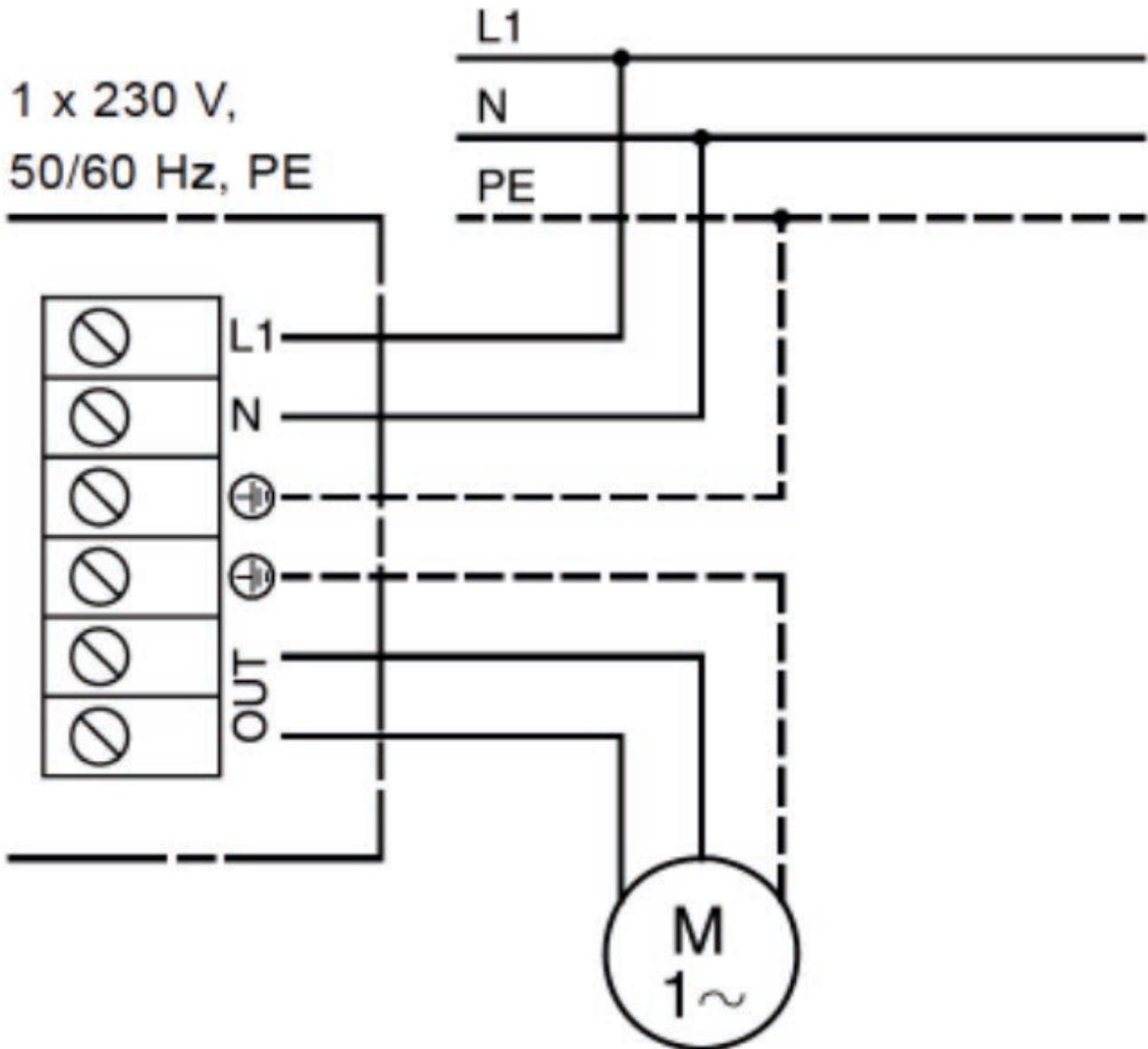
ELECTRICAL HAZARD

Risk of electric shock

- Never make any connections in the terminal box of the unit unless the electricity supply has been switched off
-

The unit must be connected to an external mains switch with a minimum contact gap of 3mm in all poles.

Figure 5: Wiring diagram



Commissioning

Installation and Commissioning Overview

Before shipment, all Dutypoint pump sets are pre-commissioned. Whilst important procedures such as venting and rotational direction checks need to be carried out on site, initial parameters including pressure settings and delay timers will be adjusted to suit the site conditions previously advised to Dutypoint.

In practice, a system can almost invariably be made to perform more efficiently if further re-commissioning is carried out on site.

Please note that engineer visits by Dutypoint are priced at one visit to commission one pump set. If there are multiple units on a site, special terms can be negotiated. To arrange a commissioning visit, please call the Technical Service Help line 01452 300590.

The following checks should be carried out at the initial installation before any run tests are performed.

WARNING

- Ensure that you have read and understood Section [Important Safety Information](#) (p. 1).
-

Pipework and mechanical components

- 1) Ensure that the mounting area and any associated groundwork provides adequate support for the pump set.
- 2) Ensure all supports/brackets are in place and secure.
- 3) Verify all pipe joints are sealed and tight.

Electrical

WARNING

- These checks MUST be carried out by a competent electrician.
 - Ensure that the power source is sufficient to allow the running of all pumps together where there are multiple pumps in the system. This also applies to 'standby' pumps.
-

- 1) Check the motor voltage and frequency information on all the motor nameplates and on controllers etc. correspond with that of the source power supply.
 - 2) Check that all electrical connections are correctly made and secure. Pay particular attention to earth and bonding connections.
 - 3) Carry out specific checks for earth bonding.
-

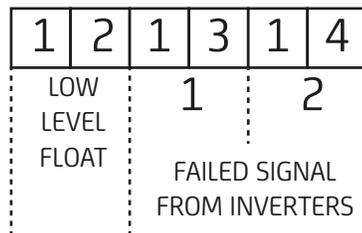
- 4) Carry out NICEIC certification checks as required for the installation, e.g Earth Loop Impedance, Insulation Tests, etc.
- 5) Carry out any other pre-start checks recommended by the pump manufacturer. Refer to the pump manual in the Appendix of this manual. **DO NOT POWER UP AT THIS STAGE.**

Low Level Float Switch Wiring (Hydrovar or VASCO Systems only)

Terminal 1 and 3 require a normally closed contact in order to allow the pump set to operate. To facilitate this the unit will be supplied with a wire loop between 1 and 2. To install a low level float switch this loop has to be removed and the float switch wired to operate as an open on fail scenario.

If 2 or more float switches are required (due to twin compartment or multiple tanks) all float switches are wired into terminals 1 and 2 in parallel.

Figure 6: Terminal Wiring



If installing a Dutypoint FS-series float switch, the following terminals should be used:

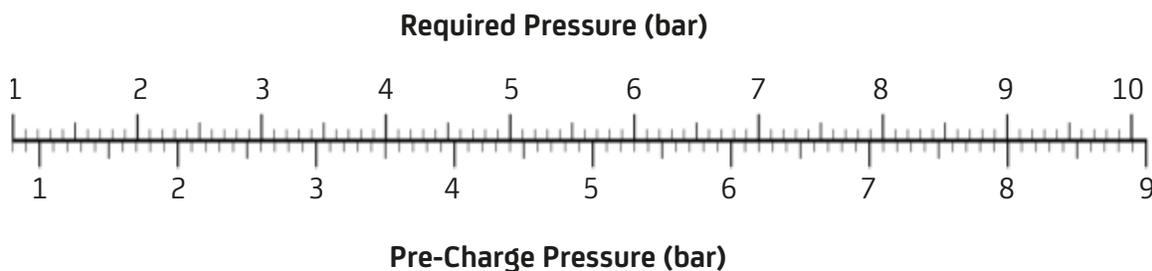
- BROWN: Terminal 1
- BLACK: Terminal 2
- BLUE: Not used - terminate safely

Final Checks Before Commissioning

- 1) Re-check all equipment for any accidental damage caused during installation.
- 2) Carry out the pre-charging and venting procedures described next.

Pressure Vessel Pre-Charging (If fitted)

Figure 7: Pressure Vessel Pre-charge



Before commissioning starts the pre-charge of the pressure vessels should be checked.

On variable speed systems the pre-charge air pressure for vessels should be 90% of the maximum pressure generated by the pump in the pipework system

e.g: If the maximum pressure generated by the pump in a system is 6 bar, this will require a pre-charge pressure of $6 \times 90\% = 5.4$ bar.

To verify the pre-charge pressure:

- 1) First check that the expansion or pressure vessel(s) are totally drained of water, and that the system is switched off and no electrical parts are live.
- 2) Locate the charging valve on each vessel, accessed by removing the plastic cover on the top of the vessel
- 3) Connect a portable pressure gauge with a measuring range compatible with the expected pressures in your application, which has a flexible hose and Schrader-type connector to the charging valve.
- 4) Check the pre-charge pressure above the diaphragm in each pressure vessel correspond to criteria given in the text above.
- 5) If necessary, release or add additional air to correct.

Venting Pumps

It is important to bleed all air from the pump body before initial start-up.

Procedure for flooded suction

Flooded Suction is defined as the condition where there is positive pressure on the suction (inlet) side of the pump(s) as is the case where the storage tank water level is at the same or higher level than the pump bleed point.

This procedure should be carried out individually for each pump in the pump set.

- 1) Open all valves on the suction (inlet) side of the pump.
- 2) Using the vent screw at the top of the pump (refer to Appendix to locate), allow any air in the pump body and suction pipework to vent to atmosphere.
- 3) When water (under pressure from the storage tank feeding the pump on the suction side) escapes through the vent screw hole - and no more air bubbles can be seen - close the vent screw.
- 4) Switch on the electrical supply to the pump motor and start the pump in AUTO mode. As each motor starts verify that the direction of rotation correctly corresponds with the direction of the arrow shown on the body of the pump. If rotation is backward STOP, switch off the pump and investigate.
- 5) Slowly open the valve on the discharge manifold outlet to the system allowing water to be pumped into the system.
- 6) Switch off, re-close the discharge valve and repeat steps 3 to 6 several times to ensure that all air is released from the pump body and local pipework.

The above procedure should be carried out individually for each pump in the pump set.

It may be necessary to add the suction head of the break tank to the maximum head parameter for greater accuracy and to enable smoother running.

Procedure for Lift Suction

Lift Suction is defined where the water storage tank is at a lower level than the pump set. In this case a negative pressure condition may exist at the pump suction.

NOTE: The "Lift Suction" mode of operation requires specific venting procedures. Please call Dutypoint Systems Technical Support on +44 (0)1452 300590 for advice before attempting to vent the pump(s).

The advised procedure should then be carried out individually for each pump in the pump set.

Programming the Controller

Dutypoint Systems fit a design of Inverter/Controller that is most suitable for the design duty of the pump set.

Manufacturer's information for them is detailed in the Appendices to this manual.

Carefully follow the appropriate step-by-step setting-up procedures contained in the manual, ensuring that any data required to be entered by the end user is accurately inserted where requested.

If in doubt please call Dutypoint Systems Technical Support on 01452 300590 for advice.

Operation and Performance Tests

Having checked that the pump set is installed, pre-charged, vented in accordance with the procedures set out earlier, carry out the following running tests before handing over the pump set for operational use.

- 1) Run each pump by selecting HAND (Manual) control.
- 2) Re-select to AUTO mode.
- 3) Create the conditions for a normal start and run and allow the selected 'Duty' pump to run. Whilst running observe the pressure values. Verify the pump motor speeds up / slows down in accordance with the desired control philosophy.

Duty/Standby Twin Pump Sets

- 1) On Duty/Standby sets, wait for a normal stop to take place (or create the conditions where this would happen) and check that the 'Duty' pump stops. Whilst stopped simulate a fault by inhibiting the 'Duty' pump and then recreate the conditions for a normal start to take place. Check that the 'Standby' Pump now starts and runs in place of the inhibited 'Duty' pump and observe the pressure

values. Verify that the pump motor speeds up / slows down in accordance with the desired control philosophy.

- 2) Wait for a normal stop to take place (or create the conditions where this would happen) and check the 'Standby' pump stops. Whilst stopped undo the inhibit to the 'Duty' pump which should now return to normal.

