



**Bid Number 50 - 123860**

One time purchase of Flygt 7.5 HP submersible pumps for the Jefferson Parish Sewerage Department.

**August 30, 2018 AT 2:00 PM**

**ATTENTION VENDORS!!!**

**Please review all pages and respond accordingly, complying with all provisions in the technical specifications and Jefferson Parish Instructions for Bidders and General Terms and Conditions. All bids must be received in the Purchasing Department by the bid due date and time.**

**Jefferson Parish Purchasing Department  
200 Derbigny Street  
General Government Building, Suite 4400  
Gretna, LA 70053  
Donna Reamey  
Dreamey@Jeffparish.net  
504-364-2684**

# SPECIFICATIONS FOR BID # 50-123860

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## JEFFERSON PARISH DEPT. OF SEWERAGE SOLIDS-HANDLING SUBMERSIBLE PUMPS AND CONTROL COMPONENTS SEWER LIFT STATION N-11-5 (MAPLEWOOD & GRETNA BLVD.)

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Furnish three (3), submersible solids-handling pumps with integral electric submersible motors and accessories. Pumps shall have suction and discharge size and motor ratings as specified herein.
- B. The Equipment Supplier shall be an Authorized Distributor of the proposed products. The supplier shall be capable of servicing the products with repair service and parts availability to Jefferson Parish. The Supplier shall routinely stock complete pumps and parts to repair those units in their own facility.

#### 1.02 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
  - 1. All equipment approved for this project shall meet or exceed all performance, service, and warranty requirements of these specifications.
  - 2. The solids-handling pumps specified shall be suitable for domestic sewage, pre-treatment plant effluent, and possibly storm water and shall be designed and fully guaranteed for this use. The fluid temperature range shall be from 40 degrees to 104 degrees Fahrenheit.

#### 1.03 TESTING

- A. General

Each pump shall be shop tested and field tested as specified hereinafter. All costs for the tests shall be borne by the Bidder. In the event any equipment fails to meet the performance values set forth in this specification, the equipment shall be modified and re-tested or replaced with equipment that performs in accordance with this specification.

B. Shop Tests

Each pump and motor shall be performance tested as specified hereinafter; all pumps shall be tested with motor cable to be supplied with the pumps. Three copies of certified test reports, including actual test records, shall be submitted and approved by the Engineer prior to shipment of the equipment.

Each pump shall be tested for performance at the factory to determine the head vs. capacity, motor total electrical power draw (KVA), and motor active electrical power draw (KW) for the full speed at which the pumps are specified and shown on a performance test curve, certified by a registered professional engineer, as continuous functions throughout the pump's performance range. Tests of models, prototypes, or similar units will not be accepted.

The motor and cable on each pump shall be tested for moisture content or insulation defects. After the test, the pump cable end shall be fitted with a shrink-fit rubber boot to protect it from moisture or water.

C. Field Tests

Equipment shall be field tested as specified hereinafter. Field testing shall be composed of preliminary tests and acceptance tests. The Bidder shall provide the services of authorized equipment supplier's representatives to conduct all field tests.

1. Preliminary tests shall be run on all pumps, motors, and control systems to demonstrate that they are in proper working order.
2. Acceptance tests shall be run to demonstrate that the pumping units, motors, and control systems meet the following requirements:
  - a. The pumping units operate as specified without excessive noise, cavitation, vibration, and without overheating of the bearings.
  - b. All automatic and manual controls function in accordance with the specified requirements.

#### 1.04 PERFORMANCE

<b>Performance Requirement</b>	<b>7.5 HP</b>
Minimum Shutoff Head (ft.)	59 Feet
Rating (GPM/Ft/Hydraulic Efficiency)	660 GPM @30 feet @71 percent
Maximum Active Motor Input Power at Rating (KW)	6.1 KW
Maximum Active Shaft Power at Rating (KW)	7.0 KW
Maximum Specific Energy at Rating (KWHr/MG)	153 KWH/MG
Maximum NPSH <sub>Re</sub> at Rating (Ft.)	14 feet
Motor Rating (HP) at 40 degrees C – Dry Pit	7.5 HP
Voltage/Cycle/Phase	230v/60Hz/3
Motor Design Type	NEMA B – Inverter
Motor Service Factor	1.15
Motor Insulation Rating	H
Maximum Pump Speed (RPM)	1745
Maximum Rated Current (A)	19 Amps
Minimum Rated (FL) Power Factor (%)	0.86
Maximum Starting Current (A)	134 Amps
Pump Suction x Discharge Size (inches)	6 inches x 4 inches

#### 1.05 SUBMITTALS

- A. Complete assembly, foundation support, and installation drawings, together with detailed specifications and data covering pumps, motors, material used, parts, devices, and other accessories forming a part of the equipment furnished shall be submitted for approval in accordance with the procedure set forth in the General Conditions.
- Data and specifications for the equipment shall include, but shall not be limited to the following:



- a. Setting Plans. Setting plans shall include:
  1. Anchor bolt layout
  2. Anchor bolt dimensions
  3. Outline dimensions and weights of pumps, bases, motors, and control enclosures.
  
- b. Pumps. Data and drawings shall include:
  1. Manufacturer, type, and model number.
  2. Assembly drawing, nomenclature and material list, O&M manual, and parts list.
  3. Type, manufacturer, model numbers, location, and spacing of bearings.
  4. Impeller type, diameter, thru-let dimensions, shredder size, number of vanes, and identification number.
  5. Complete motor performance data including: rating, voltage/phase/frequency; design type; service factor; insulation class; motor pole number; actual rotation speed when combined with the specified pumps; current, power factor, and active input power (KW) as a continuous function of shaft power from no load to at least 115 percent load, start (max. inrush) current; locked rotor current; NEC code letter; and motor torque as a continuous function through the motor start cycle from no rotation to synchronous speed.
  6. Complete performance test curve(s) showing full range (shutoff to run-out) head vs. Capacity, NPSHR, hydraulic efficiency, motor active (KW) input power, motor total (KVA) input power (Based on measured current and voltage), and shaft power (BHP). See Section 1.03 Shop Tests.
  7. Location and description of Service Centers and spare parts stock.
  8. Warranty for the proposed equipment.

The manufacturer shall indicate, by arrows to points on the Q/H curves, limits recommended for stable operation, between which the pumps are to be operated to prevent surging, cavitation, and vibration. The stable operating range shall be as large as possible, and shall be based on actual hydraulic and mechanical characteristics of the units and shall meet the hydraulic performance requirements of the proposed system.

- B. Furnish shop drawings and other pertinent data to the Engineer and obtain his approval before fabrication. The drawings shall be complete with respect to dimensions, materials of construction, wiring diagrams, and all supporting engineering information.
  
- C. Submit four (4) copies of operation and maintenance instructions to the Department upon delivery.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle items of equipment in a manner that will prevent any damage.

- B. Follow manufacturer's instructions for short term and long term storage, particularly with respect to proper lubricants and periodic rotation of shafts and bearing.
- C. Touch up shop paint to prevent corrosion.

#### 1.07 CO-ORDINATION

- A. Co-ordinate delivery with the Department of Sewerage to avoid interferences and to provide for timely installation.

#### 1.08 WARRANTY

- A. See Section 4

### **PART 2 - PRODUCTS**

#### 2.01 Solids-Handling Pumps with Electric Submersible Motors

- A. Each pump shall be equipped with radiant cooling, submersible, electric motors - connected for operation on 230/460 volts, 3 phase, 60 hertz, and 4-wire service. Pumps shall be furnished with 60 feet of shielded submersible cable suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards, and also meet with P-MSHA Approval. The pump volute shall be drilled in accordance with ANSI B16.1 to accommodate an adapter flange that may be required to allow pump to fit onto the existing pump discharge connection.
  - 1. Acceptable Manufacturers will be those who meet or exceed all performance, material, warranty, and service requirements of these specifications

#### 2.02 PUMP DESIGN

- A. The pumps for this application shall be designed to operate in a fully submerged configuration without the need of an external cooling source. The motors and cable entry system shall be capable of complete submergence and capable of handling a liquid temperature of at least 104 degrees Fahrenheit.

#### 2.03 PUMP CONSTRUCTION

- A. Major pump components shall be of gray cast iron, ASTM A-48, Class 35B, with smooth surface devoid of blow holes or other casting irregularities. Higher density cast irons (Class 40 and above) with reduced vibration dampening capacity, will not be acceptable for pump driver castings, such as stator and bearing housings. All exposed nuts or bolts shall be AISI type 316 stainless steel. All metal surfaces coming into contact with the pumped media, other than stainless steel and/or brass, shall be protected by a factory-applied spray coating of acrylic dispersion zinc phosphate primer, with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate metal-to-metal contact between machined surfaces. Pump/Motor unit mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton Rubber O-rings. Joint sealing will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific bolt torque limit.

Rectangular cross sectioned gaskets that require specific torque limits to achieve compression will not be accepted. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

#### 2.04 COOLING SYSTEM

- A. Each unit shall be provided with an adequately designed integral cooling system. The cooling system shall allow up to 15 motor starts per hour, with a partially-submerged motor, on a continuous basis in an ambient 104 degree Fahrenheit environment, and in a standard available version, with no damage to motor windings, bearings, or drive shaft seals. The pump supplied under this specification shall be suitable for continuous operation; under, partially submerged conditions. The cooling system shall be a radiant heat sink type system integral to the stator housing, providing for dissipation of motor heat, regardless of the type of pump installation.

#### 2.05 CABLE ENTRY SEAL

- A. The cable entry seal design shall provide strain relief and preclude specific torque requirements, to insure a watertight and submersible seal. The cable entry shall consist of at least one elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter, the cable entry inside diameter, and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. Epoxies, silicones, or other secondary sealing systems will not be accepted.

The cable junction chamber shall be sealed off from the stator housing. It shall allow connection of the motor leads to the power cable in an isolated sealing chamber.

#### 2.06 MOTOR

- A. Each pump shall be driven by a vertical, submersible, squirrel cage induction motor, shell type NEMA B design, housed in a dry watertight chamber. The motor and the pump shall be produced by the same manufacturer. Motors shall be FM Approved for NEC Class 1 Division 1, Group C & D locations.

The stator winding shall be insulated with moisture resistant Class H insulation, rated for a temperature of 180° Celsius. The stator shall be insulated by the trickle impregnation method, using Class H monomer-free polyester resin, resulting in a winding fill factor of at least 95 percent. The stator shall be heat shrink fitted into the cast iron stator housing. The use of multiple step dip and bake type stator insulation process will not be accepted. The use of bolts, pins, screws, or other fastening devices used to locate or hold the stator and that penetrate the stator housing will not be accepted. The motor shall be designed for continuous duty, while handling pumped media of up to 104 degrees Fahrenheit. The motor shall be capable of withstanding at least 10 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum.

Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with, and supplemental to, external motor overload protection, and shall

be connected to the motor control panel.

The motor service factor (combined effect of voltage, frequency, viscosity, and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of plus or minus 10 percent. The motor shall be designed for continuous operation in a 40° Celsius ambient environment, and shall have a NEMA Class B maximum operating temperature rise of 80° Celsius. A motor performance curve shall be provided upon request. It shall show torque as a function of speed, current, power factor, speed, input power in KW, and efficiency, as a function of shaft power.

The motor shall be sized to be non-overloading when the pump is operated at any point on the pump performance characteristic curve.

Pump and motor shaft shall be a solid continuous unit. The pump shaft is an extension of the motor shaft. Couplings and shafts incorporating sleeves will not be accepted. The pump shaft shall be completely isolated from the pumped liquid.

Pump motor power cables shall be oil resistant chloroprene rubber jacketed, type SPC multi-conductor shielded cable, suitable for submersible pump applications and heavy mechanical stresses. The power cable shall also be sized according to NEC and ICEA standards and also have P-MSHA approval. The total length of each cable shall be a minimum of 60 feet long. Power cables shall each include a ground check conductor.

## 2.07 BEARINGS

- A. The integrated pump/motor shaft shall rotate on two (2) sealed and permanently lubricated bearings. External bearing lubrication ports, which allow bearing contamination and over-packing, will not be accepted. The upper bearing, providing for radial thrust, shall be a single row, roller, or ball bearing. The lower bearing shall consist of one double row angular contact bearing for combined axial and radial loads. Minimum L<sub>10</sub> bearing life shall be 50,000 hours at any usable portion of the pump curve.

## 2.08 MECHANICAL SEAL

- A. Each pump shall be provided with dual tandem mechanical shaft seal system comprising two totally independent seal assemblies. The seals shall operate in a seal lubricant buffer chamber that hydro-dynamically lubricates the lapped seal faces at a constant rate. The inner seal, located between the lubricant buffer chamber and the stator housing, shall contain one stationary and one positively driven rotating ring, functioning as an independent secondary barrier between the pumped liquid and the stator housing. Both inner seal faces shall be corrosion resistant Tungsten Carbide (WCCR). The outer of the tandem set of seals functions as the primary barrier between the pumped liquid and the stator housing. This set shall consist of a stationary ring and a positively driven rotating ring, both of which shall be corrosion resistant WCCR.

Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. The lower (outer) seal shall not bear on the impeller and shall remain fixed upon impeller removal.

Upon request of the Owner (as a Submittal), the pump manufacturer shall provide dry-run/leakage test procedures and data for the specific pump shaft seal system on pumps proposed for this project.

Shaft seals without positively driven rotating members, or conventional double mechanical seals with a common single or double spring acting between the upper and lower units requiring a substantial pressure differential to offset external pressure and effect sealing, will not be accepted, nor considered equal to the dual independent seal system specified. Cartridge-type seals comprising a single rotating element sandwiched between dual stationary elements will not be accepted. Seals shall not be of the uni-directional type, but capable of dual rotation with no damage. The shaft sealing system shall be capable of withstanding volute pressures up to 1.5 times pump shutoff head. No seal damage shall result from operating the pumping unit in its liquid environment, from running pump dry, or from reverse pump operation. The seal system shall not rely upon the pumped media for lubrication.

Each pump shall be provided with a seal buffer chamber containing FDA-approved, non-toxic lubricant for the shaft sealing system. Petroleum-based oil in the buffer chamber will not be accepted. The buffer chamber shall be designed to ensure that air is left in the buffer chamber to absorb the expansion of the lubricant due to temperature variations. The drain and inspection plug, with positive anti-leak seal, shall be easily accessible from the outside.

## 2.09 PUMP SHAFT

- A. The pump and motor shaft shall be a single piece unit. The pump shaft is an extension of the motor shaft. Shafts using mechanical couplings will not be accepted. The shaft shall be stainless steel – ASTM A479 S43100-T. Shaft sleeves will not be accepted.

## 2.10 IMPELLER

- A. The impeller shall be constructed of Hi-Chrome Iron, ASTM A532 (Alloy III A) 25 percent, or a material of similar properties, particularly as it relates to tensile strength and hardness – Brinnell Hardness without heat treating of 500 and dynamically balanced. The impeller shall be a non-clog design capable of demonstrating superior resistance to clogging of rags and stringy material. The impeller shall move axially upwards to allow larger debris to pass through and immediately return to normal operating position. The impeller to volute clearance shall be adjustable by a single adjustment screw. The Impeller shall be locked to the shaft, held by an impeller bolt and treated with a corrosion inhibitor. The design as stated above shall be supplied, with a Brinnell hardness of at least 500 without heat treating.

## 2.11 VOLUTE

- A. The pump volute shall be a single piece gray cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum discharge size shall be 10 inches. The volute shall have integral spiral-shaped, sharp-edged insert ring that is pressed into the suction cover of the volute. The spiral groove(s) of the insert ring shall provide the sharp edge(s) across which each impeller vane leading edge shall cross during rotation so



to remain unobstructed. The insert ring shall provide effective sealing between the multi-vane semi-open impeller and the volute. It shall be constructed of ASTM A532 (Alloy III A) 25 percent – Hi-Chrome Iron.

## 2.12 PROTECTION

- A. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. At 140° Celsius, the thermal switches shall open, stop the motor and activate an alarm.

**THE USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 140° CELSIUS WILL NOT BE ACCEPTED.**

- B. Each pump/motor unit shall be provided with a stator leakage sensor that will sense water intrusion into the motor housing in the event of seal failure or cable entry failure.
- C. Each pump shall be supplied with a supervisory relay to be mounted in the existing control panel by Jefferson Parish. This relay shall prohibit operation in the event of a fault.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Inspect all equipment upon arrival at job site and prior to installation. Notify manufacturer of any damage and/or shortage.

### 3.02 PREPARATION

- A. Make corrections and/or repairs as required for items inspected and found to be deficient.

### 3.03 FIELD QUALITY CONTROL

- A. The manufacturer's field engineer or representative shall inspect and check the installation after erection and be on hand for initial start-up of the equipment for a period of at least three days. He shall also instruct lift station personnel in the operation and maintenance of the system.

### 3.04 ADJUSTING AND CLEANING

- A. Adjust equipment as required and within limits of manufacturer's instructions for proper alignment.
- B. Apply proper type and quantity of lubricants for short term storage or start-up operation as applicable.
- C. Clean equipment of any foreign matter or substances.

- D. Field paint all components to be painted in accordance with manufacturer's recommendations.

### 3.05 PROTECTION

- A. After installation and painting protect the equipment from any damage by work of other trades. Repair any damage that nevertheless occurs.

## **PART 4- SERVICE AND WARRANTY**

### 4.01 SERVICE

- A. The pump manufacturer shall have an authorized factory service center capable of completely servicing the proposed pumps within two (2) hours of the project site. The pump manufacturer shall have a direct factory service center/stocking facility capable of completely servicing, and which stocks identical complete drive units and spare parts for, the proposed pumps within three (3) hours of the project site.

### 4.02 WARRANTY

- A. The pump manufacturer shall provide a written prorated warranty for the units supplied to the Owner against defects in material and workmanship for a period of at least five (5) years or 10,000 operating hours, under the operating conditions presented by this project, in accordance with their standard published Municipal Pump Warranty. Pump manufacturer shall demonstrate ability to support claimed warranty coverage by meeting all requirements of these specifications.

DATE: 8/15/2018  
BID NO.: 50-00123860

INVITATION TO BID  
THIS IS NOT AN ORDER

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**JEFFERSON PARISH**

PURCHASING DEPARTMENT  
P.O. BOX 9  
GRETNA, LA. 70054-0009  
504-364-2678

BUYER: DREAMEY@jeffparish.net

**BIDS WILL BE RECEIVED IN THE WEST BANK PURCHASING DEPT, SUITE 4400, JEFFERSON PARISH GENERAL GOVERNMENT BUILDING, 200 DERBIGNY STREET, GRETNA, LA 70053 UNTIL 2:00 PM, 8/30/2018 AND PUBLICLY OPENED THEREAFTER.**

For convenience, bidders may also submit bids in the East Bank Purchasing Department, Suite 404, Jefferson Parish Joseph S. Yenni Building, 1221 Elmwood Park Blvd., Jefferson LA 70123. However, if submitting bids on the day of bid opening, bidders must submit at the West Bank location only. All bids will be publicly opened at the West Bank location.

At no charge, bidders may also submit via Jefferson Parish's electronic procurement page by visiting [www.jeffparishbids.net](http://www.jeffparishbids.net) to register for this free site. Additional instructions are included in the text box highlighting electronic procurement.

**LATE BIDS WILL NOT BE ACCEPTED**

Unless submitting via online (see Page 3), each bid must be submitted in a sealed envelope bearing on the outside; the name of the Bidder, his address, and the name of the project for which the bid is submitted and the bid number.

**NOTE: ONLY BIDS WRITTEN IN INK OR TYPEWRITTEN, AND PROPERLY SIGNED BY A MEMBER OF THE FIRM OR AUTHORIZED REPRESENTATIVE, WILL BE ACCEPTED. PENCIL AND/OR PHOTOSTATIC FIGURES OR SIGNATURES SHALL RESULT IN BID REJECTION.**

**INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS**

**THE FOLLOWING INSTRUCTIONS APPLY TO ALL BIDS**

All bids submitted are subject to these instructions and general conditions and any special conditions and specifications contained herein, all of which are made part of this bid proposal reference. By submitting a bid, vendor agrees to comply with all provisions of Louisiana Law as well be in compliance with the Jefferson Parish Code of Ordinances, Louisiana Code of Ethics, applicable Jefferson Parish ethical standards and Jefferson Parish Resolution No. 113646 and/or Resolution No. 113647.

All vendors submitting bids should register as a Jefferson Parish vendor if not already yet registered. Registration forms may be downloaded from <http://purchasing.jeffparish.net> and by clicking on Vendor Information. Current W-9 forms with respective Tax Identification numbers and vendor applications may be submitted at any time; however, if your company is not registered and/or a current W-9 form is not on file, vendor registration is mandatory. Further, a current W-9 form and respective Tax Identification number must be supplied upon contract execution, should you be awarded a contract and/or issued purchase order. Failure to do so may result in delay of payment.

All quotations shall be based on F.O.B. Agency warehouse or job site, anywhere within the Parish as designated by the Purchasing Department. This provision does not apply to public works projects

JEFFERSON PARISH requires all products to be new (current) and all work must be performed according to standard practices for the project. Unless otherwise specified, no aftermarket parts will be accepted. Unless otherwise specified, all workmanship and materials must have at least one (1) year guaranty, in writing, from the date of delivery and/or acceptance of the project. Any deviations or alterations from the specifications must be indicated and/or supporting documentation supplied with bid submission.

Bidders should submit all questions in writing via email to the buyer's email address as indicated above, no later than Five (5) working days prior to the bid opening. Bid numbers should be mentioned in all requests. If submitting online, vendors may send questions via the E-Procurement site no later than Five (5) working days prior to the bid opening.

If this bid requires a pre-bid conference (see Additional Requirements section), bidders are advised that such conference will be held to allow bidders the opportunity to identify any discrepancies in the bid specifications and seek further clarification regarding instructions. The Purchasing Department will issue a written response to bidders' questions in the form of an Addendum. Please note that all official communication will be expressed in the form of an addendum.

All formal Addenda require written acknowledgement on the bid form by the bidder. Failure to acknowledge an Addendum on the bid form shall cause the bid to be rejected. JEFFERSON PARISH reserves the right to award bid to next lowest responsive and responsible bidder in this event.