Duty/Assist Twin Pump Sets

- 1) For 'Duty/Assist' applications, run the system up to pressure using the 'Duty' Pump only, then deliberately create the condition(s) which will require the 'Assist' Pump to operate as well. (e.g: open taps to reduce the pressure in the system to a point where one pump only cannot maintain the required output. Verify that the 'Assist' Pump starts and runs together with the 'Duty' Pump and that the desired pressure is duly restored and maintained.
- 2) Close the taps again (thereby reducing the demand) and check the 'Assist' Pump slows down and stops, allowing the 'Duty' Pump to continue on its own.

Commissioning/Handover Check

- 1) Record any indicated voltage / amperage / pressure data / controller passwords for future reference.
- 2) Re-check all isolating valves are fully open and replace any cover(s).
- 3) With all the isolators ON and the switches and/or control programs set to AUTO, the pump set is now fully operational in automatic control mode.

NOTE: No manual operation or attendance is required other than for routine servicing and maintenance checks. Other than for maintenance purposes, the supply to the Controller(s) and the Pump motor(s) should never be switched off.

Booster Set Troubleshooting

The information in this section is common to all Dutypoint pump sets. For more detailed troubleshooting information that is specific to the type and model of pump and controller used in this product, please refer to the manufacturer's literature.

FIRST STEP WHEN A FAULT OCCURS:

- When a fault first occurs, turn off the main power to the pump set and leave off for around 1 minute.
 - Switching power back on and re-energising the system may be sufficient to clear the fault.
-

Booster Set Problems, Causes and Recommended Actions

Problem	Possible Causes	Recommended Action
Pump will not start	No electrical power	Check and rectify
	Blown fuse	Check and rectify
	Overload trip	Check and rectify
Low or zero output discharge	The rotating part(s) of the pump is/are partially or completely obstructed, e.g. impeller obstructed by foreign matter	Strip the pump to inspect and rectify
	Pump not primed - WARNING: running the pump 'dry' can cause serious damage to the mechanical seal.	Having first checked the mechanical seal for damage, prime and air-bleed the pump and try again
	Valve in suction pipework closed or partially closed.	Check all appropriate valves are fully open.
	Incorrect pump rotation	Check and rectify.

Problem	Possible Causes	Recommended Action
Pump vibrates and/or is noisy	Pump is cavitating	Increase the discharge back pressure slightly by progressively closing a manual isolating valve on the discharge side until the cavitation stops.
	Motor bearings worn	Check and rectify
	The rotating part(s) of the pump is(are) partially or completely obstructed. E.g. impeller obstructed by foreign matter.	Strip the pump to inspect and rectify
Pump runs continuously	If the pump has a “Hand Control” option on it’s control panel.	Switching to “Auto” should restore normal control. If normal control is not returned an immediate service visit is required.
	Pump has no “Hand Control” option.	An immediate service visit is required.
Overload trip	Pipework or the pump chamber has a partial blockage.	Check and rectify
	Momentary loss of one phase of power supply	Check and try again
	Discharge flow rate too high	Reduce by the discharge flow rate by increasing the discharge back pressure slightly, progressively closing a manual isolating valve on the discharge side: then try again
	Overload trip setting too low for rated duty	Check and (if necessary) reset the overload trip value

User Maintenance

Routine user maintenance for Dutypoint pump sets.

Dutypoint pump sets have been designed to keep major maintenance requirements to a minimum. Planned maintenance of the pumps and other principal components should therefore be undertaken at the intervals recommended in the manuals referenced below.

It is essential that a full test following the Pre-Commissioning procedure on is carried out on an annual basis.

In addition, the operator in charge should routinely make visual checks of the equipment during use, noting particularly any unusual noises or vibrations. This will give an immediate indication of any irregularity in the operation of the system.

DANGER!

Do not commence any work until:

- You have read [Important Safety Information](#) (p. 1)
 - You have the appropriate personal protective equipment
 - You have all necessary safety equipment to hand
-

Refer to the appropriate manufacturer's information that is provided in the appendices of this manual for the equipment being serviced.

Table 4: Periodic User Checks for Pump Sets

Timing	Checks
Weekly	<ol style="list-style-type: none"> 1) Visually check the complete pump set 2) Observe the running of the pump(s) and note any unusual vibrations or sounds.
Quarterly	<ol style="list-style-type: none"> 1) Visually check the complete pump set 2) Observe the running of the pump(s) and note any unusual vibration, etc. 3) Check the cooling fan and vents on the Control Unit(s) and clear any dust or other obstructions 4) Operate each manual isolating valve three times to ensure continued efficient working
6-monthly	The pressure vessel (if fitted) should be drained and the pre-charge pressure checked. See the relevant section for more details.
12-monthly (essential)	Carry out the full pre-commissioning procedure to verify safe operation - see Commissioning (p. 1).

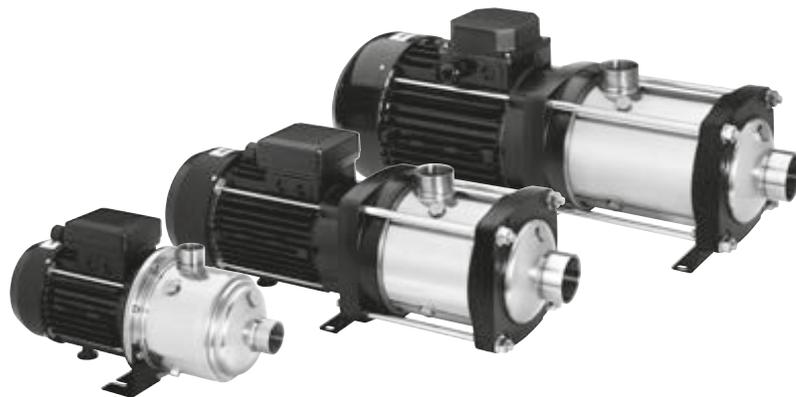
DH Pump Manual

POMPE MULTISTADIO ORIZZONTALI / AUTOADESCANTI
HORIZONTAL / SELF-PRIMING MULTI-STAGE PUMPS
POMPES MULTICELLULARES HORIZONTALES / AUTO-AMORÇANTE
HORIZONTALE / SELBSTANSAUGEND MEHRSTUFIGE PUMPEN
BOMBAS HORIZONTALES / AUTOCEBANTES MULTIETAPA
التحضير متعددة المراحل متعددة/ة أفقي تامضخ

DH 3 - 5 - 9 - 15 - 20 / DHsp 3 - 5
50 - 60 hz



Manuale d'uso e installazione
Operating and installation manual
Manuel d'utilisation et d'installation
Betriebs- und Installationshandbuch
Manual de uso e instalación
دليل الاستعمال والتركيب



1 INTRODUCTION AND SAFETY

This manual contains basic instructions to be observed during installation, use and maintenance. It is essential that this manual be consulted by the installation personnel and by all qualified personnel chosen by the installation manager to follow its operation. Furthermore, this manual should always be at hand at the site where the pump is being used.

1.1 Identification of the codified instructions in this manual



WARNING: General danger: inobservance of these safety instructions may cause physical injury.



WARNING: Electrical hazard: failure to comply with these instructions may cause an electric shock and resulting serious physical injury or death.



WARNING: Hot surface: inobservance of these safety instructions may cause physical injury.

Risks deriving from failure to comply with safety regulations

Failure to comply with safety regulations may cause physical injury or material damage, as well as possible environmental contamination. Inobservance of safety regulations may lead to the complete loss of warranty rights.

For example, non-compliance with the said regulations may cause:

- breakdown of the main functions of the machine or of the installation,
- compromised maintenance operations,
- electrical, mechanical physical damage.

1.2 General information

This pump has been made according to the most recent, advanced techniques, in full compliance with current standards and has been subject to strict quality control. This manual will help you understand its function and learn its possible applications.

The user manual contains important recommendations necessary for correct and efficient operation. These recommendations must be observed in order to guarantee reliability and lifespan and to prevent accidents arising from improper use.

The pump should not be used outside the limits described in the technical specifications. It is necessary to observe the instructions regarding the nature, density, temperature and volume of the pumped liquid, rotation speed and direction, pressure and motor power, as well as all the other instructions contained in this manual or the documentation attached to the contract.

The data plate indicates the model, the main service specifications and the serial number. It is important to provide these indications when requesting repairs or support and when ordering spare parts.

The manufacturer declines all liability for any damage caused, directly or indirectly, by persons or objects, as a consequence of failure to comply with all instructions given in this instruction manual and regarding, in particular, warnings concerning installation, use and maintenance of the electric pump or in conditions other than those specified on the data plate.

The warranty will be permanently withdrawn in the case of wrong or improper use of the product, or negligence.



WARNING: This equipment must not be used by children or persons with reduced physical, sensory or mental abilities, or lacking in experience and expertise, unless supervised or trained.



WARNING: Children may not use the equipment and must not play with the pump or in the near vicinity.



WARNING: For all normal operations of installation/commissioning and functioning of the machine it is not necessary to remove the protective devices (motor fan cover).

EC declaration of conformity

In accordance with Annex II.A of Directive 2006/42/EC

Dutypoint Ltd., Shepherd Road, Gloucester, GL2 5EL, United Kingdom declares that the machine:

PUMP MODEL: DH / DHsp

SERIAL NUMBER: (SEE STICKER ON LAST PAGE AND PUMP DATA

PLATE) is compliant with the following Directives:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU
- RHOS II Directive 2011/65/EU
- Ecodesign Directive 2009/125/E, RULING (EC) 640/2009 (MOTOR 3-, 50Hz, PN \geq 0.75 kW 50Hz) if marked IE2 or IE3

and with the following technical standards:

- EN 809:2009
- EN 60335-1:2013, EN 60335-2-41:2005
- EN 62233:2005
- EN 61000-6-1:2007, EN 61000-6-3:2007
- EN 60034-30-1:2014

2 PRELIMINARY INSPECTION

2.1 Delivery and packing

The pumps are supplied in their original packing, in which they should remain until the time of installation.

Check externally that the packing is free from damage. If the product appears to be damaged, inform the reseller immediately. The pump should not be exposed to unnecessary shocks and impacts.

2.2 Contents of packing

The packing contains the operating and installation manual and the electric pump.

3 STORAGE AND HANDLING

3.1 Storage:

Storage temperature: from -5 °C to +40 °C.

The electric pump must be kept indoors in a dry place, away from heat and protected from dirt and vibrations.

3.2 Handling:



WARNING: Observe the accident prevention regulations in force. Risk of crushing. The pump may be heavy. Use suitable lifting methods and always wear personal protection equipment.

Before handling the product, check its weight to identify suitable lifting equipment. The weight is indicated on the pump data plate.

There are two possible methods for handling the pump:

- 1) Where indicated, remove the cap and screw on a lifting eyebolt suitable for the weight involved. **Warning: The eyebolt does not correspond to the centre of gravity** (see fig. 1-C).
- 2) Position the hoist cables as shown in (fig. 1-A) and (fig. 1-B).

Take the pump out of its packing and check that it is in good condition.

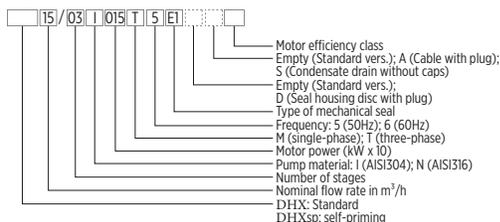
Check also that the plate data correspond to those required. In the event of any anomaly, contact the supplier immediately, reporting the nature of the defects.

4 GENERAL INFORMATION

4.1 General description

This product is a non self-priming, close-coupled, multi-stage, horizontal pump, with an electric motor. The pump can pump hot or cold water. The metal parts in contact with liquid are made of stainless steel.

Pump identification code



Permitted use

- The pump is suitable for:
- Civil and industrial water distributions systems,
- Irrigation,
- Water treatment,
- Washing systems,
- HVAC (heating and cooling)

Non-permitted use

The pump is not suitable for:

- Pumping liquids not compatible with construction materials.
- Pumping dangerous liquids (e.g. toxic, explosive, inflammable or corrosive liquids),
- Pumping liquids for human consumption other than water (for example wine or milk),
- Pumping liquids containing abrasive, solid or fibrous substances,
- Working outside of the rated capacity range specified on the data plate.

Examples of improper installation:

- Environments with explosive or corrosive atmospheres,
- Outdoor installations without protection from the weather (e.g., sun, rain, high or freezing temperatures).



WARNING: Do not use this pump for inflammable or explosive liquids. Misuse may create hazardous conditions and cause personal injuries and material damage. Misuse of the product renders the warranty void.

Special use:

Contact the sales and service office:

- If the pump is used to pump liquids with viscosity or density greater than water (a motor with proportionately higher power should be used),
- If the water to be pumped has been chemically treated (softened, chlorinated, demineralised etc.),
- In any other situation other than those listed for permitted use.

4.2 Technical data

4.2.1 Temperature of the liquid

Pumped liquids must remain within certain temperature limits:

- with EPDM seals (standard versions): from -15°C to +110°C (EH) and from 0°C to +35°C (EHsp),
- with VITON/FKM seals (special versions): from -10°C to +110°C (EH).

If the pump is intended for uses provided for by CEI EN 60335-2-41 the upper temperature limit, for any combination of materials, is +90°C.

4.2.2 Ambient temperature and altitude

In the case of ambient temperatures higher than +40°C, or the installation of the pump at an altitude higher than 1,000 metres, the motor must not work at full capacity to avoid the risk of overheating. Excessive ambient temperatures and low air density reduce the motor's capacity to cool. Below is a non-binding chart of motor capacity percentage based on altitude or temperature (see Fig. 4).

4.2.3 Maximum number of start-ups

Power [kW]	Starts per hour	
	2 poles	4 poles
0,37 ÷ 0,55	60	140
0,75 ÷ 3	60	140
4 ÷ 7,5	30	60

The table shows the maximum number of start-ups per hour for the electric pump.

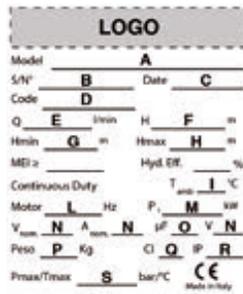
4.2.4 Maximum limit of pressure

The maximum pressure, not to be exceeded, is shown on the data plate (see point 4.3).

4.3 Pump data plate

The data plate, positioned on the side of the pump's outer casing, contains the main information about the machine (EH: fig. 5; EHsp: fig. 11).

Single-phase:



- A) Pump identification code
- B) Serial number
- C) Date of production
- D) Product code
- E) Working flow range
- F) Working head range
- G) Minimum head (according to EN 60335-2-41)
- H) Maximum head
- I) Maximum ambient temperature
- L) Motor type and frequency
- M) Maximum absorbed power
- N) Electrical Connections / Motor data
- O) Capacitor (single-phase motors)
- P) Weight of electric pump
- Q) Motor insulation class
- R) Motor IP rating
- S) Max. working pressure / Max. temperature
- T) Efficiency at variable loads

4.4 Other plates

For three-phase motors only, a label with arrow on the cover of the motor's cooling fan indicates the correct direction of rotation (EH: fig. 5-F; EHsp: fig. 11-F).

A label on the pump as shown in Fig. 5-U (EH) and Fig. 11-U (EHsp) indicates:

the pump is suitable for pumping liquid at the indicated temperatures for industrial use only (uses other than those provided by the CEI EN 60335-2-41 standard);

the pump is suitable for pumping liquid at the indicated temperatures for home use (uses provided by the CEI EN 60335-2-41 standard);

read the instruction manual carefully before use.

A WRAS label on the pump indicates that the product can be used for handling drinking water for human use.

5 INSTALLATION AND PREPARATION

For the pump to function correctly and to avoid damage to people or things, some basic conditions must be observed.

In particular the NPSH and maximum pressure must be checked.

5.1 Checking the NPSH

Check the characteristic curves of the electric pump to evaluate the NPSH factor (EH: Fig. 8; EHsp:fig. 13) and thus avoid cavitation problems in the case of an excessively high gap between the pump and the level of the liquid to be drawn or due to an excessively high temperature (Fig. 2).

The maximum height between the pump and the level of liquid "H" can be calculated using the following formula:

$$H = pb \times 10,2 - NPSH - Hf - Hv - Hs$$

- pb: Bar pressure or liquid suction pressure [bar].
- NPSH: Net positive suction head [m] (EH: Fig. 8; EHsp: fig. 13)
- Hf: Friction and entrance head losses in the suction piping [m]
- Hv: Steam pressure [m] in relation to the temperature of the liquid (tm) (see Fig. 2-A)

Hs: Safety margin [m] (minimum 0.5)
If the value calculated is less than "0" the pump should be placed below the liquid level.

Example

pb = 1 bar
Type of pump: EH 15/4
Capacity: 14 m³/h
NPSH: 1,8 m
Hf = 2,5 m
Temperature of the liquid: +50°C
Hv: 1,3 m
H = pb x 10,2 - NPSH - Hf - Hv - Hs [m].
H = 1 x 10,2 - 1,8 - 2,5 - 1,3 - 0,5 = 4,1 [m]
This means that the maximum height between the pump and the level of the liquid is 4.1 metres.

5.2 Verifying maximum pressure

Working pressure

It is important to keep the sum of the inlet pressure plus the maximum pressure of the pump at zero capacity, always lower than the maximum allowed working pressure (PN). The PN maximum working pressure is shown on the data plate (see point 4.3).

5.3 Minimum rated capacity

- WARNING:** The pump must never operate dry (without liquid inside it)
- WARNING:** The pump must never operate with the discharge valve closed for more than 5 seconds.

Functioning for a long time at a lower level than the minimum allowed on the data plate may cause excessive and dangerous overheating of the pump.

For water temperatures over 40°C, the minimum capacity should be increased according to the temperature of the liquid (see Fig. 3). For liquids other than water contact the sales and service office.

5.4 Installing the pump

WARNING: Please observe current accident prevention standards, use suitable protective devices and refer to the regulations, legislation and local and/or national laws in the country of installation regarding water and electricity connection.

WARNING: DO NOT USE THIS PUMP IN ENVIRONMENTS THAT MAY CONTAIN INFLAMMABLE/EXPLOSIVE OR CHEMICALLY AGGRESSIVE POWDERS OR GASES.

WARNING: Installing an electric pump may be a rather complex operation. It should therefore be carried out by skilled and authorised installers.

5.4.1 Assembly Guidelines

- Install the electric pump in an area that is accessible and protected from frost, leaving sufficient space around the electric pump to allow for its operation and maintenance.
- Vertical assembly is not permitted with the motor placed on the lower part (EH: Fig.5-V; EHsp: fig. 11-V).
- Check that there are no obstacles blocking the air flow to cool the motor, make sure there is at least 100mm of space in front of the fan (EH: Fig. 5; EHsp: fig. 10).
- Any liquid leakages or similar occurrences must be drained and must not flood the place of installation and/or submerge the unit.
- The electric pump must ALWAYS be firmly fixed to a concrete base or to a metal structure of a size and weight to suit the size and weight of the electric pump, using screws suitable for the fixing holes provided (EH: Fig. 6.7; EHsp: 12 - dimensions, tightening torques).
- If the pump works with liquid at temperatures above 50 °C, anchor the pump only on the side of the motor bracket and leave free the inlet side bracket.
- To reduce vibrations to a minimum, insert vibration-damping seals between the pump and the base.
- Make sure the pump is correctly orientated (EH: Fig. 5; EHsp: fig. 11).
- The connection pipes must be suitable for the operating pressure and the pumped liquid. Between the connections of the pipes and the pump must be interposed appropriate sealing gaskets.
- The pipes should be properly supported (EH: Fig. 5-1; EHsp: fig. 11-1) and should not rest on the unit. Do not force the position of the pipes when fixing them to the pump. Flexible pipes or expansion joints (EH: Fig. 5-2; EHsp: fig. 11-2) are necessary to avoid vibrations being transmitted from the pump to the pipes and vice versa.
- To prevent air bubbles in the suction pipe, give it an inclination of no less than 2%.
- The diameter of the pipe should not be smaller than the diameter of the suction vent and must be hermetically sealed. If the suction pipe is bigger, install an eccentric reducer (EH: Fig. 5-6; EHsp: fig. 11-6).
- If the pump is installed above the level of the liquid to be suctioned (suction head case), a check valve will have to be fitted to the pipe (EH: see fig. 5-3; EHsp: see fig. 11-3).
- The end of the suction pipe should be sufficiently immersed to prevent air entering the suction vortex (EH: Fig. 5-7; EHsp: fig. 11-7) when the liquid is at minimum level.
- Suitably sized gate valves should be fitted to the suction pipes (EH: Fig. 5-4; EHsp: fig. 11-4) and delivery pipes (Fig. 5-8) to isolate the pump from the circuit in the case of inspection and maintenance.
- Install a check valve (EH: Fig. 5-5; EHsp: fig. 11-5) to the discharge piping to prevent reflux and water hammer when the pump is switched off.
- See (EH: Fig. 6, 7; EHsp: fig. 12) for the sizes of the pump's threaded connections.

WARNING: Depending on the temperature of the pumped liquid, the surfaces of the electric pump can become very hot. If deemed necessary, provide guards to avoid accidental contact.

5.4.2 Electrical connections

WARNING: Low voltage machines are made up of rotating, hazardous, live parts and also sometimes of hot surfaces.

- WARNING:**
- The specialist installer must carry out the connection conform to standards in force in the country of installation.
 - Before doing any work on the unit make sure the power supply is disconnected and that neither the control panel nor the unit can switch on, not even accidentally.

- WARNING:**
- Ensure all electrical equipment of the pump, motor and any monitoring equipment is grounded before connecting the phase conductors.
 - The earth conductor must be the last conductor to disconnect from the terminal.
 - Make sure that the earth conductor is longer than the phase conductors on both ends of the cable.

Guidelines

- Protect electrical conductors from extreme heat, vibration and impact.
- The power line must be fitted with:
 - a protection circuit.
- As extra protection against lethal electric shocks install a high sensitivity residual current device, whose operating current differential is less than or equal to 30mA.
- An overvoltage category III all-pole mains isolator in the power supply network as per current standards.

The electric control panel should:

- Be suited to the rated values of the electric pump, to properly protect the motor.
- Protect the motor from overload and short circuits.
- Protect the motor from overheating (circuit breaker protection);
- Be equipped with a system to protect against dry running, to which should be connected the pressure switch, level sensors, floats and other suitable devices.
- An inflow pressure switch is recommended if the pump is connected to the water supply or level sensors/floats if the pump draws from a tank.

- WARNING:** The data regarding the power supply of the motor are shown on the plate (EH: Fig. 5-T; EHsp: fig. 11-T) and paragraph 4.3.

Before starting up the motor, check that:

- The power cables conform, with 3 conductors (2 + Earth) for the single phase versions and with 4 conductors (3 + Earth) for the three phase version.
- The power supply is compatible with the motor characteristics.
- Wire the electric cable to the motor according to the diagram shown on the label inside the cover of the terminal box.
- Check that the earth cable is longer than the phase conductors. If the power supply cables are pulled and detached from their cable stay, the last one that should disconnect is the earth cable.
- Make the connection ensuring there is an effective earth circuit.

- WARNING:** Once the cables have been connected, replace the terminal board cover; failure to follow these instructions may cause personal injury.

- WARNING:**
- Avoid any contact between the electric cables and the pipes or other parts of the pump
 - Carefully keep the cables away from damp.
 - Tighten the cable glands properly to prevent moisture from entering the terminal and to ensure protection against sliding of the cables.

The electric motors can run with the voltage shown on the data plate, with a tolerance of +/- 10%. The single-phase motors have built-in automatic thermal overload protection. The three-phase motors have no thermal protection. The installer must install it in the control panel.

6 START-UP

- WARNING:**
- Pay attention to discharged liquid so that it cannot cause damage to people or things.
 - The motor protectors can cause an unexpected restart of the motor, which may cause serious personal injury.
 - Never start up the pump without the coupling safety casings correctly installed.

- WARNING:**
- During operation the external surfaces of the pump and the motor could exceed 40°C (104°F) if the pumped liquid is not at ambient temperature.
 - Do not touch the unit without proper protection.
 - Do not place inflammable material near to the pump.