The purpose and intention of this invitation to bid is to afford all suppliers an equal opportunity to bid on all construction, maintenance, repair, operating supplies and/or equipment listed in this bid proposal. JEFFERSON PARISH WILL ACCEPT ONE BID ONLY FROM EACH VENDOR. Items bid must meet specifications.

**Visit our website at [HTTP://PURCHASING.JEFFPARISH.NET](http://PURCHASING.JEFFPARISH.NET)**

JEFFERSON PARISH will accept one price for each item unless otherwise indicated. Two or more prices for one item will result in bid rejection. Bidders are required to complete, sign and return the bid form and/or complete and return the associated line item pricing forms as indicated. Vendors must not alter the bid forms. Doing so will cause the bid to be rejected.

A corporate resolution or written evidence of the individual signing the bid having such authority must be submitted with the bid. Failure to comply will cause bid to be rejected. For corporate entities, such written evidence may be a printout of the Louisiana Secretary of State's website listing the signatory as an officer. Such printout shall be included with the bid submission. Bids submitted by Owners or Sole Proprietorships must include certification that he or she owns the entity for which the bid is signed. This documentation must be submitted with the bid. Failure to do so will result in bid rejection.

NOTE: A sample corporate resolution can be downloaded from our website <http://purchasing.jeffparish.net> or you may provide your own document. A sample certification of sole proprietorship can also be downloaded from our website <http://purchasing.jeffparish.net> or you may provide your own document.

## INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS

A. AWARD OF CONTRACT: JEFFERSON PARISH reserves the right to award contracts or place orders on a lump sum or individual item basis, or such combination, as shall in its judgment be in the best interest of JEFFERSON PARISH. Every contract or order shall be awarded to the LOWEST RESPONSIVE and RESPONSIBLE BIDDER, taking into consideration the CONFORMITY WITH THE SPECIFICATIONS and the DELIVERY AND/OR COMPLETION DATE. SPLIT AWARDS MADE TO SEVERAL VENDORS WILL ONLY BE GRANTED TO THOSE DEEMED RESPONSIVE AND RESPONSIBLE.

All bid prices shall remain valid for 45 days. Jefferson Parish and the lowest responsive and responsible bidder(s) by mutual written consent may mutually agree to extend the deadline for award by one (1) or more extensions of thirty (30) calendar days.

PROTESTS: Only those vendors that submitted a bid in response to this solicitation may submit a protest in writing to the Director of the Purchasing within 48 hours of bid opening. The Purchasing Director will review it in connection with the Parish Attorney's Office which will then respond in writing as soon as possible.

PREFERENCE: Unless federal funding is directly spent by Jefferson Parish for this purchase, preference is hereby given to materials, supplies, and provisions produced, manufactured or grown in Louisiana, quality being equal to articles offered by competitors outside the state. "LSA - R.S. 38:2251-2261"

B. USE OF BRAND NAMES AND STOCK NUMBERS: Where brand names and stock numbers are specified, it is for the purpose of establishing certain minimum standards of quality. Bids may be submitted for products of equal quality, provided brand names and stock numbers are specified. Complete product data may be required prior to award.

C. CANCELLATION OF CONTRACT: JEFFERSON PARISH reserves the right to cancel all or any part if not shipped promptly. No charges will be allowed for parking or cartage unless specified in quotation. The order must not be filled at a higher price than quoted. JEFFERSON PARISH reserves the right to cancel any contract at anytime and for any reason by issuing a THIRTY (30) day written notice to the contractor.

For good cause and as consideration for executing a contract with Jefferson Parish, vendor conveys, sells, assigns and transfers to Jefferson Parish or its assigns all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of Louisiana, relating to the particular good or services purchased or acquired by Jefferson Parish.

D. PRICES: Jefferson Parish is exempt from paying sales tax under LSA-R.S. 47:301 (8)(c). All prices for purchases by Jefferson Parish of supplies and materials shall be quoted in the unit of measure specified and unless otherwise specified, shall be exclusive of state and Parish taxes. The price quoted for work shall be stated in figures. In the event there is a difference in unit prices and totals, the unit price shall prevail.

Quantities listed are for bidding purposes only. Actual requirements may be more or less than quantities listed.

Bidders are not to exclude from participation in, deny the benefits of, or subject to discrimination under any program or activity, any person in the United States on the grounds of race, color, national origin, or sex; nor discriminate on the basis of age under the Age Discrimination Act of 1975, or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973, or on the basis of religion, except that any exemption from such prohibition against discrimination on the basis of religion as provided in the Civil Rights Act of 1964, or Title VI and VII of the Act of April 11, 1968, shall also apply. This assurance includes compliance with the administrative requirements of the Revenue Sharing final handicapped discrimination provisions contained in Section 51.55 (c), (d), (e), and (k)(5) of the Regulations. New construction or renovation projects must comply with Section 504 of the 1973 Rehabilitation Act, as amended, in accordance with the American National Standard Institute's specifications (ANSI A17.1-1961).

Jefferson Parish and its partners as the recipients of federal funds are fully committed to awarding a contract(s) to firm(s) that will provide high quality services and that are dedicated to diversity and to containing costs. Thus, Jefferson Parish strongly encourages the involvement of minority and/or woman-owned business enterprises (DBE's, including MBE's, WBE's and SBE's) to stimulate participation in procurement and assistance programs.



**INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS**

Advertised bids will be tabulated and a copy of the tabulation will be forwarded to each responding bidder.

**IN ACCORDANCE WITH STATE REGULATIONS JEFFERSON PARISH OFFERS ELECTRONIC PROCUREMENT TO ALL VENDORS**

This electronic procurement system allows vendors the convenience of reviewing and submitting bids online. This is a secure site and authorized personnel have limited read access only. Bidders are encouraged to submit electronically using this free service; while the website accepts various file types, one single PDF file containing all appropriate and required bid documents is preferred. Bidders submitting uploaded images of bid responses are solely responsible for clarity. If uploaded images/documents are not legible, then bidder's submission will be rejected. Please note all requirements contained in this bid package for electronic bid submission.

Please visit our E-Procurement Page at [www.jeffparishbids.net](http://www.jeffparishbids.net) to register and view Jefferson Parish solicitations. For more information, please visit the Purchasing Department page at <http://purchasing.jeffparish.net>.

The general specifications for construction projects and the purchase of materials, services and/or supplies are those adopted by the JEFFERSON PARISH Council by Resolution No. 113646 or 113647 dated 12/09/09. The general conditions adopted by this resolution shall be considered as much a part of this document as if they were written wholly herein. A copy may be obtained from the Office of the Parish Clerk, Suite 6700, Jefferson Parish General Government Building, 200 Derbigny Street, Gretna, LA 70053. You may also obtain a copy by visiting the Purchasing Department webpage at <http://purchasing.jeffparish.net> and clicking on Online Forms.

**ADDITIONAL REQUIREMENTS FOR THIS BID**

PLEASE MATCH THE NUMBERS PRINTED IN THIS BOX WITH THE  
CORRESPONDING INSTRUCTIONS BELOW.

**13,15**

1. All bidders must attend the MANDATORY pre-bid conference and will be required to sign in and out as evidence of attendance. In accordance with LSA R.S. 38:2212(l), all prospective bidders shall be present at the beginning of the MANDATORY pre-bid conference and shall remain in attendance for the duration of the conference. Any prospective bidder who fails to attend the conference or remain for the duration shall be prohibited from submitting a bid for the project.
2. Attendance to this pre-bid conference is optional. However, failure to attend the pre-bid conference shall not relieve the bidder of responsibility for information discussed at the conference. Furthermore, failure to attend the pre-bid conference and inspection does not relieve the successful bidder from the necessity of furnishing materials or performing any work that may be required to complete the work in accordance with the specification with no additional cost to the owner.
3. Contractor must hold current applicable JEFFERSON PARISH licenses with the Department of Inspection and Code Enforcement. Contractor shall obtain any and all permits required by the JEFFERSON PARISH Department of Inspection and Code Enforcement. The contractor shall be responsible for the payment of these permits. All permits must be obtained prior to the start of the project. Contractor must also hold any and all applicable Federal and State licenses. Contractor shall be responsible for the payment of these permits and shall obtain them prior to the start of the project.
4. A LA State Contractor's License will be required in accordance with LSA R.S. 37-2150 et. seq. and such license number will be shown on the outside of the bid envelope. Failure to comply will cause the bid to be rejected. Additionally if submitting the bid electronically, then the license number must be entered in the appropriate field in the Electronic Procurement system. Failure to comply will cause the bid to be rejected.
5. It is the bidder's responsibility to visit the job site and evaluate the job before submitting a bid.
6. Job site must be clean and free of all litter and debris daily and upon completion of the contract. Passageways must be kept clean and free of material, equipment, and debris at all times. Flammable material must be removed from the job site daily because storage will not be permitted on the premises. Precautions must be exercised at all times to safeguard the welfare of JEFFERSON PARISH and the general public.



**INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS**

7. PUBLIC WORKS BIDS: All awards for public works in excess of \$5,000.00 will be reduced to a formal contract which shall be recorded at the contractor's expense with the Clerk of Court and Ex-Officio Recorder of Mortgages for the Parish of Jefferson. A price list of recordation costs may be obtained from the Clerk of Court and Ex-Officio Recorder of Mortgages for the Parish of Jefferson. All awards in excess of \$25,000.00 will require both a performance and a payment bond. Unless otherwise stated in the bid specifications, the performance bond requirements shall be 100% of the contract price. Unless otherwise state in the bid specifications, the payment bond requirements shall be 100% of the contract price. Both bonds shall be supplied at the signing of the contract.
8. NON-PUBLIC WORKS BIDS: A performance bond will be required for this bid. The amount of the bond will be 100% of the contract price unless otherwise indicated in the specifications. The performance bond shall be supplied at the signing of the contract.
9. NON-PUBLIC WORKS BIDS: A payment bond will be required for this bid. The amount of the bond will be 100% of the contract price unless otherwise indicated in the specifications. The payment bond shall be supplied at the signing of the contract.
10. All bidders must comply with the requirements stated in the attached "Standard Insurance Requirements" sheet attached to this bid solicitation. Prior to contract executions/purchase order issuance, the successful bidder will be required to provide final insurance certificates which shall name Jefferson Parish as an additional insured in accordance with the instructions in the aforementioned "Standard Insurance Requirements" sheet.
11. A bid bond will be required with bid submission in the amount of 5% of the total bid, unless otherwise stated in the bid specifications. Acceptable forms shall be limited to cashier's check, certified check, or surety bid bond. All sureties must be in original format (no copies) If submitting a bid online, vendors must submit an electronic bid bond through the respective online clearinghouse bond management system(s) as indicated in the electronic bid solicitation on Central Auction House. No scanned paper copies of any bid bond will be accepted as part of the electronic bid submission.
12. This is a requirements contract to be provided on an as needed basis. JEFFERSON PARISH makes no representations on warranties with regard to minimum guaranteed quantities unless otherwise stated in the bid specifications.
13. Freight charges should be included in total cost when quoting. If not quoted FOB DELIVERED, freight must be quoted as a separate item. Bid may be rejected if not quoted FOB DELIVERED or if freight charges are not indicated on bid form.
14. PUBLIC WORKS BIDS - Completed, Signed and Properly Notarized Affidavits Required; This applies to all solicitations for construction, alteration or demolition of public buildings or projects, in conformity with the provisions contained in LSA-RS 38:2212.9, LSA-RS 38:2212.10, LSA-RS 38:2224, and Sec 2-923.1 of the Jefferson Parish Code of Ordinances. For bidding purposes, all bidders must submit with bid submission COMPLETED, SIGNED and PROPERLY NOTARIZED Affidavits, including: Non-Conviction Affidavit, Non-Collusion Affidavit, Campaign Contribution Affidavit, Debt Disclosures Affidavit and E-Verify Affidavit. For the convenience of vendors, all affidavits have been combined into one form entitled PUBLIC WORKS BID AFFIDAVIT. This affidavit must be submitted in its original format, and without material alteration, in order to be compliant and for the bid to be considered responsive. A scanned copy of the completed, signed and properly notarized affidavit may be submitted with the bid, however, the successful bidder must submit the original affidavit in its original format and without material alteration upon contract execution. Failure to comply will result in the bid submission being rejected as non-responsive. The Parish reserves the right to award bid to the next lowest responsive and responsible bidder in this event.
15. NON PUBLIC WORK BIDS - Completed, Signed and Properly Notarized Affidavits Required in conformity with the provisions contained in LSA – RS 38:2224 and Sec 2-923.1 of the Jefferson Parish Code of Ordinances. For bidding purposes, all bidders must submit with bid submission COMPLETED, SIGNED and PROPERLY NOTARIZED Affidavits, including: Non-Collusion Affidavit, Debt Disclosures Affidavit and Campaign Contribution Affidavit. For the convenience of vendors, all affidavits have been combined into one form entitled NON PUBLIC WORKS BID AFFIDAVIT. This affidavit must be submitted in its original format, and without material alteration, in order to be compliant and for the bid to be considered responsive. A scanned copy of the completed, signed and properly notarized affidavit may be submitted with the bid, however, the successful bidder must submit the original affidavit in its original format and without material alteration upon contract execution. Failure to comply will result in the bid submission being rejected as non-responsive. The Parish reserves the right to award bid to the next lowest responsive and responsible bidder in this event.
16. The ensuing contract for this bid solicitation may be eligible for FEMA reimbursement and/or Federal funding/reimbursement. As such, the referenced appendix will be applicable accordingly and shall be considered a part of the bid documents. All applicable certifications must be duly completed, signed and submitted with bid submission. Failure to submit applicable certifications with bid submission will result in bid rejection.
17. For this project, the Contractor shall not pay any state or local sales or use taxes on materials and equipment which are affixed and made part of the immovable property of the project or which permanently incorporated in the project (hereinafter referred to as "applicable materials and equipment"). All purchases of applicable materials or equipment shall be made by the contractor on behalf of and as the agent of Jefferson Parish (Owner), a political subdivision of the State of Louisiana. No state and local sales and use taxes are owned on applicable materials and equipment under the provisions of Act 1029 of the 1991 Regular Session – Louisiana Revised Statute 47:301(8)(c). Owner will furnish contractor a certificate form which certifies that Owner is not required to pay such state or local sales and use taxes, and contractor shall furnish a copy of such certificate to all vendors or suppliers of the applicable materials and equipment

It shall be the duty of every parish officer, employee, department, agency, special district, board, and commission: and the duty of every contractor, subcontractor, and licensee of the parish, and the duty of every applicant for certification of eligibility for a parish contract or program, to cooperate with the Inspector General in any investigation, audit, inspection, performance review, or hearing pursuant to Jefferson Parish Code of Ordinances Section 2-155.10(19). By submitting a bid, vendor acknowledges this and will abide by all provisions of the referenced Jefferson Parish Code of Ordinances.



# JEFFERSON PARISH

Department of Purchasing

Michael S. Yenni  
Parish President

Renny Simno  
Director

July 2018

## CHANGES TO JEFFERSON PARISH BIDDING PROCEDURES

The East bank Office of Purchasing is now open! We are located in the Joseph S. Yenni Building, 1221 Elmwood Park Blvd., Suite 404, Jefferson, LA 70123. Bidders may submit bid responses at this location, pending authorization in each bid package. **Bidders should carefully read and must respond accordingly per the requirements of the bid packages. NOTE: Bidders submitting bids on the day of bid opening, bidders must submit at the West Bank location only.**

### Other Changes Continued:

- For all advertised sealed bids, written evidence of signature authority must be included with bid submission.
- Current W9 Forms and vendor applications may be submitted at any time; however, if your company is not registered and/or a current W-9 form is not on file, a current W-9 form must be supplied upon contract execution, should you be awarded a contract and/or issued a purchase order.
- **Proof of insurance in the form of a current certificate evidencing coverages is required with bid submission.** Bidders must read the insurance requirements attachment included in each bid package for specific instructions. Upon contract execution, successful bidder must produce final insurance certificates in accordance with Jefferson Parish insurance requirements.

**Bidders should reference the "Additional Requirements" section of the bid instructions and/or the "Important Notice to Bidders" included in the bid package for specific requirements to respond accordingly.**

For more information, please call Jefferson Parish Purchasing at 504-364-2678.

Joseph S. Yenni Building – 1221 Elmwood Park Blvd., Ste. 404, Jefferson, LA 70123  
Office 504.364.2678  
General Government Bldg. – 200 Derbigny St – Suite 4400 - Gretna, LA 70053  
Office 504.364.2678  
Email: [Purchasing@jeffparish.net](mailto:Purchasing@jeffparish.net) Website: [www.jeffparish.net](http://www.jeffparish.net)

DATE: 8/15/2018

Page: 5

BID NO.: 50-00123860

**BID FORM**  
Non Public Works

**All Public Work Projects are required to use the Louisiana Uniform Public Work Bid Form**

All prices must be held firm unless an escalation provision is requested in this bid. Jefferson Parish will allow one escalation during the term of the contract, which may not exceed the U.S. Bureau of Labor Statistics National Index for all Urban Consumers, unadjusted 12 month figure. The most recently published figure issued at the time an adjustment is requested will be used. A request must be made in writing by the vendor, and the escalation will only be applied to purchases made after the request is made.

Are you requesting an escalation provision?

YES \_\_\_\_\_ NO \_\_\_\_\_

MAXIMUM ESCALATION PERCENTAGE REQUESTED \_\_\_\_\_%

INITIAL BID PRICES WILL REMAIN FIRM THROUGH THE DATE OF 12-1-18

For the purposes of comparison of bids when an escalation provision is requested, Jefferson Parish will apply the maximum escalation percentage quoted by the bidder to the period to which it is applied in the bid. The initial price and the escalation will be used to calculate the total bid price. It will be assumed, for comparison of prices only, that an equal amount of material or labor is purchased each month throughout the entire contract.

**DELIVERY: FOB JEFFERSON PARISH**

INDICATE DELIVERY DATE ON EQUIPMENT AND SUPPLIES

10x14 weeks ARO

**LOUISIANA CONTRACTOR'S LICENSE NO.: (if applicable)**

Not Applicable

**THIS SECTION MUST BE COMPLETED BY BIDDER:**

FIRM NAME: Gulf States Engineering Co., Inc.

ADDRESS: 17961 Painters Row

CITY, STATE: Covington, La. ZIP: 70435

TELEPHONE: (985) 893-3631 FAX: (985) 893-5484

EMAIL ADDRESS: diana@gsengr.com

In the event that addenda are issued with this bid, bidders MUST acknowledge all addenda on the bid form. Bidder must acknowledge receipt of an addendum on the bid form as indicated. Failure to acknowledge any addendum on the bid form will result in bid rejection.

Acknowledge Receipt of Addenda: NUMBER: N/A

NUMBER: \_\_\_\_\_

NUMBER: \_\_\_\_\_

NUMBER: \_\_\_\_\_

TOTAL PRICE OF ALL BID ITEMS: \$ \$38,195.00

AUTHORIZED  
SIGNATURE: Jeane James

Jeane James  
Printed Name

TITLE: Secretary/Treasurer

SIGNING INDICATES YOU HAVE READ AND COMPLY WITH THE INSTRUCTIONS AND CONDITIONS.

NOTE: All bids should be returned with the BID NUMBER and BID OPENING DATE indicated on the outside of the envelope submitted to the Purchasing Department.

## INVITATION TO BID FROM JEFFERSON PARISH - continued

BID NO.: 50-00123860

SEALED BID

ITEM NUMBER	QUANTITY	U/M	DESCRIPTION OF ARTICLES	UNIT PRICE QUOTED	TOTALS
1	3.00	EA	ONE TIME PURCHASE OF FLYGT 7.5 HP SUBMERSIBLE PUMPS FOR THE JEFFERSON PARISH SEWERAGE DEPARTMENT.		
			0010 - Flygt 7.5 Hp Submersible Pumps, 230/3 Phase with FM Explosion Proof	\$11,439.00	\$34,317.00
2	3.00	EA	Motors, 50 Shielded Power Cable, Hi Chrome Impellers and Insert Rings-4 inch Drilled ANSI Item Model: NP3127.095		
			0020 - FLS Seal Leakage Detector with Motor Thermal Switches with Protection	\$696.00	\$2,088.00
3	1.00	EA	Relay Item Model: FLS		
			0030 - MJK 3400 - 15 PSI Submersible Level Transducer with 50 foot of	\$1,095.00	\$1,095.00
4	1.00	EA	Cable and Suspension Kit Item Model: MJK3400		
			0040 - Freight to Jefferson Parish	\$695.00	\$695.00

## CORPORATE RESOLUTION

EXCERPT FROM MINUTES OF MEETING OF THE BOARD OF DIRECTORS OF  
Gulf States Engineering Co.-Inc.  
INCORPORATED.

AT THE MEETING OF DIRECTORS OF Gulf States Engineering Co.  
INCORPORATED, DULY NOTICED AND HELD ON August 20, 2018,  
A QUORUM BEING THERE PRESENT, ON MOTION DULY MADE AND SECONDED. IT  
WAS:

RESOLVED THAT Jeanne James, BE AND IS HEREBY  
APPOINTED, CONSTITUTED AND DESIGNATED AS AGENT AND ATTORNEY-IN-  
FACT OF THE CORPORATION WITH FULL POWER AND AUTHORITY TO ACT ON  
BEHALF OF THIS CORPORATION IN ALL NEGOTIATIONS, BIDDING, CONCERNS  
AND TRANSACTIONS WITH THE PARISH OF JEFFERSON OR ANY OF ITS AGENCIES,  
DEPARTMENTS, EMPLOYEES OR AGENTS, INCLUDING BUT NOT LIMITED TO, THE  
EXECUTION OF ALL BIDS, PAPERS, DOCUMENTS, AFFIDAVITS, BONDS, SURETIES,  
CONTRACTS AND ACTS AND TO RECEIVE ALL PURCHASE ORDERS AND NOTICES  
ISSUED PURSUANT TO THE PROVISIONS OF ANY SUCH BID OR CONTRACT, THIS  
CORPORATION HEREBY RATIFYING, APPROVING, CONFIRMING, AND ACCEPTING  
EACH AND EVERY SUCH ACT PERFORMED BY SAID AGENT AND ATTORNEY-IN-  
FACT.