- WARNING:**
- The electric pump must NOT be started without first being filled.
 - Its use without liquid may permanently damage the mechanical seal.
 - Do not operate the pump with the inlet and discharge valves closed for more than 5 seconds.
 - Do not expose the pump when idle to freezing temperatures. Frozen liquid will damage the pump.
 - The pump should not operate if there is cavitation, because this damages the internal parts (see point 5.1).

Noise level

All the units generate an acoustic pressure level below LpA 70 dB.

6.1 Priming

With liquid level above the pump (positive suction head EH: Fig. 5-B; EHsp: fig. 11-B)

- Close the delivery valve (EH: see fig. 5-8; EHsp: see fig. 11-8) and open the intake valve (EH: see Fig. 5-A; EHsp: see fig. 11-A).
- Remove the filling caps (EH: Fig. 5-A1, 5-A2; EHsp: fig. 11-A1, 11-A2).
- Open the inlet gate valve (EH: Fig. 5-4; EHsp: fig. 11-4) to allow the liquid to enter and wait until the water overflows.
- Close the inlet valve and tighten the caps (see tightening torques in EH: Fig. 6, 7; EHsp: fig. 12).
- With liquid level below the pump (negative suction head EH: Fig. 5-A; EHsp: fig. 11-A)
- Close the discharge valve (EH: Fig. 5-8; EHsp: fig. 11-8).

- Remove the filling caps (EH: Fig. 5-A1, 5-A2; EHsp: fig. 11-A1, 11-A2).
- Using a funnel, fill the pump until the water comes out, (this operation may need to be repeated several times)
- Replace and tighten the caps (see tightening torques in EH: Fig. 6, 7; EHsp: fig. 12).

6.2 Checking rotation direction

This operation is only required for three-phase motors. For single-phase motors, the direction of rotation is already set.

- Start up the motor for 1-2 seconds, and check the direction of rotation through the motor fan cover (no need to remove the cover). The arrow on the fan cover shows the correct direction.

- WARNING:** Before any operation on the electric pump, check that the power supply is disconnected and that it cannot be accidentally reconnected during maintenance operations.

If the direction is wrong:

- Disconnect the power supply.
- In the terminal box or control panel of the motor, swap the position of two phases of the power cable.
- Close the lid of the terminal box and/or control panel.
- Check again the direction of rotation.

6.3 Starting up the pump

Before starting up, check that:

- The electric pump is correctly connected to the power supply,
 - The pump is correctly primed (procedure point 6.1)
 - The discharge gate valve (EH: Fig. 5-8; EHsp: fig. 11-8) is closed and the inlet valve (EH: Fig. 5-4; EHsp: fig. 11-4) is open.
 - Start the motor and gradually open the valve on the discharge side of the pump.
 - After a few seconds of noisy operation to expel any air, the pump should function silently and regularly without any changes in pressure. The EHsp versions may require longer to expel the air from the intake pipe if this is not full.
- Otherwise refer to the Troubleshooting table Point 9.

6.4 Emptying the pump

- WARNING:** Liquid may remain in some parts inside the pump. To remove all liquid, the pump must be completely disassembled.

- WARNING:** Be careful that the discharged liquid does not damage people or things.

If it is necessary to empty the pump for maintenance or for long downtimes, the procedure is as follows:

- Close the gate valves of the discharge and inlet piping (EH: Fig. 5-4, 5-8; EHsp: fig. 11-4, 11-8).
- Partially unscrew the discharge cap to release pressure on the pump (EH: Fig. 5-A1; EHsp: 11-A1).
- When there is no more pressure completely remove the inlet and discharge caps (EH: Fig. 5-A3; EHsp: fig. 11-A3) and wait for pump to empty.
- Once emptying is completed, replace and tighten the caps again, (tightening torques shown in EH: Fig. 6, 7; EHsp: fig. 12).

7 RESIDUE RISK ANALYSIS

The pump described in this manual has been built according to European Community safety standards, and totally complies with the Machinery Directive.

The pump has also been designed by taking into account all the risks which workers may possibly experience and is therefore equipped with all guards positioned in order to avoid accidents to the operators; however, some residual risks remain, which in normal conditions cannot cause accidents, but that we wish to point out in any case.

Before any intervention, stop the machine by turning off the main switch and isolate the machine from the system by closing the upstream and downstream shut-off valves.

- RISK OF ELECTROCUTION**
- Never remove the terminal cover during machine operation. Before any intervention, turn off the main electrical switch. If the pump is a single-phase one, make sure that the capacitor is discharged.

- RISK OF EJECTION OF THE FLUID PUMPED BY THE MACHINE**
- Before start-up, make sure that the connections to the system and the filler cap and drain plug are tight. The pumped fluid can be under pressure even when the machine is at a standstill; before any intervention isolate the machine from the system by closing the upstream and downstream shut-off valves and partially unscrew the filler cap to reduce the internal pressure. During this phase there can be a fluid leakage.

- RISK OF SCALDING**
- The outer surface of the motor can be hot during operation. If the pumped liquid has a higher temperature than the ambient temperature, the pump will also be at a higher temperature. Use appropriate protective equipment (gloves, goggles...) and provide for any external protective devices to reduce the risk of scalding.

- RISK DUE TO THE LIQUID'S NATURE**
- Ascertain the nature of the pumped liquid and use appropriate protective equipment (gloves, goggles...) when carrying out the start-up, adjustment and maintenance and disposal operations. Arrange for a containment structure to prevent any dispersion of the liquid into the environment.

- CRUSHING HAZARD**
- Lifting means suitable for the machine's weight must be used during handling and installation. To prevent any tipping, the machine must be blocked before start-up as specified in the instructions.

8 MAINTENANCE AND SUPPORT

-  **WARNING:** Before any repairs to the electric pump, check that the power supply is disconnected and that it cannot be accidentally reconnected during maintenance operations.
-  **WARNING:** If the electric pump is used for hot and/or hazardous liquids, it is essential to inform the personnel who will carry out the repair. In this case, clean the pump so as to ensure the safety of the operator.
-  **WARNING:** Repairing or having the electric pump repaired by personnel not authorised by the manufacturer means losing the warranty and operating with unsafe and potentially hazardous equipment.
-  **WARNING:** Be careful that the discharged liquid does not damage people or things.

The electric pump does not require any ordinary scheduled maintenance. If the user wishes to prepare a scheduled maintenance plan, bear in mind that the due dates depend on the type of liquid pumped and the running conditions. For spare parts and maintenance documentation, contact our sales and service office. Spare parts see (Fig. 8 and Fig. 9 and 14).

9 DISPOSAL



Devices marked with this symbol cannot be disposed of in household waste but must be disposed of at appropriate waste drop-off centres. It is recommended to contact the Waste Electrical and Electronic Equipment drop-off centres (WEEE) in the area. If not disposed of properly, the product can have potential harmful effects on the environment and on human health due to certain substances present within. Illegal or incorrect disposal of the product is subject to serious administrative and/or criminal penalties.

10 TROUBLESHOOTING

-  **WARNING:** Before any repairs to the electric pump, check that the power supply is disconnected and that it cannot be accidentally reconnected during maintenance operations.
-  **WARNING:** If the electric pump is used for hot and/or hazardous liquids, it is essential to inform the personnel who will carry out the repair. In this case, clean the pump so as to ensure the safety of the operator.

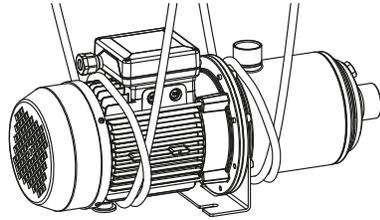
For problems and solutions, consult table below: "TROUBLESHOOTING TABLE"

TROUBLESHOOTING TABLE:		
PROBLEM	CAUSE	ACTION
9.1 The pump turns but does not deliver	a) The internal parts are obstructed by foreign bodies:	Dismantle the pump and clean it.
	b) Inlet pipe is blocked:	Clean the pipe.
	c) Air is entering the inlet pipe:	Check that the pipe is airtight right up to the pump and seal it.
	d) The pump is unprimed:	Re-prime it by filling the pump. Check that the base valve is airtight.
	e) Inlet pressure is too low and generally accompanied by cavitation noise:	Excessive loss of head in suction or the suction height is excessive (check the NPSH of the installed pump).
	f) Voltage insufficient to power the motor:	Check the voltage of the motor terminals and the correct diameter of the conductors.
9.2 The pump vibrates	a) Anchorage on a faulty base:	Check and fully tighten the nuts on the bolts of the studs.
	b) Foreign bodies obstructing the pump:	Dismantle the pump and clean it.
	c) Obstruction to the pump rotation:	Check that the pump can rotate freely without any abnormal resistance.
	d) Faulty electrical connection:	Check the pump connections.
9.3 The motor heats up abnormally	a) Insufficient voltage:	Check the voltage of the motor terminals. The voltage should be ± 10% of the rated voltage.
	b) Pump blocked by foreign bodies:	Dismantle the pump and clean it.
	c) Ambient temperature more than +40°C:	The motor is designed to function at a maximum ambient temperature of +40°C.
	d) Connection error in the terminal board:	Check that the connections respect the diagram shown inside the cover of the terminal box and the data plate information.
9.4 The pump does not deliver sufficient pressure	a) The motor is not rotating at normal speed (foreign bodies or faulty power supply etc.):	Dismantle the pump and correct the problem.
	b) The motor is faulty:	Replace it.
	c) The pump is not filling properly:	Repeat the priming operation.
	d) The motor rotates in reverse (three-phase motor):	Invert the direction of rotation by exchanging two phase wires on the motor terminal board or the electrical control panel.
	e) Voltage insufficient to power the motor:	Check the voltage of the motor terminals and the correct diameter of the conductors.
9.5 The automatic circuit breaker trips	a) Thermal overload relay value too low:	Control the intensity with an ammeter, set the value of the intensity shown on the motor rating plate.
	b) Voltage is too low:	Check that the diameter of the conductors of the electric cable is correct.
	c) Interruption of one phase:	Check the electric cable or fuse and replace if necessary.
	d) The thermal overload relay relay is faulty:	Replace it.
9.6 The flow is not regular	a) The inlet height is not being observed:	Check the installation conditions and the recommendations of this manual.
	b) The inlet piping has a smaller diameter than the pump:	The inlet piping should have the same diameter as the inlet mouth.
	c) The suction filter and inlet piping are partially blocked:	Clean the inlet duct.