I HEREBY CERTIFY THE FOREGOING TO BE  
A TRUE AND CORRECT COPY OF AN  
EXCERPT OF THE MINUTES OF THE ABOVE  
DATED MEETING OF THE BOARD OF  
DIRECTORS OF SAID CORPORATION, AND  
THE SAME HAS NOT BEEN REVOKED OR  
RESCINDED.

Jeanne James  
SECRETARY-TREASURER

8/20/18  
DATE



## **Non-Public Works Bid Affidavit Instructions**

- Affidavit is supplied as a courtesy to Affiants, but it is the responsibility of the affiant to insure the affidavit they submit to Jefferson Parish complies, in both form and content, with federal, state and parish laws.
- Affidavit must be signed by an authorized representative of the entity or the affidavit will not be accepted.
- Affidavit must be notarized or the affidavit will not be accepted.
- Notary must sign name, print name, and include bar/notary number, or the affidavit will not be accepted.
- Affiant **MUST** select either A or B when required or the affidavit will not be accepted.
- Affiants who select choice A must include an attachment or the affidavit will not be accepted.
- If both choice A and B are selected, the affidavit will not be accepted.
- Affidavit marked N/A will not be accepted.
- It is the responsibility of the Affiant to submit a new affidavit if any additional campaign contributions are made after the affidavit is executed but prior to the time the council acts on the matter.

*Instruction sheet may be omitted when submitting the affidavit*

Non-Public Works Bid

AFFIDAVIT

STATE OF Louisiana

PARISH/COUNTY OF St. Tammany

BEFORE ME, the undersigned authority, personally came and appeared: Seanne  
James, (Affiant) who after being by me duly sworn, deposed and said that  
he/she is the fully authorized Secretary/Treasurer of Gulf States Eng'g Co. (Entity),  
the party who submitted a bid in response to Bid Number 50-00123860 to the Parish of  
Jefferson.

Affiant further said:

Campaign Contribution Disclosures

(Choose A or B, if option A is indicated please include the required  
attachment):

Choice A \_\_\_\_\_ Attached hereto is a list of all campaign contributions, including  
the date and amount of each contribution, made to current or  
former elected officials of the Parish of Jefferson by Entity,  
Affiant, and/or officers, directors and owners, including  
employees, owning 25% or more of the Entity during the two-year  
period immediately preceding the date of this affidavit or the  
current term of the elected official, whichever is greater. Further,  
Entity, Affiant, and/or Entity Owners have not made any  
contributions to or in support of current or former members of the  
Jefferson Parish Council or the Jefferson Parish President through  
or in the name of another person or legal entity, either directly or  
indirectly.

Choice B X there are NO campaign contributions made which would require  
disclosure under Choice A of this section.

Debt Disclosures

**(Choose A or B, if option A is indicated please include the required attachment):**

Choice A \_\_\_\_\_ Attached hereto is a list of all debts owed by the affiant to any elected or appointed official of the Parish of Jefferson, and any and all debts owed by any elected or appointed official of the Parish to the Affiant.

Choice B X There are **NO** debts which would require disclosure under Choice A of this section.

Affiant further said:

That Affiant has employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for Affiant; and

*[The remainder of this page is intentionally left blank.]*

That no part of the contract price received by Affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for Affiant.

Jeane James  
Signature of Affiant

Jeane James  
Printed Name of Affiant

SWORN AND SUBSCRIBED TO BEFORE ME  
ON THE 20 DAY OF Aug, 2018.

Salvatore A. Mortillaro, II  
Notary Public

\_\_\_\_\_  
Printed Name of Notary

\_\_\_\_\_  
Notary/Bar Roll Number

My commission expires \_\_\_\_\_.

Salvadore A. Mortillaro, II  
Notary Public for Life  
Parish of St. Tammany, LA  
Notary ID #88181



GULFSTA-04

KHARTMAN

## CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

09/25/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER License # 231432 Hub International Gulf South 3510 N. Causeway Blvd., Suite 300 Metairie, LA 70002	CONTACT NAME:	
	PHONE (A/C, No, Ext): (800) 256-2842	FAX (A/C, No): (504) 834-2995
INSURED  Gulf States Engineering Co Inc 17961 Painters Row Covington, LA 70435	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A: Travelers Casualty and Surety Company	
	NAIC # 19038	
	INSURER B:	
	INSURER C:	
INSURER D:		
INSURER E:		
INSURER F:		

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:			Y6609262N786PHX17	10/08/2017	10/08/2018	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			BA9262N78617CAG	10/08/2017	10/08/2018	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 10,000			YSMCUP9262N786TIL17	10/08/2017	10/08/2018	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000
A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) <input type="checkbox"/> If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	YOUB9262N78617	10/08/2017	10/08/2018	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.I. EACH ACCIDENT \$ 1,000,000 E.I. DISEASE - EA EMPLOYEE \$ 1,000,000 E.I. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER	CANCELLATION
SAMPLE	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE 



Project	Project ID	Created by	Created on	Last update
			<b>8/15/2018</b>	

## NP 3127 MT 3~ Adaptive 439



### Performance curve

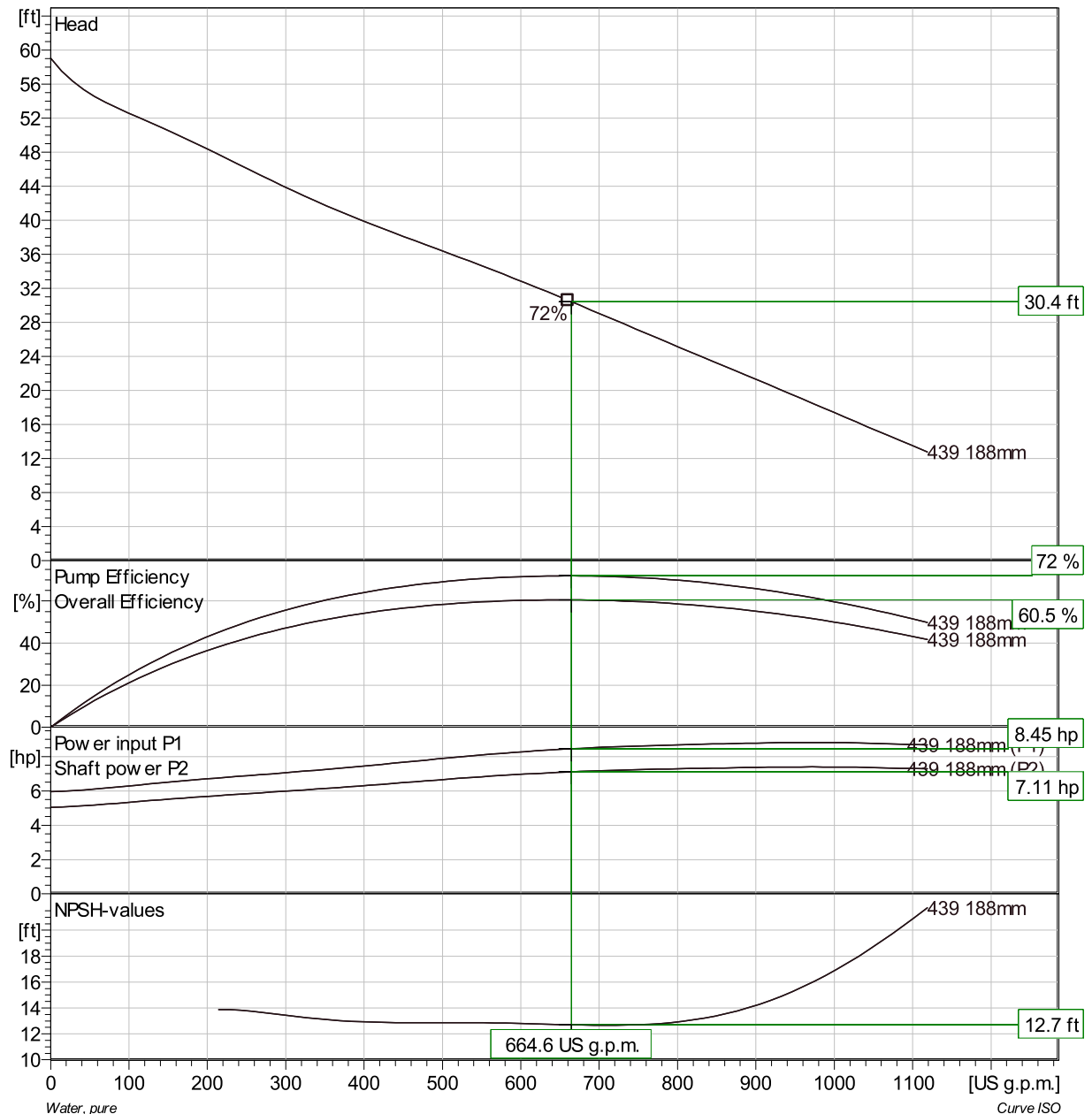
#### Pump

Discharge Flange Diameter 3 15/16 inch  
Suction Flange Diameter 100 mm  
Impeller diameter 7 3/8"  
Number of blades 2

#### Motor

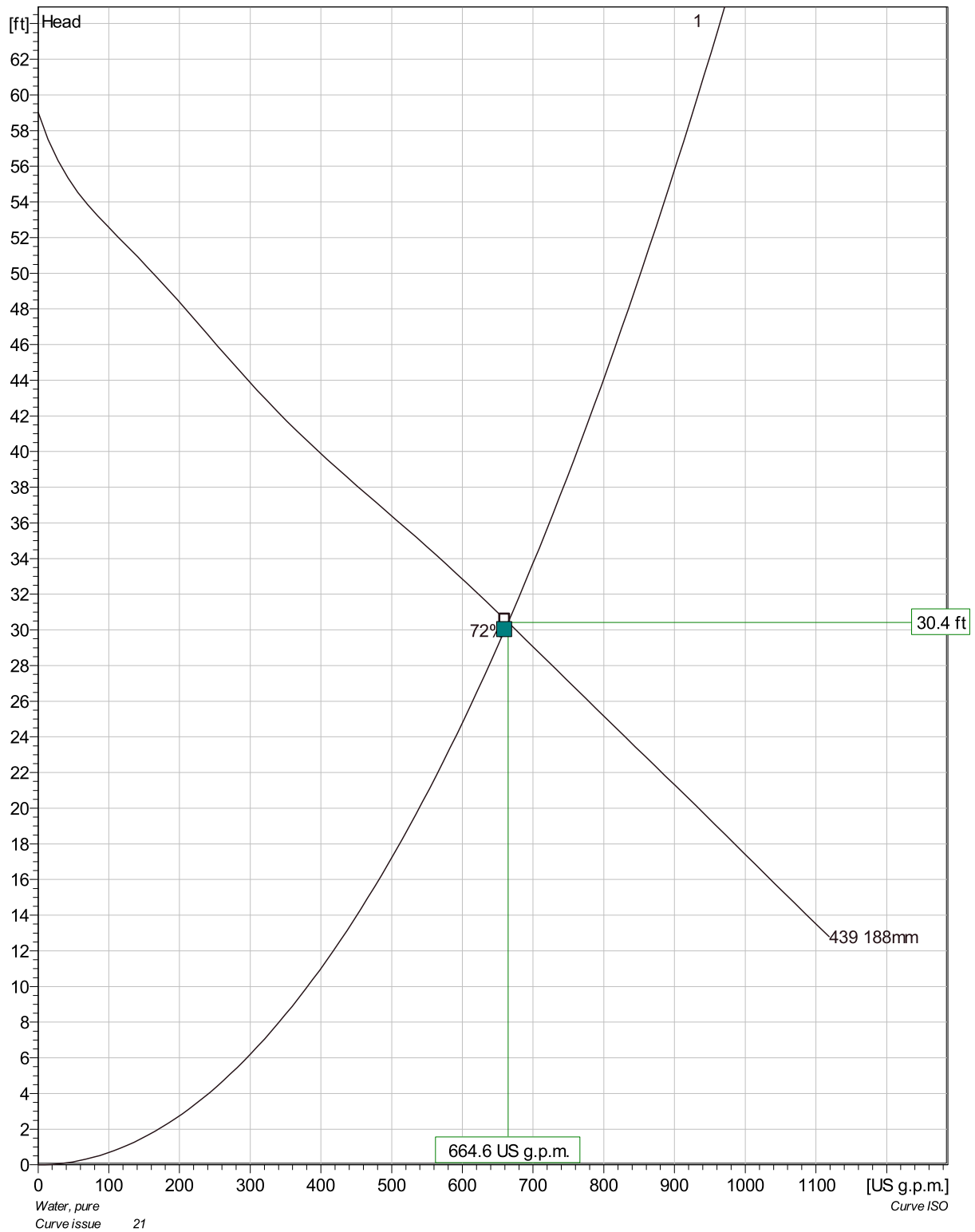
Motor # N3127.070 21-10-4AL-W 7.5hp  
Stator variant 12  
Frequency 60 Hz  
Rated voltage 230 V  
Number of poles 4  
Phases 3~  
Rated power 7.5 hp  
Rated current 19 A  
Starting current 105 A  
Rated speed 1740 rpm

Power factor  
1/1 Load 0.88  
3/4 Load 0.85  
1/2 Load 0.77  
Motor efficiency  
1/1 Load 83.8 %  
3/4 Load 84.7 %  
1/2 Load 83.7 %



Project	Project ID	Created by	Created on 8/15/2018	Last update
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## NP 3127 MT 3~ Adaptive 439 Duty Analysis

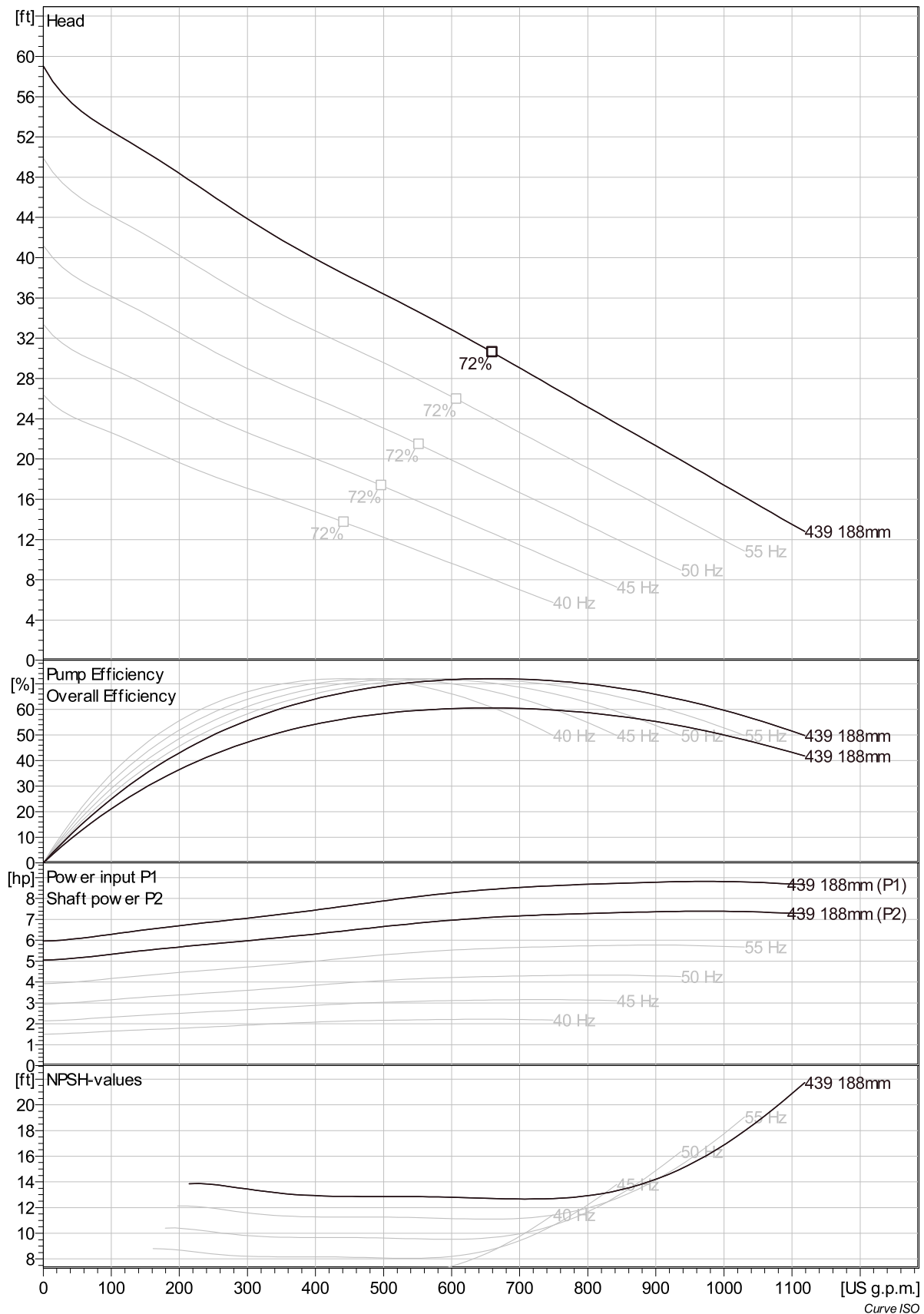


Pumps running /System	Individual pump			Total					NPSHre
	Flow	Head	Shaft power	Flow	Head	Shaft power	Pump eff.	Specific energy	
1	665 US g.p.m.	30.4 ft	7.11 hp	665 US g.p.m.	30.4 ft	7.11 hp	72 %	158 kWh/US MG	12.7 ft

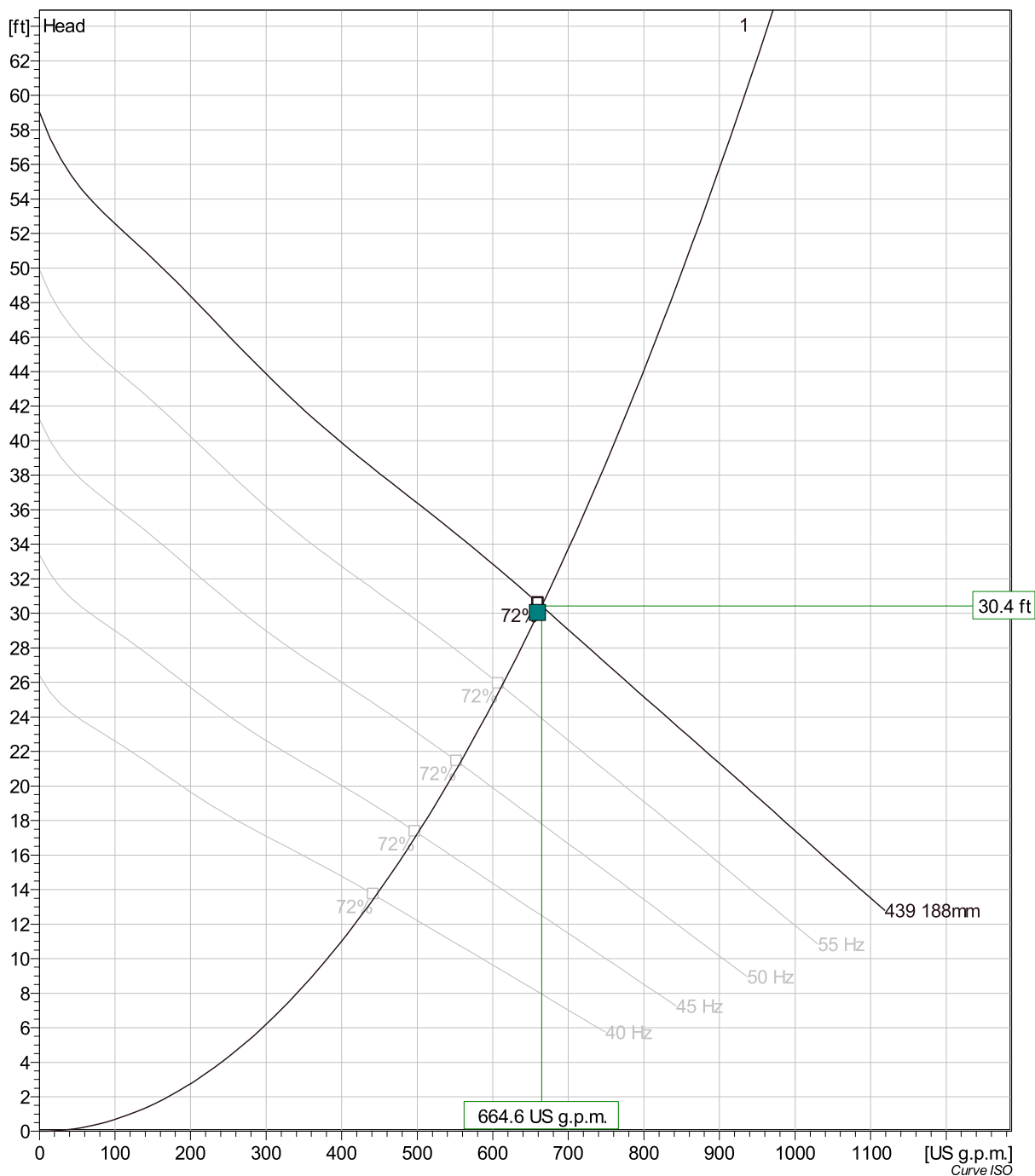
Project	Project ID	Created by	Created on 8/15/2018	Last update
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## NP 3127 MT 3~ Adaptive 439 VFD Curve



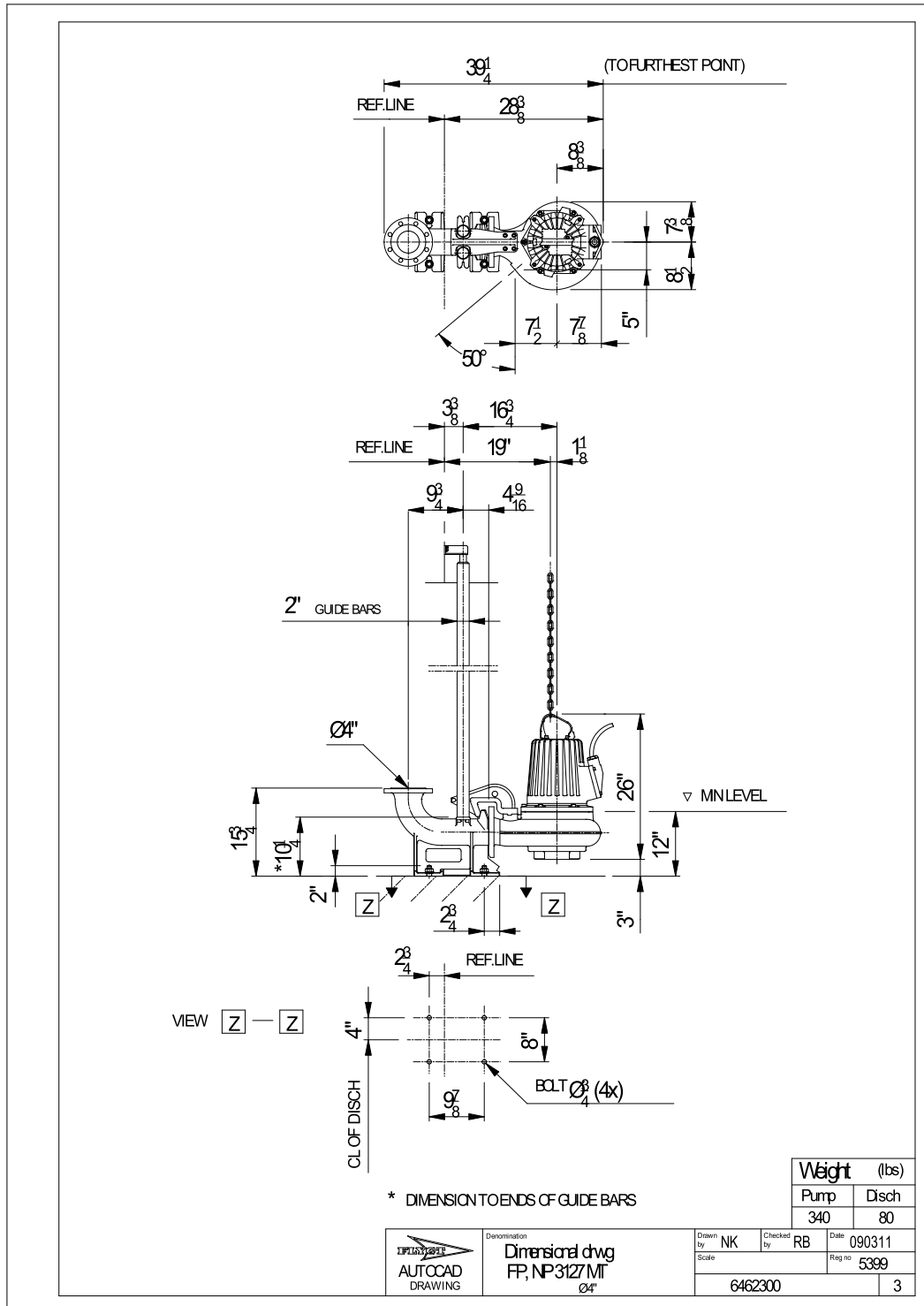
Project	Project ID	Created by	Created on 8/15/2018	Last update
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## NP 3127 MT 3~ Adaptive 439 VFD Analysis



Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	58.1 Hz	665 US g.p.m.	30.4 ft	7.11 hp	665 US g.p.m.	30.4 ft	7.11 hp	72 %	158 kWh/US MG	12.7 ft
1	55 Hz	612 US g.p.m.	25.8 ft	5.55 hp	612 US g.p.m.	25.8 ft	5.55 hp	72 %	133 kWh/US MG	11.1 ft
1	50 Hz	556 US g.p.m.	21.3 ft	4.17 hp	556 US g.p.m.	21.3 ft	4.17 hp	72 %	110 kWh/US MG	9.56 ft
1	45 Hz	501 US g.p.m.	17.3 ft	3.04 hp	501 US g.p.m.	17.3 ft	3.04 hp	72 %	91.2 kWh/US MG	8.07 ft
1	40 Hz	445 US g.p.m.	13.6 ft	2.13 hp	445 US g.p.m.	13.6 ft	2.13 hp	72 %	75 kWh/US MG	6.69 ft

Project	Project ID	Created by	Created on	Last update
			8/15/2018	



Weight (lbs)	
Pump	Disch
340	80

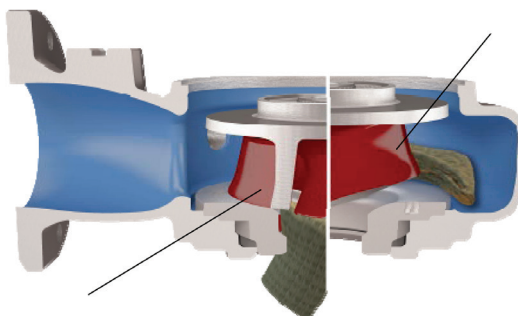
Drawn by	NK	Checked by	RB	Date	090311
Scale				Reg no	5399
6462300					3

Project	Project ID	Created by	Created on 8/15/2018	Last update
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# Adaptive Impeller

## Description

The adaptive N-impeller is a new innovation which further improves the self cleaning characteristics of the N-concept. The impeller can move axially in the last stage of the cleaning cycle to make it easier for everything from big rags to stones to go through the volute. This makes these pumps more reliable than with any other impeller. Our lab tests clearly show that this impeller simply does not clog.



The technique is quite simple. First, the guide pin and the relief groove guide debris from the center to the perimeter of the inlet. The relief groove and swept back impeller edges push the debris through the volute. If the torque of the impeller is not large enough to push the debris through, the debris pushes the impeller upwards which enables it to be guided more easily through the relief groove. After the debris has passed through, the hydraulic pressure on the impeller pushes the impeller down to its original position. The dampening effect of the axially moving impeller also reduces stress on the shaft and bearings as well as reducing wear on the impeller edges.

## Benefits:

- High original efficiency
- No partial blockages
- Less wear on impeller = Sustained high efficiency. We guarantee 25% energy savings.
- No complete blockages
- Less stress on bearings, shaft and seals
- Less wear on impeller = Reliability and prolonged service intervals

Longer service intervals due to superior non-clogging compared to anything on the market today. The impeller solves the problem only when needed compared to, for example, a vortex impeller that solves the problem when needed and when it is unnecessary. This gives this pump excellent hydraulic efficiency not only in clean water but in the toughest of applications (compared to the competition).

## Available on the following models:

N-3085  
N-3102  
N-3127



# Explosion-proof Pumps

## Explosion-proof Pumps for Hazardous Locations

Flygt Electric Submersible Explosion-proof Wastewater Pumps are examined, tested, and approved by Factory Mutual Research (FM) as Explosion-proof. They conform to the latest edition of the National Electrical Code (NEC), Articles 500, 501, 502, and 503 requirements as explosion proof and suitable for use in Class I, Division 1, Groups C and D, and dust ignition proof and suitable for use in Class II, Division 1, Groups E, F and G hazardous locations, and suitable for use in Class III, Division 1 hazardous locations. FM approval also meets OSHA (Occupational Safety and Health Administration) requirements.

### Definition of Hazardous Locations by NEC

**Class I locations** are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosion or ignitable mixtures.

**Class I, Division 1 location** is a location: (1) in which ignitable concentrations of flammable gases or vapors exist under normal operating conditions; or (2) in which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or (3) in which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also **cause** simultaneous failure of electric equipment.

**Class II locations** are those that are hazardous because of the presence of combustible dust.

**Class II, Division 1 location** is a location: (1) in which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures; or (2) where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes; or (3) in which combustible dusts of an electrically conductive nature may be present.

**Class III locations** are those that are hazardous because of the presence of easily ignitable fibers or flyings but not likely in air suspension in quantities sufficient to produce ignitable mixtures.

**Class III, Division 1 location** is one in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

## Special Features

The construction of an Explosion Proof pump is similar in most respects to the standard wastewater pump, but differs in the following details:

1. Hydrostatically pressure tested high strength, cast iron housings are designed to withstand an internal explosion and have long tight flame paths to reduce exit temperature of any exploding gases to a value below the ignition temperature of the surrounding environment.
2. All pumps have required pilot thermal sensors embedded in stator windings, to guarantee that the pump surface temperature never exceeds safe limits, avoiding possible environmental ignition.
3. Externally mounted leakage sensors may not be used unless explosion proof or intrinsically safe (consult factory for details).
4. Special approved power cables required: Flygt SUBCAB.
5. All pumps, except 3045(X), 3057(X), 3085(X), 3102(X) and 3127(X), have a **special** stator inspection plug. The 3085(X), 3102(X) and 3127(X) stator housings are inspected for leakage through the cable entry. Here, penetration of oil from the oil chamber below, or water from the junction chamber above can be detected.
6. Flygt controls supplied with these pumps incorporate the following **required** circuits:
  - A. Motor pilot thermal sensors (connection is approval **mandatory**).
  - B. Intrinsically safe relays for ENM-10 level sensors (or equal) - usage is **mandatory**.

**CAUTION:** All controls, used with these pumps but not supplied by Flygt, **must** be designed according to the latest applicable standards. See **Monitoring & Controls** Section for additional details and requirements.

## Environmental Limits

The maximum temperature of exposed (external) pump surfaces is self controlled by the motor pilot thermal switches. Maximum allowed ambient (environmental) temperature is 115°F (46°C).

## Application of Explosion-proof Pumps

These pumps may be used in sewage wet wells that are classified as Class I, Division 1, Groups C and D

# Explosion-proof Pumps

hazardous locations (gases and vapors). They can also be used in applications that are classified as Class II, Division 1, Groups E, F and G hazardous locations (typified by grain or coal storage); also, Class III, Division 1 locations (fibers and flyings).

Other areas, which may be classified hazardous under normal conditions and where the use of Explosion-proof pumps for handling contaminated wastewater is required are: refineries, petrochemical industry locations, tank farms, gas utility vaults, etc., always taking into consideration that these pumps are **not designed or approved as process pumps deliberately and protractedly handling high concentrations of hazardous liquids, e.g.: gasoline, etc.**

## Limitations

1. CP/CS, DP/DS and FP/FS 3085(X) does not optionally have a terminal board as does the standard version.
2. This Explosion-proof pump is not available in the Warm Liquid (WL) variant.

**Division 2, All Classes:** For Class I or II locations, a Division 2 designation means that the ignitable or combustible materials will not normally be present in hazardous concentrations except by accident or malfunctions of containing or protective systems. In Class III locations, Division 1 and 2 are almost the same (check NEC Article 503).

Equipment approved as suitable for use in Division 1 locations is automatically suitable for use in Division 2 locations. **However**, if the Authority Having Jurisdiction has definitely defined the area as Division 2, standard submersible pumps (motors) may be used so long as they do not contain any open (non-hermetically sealed) ignition sources (See NEC Article 501-8 and 502-8) and use motor pilot thermal switches to limit surface temperatures. Standard Flygt submersible pumps meet these requirements.

## Classification

A sewage wet well (or any other wastewater collection location) is not automatically a hazardous location. The nature and classification of any location must be determined and indicated by whoever is considered to be the Authority Having Jurisdiction.

This Authority is not always easily determined. Care and diligence must be exercised to make sure, once a preliminary identification has been made, that there is not some other superseding Authority.

Depending on the type and geographical position of the "location", the Authority may range the gamut from a federal agency to state, regional, local agencies or the consulting or plant engineer. Often the best source of information is the state Administrative Code or a state agency such as a Department of Environmental Protection (DEP), Environmental Protection Agency (EPA), Department of Health, etc.

## Approval Requirements (NEC/Factory Mutual)

Class I, Division 1: suitable equipment must be explosion proof. It must also contain pilot motor thermal sensors (which must be connected in the motor control).

Class II, Division 1: suitable equipment must be "dust ignition proof" and use motor pilot surface temperature limiting thermal switches as in Class I.

Class III, Division 1: suitable equipment need only be totally enclosed, non ventilated.

**Current Approvals** for hazardous location pumps previously noted are by FM (Factory Mutual Research). FM is officially listed by OSHA (Occupational Safety & Health Administration) in the Federal Register as a Nationally recognized testing laboratory (NRTL). It is in all regards equivalent to UL (Underwriters Laboratory).

**Restrictions:** The listed (X) pumps are not approved for "process pumping" where high concentrations of liquids (other than wastewater) are handled for process work, transfer, or recovery. The acceptable usage is for handling wastewater (contaminated water, sewage, etc.) for the purposes of treatment, transfer, storage, or disposal.

No accessory equipment may be attached to an approved pump unless it is specifically approved for the location or "intrinsically safe" (See NEC 500-2 for Intrinsic Safe requirements).

**WARNING:** All NEC and local code requirements must be scrupulously observed when making an installation. Be certain that glands and conduits where pump(s) or control wiring/cable passes from a hazardous location (wet pit, etc.) to electrical service, controls, or nonclassified area are suitably sealed against passage of gases or liquids.

**Aggressive Liquids:** Depending on temperature, pH, concentration, and their intrinsic reactivity, certain contaminant chemicals (acids, alkalies, solvents, etc.) may have a deteriorating effect on the equipment and

## Explosion-proof Pumps

pose a safety hazard to the installation. Be careful to fully examine these circumstances with the end user or his representative and consult with Flygt.

A number of alternative configurations or approaches are available which may make the equipment suitable in the presence of these materials: alternate elastomers, cable sheathing, special cable entries, etc.

**Accessories:** Non-sparking bronze “Safe-Slide®” installation/removal guide accessories are available for all approved pumps. While not required by the Approval Authority they may be desired by local authorities and do provide an extra margin of safety for particularly hazardous classified locations.

**Cable:** Flexible cords or cables used in hazardous locations must be of the NEC type “extra-hard usage” and be specifically approved/tested for the approved equipment (motor/pumps) which they will be used with.

**No unapproved substitutions may be made without loss of official approval.** Cables supplied by Flygt and used with Flygt electric submersible pumps are FM tested and approved for the hazardous locations listed for the pumps in the beginning of this Explosion-proof pumps section.

To protect against the damaging and unsafe effects of very aggressive contaminants (liquids, dissolved solids) in the wastewater, special cable entries are available which will allow pipe or stainless steel flex hose sheathing to be attached to protect the cable.

**Special Exceptions for Hazardous Locations:** It is possible in some circumstances to use standard pumps in what would normally be declared as hazardous locations. These approaches are supported by various codes but may **not** be used if specifically disallowed by an Authority Having Jurisdiction.

**Guaranteed Pump Submersion (GPS):** If the equipment is so controlled that the liquid level never falls below a point 4 - 6 inches above the topmost point of the pump, then standard non-approved pumps may be used. This is because the volume below a liquid surface is not considered hazardous.

The means for guaranteeing that a pump will always remain submerged during operation vary from one part of the country to another. Consult Flygt for appropriate configurations.

**Declassification:** An examination of local/state administrative codes, NEC Chapter 5, and NFPA Standard 70C and 496, shows that a hazardous location may be reduced in classification from Division 1 to Division 2 or even to a nonhazardous condition through the use of suitable air purging and use of monitoring safeguards. This would then allow the installation of standard pumping equipment.

This is a common practice in many parts of the country when the installation makes it practical. The approach has additional benefits: purging not only removes any explosive/flammable gases, but also removes smothering or poisonous gases thus improving the personnel safety aspects of the location.

### **Mine Safety and Health Administration (MSHA)**

Equipment approved by MSHA (Permissible-suitable for use in gassy mines) may **not** be used in any hazardous location covered by the NEC categories (Class I, II, or III) without written permission of the **authority having jurisdiction**.

Nor may equipment approved/listed by FM or UL be used in a gassy mine without the written approval of MSHA.

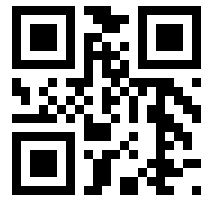
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## Materials of Construction

Components	Cast Iron Pump
<b>Major Castings</b>	Cast iron, A48, Class 35B
<b>Pump Lifting Handle</b>	Stainless steel
<b>Motor Cable</b>	Chloroprene rubber jacketed
<b>Cable Entry Grommets</b>	Nitrile rubber
<b>Shaft</b>	Stainless steel ASTM A479 S43100-T
<b>Impeller (Adaptive)</b>	Hard Iron™ (25 ASTM A-532 (Alloy III A) 25% chrome cast iron).
<b>Insert Ring</b>	Hard Iron™ (25 ASTM A-532 (Alloy III A) 25% chrome cast iron)
<b>O-Rings</b>	Nitrile rubber or optional Viton
<b>Lubricant Plug</b>	316 Stainless steel
<b>Screws, studs and nuts</b>	316 Stainless steel
<b>Inner Mechanical Shaft Seal</b>	*Tungsten carbide/ *Tungsten carbide
<b>Outer Mechanical Shaft Seal</b>	*Tungsten carbide/ *Tungsten carbide
	*All corrosion and abrasion resistant

Installation, Operation, and  
Maintenance Manual

886652\_3.0



# Flygt 3127



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# 1 Introduction and Safety

## 1.1 Introduction

### Purpose of the manual

The purpose of this manual is to provide necessary information for working with the unit. Read this manual carefully before starting work.

### Read and keep the manual

Save this manual for future reference, and keep it readily available at the location of the unit.

### Intended use



#### **WARNING:**

Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment and the surroundings. This includes any modification to the equipment or use of parts not provided by Xylem. If there is a question regarding the intended use of the equipment, please contact a Xylem representative before proceeding.

### Other manuals

See also the safety requirements and information in the original manufacturer's manuals for any other equipment furnished separately for use in this system.




## 1.2 Safety terminology and symbols

### About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:



- Personal accidents and health problems
- Damage to the product and its surroundings
- Product malfunction

### Hazard levels

Hazard level	Indication
 <b>DANGER:</b>	A hazardous situation which, if not avoided, will result in death or serious injury
 <b>WARNING:</b>	A hazardous situation which, if not avoided, could result in death or serious injury
 <b>CAUTION:</b>	A hazardous situation which, if not avoided, could result in minor or moderate injury
<b>NOTICE:</b>	Notices are used when there is a risk of equipment damage or decreased performance, but not personal injury.

## Special symbols

Some hazard categories have specific symbols, as shown in the following table.

Electrical hazard	Magnetic fields hazard
 Electrical Hazard:	 CAUTION:

## 1.3 User safety

All regulations, codes, and health and safety directives must be observed.

### The site

- Observe lockout/tagout procedures before starting work on the product, such as transportation, installation, maintenance, or service.
- Pay attention to the risks presented by gas and vapors in the work area.
- Always be aware of the area surrounding the equipment, and any hazards posed by the site or nearby equipment.

### Qualified personnel

This product must be installed, operated, and maintained by qualified personnel only.

### Protective equipment and safety devices

- Use personal protective equipment as needed. Examples of personal protective equipment include, but are not limited to, hard hats, safety goggles, protective gloves and shoes, and breathing equipment.
- Make sure that all safety features on the product are functioning and in use at all times when the unit is being operated.

## 1.4 Ex-approved products

Follow these special handling instructions if you have an Ex-approved unit.

### Personnel requirements

These are the personnel requirements for Ex-approved products in potentially explosive atmospheres:

- All work on the product must be carried out by certified electricians and Xylem-authorized mechanics. Special rules apply to installations in explosive atmospheres.
- All users must know about the risks of electric current and the chemical and physical characteristics of the gas, the vapor, or both present in hazardous areas.
- Any maintenance for Ex-approved products must conform to international and national standards (for example, IEC/EN 60079-17).

Xylem disclaims all responsibility for work done by untrained and unauthorized personnel.

### Product and product handling requirements

These are the product and product handling requirements for Ex-approved products in potentially explosive atmospheres:

- Only use the product in accordance with the approved motor data.
- The Ex-approved product must never run dry during operation. The volute must be filled with liquid during operation. Dry running during service and inspection is only permitted outside the classified area.
- Before you start work on the product, make sure that the product and the control panel are isolated from the power supply and the control circuit, so they cannot be energized.
- Do not open the product while it is energized or in an explosive gas atmosphere.

- Intrinsically safe circuits are normally required for the automatic level-control system by the level regulator if mounted in zone 0.
- The yield stress of fasteners must be in accordance with the approval drawing and the product specification.
- Do not modify the equipment without approval from an Ex-approved Xylem representative.
- Only use original Xylem spare parts that are provided by an Ex-approved Xylem representative.
- The thermal detectors that are fitted to the stator windings must be connected correctly to a separate motor control circuit and in use. The detectors disconnect the power supply to the motor timely. This action prevents the rise of temperatures above the temperature value for the approval classification.
- The width of flameproof joints is more than the values specified in the tables of the IEC 60079-1 standard.
- The gap of flameproof joints is less than the values specified in Table 1 of the IEC 60079-1 standard.

### Guidelines for compliance

Compliance is fulfilled only when you operate the unit within its intended use. Do not change the conditions of the service without the approval of an Ex-approved Xylem representative. When you install or maintain explosion proof products, always comply with the directive and applicable standards (for example, IEC/EN 60079-14).

### Minimum permitted liquid level

See the dimensional drawings of the product for the minimum permitted liquid level according to the approval for explosion proof products. If the information is missing on the dimensional drawing, the product must be fully submerged. Level-sensing equipment must be installed if the product can be operated at less than the minimum submersion depth.

### Monitoring equipment

For additional safety, use condition-monitoring devices. Examples of condition-monitoring devices include, but are not limited to, the following:

- Level indicators
- Temperature detectors in addition to the stator thermal detectors

Any thermal detectors or thermal protection devices delivered with the pump must be installed and in use at all times.

## 1.5 Special hazards

### Biological hazards

The product is designed for use in liquids that can be hazardous to your health. Observe these rules when you work with the product:

- Make sure that all personnel who may come into contact with biological hazards are vaccinated against diseases to which they may be exposed.
- Observe strict personal cleanliness.



---

#### **WARNING: Biological Hazard**

Infection risk. Rinse the unit thoroughly with clean water before working on it.