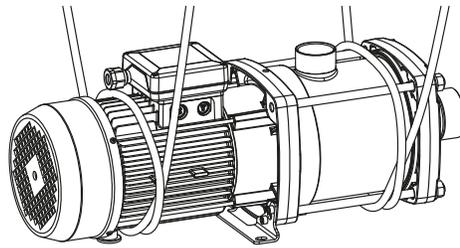
Fig. 1

HANDLING

A



B



C

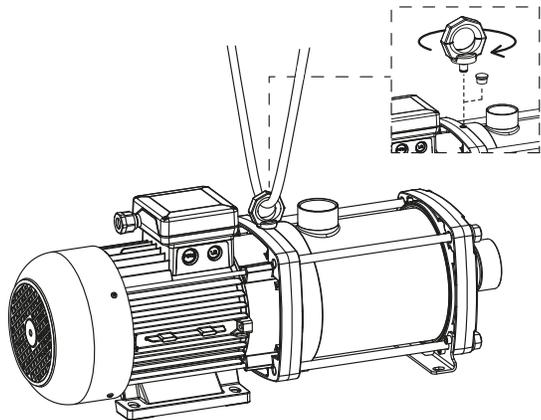


Fig. 2

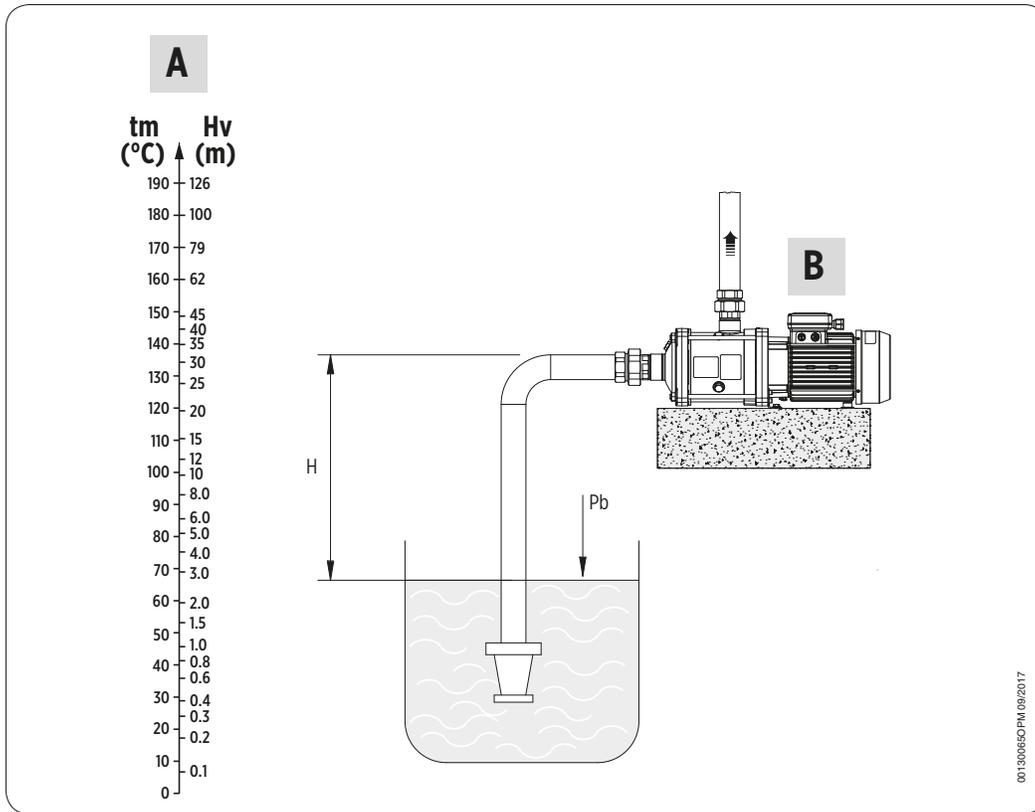


Fig. 3

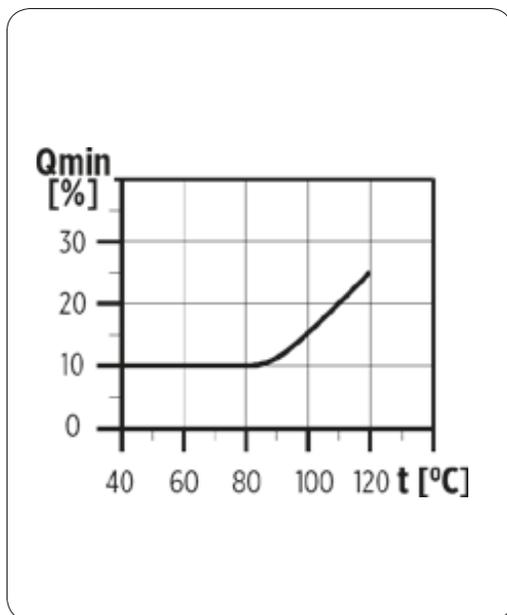


Fig. 4

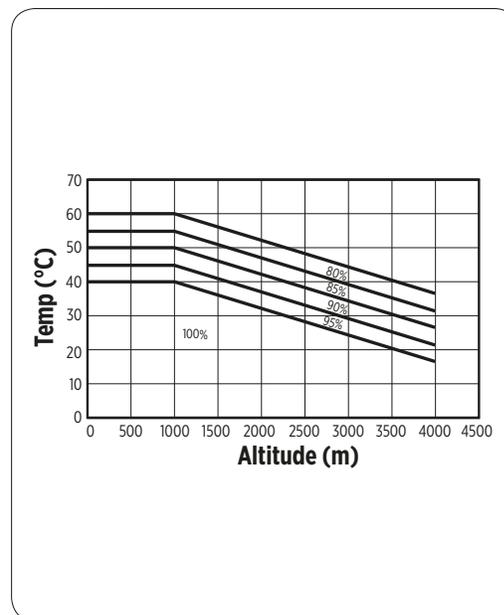


Fig. 5

DH Series - Installation recommendations

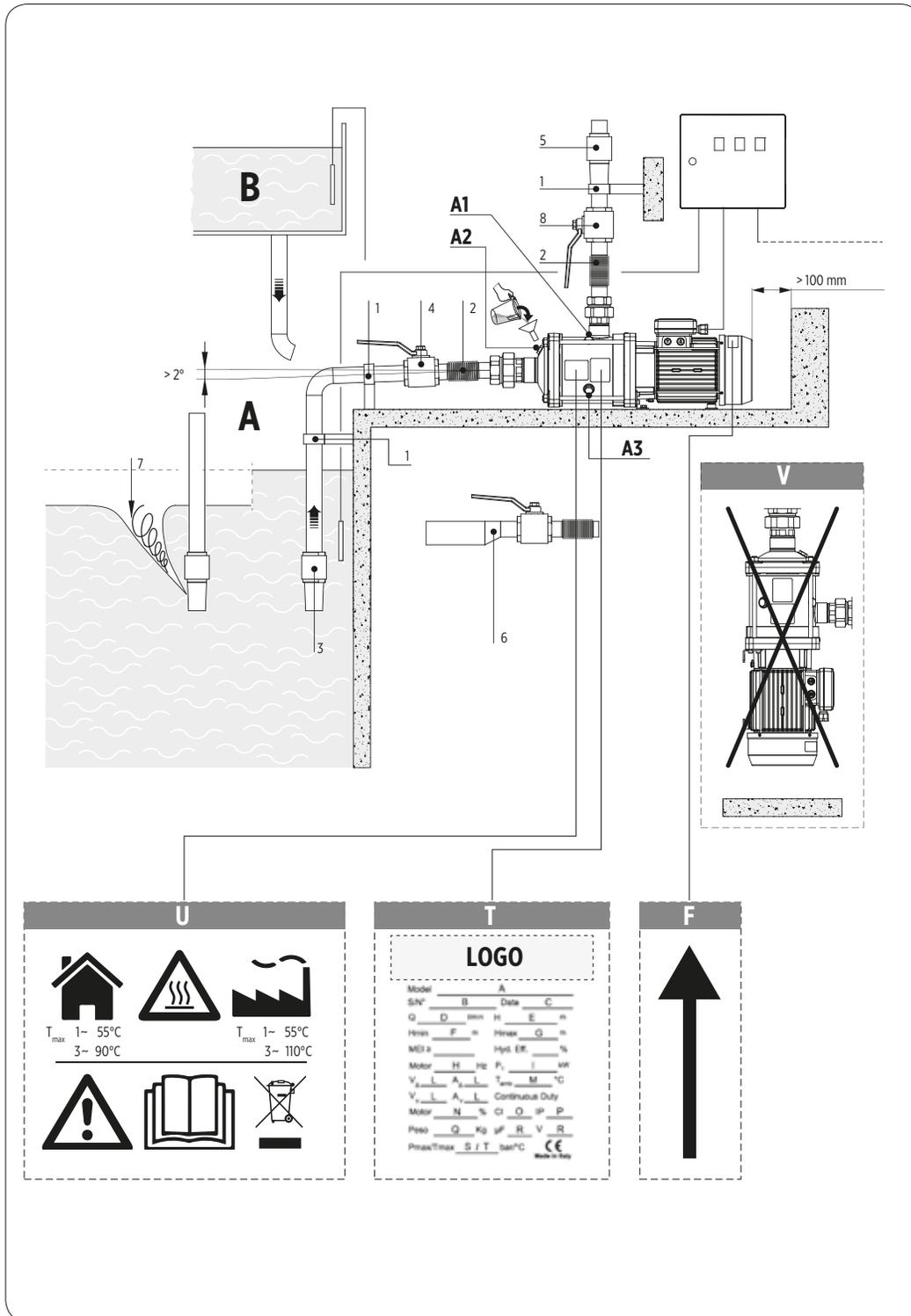
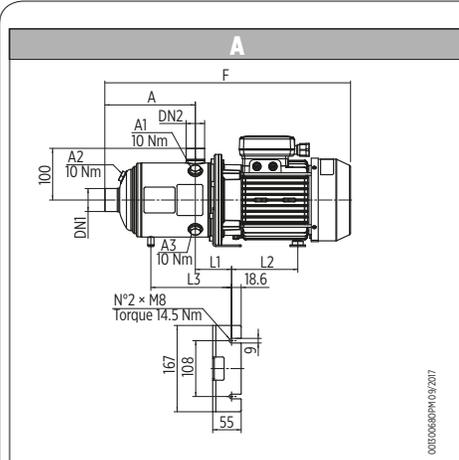
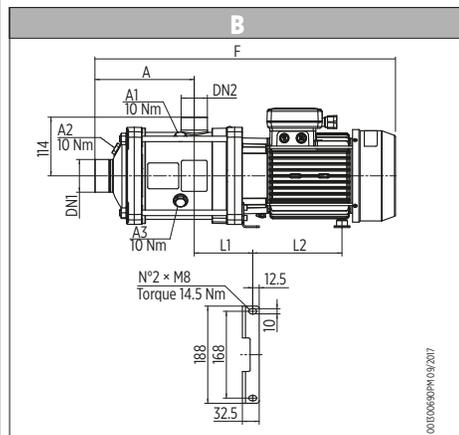


Fig. 6

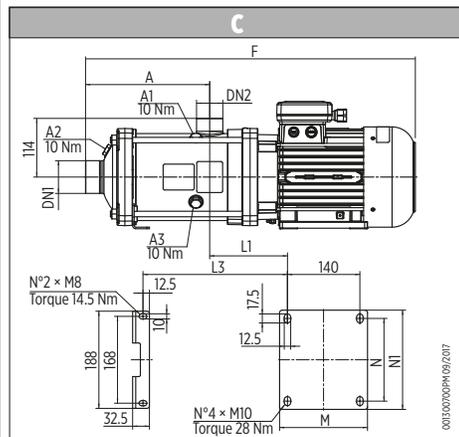
DH Series 50 Hz- Dimensions



00100680PM/09/2017



00100680PM/09/2017



00100700PM/09/2017

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	
1 ~	DH 3/2	103	Rp 1 1/4	Rp 1"	361	70	101	-	A
	DH 3/3	103	Rp 1 1/4	Rp 1"	361	70	101	-	
	DH 3/4	127	Rp 1 1/4	Rp 1"	385	70	101	-	
	DH 3/5	151	Rp 1 1/4	Rp 1"	409	70	101	-	
	DH 3/6	175	Rp 1 1/4	Rp 1"	433	70	101	-	
	DH 3/7	199	Rp 1 1/4	Rp 1"	457	70	101	180	
	DH 3/8	223	Rp 1 1/4	Rp 1"	523	70	128	204	
	DH 3/9	247	Rp 1 1/4	Rp 1"	547	70	128	228	
	3 ~	DH 3/2T	103	Rp 1 1/4	Rp 1"	363	70	101	
DH 3/3T		103	Rp 1 1/4	Rp 1"	363	70	101	-	
DH 3/4T		127	Rp 1 1/4	Rp 1"	387	70	101	-	
DH 3/5T		151	Rp 1 1/4	Rp 1"	411	70	101	-	
DH 3/6T		175	Rp 1 1/4	Rp 1"	435	70	101	-	
DH 3/7T		199	Rp 1 1/4	Rp 1"	459	70	101	180	
DH 3/8T		223	Rp 1 1/4	Rp 1"	520	70	128	204	
DH 3/9T		247	Rp 1 1/4	Rp 1"	544	70	128	228	

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	
1 ~	DH 5/2	103	Rp 1 1/4	Rp 1"	361	70	101	-	A
	DH 5/3	103	Rp 1 1/4	Rp 1"	361	70	101	-	
	DH 5/4	127	Rp 1 1/4	Rp 1"	385	70	101	-	
	DH 5/5	151	Rp 1 1/4	Rp 1"	409	70	101	-	
	DH 5/6	175	Rp 1 1/4	Rp 1"	475	70	128	-	
	DH 5/7	199	Rp 1 1/4	Rp 1"	499	70	128	180	
	DH 5/8	223	Rp 1 1/4	Rp 1"	567	70	172	204	
	DH 5/9	247	Rp 1 1/4	Rp 1"	592	70	172	228	
	3 ~	DH 5/2T	103	Rp 1 1/4	Rp 1"	363	70	101	
DH 5/3T		103	Rp 1 1/4	Rp 1"	363	70	101	-	
DH 5/4T		127	Rp 1 1/4	Rp 1"	387	70	101	-	
DH 5/5T		151	Rp 1 1/4	Rp 1"	411	70	101	-	
DH 5/6T		175	Rp 1 1/4	Rp 1"	472	70	128	-	
DH 5/7T		199	Rp 1 1/4	Rp 1"	496	70	128	180	
DH 5/8T		223	Rp 1 1/4	Rp 1"	567	70	172	204	
DH 5/9T		247	Rp 1 1/4	Rp 1"	591	70	172	228	