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### Wash the skin and eyes

Follow these procedures for chemicals or hazardous fluids that have come into contact with your eyes or your skin:

Condition	Action
Chemicals or hazardous fluids in eyes	<ol style="list-style-type: none"><li>1. Hold your eyelids apart forcibly with your fingers.</li><li>2. Rinse the eyes with eyewash or running water for at least 15 minutes.</li><li>3. Seek medical attention.</li></ol>
Chemicals or hazardous fluids on skin	<ol style="list-style-type: none"><li>1. Remove contaminated clothing.</li><li>2. Wash the skin with soap and water for at least 1 minute.</li><li>3. Seek medical attention, if necessary.</li></ol>

## 1.6 Protecting the environment

### Emissions and waste disposal

Observe the local regulations and codes regarding:

- Reporting of emissions to the appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills

### Exceptional sites



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**CAUTION: Radiation Hazard**

Do NOT send the product to Xylem if it has been exposed to nuclear radiation, unless Xylem has been informed and appropriate actions have been agreed upon.

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## 1.7 Spare parts



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**CAUTION:**

Only use the manufacturer's original spare parts to replace any worn or faulty components. The use of unsuitable spare parts may cause malfunctions, damage, and injuries as well as void the warranty.

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## 1.8 Warranty

For information about warranty, see the sales contract.

## 2 Transportation and Storage

### 2.1 Inspect the delivery

#### 2.1.1 Inspect the package

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. File a claim with the shipping company if anything is out of order.  
If the product has been picked up at a distributor, make a claim directly to the distributor.

#### 2.1.2 Inspect the unit

1. Remove packing materials from the product.  
Dispose of all packing materials in accordance with local regulations.
2. Inspect the product to determine if any parts have been damaged or are missing.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.  
For your personal safety, be careful when you handle nails and straps.
4. Contact a sales representative if there is any issue.

### 2.2 Transportation guidelines

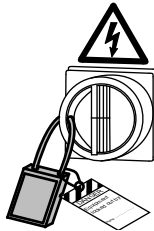
#### Precautions



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**DANGER: Crush Hazard**

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.



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#### Position and fastening

The unit can be transported either horizontally or vertically. Make sure that the unit is securely fastened during transportation, and cannot roll or fall over.

#### 2.2.1 Lifting

Always inspect the lifting equipment and tackle before starting any work.



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**WARNING: Crush Hazard**

1) Always lift the unit by its designated lifting points. 2) Use suitable lifting equipment and ensure that the product is properly harnessed. 3) Wear personal protective equipment. 4) Stay clear of cables and suspended loads.

---

**NOTICE:**

Never lift the unit by its cables or hose.

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### Lifting equipment

Lifting equipment is always required when handling the unit. It must fulfill the following requirements:

- The minimum height (contact your local sales and service representative for information) between the lifting hook and the floor must be sufficient to lift the unit.
- The lifting equipment must be able to hoist the unit straight up and down, preferably without the need for resetting the lifting hook.
- The lifting equipment must be securely anchored and in good condition.
- The lifting equipment must support the weight of the entire assembly and must only be used by authorized personnel.
- Two sets of lifting equipment must be used to lift the unit for repair work.
- The lifting equipment must be dimensioned to lift the unit with any remaining pumped media in it.
- The lifting equipment must not be oversized.



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**CAUTION: Crush Hazard**

Over-dimensioned lifting equipment can lead to injury. A site-specific risk analysis must be done.

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## 2.3 Temperature ranges for transportation, handling and storage

### Handling at freezing temperature

At temperatures below freezing, the product and all installation equipment, including the lifting gear, must be handled with extreme care.

Make sure that the product is warmed up to a temperature above the freezing point before starting up. Avoid rotating the impeller/propeller by hand at temperatures below the freezing point. The recommended method to warm the unit up is to submerge it in the liquid which will be pumped or mixed.

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**NOTICE:**

Never use a naked flame to thaw the unit.

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### Unit in as-delivered condition

If the unit is still in the condition in which it left the factory - all packing materials are undisturbed - then the acceptable temperature range during transportation, handling and storage is:  $-50^{\circ}\text{C}$  ( $-58^{\circ}\text{F}$ ) to  $+60^{\circ}\text{C}$  ( $+140^{\circ}\text{F}$ ).

If the unit has been exposed to freezing temperatures, then allow it to reach the ambient temperature of the sump before operating.

### Lifting the unit out of liquid

The unit is normally protected from freezing while operating or immersed in liquid, but the impeller/propeller and the shaft seal may freeze if the unit is lifted out of the liquid into a surrounding temperature below freezing.

Follow these guidelines to avoid freezing damage:

1. Empty all pumped liquid, if applicable.
2. Check all liquids used for lubrication or cooling, both oil and water-glycol mixtures, for the presence of unacceptable amounts of water. Change if needed.

Water-glycol mixtures: Units equipped with an internal closed-loop cooling system are filled with a mixture of water and 30% glycol. This mixture remains a flowing liquid at temperatures down to  $-13^{\circ}\text{C}$  ( $9^{\circ}\text{F}$ ). Below  $-13^{\circ}\text{C}$  ( $9^{\circ}\text{F}$ ), the viscosity increases such that the glycol mixture will lose its flow properties. However, the glycol-water mixture will not solidify completely and thus cannot harm the product.

## 2.4 Storage guidelines

### Storage location

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

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**NOTICE:**

Protect the product against humidity, heat sources, and mechanical damage.

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**NOTICE:**

Do not place heavy weights on the packed product.

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### Long-term storage

If the unit is stored more than six months, then the following apply:

- Before operating the unit after storage, it must be inspected with special attention to the seals and the cable entry.
- The impeller/propeller must be rotated every other month to prevent the seals from sticking together.

### Packaging material stacking limit

If the packaging material has an indicated stacking limit, then it is valid for 23°C (73°F) and 50% relative humidity. Depending on the material, other temperature and humidity ranges can reduce the stacking limit.

# 3 Product Description

## Products included

Pump	Non-explosion proof drive unit	Explosion proof drive unit	High Efficiency motor (LSPM)	C-hydraulic	D-hydraulic	F-hydraulic	H hydraulic	L hydraulic	P hydraulic	M-hydraulic (Grinder)	Chopper hydraulics	N hydraulic (Hard-Iron™)	Adaptive N™ hydraulic
3127.060	X												X <sup>1</sup>
3127.070		X											X <sup>1</sup>
3127.091		X		X	X	X	X	X	X				
3127.095		X										X	
3127.161	X												X <sup>3</sup>
3127.170	X									X			
3127.182	X			X	X	X	X	X	X				
3127.185	X											X	
3127.191		X											X <sup>3</sup>
3127.350	X										X		
3127.390		X									X		
3127.761	X												X <sup>2</sup>
3127.771		X											X <sup>2</sup>
3127.800	X		X	X									
3127.810		X	X	X									
3127.820	X		X									X	
3127.830		X	X									X	
3127.840	X		X								X		
3127.850		X	X								X		
3127.890		X								X			
3127.901	X		X										X <sup>3</sup>
3127.911		X	X										X <sup>3</sup>
3127.920	X		X										X <sup>1</sup>
3127.930		X	X										X <sup>1</sup>
3127.961	X		X										X <sup>2</sup>
3127.971		X	X										X <sup>2</sup>
<sup>1</sup> Hard-Iron™ <sup>2</sup> Stainless steel <sup>3</sup> Cast iron, gray													

## Pump-specific information

For the specific weight, current, voltage, power ratings, and speed of the pump, see the data plate of the pump.

## 3.1 Pump design

The pump is submersible, and driven by an electric motor.

For a list of pump version and corresponding motor type, see [Technical Reference](#) on page 77.

### Intended use

The product is intended for moving wastewater, sludge, raw and clean water. Always follow the limits that are given in [Technical Reference](#) on page 77. If there is a question regarding the intended use of the equipment, please contact a local sales and service representative before proceeding.




---

#### **DANGER: Explosion/Fire Hazard**

Special rules apply to installations in explosive or flammable atmospheres. Do not install the product or any auxiliary equipment in an explosive zone unless it is rated explosion-proof or intrinsically-safe. If the product is EN/ATEX-, MSHA- or FM-approved, then see the specific EX information in the Safety chapter before taking any further actions.

---

#### **NOTICE:**

Do NOT use the unit in highly corrosive liquids.

---

### Spare parts

- Modifications to the unit or installation should only be carried out after consulting with Xylem.
- Original spare parts and accessories that are authorized by Xylem are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation. For more information contact your Xylem representative.

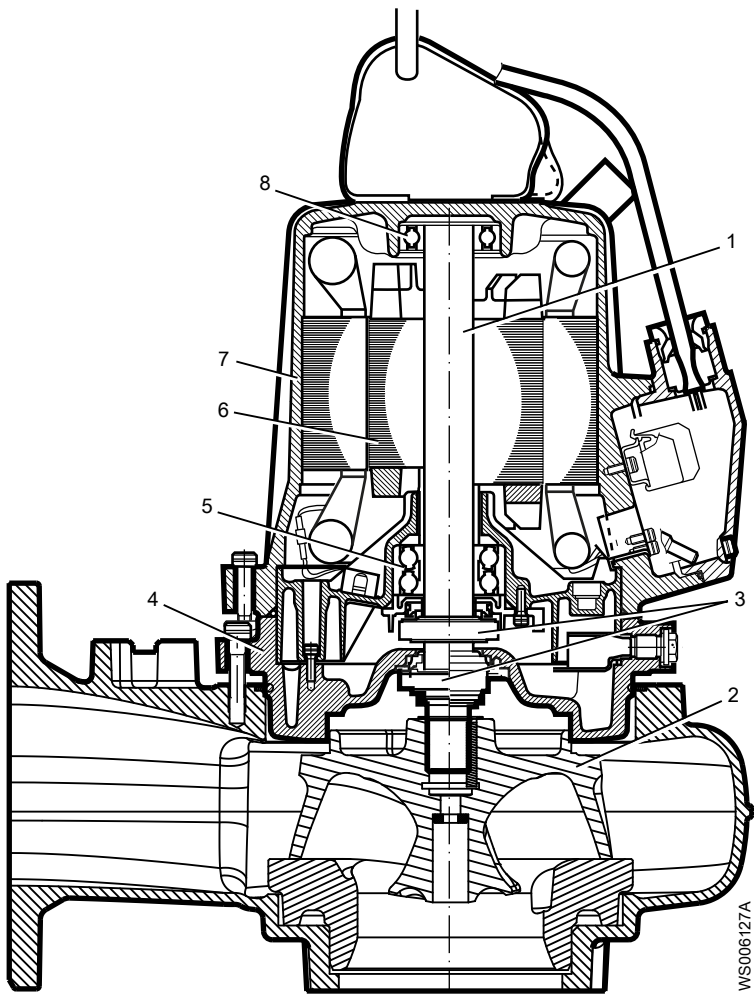
### Pressure class

LT	Low head
MT	Medium head
HT	High head
SH	Super high head

### Exterior™ product concept

Exterior™ is a product concept including N-technology, Premium efficiency motor, and the intelligent control SmartRun™.

Parts



Position	Denomination	Description
1	Shaft	The shaft is made of stainless steel, with an integrated rotor.
2	Impeller	There are multiple types of impellers. For information about the pumps impellers, see Parts List.
3	Mechanical seals	One inner and one outer seal in a combination of materials: <ul style="list-style-type: none"><li>• Aluminium oxide <math>Al_2O_3</math></li><li>• Corrosion-resistant cemented carbide WCCR</li></ul> For information about the pumps mechanical seals, see Parts List.
4	Oil housing	The oil housing includes a coolant that lubricates and cools the seals; the housing acts as a buffer between the pumped fluid and the drive unit.
5	Main bearing	The bearing consisting of a two-row angular contact ball bearing.
6	Motor	For information about the motor, see <a href="#">Technical Reference</a> on page 77.
7	Stator housing	The pump is cooled by the ambient liquid/air.
8	Support bearing	The bearing consisting of a single-row ball bearing.

3.2 Monitoring equipment

The following applies to the monitoring equipment of the pump:

- The stator incorporates three thermal contacts connected in series that activate the alarm and stops the pump at overtemperature
- The thermal contacts open at 125°C (257°F).
- Ex-approved pumps must have thermal contacts connected to the control panel.

- The sensors must be connected to either the MiniCAS II monitoring equipment or an equivalent equipment.
- The monitoring equipment must be of a design that makes automatic restart impossible.
- Information in the junction box shows if the pump is equipped with optional sensors.

### Optional sensors

**FLS** FLS is a miniature float switch for detection of liquid in the stator housing. Due to its design it is best suited for pumps in a vertical position. The FLS sensor is installed in the bottom of the stator housing.

**CLS** CLS is a sensor for detection of water in the oil housing. The sensor initiates an alarm when the oil contains approximately 35% water. The sensor is installed in the bearing housing/bearing holder with its sensing part in the oil housing. The CLS sensor is not applicable to Ex-approved pumps.

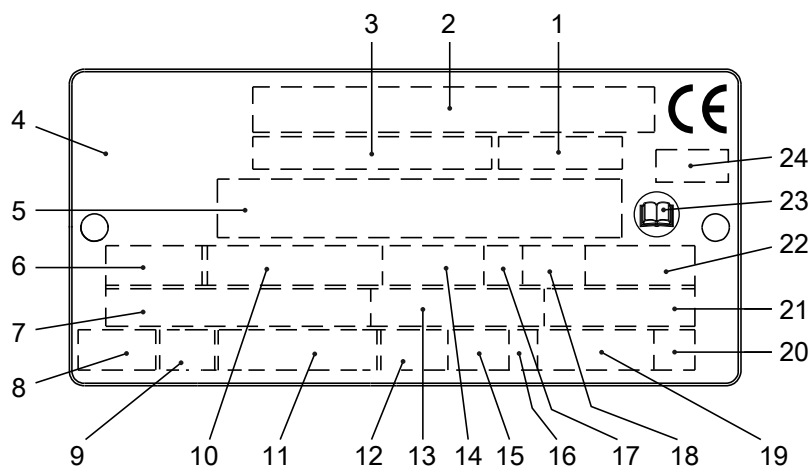
#### NOTICE:

The CLS sensor body is made of glass. Handle the sensor with care.

One CLS and one FLS sensor can be used in the same pump, if they are connected in parallel.

## 3.3 The data plate

The data plate is a metal label that is located on the main body of the products. The data plate lists key product specifications. Specially approved products also have an approval plate.



1. Curve code or Propeller code
2. Serial number
3. Product number
4. Country of origin
5. Additional information
6. Phase; type of current; frequency
7. Rated voltage
8. Thermal protection
9. Thermal class
10. Rated shaft power
11. International standard
12. Degree of protection
13. Rated current
14. Rated speed
15. Maximum submergence
16. Direction of rotation: L=left, R=right
17. Duty class
18. Duty factor
19. Product weight
20. Locked rotor code letter
21. Power factor
22. Maximum ambient temperature

WS006257A





- 23. Read installation manual
- 24. Notified body, only for EN-approved Ex products

Figure 1: The data plate

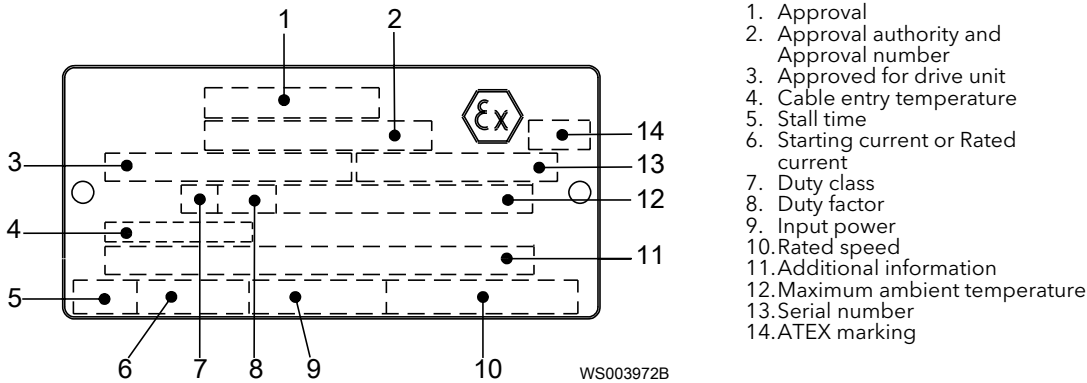
### 3.4 Approvals

Product approvals for hazardous locations

Pump	Approval
<ul style="list-style-type: none"><li>• 3127.070</li><li>• 3127.091</li><li>• 3127.095</li><li>• 3127.191</li><li>• 3127.390</li><li>• 3127.771</li><li>• 3127.810</li><li>• 3127.830</li><li>• 3127.850</li><li>• 3127.890</li><li>• 3127.911</li><li>• 3127.930</li><li>• 3127.971</li></ul>	European Norm (EN) <ul style="list-style-type: none"><li>• ATEX Directive</li><li>• EN 60079-0:2012/A11:2013, EN 60079-1:2007, EN 13463-1:2009, EN 13463-5:2011</li><li>•  I M2 c Ex d I Mb</li><li>•  II 2 G c Ex d IIB T4 Gb</li></ul>
	IEC <ul style="list-style-type: none"><li>• IECEx scheme</li><li>• IEC 60079-0, IEC 60079-1</li><li>• Ex d I Mb</li><li>• Ex d IIB T4 Gb</li></ul>
	FM (FM Approvals) <ul style="list-style-type: none"><li>• Explosion proof for use in Class I, Div. 1, Group C and D</li><li>• Dust ignition proof for use in Class II, Div. 1, Group E, F and G</li><li>• Suitable for use in Class III, Div. 1, Hazardous Locations</li></ul>
	CSA Ex <ul style="list-style-type: none"><li>• Explosion proof for use in Class I, Div. 1, Group C and D</li></ul>

#### EN approval plate

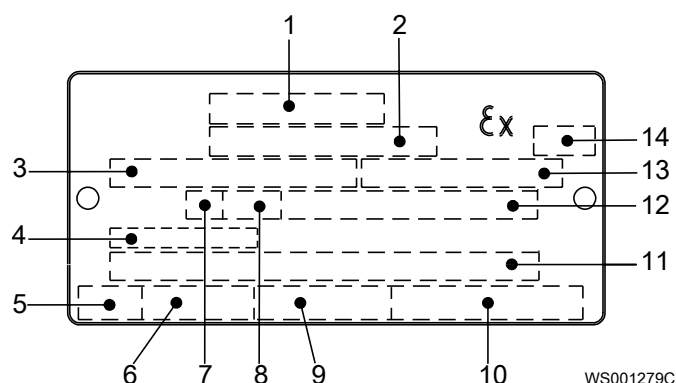
This illustration describes the EN approval plate and the information that is contained in its fields.



#### IEC approval plate

This illustration describes the IEC approval plate and the information that is contained in its fields.

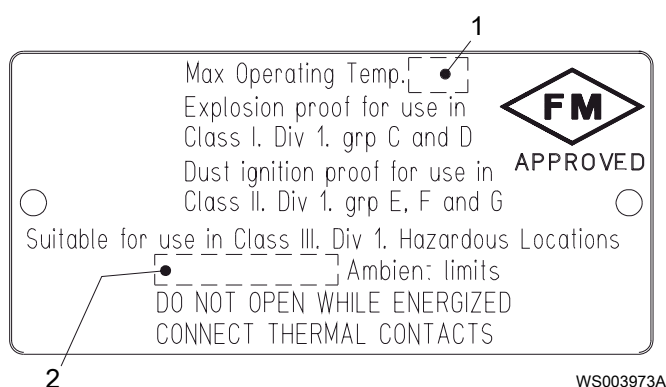
International Norm; not for EU member countries.



1. Approval
2. Approval authority and Approval number
3. Approved for drive unit
4. Cable entry temperature
5. Stall time
6. Starting current or Rated current
7. Duty class
8. Duty factor
9. Input power
10. Rated speed
11. Additional information
12. Maximum ambient temperature
13. Serial number
14. ATEX marking

### FM approval plate

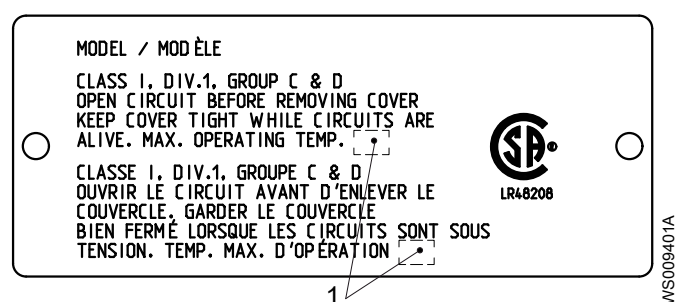
This illustration describes the FM approval plate and the information that is contained in its fields.



1. Temperature class
2. Maximum ambient temperature

### CSA approval plate

This illustration describes the CSA approval plate and the information that is contained in its fields.



1. Temperature class

## 3.5 Product denomination

### Reading instruction

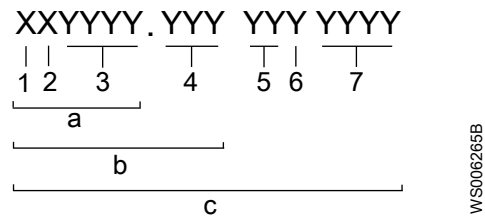
In this section, code characters are illustrated accordingly:

X = letter

Y = digit

The different types of codes are marked up with a, b and c. Code parameters are marked up with numbers.

Codes and parameters



Type of Callout	Number	Indication
Type of code	a	Sales denomination
	b	Product code
	c	Serial number
Parameter	1	Hydraulic end
	2	Type of installation
	3	Sales code
	4	Version
	5	Production year
	6	Production cycle
	7	Running number

# 4 Installation

## 4.1 Install the pump

Before starting work, make sure that the safety instructions in the chapter [Introduction and Safety](#) on page 3 have been read and understood.



### DANGER: Electrical Hazard

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.



### DANGER: Inhalation Hazard

Before entering the work area, make sure that the atmosphere contains sufficient oxygen and no toxic gases.



### WARNING: Electrical Hazard

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

### Hazardous atmospheres



### DANGER: Explosion/Fire Hazard

Special rules apply to installations in explosive or flammable atmospheres. Do not install the product or any auxiliary equipment in an explosive zone unless it is rated explosion-proof or intrinsically-safe. If the product is EN/ATEX-, MSHA- or FM-approved, then see the specific EX information in the Safety chapter before taking any further actions.



### WARNING: Explosion/Fire Hazard

Do not install CSA-approved products in locations that are classified as hazardous in the National Electric Code(TM), ANSI/NFPA 70-2005.

### General requirements

These requirements apply:

- Use the pump dimensional drawing in order to ensure proper installation.

Before installing the pump, do the following:

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that equipment is in place so that the unit cannot roll or fall over during the installation process.
- Check the explosion risk before you weld or use electric hand tools.
- Check that the cable and cable entry have not been damaged during transport.

- Always remove all debris and waste material from the sump, inlet piping, and discharge connection, before you install the pump.
- If the unit has a permanent magnet motor, then ensure that you have read and understood all safety instructions regarding permanent magnet motors.

**NOTICE:**

Do not run the pump dry.

**NOTICE:**

Never force piping to make a connection with a pump.

**Authority regulation**

Vent the tank of a sewage station in accordance with local plumbing codes.

**Fasteners**

- Only use fasteners of the correct size and material.
- Replace all corroded or damaged fasteners.
- Make sure that all the fasteners are correctly tightened and that there are no missing fasteners.

**4.1.1 Install with P-installation**

In the P-installation, the pump is installed on a stationary discharge connection, and operates either completely or partially submerged in the pumped liquid. These requirements and instructions only apply when the installation is made according to the dimensional drawing.

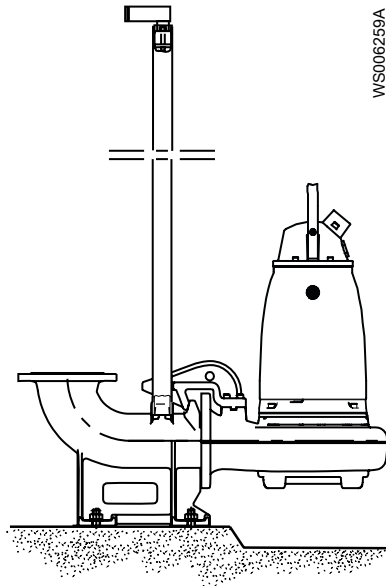


Figure 2: P-installation

These items are required:

- Guide bars
  - Guide bar bracket for attaching the guide equipment to the access frame or to the upper part of the sump
  - Cable holder for holding the cable
  - Access frame (with covers) to which the upper guide bar bracket and cable holder can be attached
  - Discharge connection for connecting the pump to the discharge line
- The discharge connection has a flange which fits the pump housing flange and a bracket for attaching the guide equipment.

- Fasteners for the discharge connection
  - Anchor bolts
1. Install the access frame:
    - a) Place the access frame in position and align it horizontally.
    - b) Grout the frame in place.
  2. Grout the anchor bolts in place.  
Be careful when you align and position the discharge connection in relation to the access frame.
  3. Place the discharge connection in position, and tighten the nuts.
  4. Install the guide bars:
    - a) Secure the guide bars in the bracket.
    - b) Check that the guide bars are placed vertically. Use a level or a plumb line.
  5. Connect the discharge pipe to the discharge connection.
  6. Lower the pump along the guide bars.  
When it reaches the bottom position, the pump automatically connects to the discharge connection.
  7. Secure the motor cable:
    - a) Fasten the permanent lifting device to the pump and to the access frame. For example, you can use a stainless-steel lifting chain with shackles.
    - b) Fasten the cable to the cable holder.  
Make sure that the cable cannot be sucked into the pump inlet or that it is neither sharply bent, or pinched. Support straps are required for deep installations.
    - c) Connect the motor cable and the starter and monitoring equipment according to the separate instructions.  
Make sure that the impeller rotation is correct. For more information, see [Check the impeller rotation](#) on page 37.

Clean all debris from the sump before starting the pump.

#### 4.1.2 Install with S-installation

In the S-installation, the pump is transportable and intended to operate either completely or partially submerged in the pumped liquid. The pump is equipped with a connection for hose or pipe and stands on a base stand.

These requirements and instructions only apply when the installation is made according to the dimensional drawing. For information about the different installation types, see Parts List.

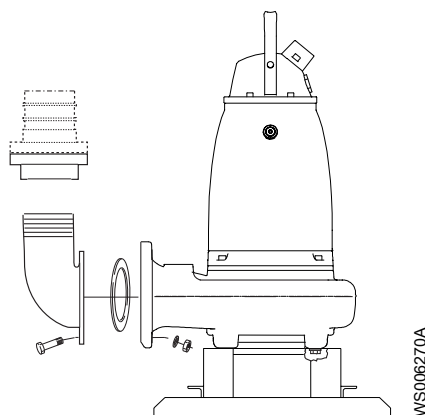


Figure 3: S-installation

1. Run the cable so that it has no sharp bends. Make sure that it is not pinched, and cannot be sucked into the pump inlet.
2. Connect the discharge line.
3. Lower the pump into the sump.
4. Place the pump on the base and make sure it cannot fall over or sink.  
Alternatively, the pump can be suspended with a lifting chain just above the sump bottom. Make sure that the pump cannot rotate at start-up or during operation.
5. Connect the motor cable and the starter and monitoring equipment according to the separate instructions.

Make sure that the impeller rotation is correct. For more information, see [Check the impeller rotation](#) on page 37.

### 4.1.3 Install with T/Z-installation

This installation is not applicable for these versions:

- .170
- .890

In the T-installation, the pump is installed in a vertical position in a dry well next to the wet sump. These requirements and instructions only apply when the installation is made according to the dimensional drawing.

In the Z-installation, the pump is installed in a horizontal position on a support stand in a dry well next to the wet sump. The following requirements and instructions are for Z-installations that comply to the dimensional drawing.

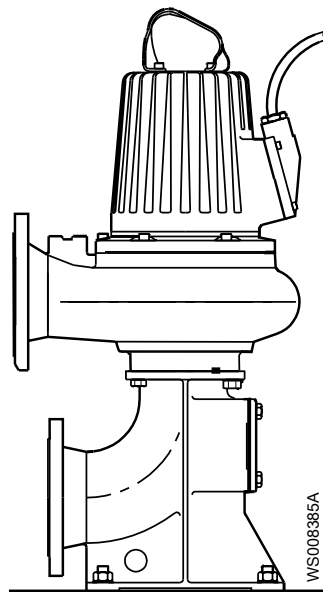


Figure 4: T-installation

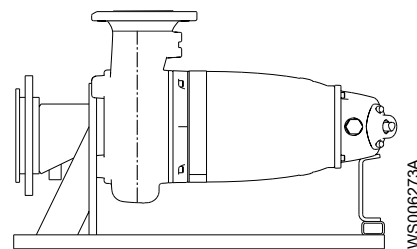
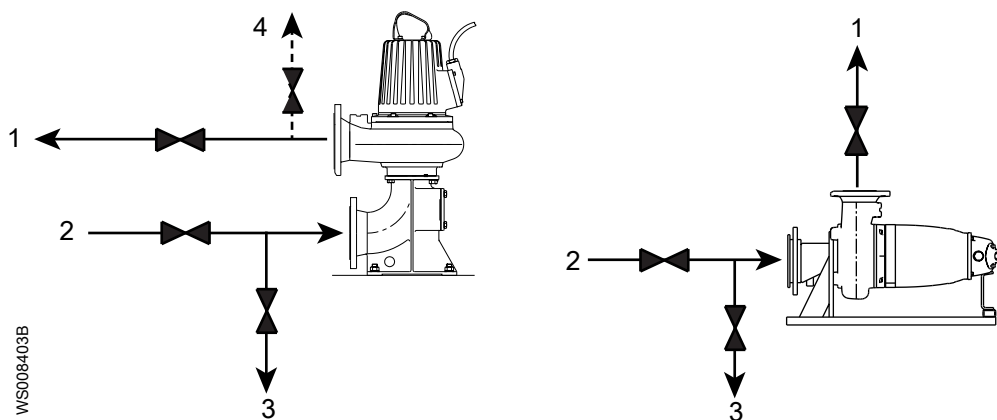


Figure 5: Z-installation

These items are required:

- Anchor bolts for anchoring the pump to a base.
- Shut-off valves that allow you to remove the pump from service



1. Outlet line
2. Inlet line
3. Line to drain
4. Air vent

Figure 6: T-, Z-installation shutoff and air vent valves (generic pumps shown)

#### NOTICE:

The risk of freezing is particularly high in T- or Z-installations.

1. Fasten the pump:
  - a) Bolt the stationary suction connection to the concrete base.
  - b) Bolt the pump to the suction connection.
2. Make sure that the pump is vertical for the T-installation or horizontal for the Z-installation.
3. Connect the suction line and discharge line.
4. Connect the motor cable and the starter and monitoring equipment according to the separate instructions.

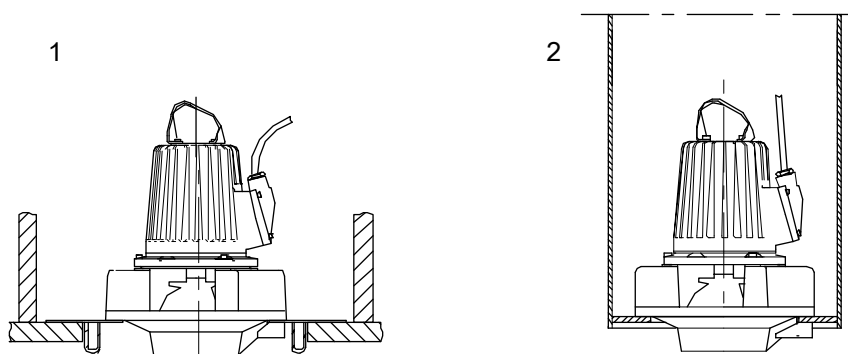
Make sure that the impeller rotation is correct. For more information, see [Check the impeller rotation](#) on page 37.

5. Make sure that the weight of the pump does not put strain on the piping.

#### 4.1.4 Install with L-installation

In the L-installation, the pump is installed in a vertical, semipermanent, wet well column pipe arrangement. The well is divided into a suction part and a discharge part. The pump end is equipped with guide vanes.

These requirements and instructions only apply when the installation is made according to the dimensional drawing.



1. Concrete installation
2. Column installation

Figure 7: L-installation alternatives



These items are required:

- Plate 416 13 0x or column pipe 416 12 xx for L-installation
- Anchor bolts for L-installation
- Cable holder

1. Select one of the following steps:

Type of installation	Action
Concrete installation	<ol style="list-style-type: none"> <li>1. Place the plate for L-installation in position and align it horizontally.</li> <li>2. Grout the anchor bolts in place.</li> <li>3. Protect the bolts with corrosion-protective compound.</li> </ol>
Column installation	<ol style="list-style-type: none"> <li>1. Cast the column pipe in concrete or install the pre-fabricated column.</li> <li>2. Place the column in position and align it horizontally.</li> <li>3. Grout the anchor bolts in place at the top flange of the column pipe.</li> <li>4. Protect the bolts with corrosion-protective compound.</li> </ol>

2. Run a cable between the pump and the starter and monitoring equipment.

Make sure that the cable is not sharply bent or pinched.

3. Connect the motor cable and the starter and monitoring equipment according to the separate instructions.

Make sure that the impeller rotation is correct. For more information, see [Check the impeller rotation](#) on page 37.

4. Install the pump.

a) Fasten the lifting device to the pump.

Use a stainless steel lifting chain with shackles.

b) Lower the pump into the correct position according to the dimensional drawing.

Make sure that the pump cannot rotate at start-up or during operation.

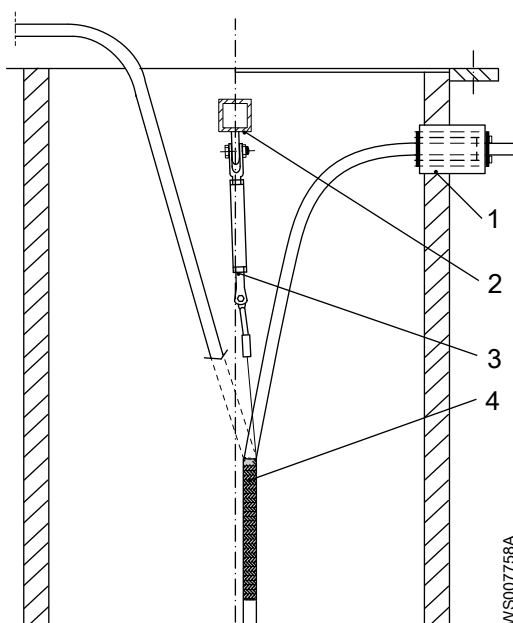
5. Secure the motor cable:

a) Install the cable support grip and the turnbuckle.

Use a support that is positioned over the center of the column.

Make sure that the cable is kept taut in the center of the column pipe and that it is not sharply bent or pinched.

b) If the discharge column is pressurized, then install a cable entry seal unit in the side of the column.



1. Cable entry seal unit
2. Support

3. Turnbuckle
4. Cable support grip

Make sure that the impeller rotation is correct. For more information, see .

Clean all debris from the column pipe before starting the pump.

#### 4.1.5 Install with X-installation

In the X-installation, the pump has no pre-determined mechanical connection. The flange is drilled.

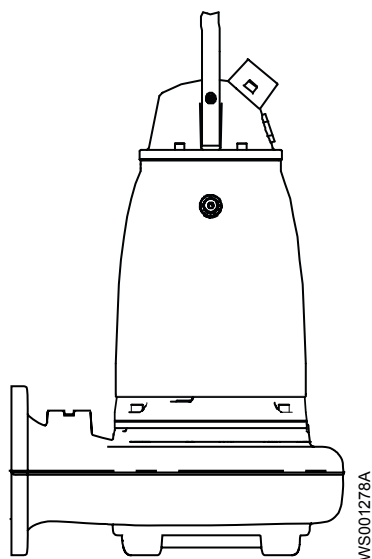


Figure 8: X-installation

#### NOTICE:

A pump prepared for X-installation is only approved to be used in P- or S-installation. Never use it in T- or Z-installation

For installation instructions, see appropriate mechanical accessories.

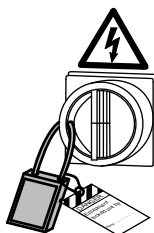
## 4.2 Make the electrical connections

### General precautions



#### DANGER: Electrical Hazard

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.



#### WARNING: Electrical Hazard

Risk of electrical shock or burn. A certified electrician must supervise all electrical work. Comply with all local codes and regulations.

**WARNING: Electrical Hazard**

There is a risk of electrical shock or explosion if the electrical connections are not correctly carried out, or if there is fault or damage on the product. Visually inspect equipment for damaged cables, cracked casings or other signs of damage. Make sure that electrical connections have been correctly made.

**WARNING: Electrical Hazard**

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

**WARNING: Crush Hazard**

Risk of automatic restart.

**CAUTION: Electrical Hazard**

Prevent cables from becoming sharply bent or damaged.

**NOTICE:**

Leakage into the electrical parts can cause damaged equipment or a blown fuse. Keep the cable ends dry at all times.

**Requirements**

These general requirements apply for electrical installation:

- The supply authority must be notified before installing the pump if it will be connected to the public mains. When the pump is connected to the public power supply, it may cause flickering of incandescent lamps when started.
- The mains voltage and frequency must agree with the specifications on the data plate. If the pump can be connected to different voltages, then the connected voltage is specified by a yellow sticker close to the cable entry.
- The fuses and circuit breakers must have the proper rating, and the pump overload protection (motor protection breaker) must be connected and set to the rated current according to the data plate and if applicable the cable chart. The starting current in direct-on-line start can be up to six times higher than the rated current.
- The fuse rating and the cables must be in accordance with the local rules and regulations.
- If intermittent operation is prescribed, then the pump must be provided with monitoring equipment supporting such operation.
- If stated on the data plate, then the motor is convertible between different voltages.
- The thermal contacts/thermistors must be in use.
- For FM-approved pumps, a leakage sensor must be connected and in use in order to meet approval requirements.

**Cables**

These are the requirements to follow when you install cables:

- The cables must be in good condition, not have any sharp bends, and not be pinched.
- The cables must not be damaged and must not have indentations or be embossed (with markings, etc.) at the cable entry.
- The cable entry seal sleeve and washers must conform to the outside diameter of the cable.
- The minimum bending radius must not be below the accepted value.

- If using a cable which has been used before, a short piece must be peeled off when refitting it so that the cable entry seal sleeve does not close around the cable at the same point again. If the outer sheath of the cable is damaged, then replace the cable. Contact a sales or authorized service representative.
- The voltage drop in long cables must be taken into account. The drive unit's rated voltage is the voltage measured at the cable connection point in the pump.
- The screened cable must be used according to the European CE and EMC requirements if a Variable Frequency Drive (VFD) is used. For more information, contact a sales or authorized service representative (VFD-supplier).
- Make sure that the cable is long enough for maintenance work.
- For SUBCAB® cables, the twisted pair copper foil must be trimmed.
- All unused conductors must be insulated.

### Grounding (earthing)

Grounding (earthing) must be done in compliance with all local codes and regulations.



#### DANGER: Electrical Hazard

All electrical equipment must be grounded (earthed). Test the ground (earth) lead to verify that it is connected correctly and that the path to ground is continuous.



#### WARNING: Electrical Hazard

If the power cable is jerked loose, then the ground (earth) conductor must be the last conductor to come loose from its terminal. Make sure that the ground (earth) conductor is longer than the phase conductors at both ends of the cable.

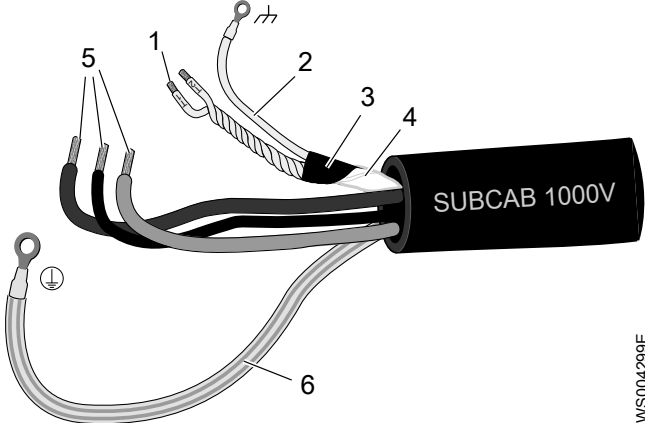
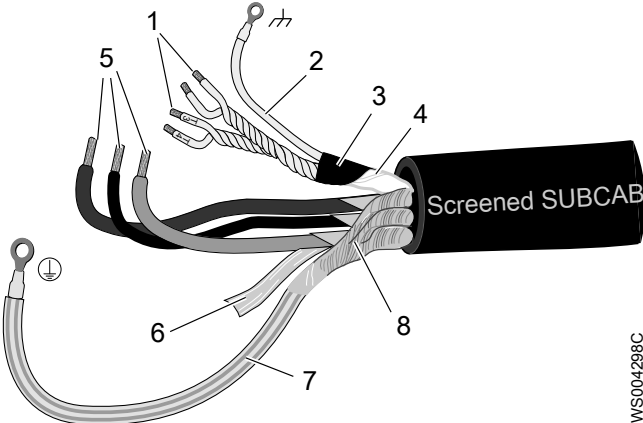


#### WARNING: Electrical Hazard

Risk of electrical shock or burn. You must connect an additional ground- (earth-) fault protection device to the grounded (earthed) connectors if persons are likely to come into contact with liquids that are also in contact with the pump or pumped liquid.

### 4.2.1 Prepare the SUBCAB® cables

This section applies to SUBCAB® cables with twisted-pair control cores.

The prepared SUBCAB® cable	The prepared screened SUBCAB® cable
 <ol style="list-style-type: none"> <li>1. T1+T2 twisted pairs in control element</li> <li>2. Drain wire in control element (bare copper wire)</li> <li>3. Screened copper pt-foil</li> <li>4. Insulation sheath (jacket) or PT-foil for control element</li> <li>5. Power cores</li> <li>6. Ground (earth) core</li> </ol>	 <ol style="list-style-type: none"> <li>1. T1+T2 and T3+T4 twisted pairs in control element</li> <li>2. Drain wire in control element (bare copper wire)</li> <li>3. Screened copper pt-foil</li> <li>4. Insulation sheath (jacket) for control element</li> <li>5. Power cores</li> <li>6. Aluminum foil</li> <li>7. Ground (earth) core with green/yellow shrink hose</li> <li>8. Uncovered screen/braided wire</li> </ol>

1. Peel off the outer sheath at the end of the cable.
2. Prepare the control element:
  - a) Peel the sheath (if applicable) and the copper foil.  
The copper foil is a screen and is conductive. Do not peel more than necessary, and remove the peeled foil.

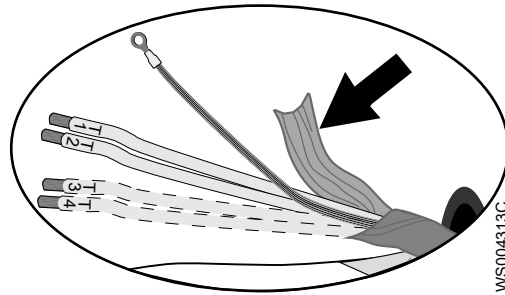


Figure 9: Copper foil on control element.

- b) Put a white shrink hose over the drain wire and the cable terminal.
  - c) Fit a cable lug on the drain wire.
  - d) Twist T1+T2 and T3+T4.
  - e) Put a shrink hose over the control element.  
Make sure that the conductive copper foil and drain wire is covered.
3. Prepare the ground (earth) core for SUBCAB™ cable:
  - a) Peel the yellow-green insulation from the ground (earth) core.
  - b) Check that the ground (earth) core is at least 10% longer than the phase cores in the cabinet.
  - c) If applicable, put a cable lug on the ground core.
4. Prepare the ground (earth) core for screened SUBCAB™ cable:
  - a) Untwist the screens around the power cores.
  - b) Put a yellow-green shrink hose over the ground (earth) core.  
Leave a short piece uncovered.
  - c) If applicable, put a cable lug on the screened ground core.
  - d) Twist all power core screens together to create a ground (earth) core and fit a cable terminal to the end.
  - e) Check that the ground (earth) core is at least 10% longer than the phase cores in the cabinet.
5. Connect to ground (earth):
  - Screw: Fit cable terminals to the ground (earth) core and the power cores.
  - Terminal block: Leave the core ends as they are.
6. Prepare the main leads:
  - a) Remove the aluminum foil around each power core.
  - b) Peel the insulation from each power core.