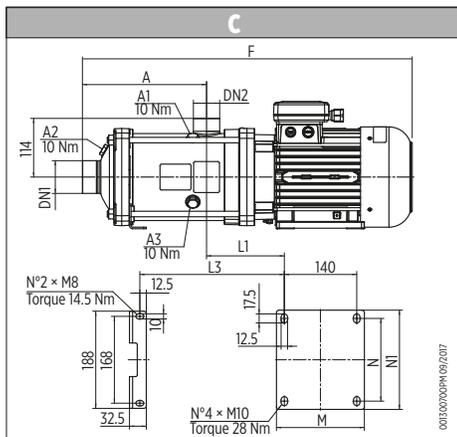
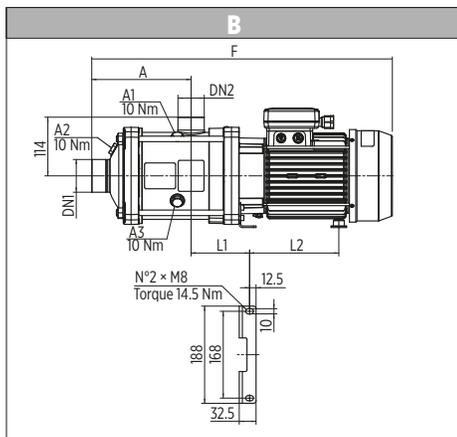
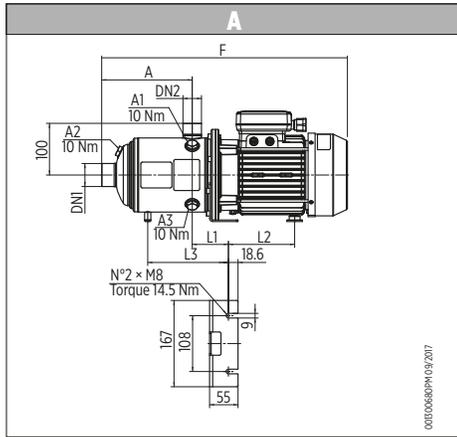
	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]		
1 ~	DH 9/2	118	Rp 1 1/2	Rp 1 1/4	380	74	101	-	A	
	DH 9/3	118	Rp 1 1/2	Rp 1 1/4	380	74	101	-		
	DH 9/4	148	Rp 1 1/2	Rp 1 1/4	452	74	128	-		
	DH 9/5	178	Rp 1 1/2	Rp 1 1/4	482	74	172	-		
	DH 9/6	208	Rp 1 1/2	Rp 1 1/4	512	74	172	192		
	DH 9/7	238	Rp 1 1/2	Rp 1 1/4	587	74	172	222		
	3 ~	DH 9/2T	118	Rp 1 1/2	Rp 1 1/4	380	74	101		-
		DH 9/3T	118	Rp 1 1/2	Rp 1 1/4	380	74	101		-
		DH 9/4T	148	Rp 1 1/2	Rp 1 1/4	452	74	128		-
DH 9/5T		178	Rp 1 1/2	Rp 1 1/4	482	74	172	-		
DH 9/6T		208	Rp 1 1/2	Rp 1 1/4	512	74	172	192		
DH 9/7T		238	Rp 1 1/2	Rp 1 1/4	587	74	172	222		
DH 9/8T		268	Rp 1 1/2	Rp 1 1/4	617	74	172	252		

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	M [mm]	N [mm]	N1 [mm]	
1 ~	DH 15/2	144	Rp 2"	Rp 1 1/2	488	113	129	-	-	-	-	B
	DH 15/3	144	Rp 2"	Rp 1 1/2	533	113	173	-	-	-	-	
	DH 15/2T	144	Rp 2"	Rp 1 1/2	485	113	129	-	-	-	-	
3 ~	DH 15/3T	144	Rp 2"	Rp 1 1/2	532	113	173	-	-	-	-	C
	DH 15/4T	192	Rp 2"	Rp 1 1/2	615	113	173	-	-	-	-	
	DH 15/5T	240	Rp 2"	Rp 1 1/2	670	150	-	279	170	160	192	
	DH 15/6T	288	Rp 2"	Rp 1 1/2	732	152	-	329	180	190	220	
	DH 15/7T	336	Rp 2"	Rp 1 1/2	780	152	-	377	180	190	220	

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	M [mm]	N [mm]	N1 [mm]		
1 ~	DH 20/2	144	Rp 2"	Rp 1 1/2	533	113	173	-	-	-	-	B	
	DH 20/2T	144	Rp 2"	Rp 1 1/2	532	113	173	-	-	-	-		
	3 ~	DH 20/3T	144	Rp 2"	Rp 1 1/2	567	113	173	-	-	-		-
		DH 20/4T	192	Rp 2"	Rp 1 1/2	622	150	-	231	170	160		192
		DH 20/5T	240	Rp 2"	Rp 1 1/2	684	152	-	281	180	190		220

Fig. 7

DH Series 60 Hz- Dimensions



	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	
1~	DH 3/26	103	Rp 1 1/4	Rp 1"	361	70	101	-	A
	DH 3/36	103	Rp 1 1/4	Rp 1"	361	70	101	-	
	DH 3/46	127	Rp 1 1/4	Rp 1"	385	70	101	-	
	DH 3/6	151	Rp 1 1/4	Rp 1"	409	70	101	-	
	DH 3/66	175	Rp 1 1/4	Rp 1"	475	70	128	-	
3~	DH 3/76	199	Rp 1 1/4	Rp 1"	499	70	128	180	
	DH 3/2T6	103	Rp 1 1/4	Rp 1"	363	70	101	-	
	DH 3/3T6	103	Rp 1 1/4	Rp 1"	363	70	101	-	
	DH 3/4T6	127	Rp 1 1/4	Rp 1"	387	70	101	-	
	DH 3/5T6	151	Rp 1 1/4	Rp 1"	448	70	128	-	
DH 3/6T6	175	Rp 1 1/4	Rp 1"	472	70	128	-		
DH 3/7T6	199	Rp 1 1/4	Rp 1"	543	70	172	180		

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	
1~	DH 5/26	103	Rp 1 1/4	Rp 1"	361	70	101	-	A
	DH 5/36	103	Rp 1 1/4	Rp 1"	361	70	101	-	
	DH 5/46	127	Rp 1 1/4	Rp 1"	427	70	128	-	
3~	DH 5/56	151	Rp 1 1/4	Rp 1"	451	70	128	-	
	DH 5/2T6	103	Rp 1 1/4	Rp 1"	363	70	101	-	
	DH 5/3T6	103	Rp 1 1/4	Rp 1"	363	70	101	-	
	DH 5/4T6	127	Rp 1 1/4	Rp 1"	424	70	128	-	
	DH 5/5T6	151	Rp 1 1/4	Rp 1"	495	70	172	-	
	DH 5/6T6	175	Rp 1 1/4	Rp 1"	519	70	172	-	
	DH 5/7T6	199	Rp 1 1/4	Rp 1"	578	70	172	180	

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	
1~	DH 9/26	118	Rp 1 1/2	Rp 1 1/4	380	74	101	-	A
	DH 9/36	118	Rp 1 1/2	Rp 1 1/4	380	74	128	-	
3~	DH 9/2T6	118	Rp 1 1/2	Rp 1 1/4	419	74	128	-	
	DH 9/3T6	118	Rp 1 1/2	Rp 1 1/4	466	74	172	-	
	DH 9/4T6	148	Rp 1 1/2	Rp 1 1/4	531	74	172	-	
DH 9/5T6	178	Rp 1 1/2	Rp 1 1/4	561	74	172	-		

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	M [mm]	N [mm]	N1 [mm]	
3~	DH 15/2T6	144	Rp 2"	Rp 1 1/2	567	113	173	-	-	-	-	B
	DH 15/3T6	144	Rp 2"	Rp 1 1/2	574	150	-	279	170	160	192	
	DH 15/4T6	192	Rp 2"	Rp 1 1/2	636	152	-	329	180	190	220	

	Pump Model	A [mm]	DN1	DN2	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	M [mm]	N [mm]	N1 [mm]	
3~	DH 20/2T6	144	Rp 2"	Rp 1 1/2	574	150	-	231	170	160	192	B
	DH 20/3T6	144	Rp 2"	Rp 1 1/2	588	152	-	281	180	190	220	