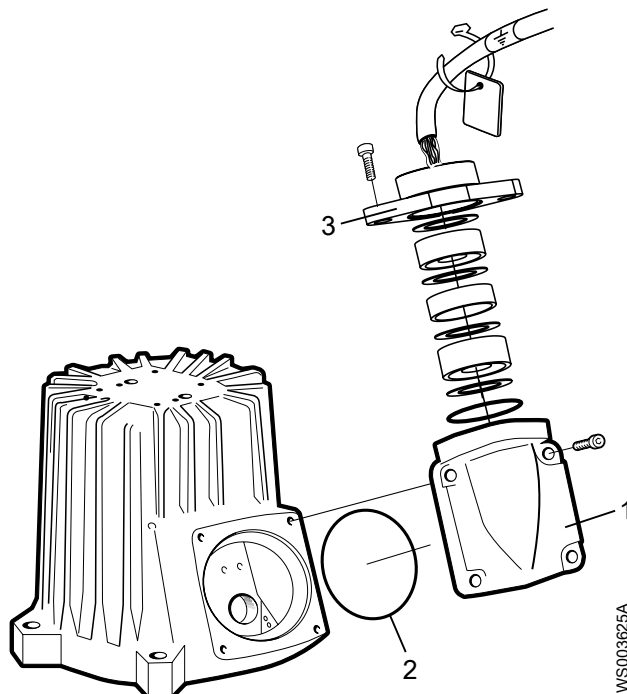
#### 4.2.2 Connect the motor cable to the pump

---

##### NOTICE:

Leakage into the electrical parts can cause damaged equipment or a blown fuse. Keep the end of the motor cable dry at all times.

---



1. Entrance cover
2. O-ring
3. Entrance flange

1. Remove the entrance cover and the O-ring from the stator housing.  
This provide access to the terminal board/closed end splices.
2. Check the data plate to see which connections are required for the power supply.
3. Arrange the connections on the terminal board/closed end splices in accordance with the required power supply.
4. Connect the mains leads (L1, L2, L3, and ground (earth) ) according to applicable cable chart.  
The ground (earth) lead must be 50 mm (2.0 in.) longer than the phase leads in the junction box of the unit.
5. Make sure that the pump is correctly connected to ground (earth).
6. Make sure that any thermal contacts incorporated in the pump are properly connected to the terminal block/closed end splices.
7. Install the entrance cover and the O-ring on the stator housing.
8. Fasten the screws on the entrance flange so that the cable insertion assembly bottoms out.

#### 4.2.3 Connect the motor cable to the starter and monitoring equipment



##### **DANGER: Explosion/Fire Hazard**

Special rules apply to installations in explosive or flammable atmospheres. Do not install the product or any auxiliary equipment in an explosive zone unless it is rated explosion-proof or intrinsically-safe. If the product is EN/ATEX-, MSHA- or FM-approved, then see the specific EX information in the Safety chapter before taking any further actions.

##### **NOTICE:**

Thermal contacts are incorporated in the pump.

**NOTICE:**

Thermal contacts must never be exposed to voltages higher than 250 V, breaking current maximum 5 A. It is recommended that they are connected to 24 V over separate fuses to protect other automatic equipment.

The single phase pumps must be equipped with a starter which has start and run capacitors.

A specially Flygt designed starter is required for the operation of single phase pumps. The connection of the motor cable to the starter is shown in the wiring diagram.

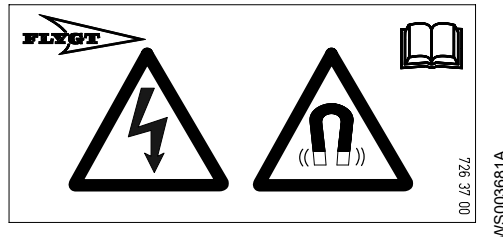
1. If thermal contacts are included in the pump installation, then connect the T1 and T2 control conductors to the monitoring equipment.

If the temperature of the pumped liquid is above 40°C (104°F), then do not connect the T1 and T2 leads to thermal contacts.

**NOTICE:**

The thermal contacts are incorporated in the stator. Connect them to 24 V over separate fuses to protect other automatic equipment.

2. Connect the mains leads (L1, L2, L3, and ground (earth)) to the starter equipment.  
For information about the phase sequence and the color codes of the leads, see Cable charts.
3. Applicable for permanent magnet motor; ensure that the warning label is attached to the cable end. In case the label is missing, attach the spare label to the cable end.  
The label is delivered with the pump.



4. Check the functionality of the monitoring equipment:
  - a) Check that the signals and the tripping function work properly.
  - b) Check that the relays, lamps, fuses, and connections are intact.
 Replace any defective equipment.

## 4.2.4 Cable charts

### Description

This topic contains general connection information. It also provides cable charts that show connection alternatives for use with different cables and power supply.

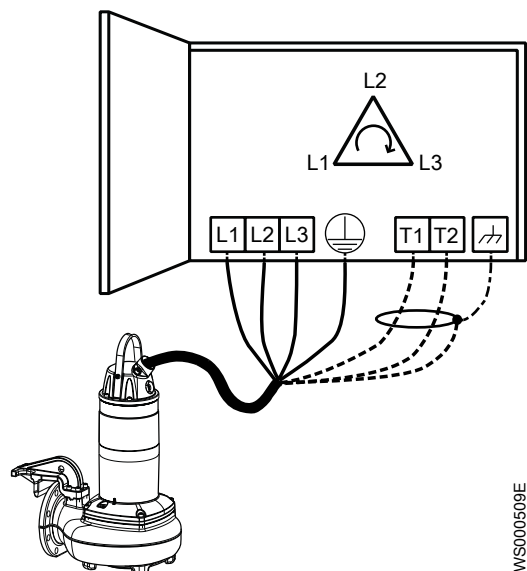
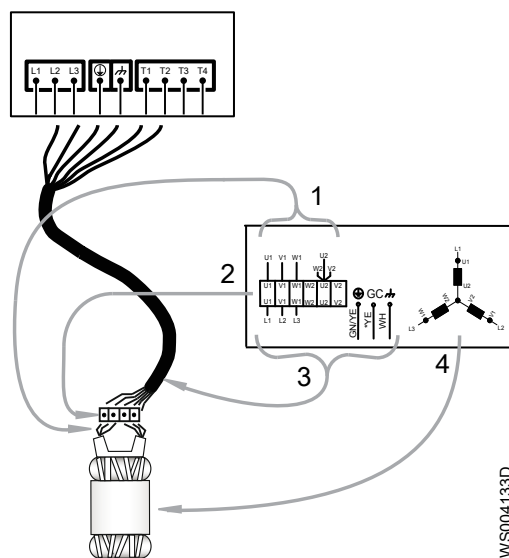


Figure 10: Phase sequence

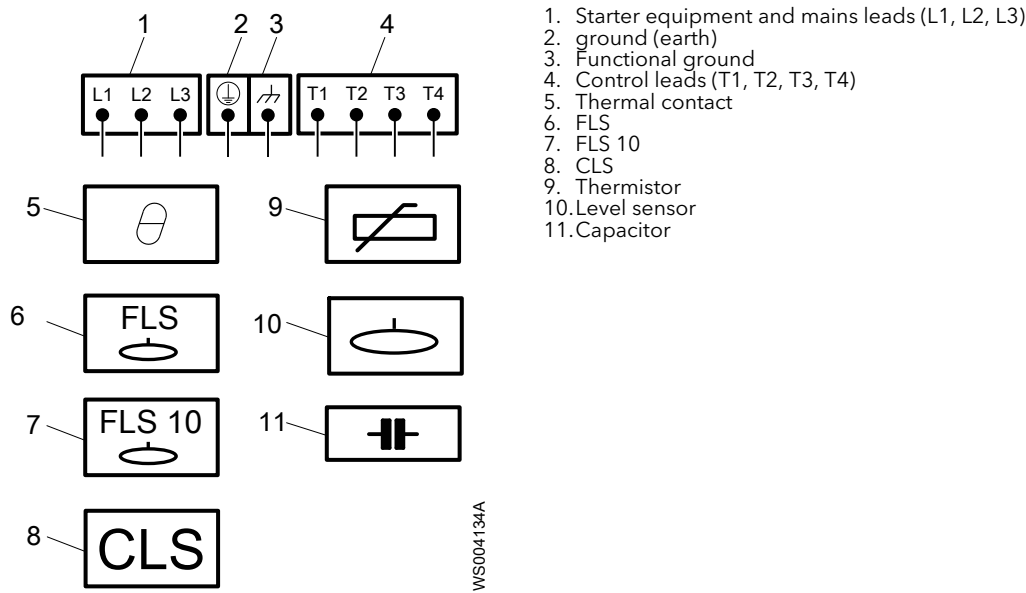
### Connection locations

The figures in this section illustrate how to interpret the connection strip symbols.



1. Stator leads
2. Terminal board
3. Power cable leads
4. Stator (internal connection illustrated)





Color code standard

Code	Description
BN	Brown
BK	Black
WH	White
OG	Orange
GN	Green
GNYE	Green-Yellow
RD	Red
GY	Grey
BU	Blue
YE	Yellow

4.2.4.1 Colors and markings of leads

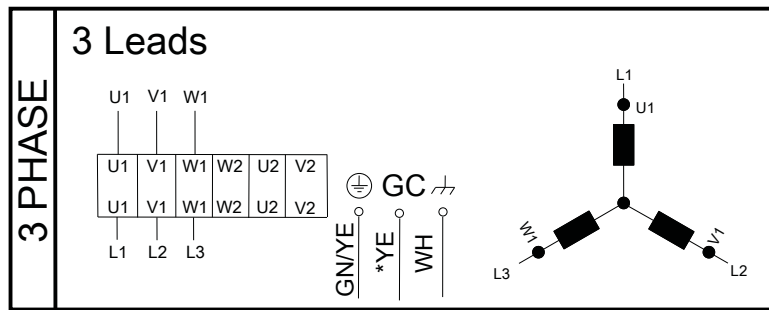
Motor connection		Mains		SUBCAB 7GX Screenflex 7GX	SUBCAB 4GX Screenflex 4GX	SUBCAB AWG	SUBCAB Screened
Colours and marking of main leads		1~	3~				
<div>COLOUR STANDARD</div> <div>BN=Brown BK=Black WH=White OG=Orange GN=Green GN/YE=Green-Yellow RD=Red GY=Grey BU=Blue YE=Yellow</div> <div>*SUBCAB AWG ** Ground Conductor is stranded around cores GC=Ground Check</div> <div>772 17 00 (REV 6)</div>	<div>STATOR LEADS</div> <div>U1,U5 RD U2,U6 GN V1,V5 BN V2,V6 BU W1,W5 YE W2,W6 BK T1,T2 WH/YE</div>	1	L1	BK 1	BN	RD	BN
		2	L2	BK 2	BK	BK	BK
		3	L3	BK 3	GY	WH	GY
			L1	BK 4	-	-	-
			L2	BK 5	-	-	-
			L3	BK 6	-	-	-
				GN/YE	GN/YE	GN/YE	**Screen/PE from cores
				Screen (WH)	Screen (WH)	-	Screen (WH)
		GC		-	-	YE	-

For markings on sensor leads, see [Sensors connection](#) on page 34.

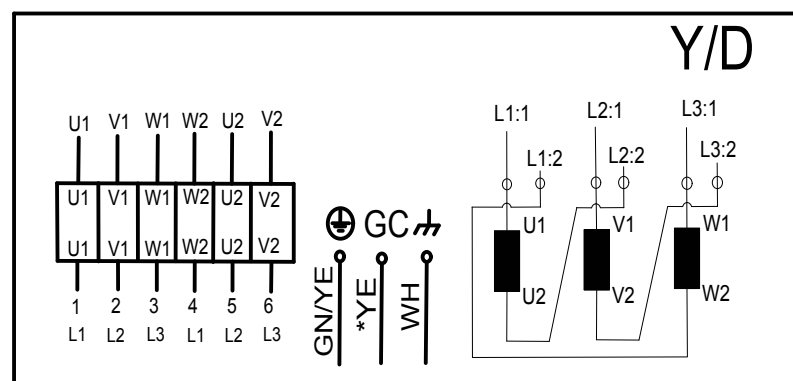
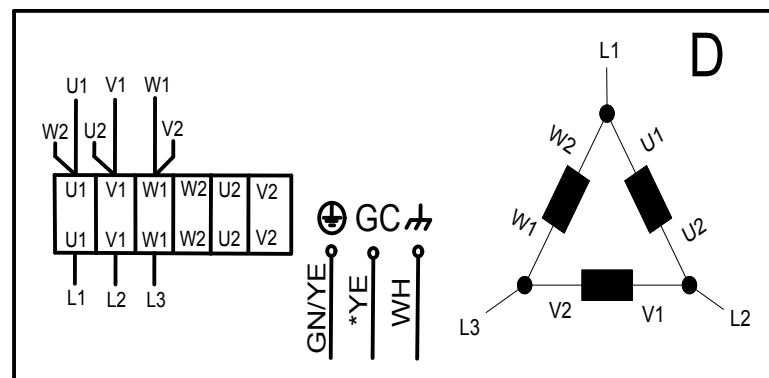
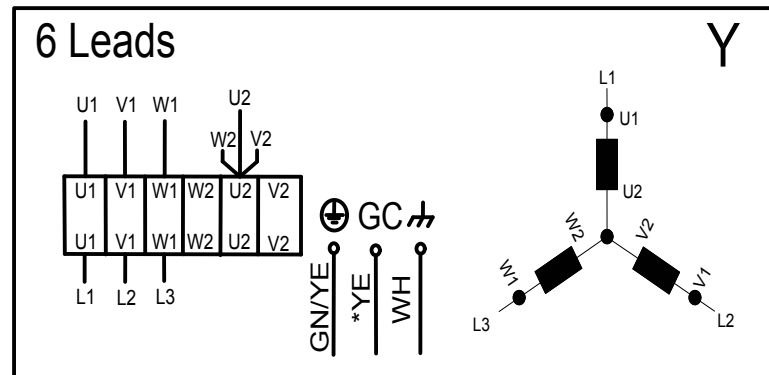
4.2.4.2 Connections included

- [3-phase connection](#) on page 31
- [1-phase connection](#) on page 33
- [Sensors connection](#) on page 34
- [Screened cable connection](#) on page 34

## 4.2.4.3 3-phase connection

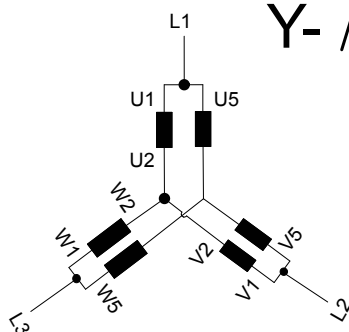
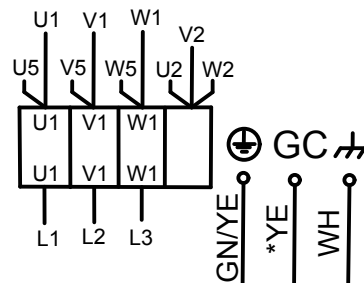


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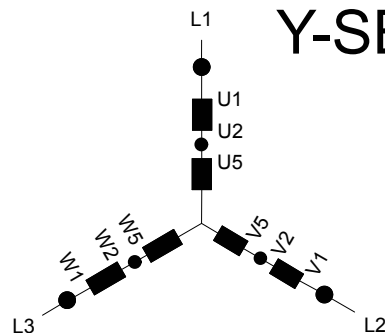
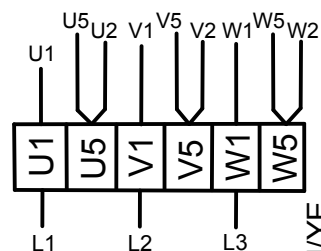
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## 9 Leads



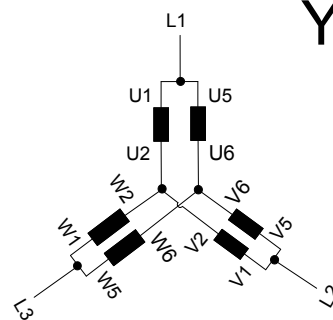
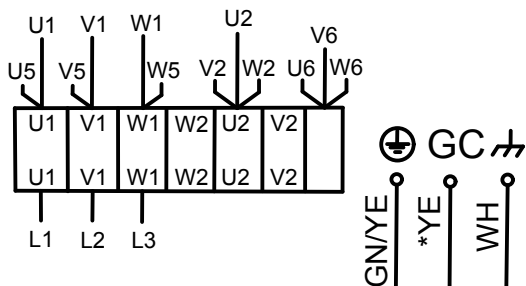
Y- //

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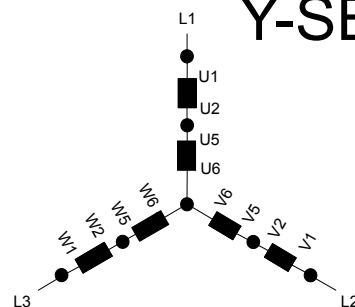
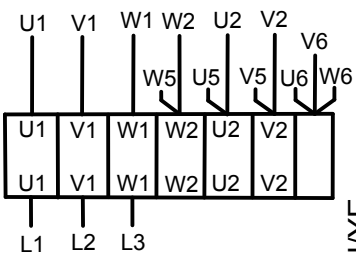


Y-SER

## 12 Leads



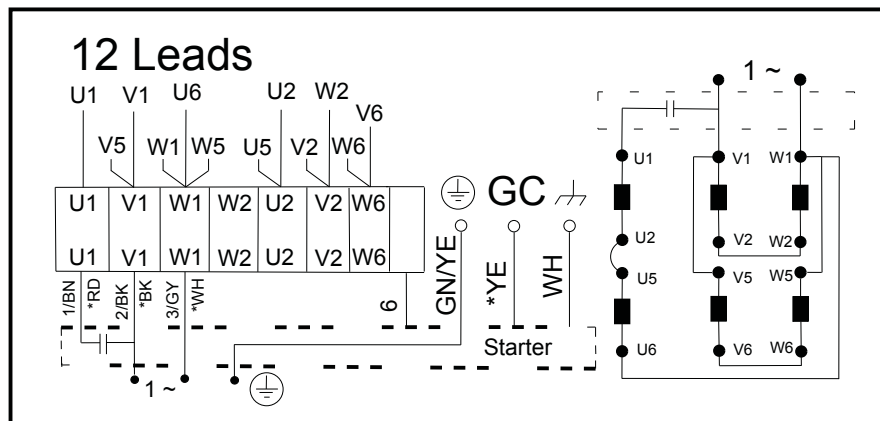
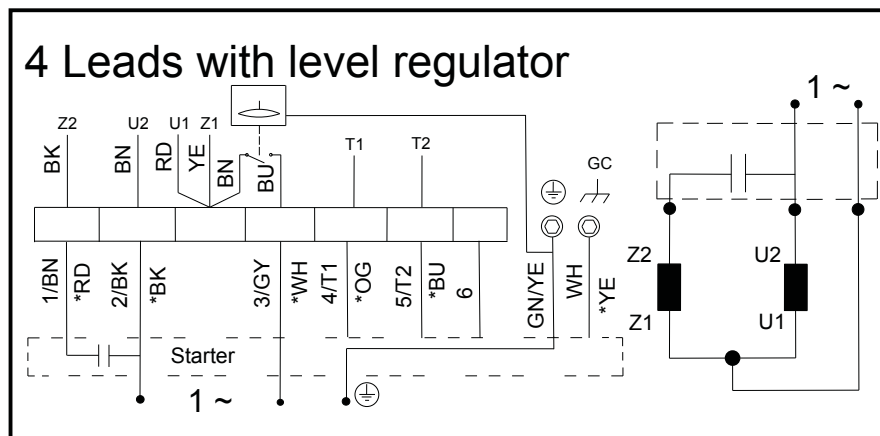
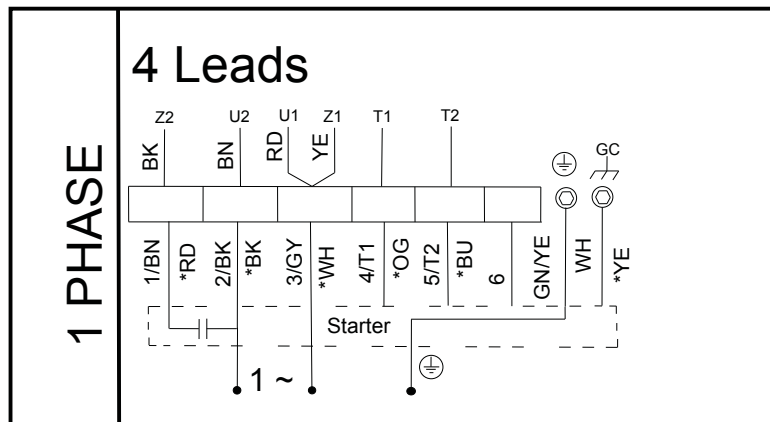
Y- //



Y-SER

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## 4.2.4.4 1-phase connection