Fig. 8

DH Series - NPSH

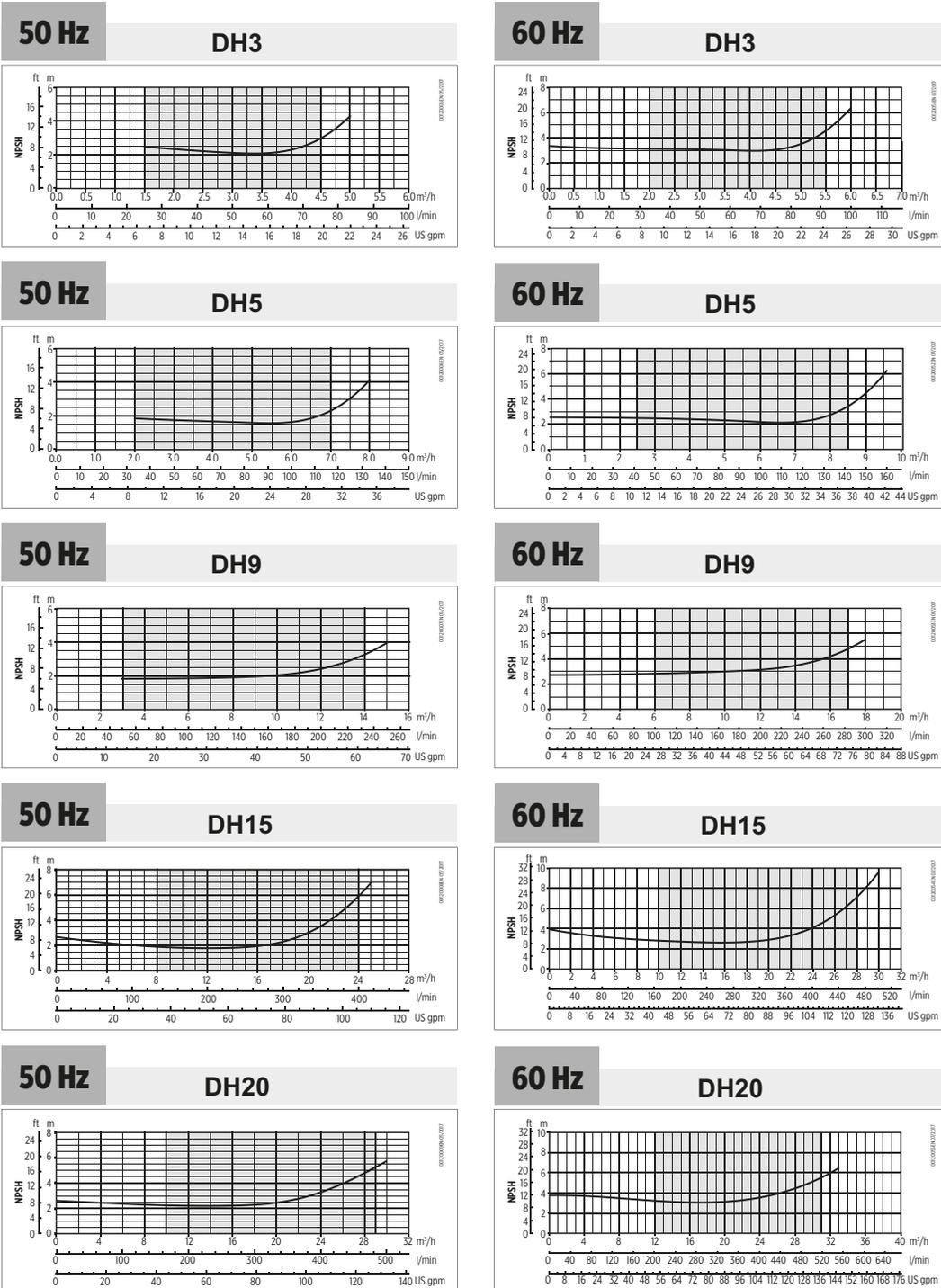
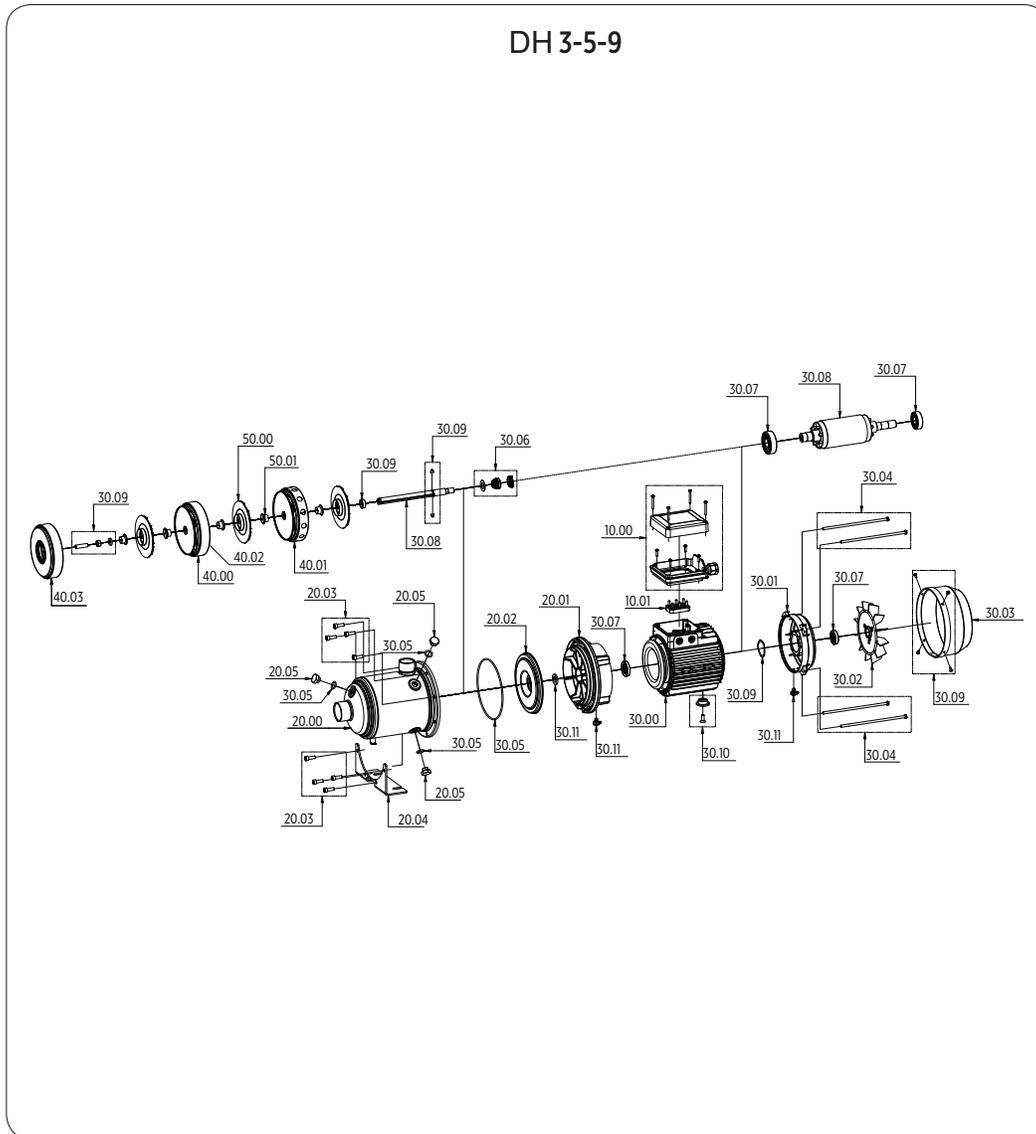


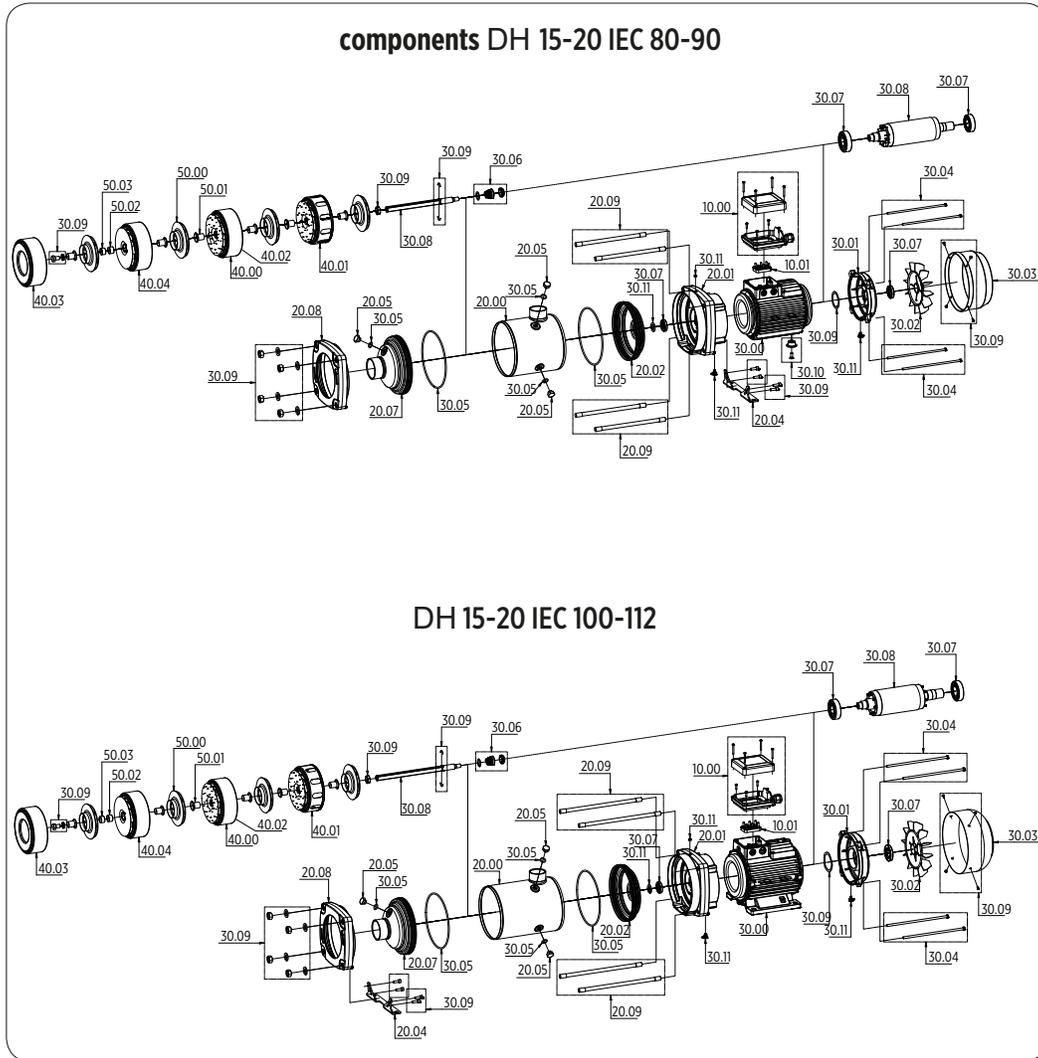
Fig. 9 DH Series - Pump section and List of main components



Ref. N.	Description
10.00	Terminal box cover and base
10.01	Terminal board
20.00	Pump casing
20.01	Motor bracket
20.02	Seal housing disc
20.03	Screws for pump casing
20.04	Support foot
20.05	Filling and draining plugs
30.00	Motor housing and stator
30.01	Bearing housing
30.02	Fan
30.03	Fan cover
30.04	Motor tie rod

Ref. N.	Description
30.05	O-Rings
30.06	Mechanical seal
30.07	Ball bearings and lip seal
30.08	Rotor and pump shaft
30.09	Screws, nuts and washers
30.10	Motor foot
30.11	Discharge valve, top plug and washer
40.00	Stage housing and diffuser
40.01	Last stage with holes
40.02	Floating neck ring assembly
40.03	Initial stage housing
50.00	Impeller
50.01	Impeller spacers

Fig. 10 DH Series - Pump section and List of main



Ref. N.	Description
10.00	Terminal box cover and base
10.01	Terminal board
20.00	Pump casing
20.01	Motor bracket
20.02	Seal housing disc
20.04	Support foot
20.05	Filling and draining plugs
20.07	Inlet cover
20.08	Flange
20.09	Pump casing tie rods
30.00	Motor housing and stator
30.01	Bearing housing
30.02	Fan
30.03	Fan cover
30.04	Motor tie rod
30.05	O-Rings

Ref. N.	Description
30.06	Mechanical seal
30.07	Ball bearings and lip seal
30.08	Rotor and pump shaft
30.09	Screws, nuts and washers
30.10	Motor foot
30.11	Discharge valve, top plug and washer
40.00	Stage housing and diffuser
40.01	Last stage with holes
40.02	Floating neck ring assembly
40.03	Initial stage housing
40.04	Stage housing and diffuser with bearing
50.00	Impeller
50.01	Impeller spacers
50.02	Intermediate sleeve
50.03	Intermediate sleeve spacer

Fig. 11 DHsp Series - Installation recommendations

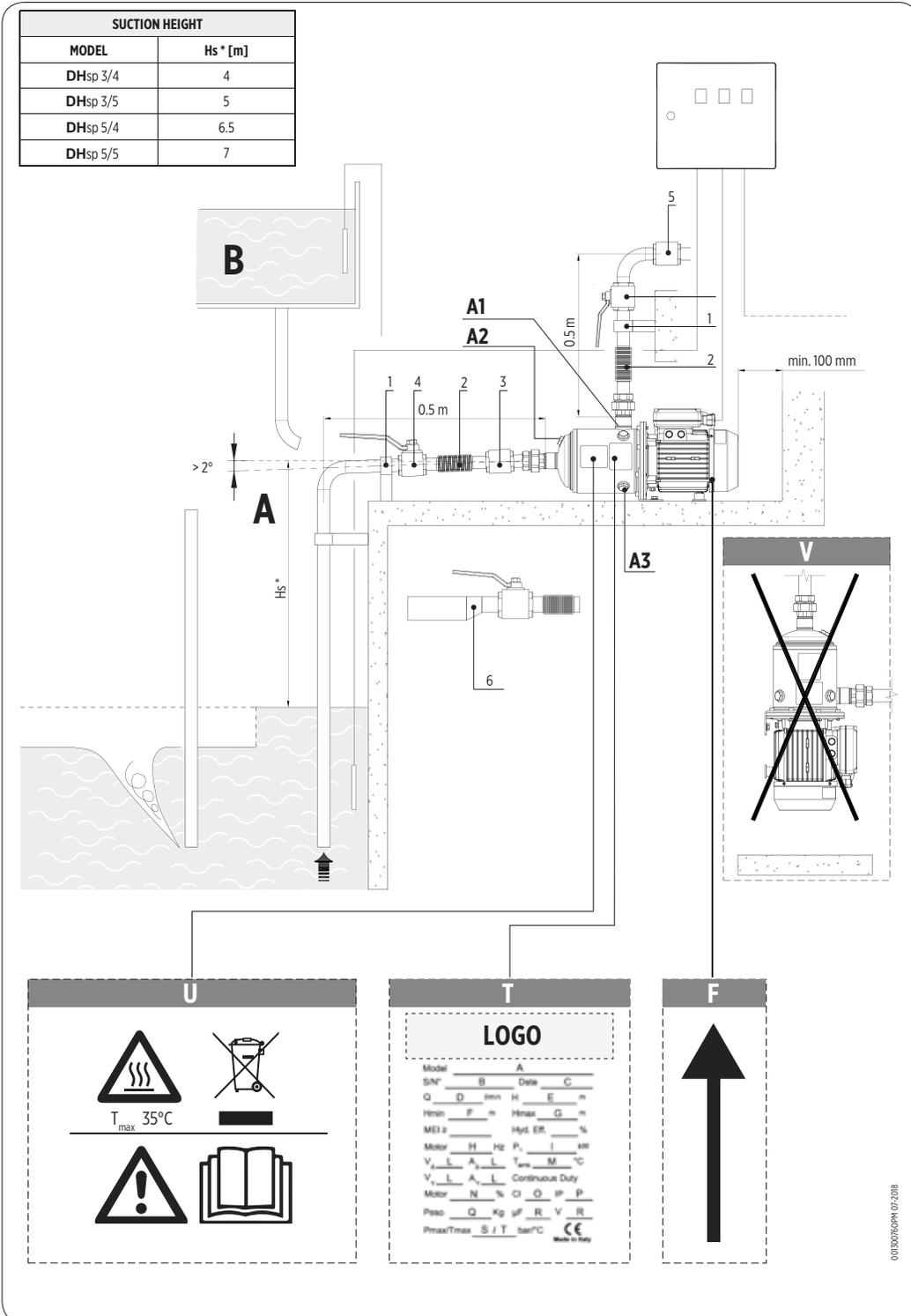


Fig. 12

DHsp Series 50/60 Hz- Dimensions

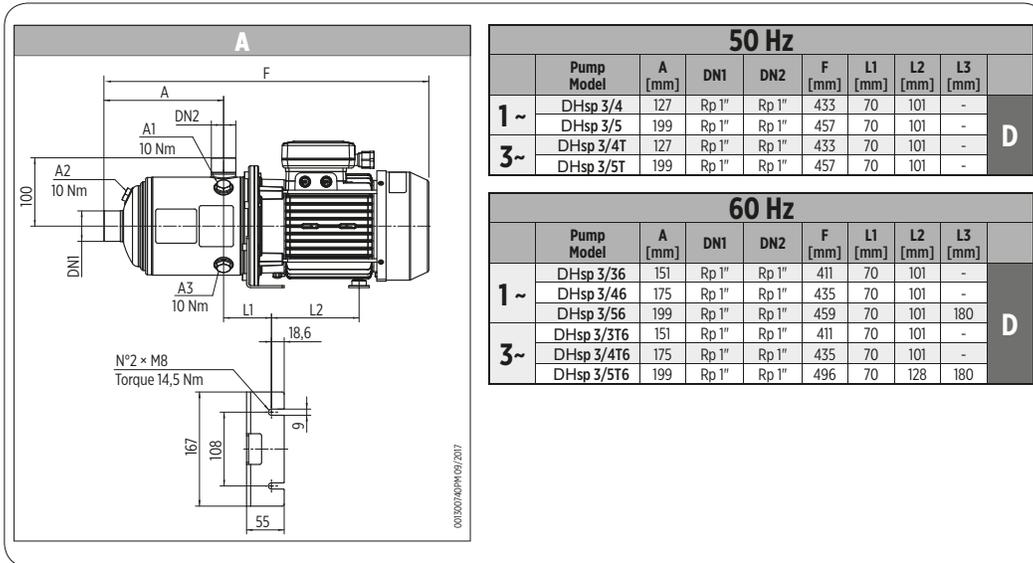


Fig. 13

DHsp Series - NPSH

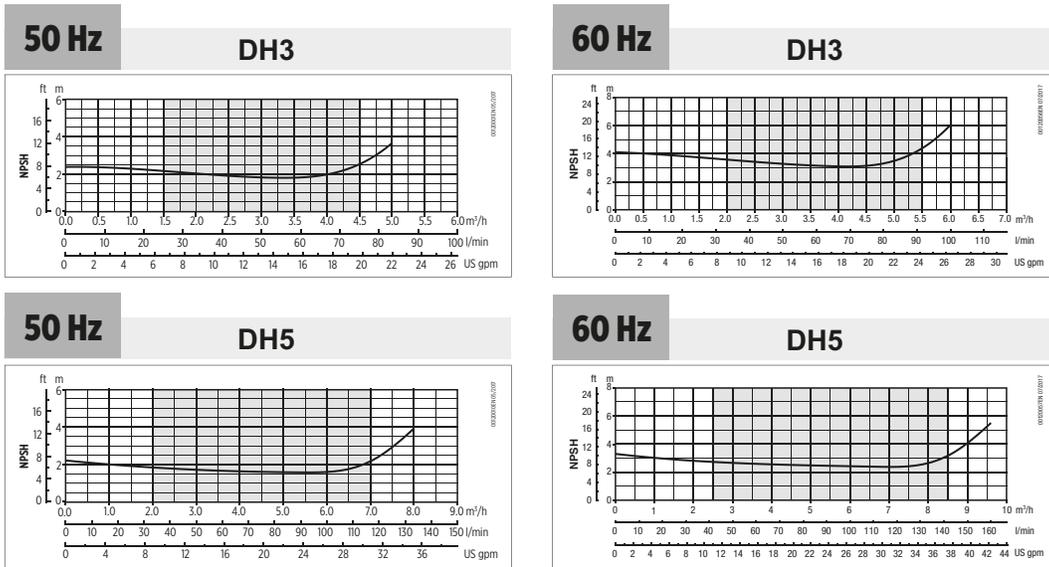
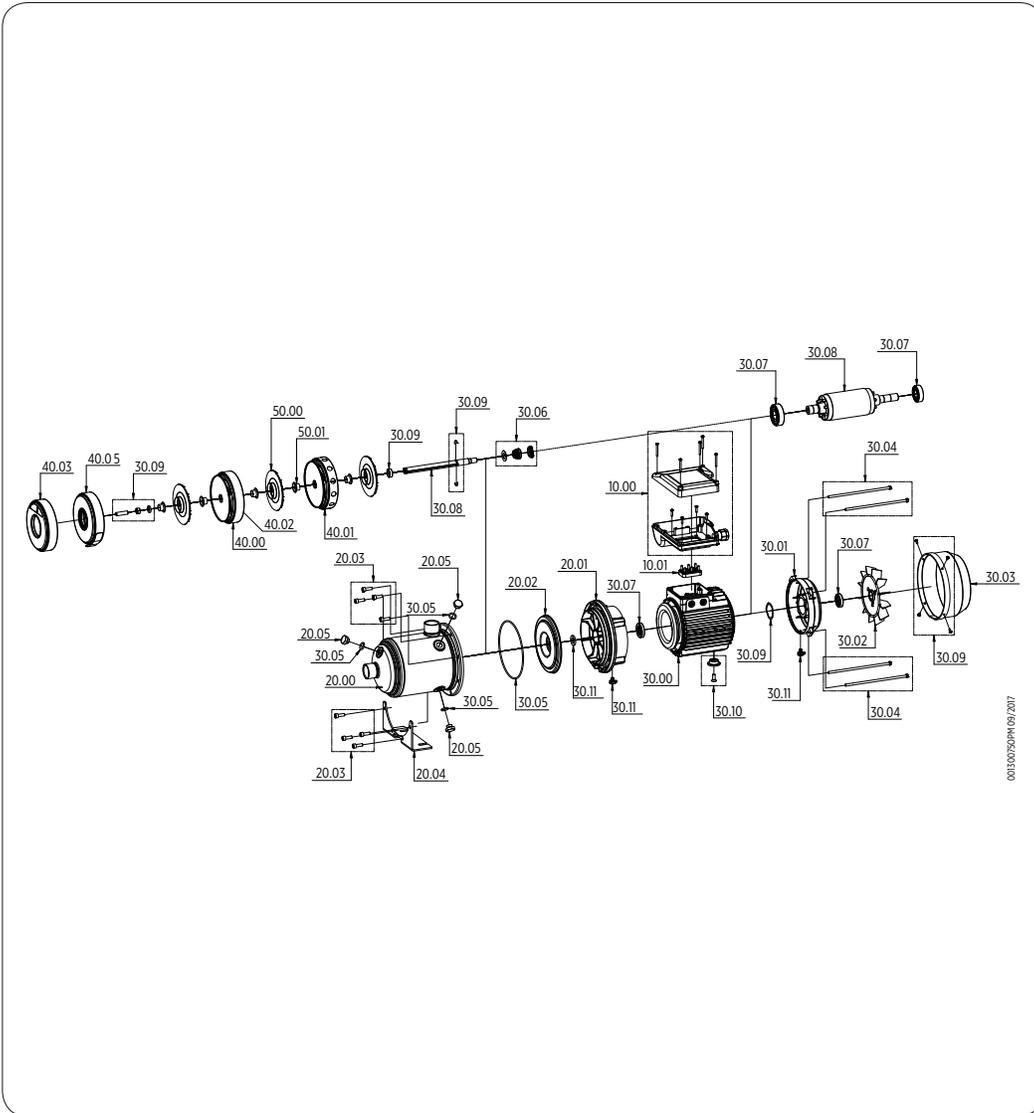


Fig. 14 DHsp Series - Pump section and List of main components



Ref. N.	Description
10.00	Terminal box cover and base
10.01	Terminal board
20.00	Pump casing
20.01	Motor bracket
20.02	Seal housing disc
20.03	Screws for pump casing
20.04	Support foot
20.05	Filling and draining plugs
30.00	Motor housing and stator
30.01	Bearing housing
30.02	Fan
30.03	Fan cover
30.04	Motor tie rod
30.05	O-Rings

Ref. N.	Description
30.06	Mechanical seal
30.07	Ball bearings and lip seal
30.08	Rotor and pump shaft
30.09	Screws, nuts and washers
30.10	Motor foot
30.11	Discharge valve, top plug and washer
40.00	Stage housing and diffuser
40.01	Last stage with holes
40.02	Floating neck ring assembly
40.03	Initial stage housing
40.05	Stage housing with priming valve
50.00	Impeller
50.01	Impeller spacers

00160750PM/09/2017

Dutypoint Standard Warranty

Your Dutypoint Systems standard product warranty is valid for a period of 12 months from date of delivery. The full terms and conditions are on the reverse of this certificate.

If you need to contact us regarding your warranty or any issue regarding your Dutypoint product, please contact our service department:

- Tel: +44(0)14523 00 590
- Email: service@dutypoint.com

Once your standard product warranty has expired, you may wish to take out our infinity service contract for an extended amount of cover. For more information visit our website: www.dutypoint.com/infinity

Terms and Conditions

- 1) The Company warrants that on delivery, and for a period of 12 months from the date of delivery, or such longer period as agreed by the Company in writing, (Warranty Period), the Goods shall:
 - a) conform in all material respects with their description as set out in the Agreement;
 - b) be free from material defects in design, material and workmanship; and
 - c) be of satisfactory quality (within the meaning of the Sale of Goods Act 1979).
- 2) Subject to Clause 3, if:
 - a) the Customer gives notice in writing to the Company during the Warranty Period within a reasonable time of discovery that some or all of the Goods do not comply with the warranty set out in Clause 1; and
 - b) the Company is given a reasonable opportunity to examine such Goods; and
 - c) the Customer (if asked to do so by the Company) returns such Goods to the Company's place of business, the Company shall, at its option, repair or replace the defective Goods, or refund the price of the defective Goods in full.
- 3) The Company shall not be liable for the failure of the Goods to comply with the warranty set out in Clause 1 in any of the following events:
 - a) the Customer makes any further use of such Goods after giving notice in accordance with Clause 2;
 - b) the defect arises because the Customer failed to follow the Company's oral or written instructions as to the storage, commissioning, installation, use and maintenance of the Goods or (if there are none) good trade practice regarding the same;
 - c) the defect arises as a result of the Company following any drawing, design or Specification supplied by the Customer;
 - d) the Customer alters or repairs such Goods without the written consent of the Company;
 - e) the defect arises as a result of fair wear and tear, wilful damage, negligence, or abnormal storage or working conditions; or

- f) the defect arises as a result of the Customer's negligence or the Customer's breach of the Agreement.
- 4) Clause is the Customer's sole remedy in respect of the matters described therein.
- 5) The terms implied by sections 13 to 15 of the Sale of Goods Act 1979 are, to the fullest extent permitted by law, excluded from the Agreement.
- 6) The terms and conditions of the Agreement apply to any repaired or replacement Goods supplied by the Company.

DUTYPOINT

SETTING
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