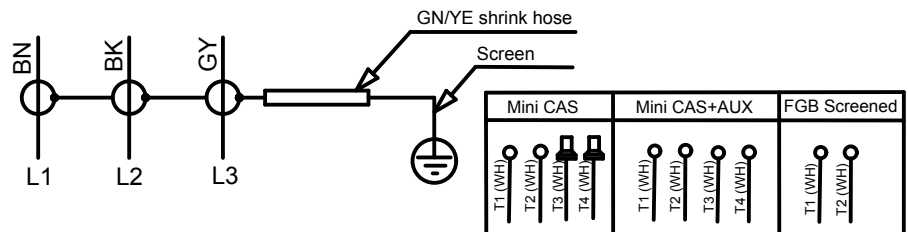


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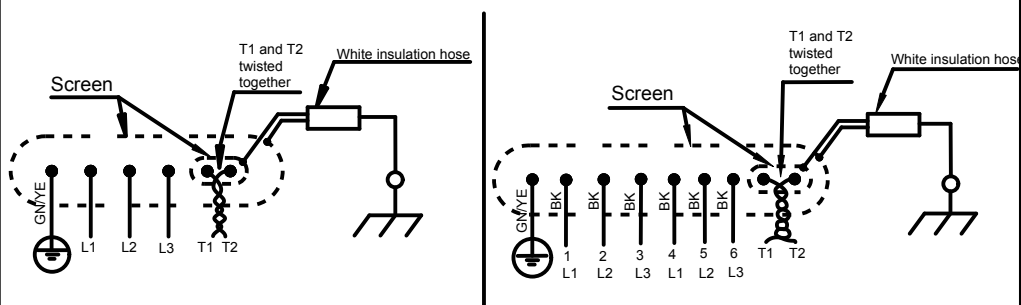
## 4.2.4.5 Screened cable connection

**Screened connection SUBCAB & FGB Screened**

Cable without sep. ground conductor  
Screen as ground conductor



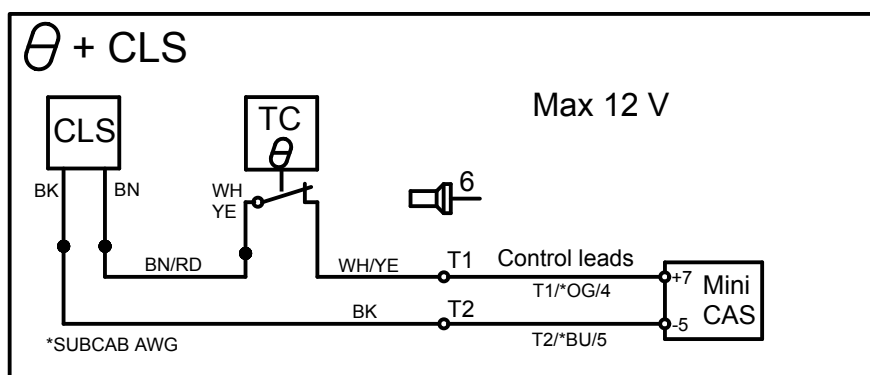
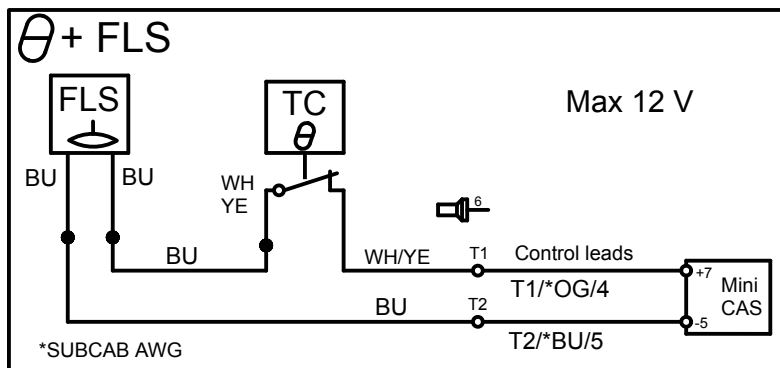
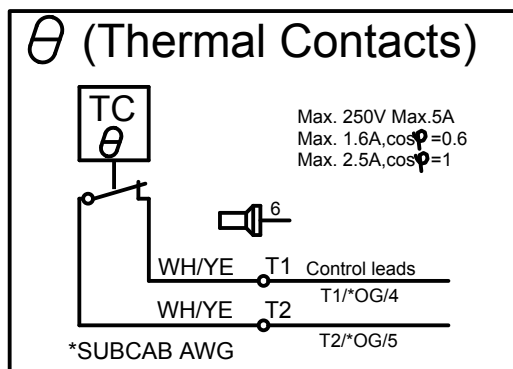
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**Screen - SUBCAB and Screenflex**

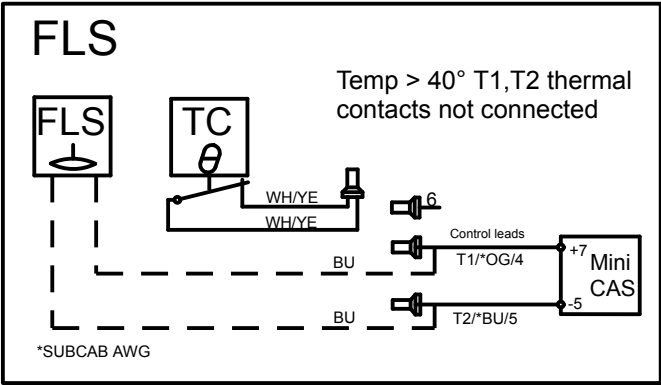
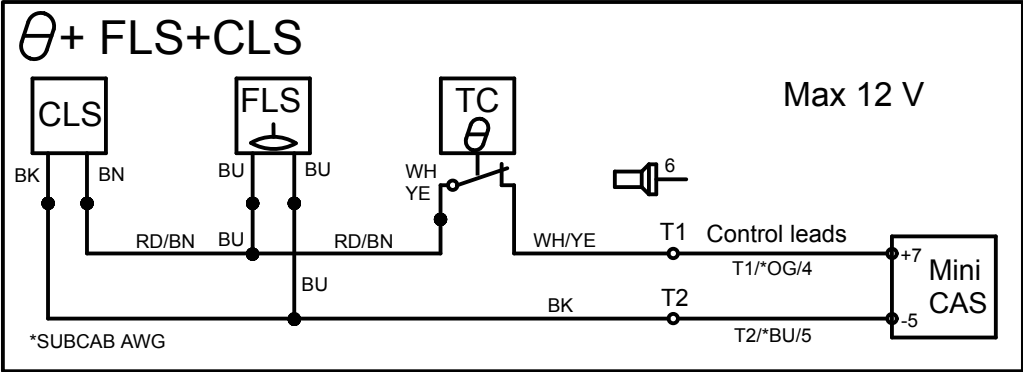
## 4.2.4.6 Sensors connection

Not all charts are applicable for every product.

SENSORS	Control	SUBCAB 7GX & 4GX Screenflex	SUBCAB AWG	SUBCAB screened
	T1	WH T1	OG	WH T1
	T2	WH T2	BU	WH T2
	T3	-	-	WH T3
	T4	-	-	WH T4



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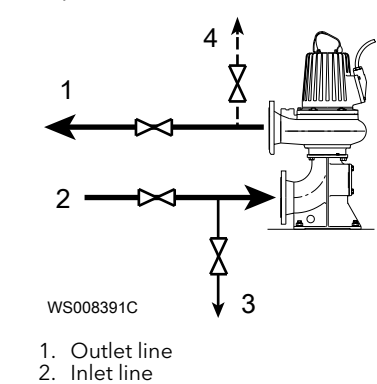
Sensor connection characteristics

The values have a 10 % tolerance.

Sensors	Value (mA)	Definition
FLS and thermal contact	0	Overtemperature
	7.8	OK
	36	Leakage
CLS and thermal contact	0	Overtemperature
	5.5	OK
	29	Leakage (5 seconds delay)
CLS, FLS and thermal contact	0	Overtemperature
	13.3	OK
	36-42	Leakage (0/5 seconds delay)

4.3 T-installation: Bleed air before starting pump

1. Open the valve on the air vent line and bleed out the air. See the following figure.



3. Line to drain
4. Air vent

Figure 11: T-installation

2. Close the valve on the air vent line before the pump is started.

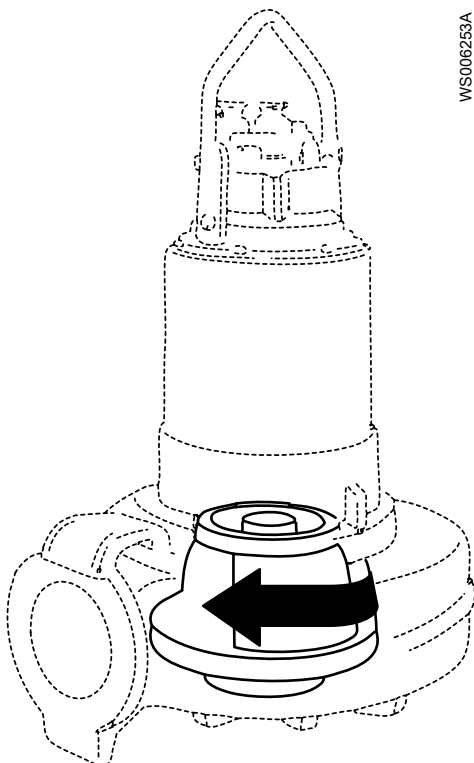
## 4.4 Check the impeller rotation



### CAUTION: Crush Hazard

The starting jerk can be powerful. Make sure nobody is close to the unit when it is started.

1. Start the motor.
2. Stop the motor after a few seconds.
3. Check that the impeller rotates according to this illustration.



The correct direction of impeller rotation is clockwise when you look at the pump from above.

4. If the impeller rotates in the wrong direction, then do one of these steps:
  - If the motor has a 1-phase connection, then contact a sales or authorized service representative.
  - If the motor has a 3-phase connection, then transpose two phase leads and do this procedure again.



# 5 Operation

## 5.1 Precautions

Before taking the unit into operation, check the following:

- All recommended safety devices are installed.
- The cable and cable entry have not been damaged.
- All debris and waste material has been removed.

---

### NOTICE:

Never operate the pump with the discharge line blocked, or the discharge valve closed.

---




---

### WARNING: Crush Hazard

Risk of automatic restart.

---

### Distance to wet areas




---

### WARNING: Electrical Hazard

Risk of electrical shock or burn. You must connect an additional ground- (earth-) fault protection device to the grounded (earthed) connectors if persons are likely to come into contact with liquids that are also in contact with the pump or pumped liquid.

---




---

### CAUTION: Electrical Hazard

Risk of electrical shock or burn. The equipment manufacturer has not evaluated this unit for use in swimming pools. If used in connection with swimming pools then special safety regulations apply.

---

### Noise level

---

### NOTICE:

The sound power level of the product is lower than 70 dB(A). However, in some installations the resulting sound pressure level may exceed 70 dB(A) at certain operating points on the performance curve. Make sure that you understand the noise level requirements in the environment where the product is installed. Failure to do so may result in hearing loss or violation of local laws.

---

## 5.2 Estimate zinc anode replacement intervals

The mass and surface area of the zinc anodes are designed to protect the pump surface for 1 year in sea water with an average temperature of 20°C (68°F). Shorter inspection intervals and anode replacement can be required, depending upon the water temperature and the chemical composition as well as the presence of other metals in the vicinity of the pump.

The rate of zinc consumption, and the appropriate inspection intervals, can be estimated by measuring how much zinc is consumed during the first two months following installation.

Anodes are replaced when the anode mass is reduced to a selected fraction of its initial mass. The recommended interval for the selection fraction is 0.25-0.50 (25-50%).

1. Remove, weigh, and reinstall one or more of the exterior zinc anodes before starting up the pump.
2. After two months, remove and weigh the same zinc anode or anodes again.

3. Divide the lapsed time in days (between steps 1 and 2) by the anode weight loss in grams to get the calculated anode consumption rate (days/gram).  
If multiple anodes were weighed, then use the anode which has lost the most weight for this calculation.
4. Calculate future replacement intervals so that they occur when the selected fraction of zinc is remaining.

## 5.3 Start the pump



---

**CAUTION: Crush Hazard**

The starting jerk can be powerful. Make sure nobody is close to the unit when it is started.

---

---

**NOTICE:**

Make sure that the rotation of the impeller is correct. For more information, see Check the impeller rotation.

---

1. Check the oil level in the oil housing.
2. Remove the fuses or open the circuit breaker, and check that the impeller can rotate freely.



---

**WARNING: Crush Hazard**

Never put your hand into the pump housing.

---

3. Conduct insulation test phase to ground. To pass, the value must exceed 5 megaohms.
4. Check that the monitoring equipment works.
5. Start the pump.

# 6 Maintenance

## Precautions

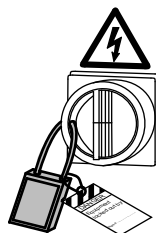
Before starting work, make sure that the safety instructions in the chapter [Introduction and Safety](#) on page 3 have been read and understood.



---

**DANGER: Crush Hazard**

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.



---

**WARNING: Biological Hazard**

Infection risk. Rinse the unit thoroughly with clean water before working on it.



---

**CAUTION: Crush Hazard**

Make sure that the unit cannot roll or fall over and injure people or damage property.

---

Make sure that you follow these requirements:

- Check the explosion risk before you weld or use electrical hand tools.
- Allow all system and pump components to cool before you handle them.
- Make sure that the product and its components have been thoroughly cleaned.
- Make sure that the work area is well-ventilated before you open any vent or drain valves, remove any plugs, or disassemble the unit.
- Do not open any vent or drain valves or remove any plugs while the system is pressurized. Make sure that the pump is isolated from the system and that pressure is relieved before you disassemble the pump, remove plugs, or disconnect piping.

## Ground continuity verification

A ground (earth) continuity test must always be performed after service.

## Maintenance guidelines

During the maintenance and before reassembly, always remember to perform these tasks:

- Clean all parts thoroughly, particularly O-ring grooves.
- Change all O-rings, gaskets, and seal washers.
- Lubricate all springs, screws, O-rings with grease.

During the reassembly, always make sure that existing index markings are in line.

The reassembled drive unit must always be insulation-tested and the reassembled pump must always be test-run before normal operation.

## 6.1 Torque values

All screws and nuts must be lubricated to achieve correct tightening torque. Screws that are screwed into stainless steel must have the threads coated with suitable lubricants to prevent seizing.

If there is a question regarding the tightening torques, then contact a sales or authorized service representative.

### Screws and nuts

Table 1: Stainless steel, A2 and A4, torque Nm (ft-lbs)

Property class	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30
50	1.0 (0.74)	2.0 (1.5)	3.0 (2.2)	8.0 (5.9)	15 (11)	27 (20)	65 (48)	127 (93.7)	220 (162)	434 (320)
70, 80	2.7 (2)	5.4 (4)	9.0 (6.6)	22 (16)	44 (32)	76 (56)	187 (138)	364 (268)	629 (464)	1240 (915)
100	4.1 (3)	8.1 (6)	14 (10)	34 (25)	66 (49)	115 (84.8)	248 (183)	481 (355)	–	–

Table 2: Steel, torque Nm (ft-lbs)

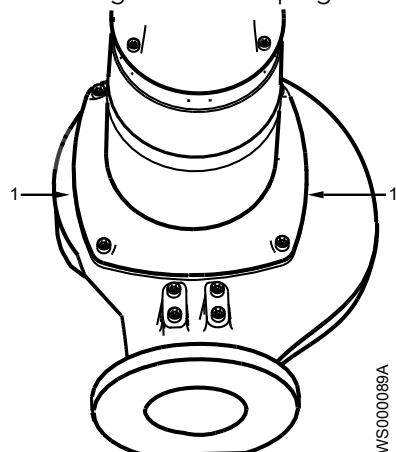
Property class	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30
8.8	2.9 (2.1)	5.7 (4.2)	9.8 (7.2)	24 (18)	47 (35)	81 (60)	194 (143)	385 (285)	665 (490)	1310 (966.2)
10.9	4.0 (2.9)	8.1 (6)	14 (10)	33 (24)	65 (48)	114 (84)	277 (204)	541 (399)	935 (689)	1840 (1357)
12.9	4.9 (3.6)	9.7 (7.2)	17 (13)	40 (30)	79 (58)	136 (100)	333 (245)	649 (480)	1120 (825.1)	2210 (1630)

### Hexagon screws with countersunk heads

For hexagon socket head screws with countersunk head, maximum torque for all property classes must be 80% of the values for property class 8.8 above.

## 6.2 Change the oil

This image shows the plugs that are used to change the oil.



1. Oil plug

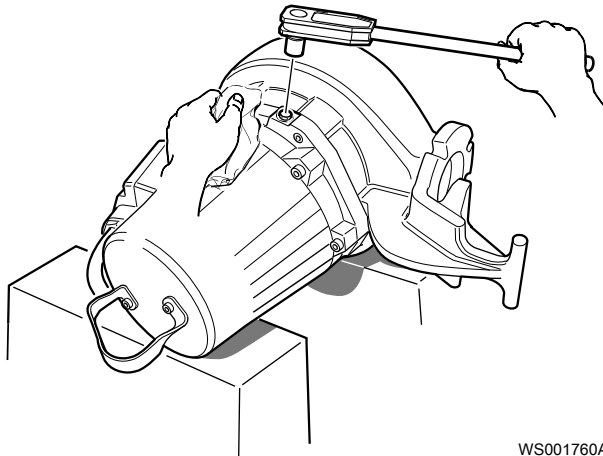
### Empty the oil



#### CAUTION: Compressed Gas Hazard

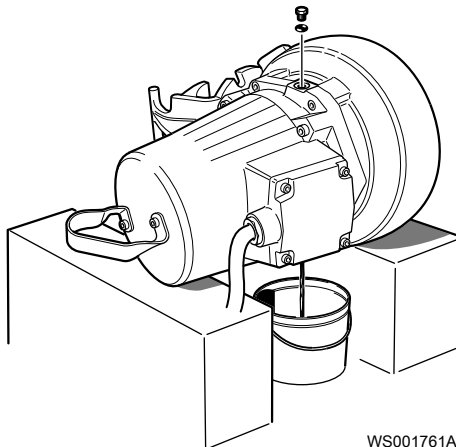
Air inside the chamber may cause parts or liquid to be propelled with force. Be careful when opening. Hold a rag over the plug to prevent liquid from spraying out.

1. Place the pump in a horizontal position and unscrew the oil plug.  
If the pump has a hole with the markings "oil out" it is important that this hole is used for drainage.



WS001760A

2. Place a container under the pump and turn the pump.
3. Unscrew the other oil plug.  
If this hole has the markings "oil in", raise the pump upright for a short period of time during drainage in order to drain all the oil.



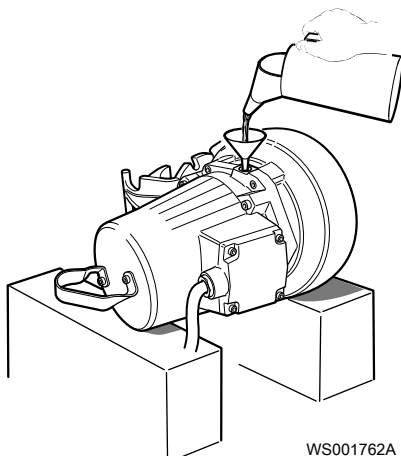
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### Fill with oil

The oil should be a medical white oil of paraffin type that fulfills FDA 172.878 (a) and viscosity close to VG32. Examples of suitable oil types are the following:

- Statoil MedicWay 32™
- BP Enerpar M 004™
- Shell Ondina 927™
- Shell Ondina X430™

1. Replace the O-rings of the oil plugs.
2. Refit an oil plug in the hole that faces downwards or is marked "oil out", and tighten.  
Tightening torque: 10-40 Nm (7.5-29.5 ft-lb)
3. Fill with oil through the hole on the opposite side or the hole marked "oil in".  
If the hole is marked "oil in", slightly tilt the pump and lower it again in order to fill the pump with the correct quantity.  
Quantity: approximately 2.0 L (2.1 qt).



4. Refit the oil plug and tighten.

Tightening torque: 10-40 Nm (7.5-29.5 ft-lb).

## 6.3 Service the pump

Type of maintenance	Purpose	Inspection interval
Initial inspection	A Xylem-authorized personnel checks the pump condition. From the results, the personnel recommends the intervals for the periodical inspection and overhaul for the installation.	Within the first year of operation.
Periodical inspection	The inspection prevents operational interruptions and machine breakdowns. The measures to increase performance and pump efficiency are decided for each application. They can include such things as impeller trimming, wear part control and replacement, control of zinc-anodes and control of the stator.	Up to every year Applies to normal applications and operating conditions at media (liquid) temperatures <40°C (104°F).
Overhaul	The overhaul lengthens the operating lifetime of the product. It includes the replacement of key components and the measures that are taken during an inspection.	Up to every three years Applies to normal applications and operating conditions at media (liquid) temperatures <40°C (104°F).

### NOTICE:

Shorter intervals may be required when the operating conditions are extreme, for example with very abrasive or corrosive applications or when the liquid temperatures exceed 40°C (104°F).

### 6.3.1 Inspection

Service item	Action
Cable	<ol style="list-style-type: none"> <li>1. If the outer jacket is damaged, replace the cable.</li> <li>2. Check that the cables do not have any sharp bends and are not pinched.</li> </ol>
Connection to power	Check that the connections are properly secured.
Electrical cabinets	Check that they are clean and dry.
Impeller	<ol style="list-style-type: none"> <li>1. Check the impeller clearance.</li> <li>2. Adjust the impeller, if necessary.</li> </ol>

Service item	Action
Stator housing	<ol style="list-style-type: none"> <li>1. Drain all liquid, if any.</li> <li>2. Check the resistance of the leakage sensor. Normal value approximately 1500 ohms, alarm approximately 430 ohms.</li> </ol>
Insulation	Use a megger maximum 1000 V. <ol style="list-style-type: none"> <li>1. Check that the resistance between the ground (earth) and phase lead is more than 5 megohms.</li> <li>2. Conduct a phase-to-phase resistance check.</li> </ol>
Junction box	Check that it is clean and dry.
Lifting device	Check that the local safety regulations are followed.
Lifting handle	<ol style="list-style-type: none"> <li>1. Check the screws.</li> <li>2. Check the condition of the lifting handle and the chain.</li> <li>3. If necessary, replace.</li> </ol>
O-rings	<ol style="list-style-type: none"> <li>1. Replace the oil plug O-rings.</li> <li>2. Replace the O-rings at the entrance or junction cover.</li> <li>3. Grease the new O-rings.</li> </ol>
Overload protection and other protections	Check the correct settings.
Personnel safety devices	Check the guard rails, covers, and other protections.
Rotation direction	Check the impeller rotation.
Oil housing	Fill with new oil, if necessary.
Terminal block/closed end splice	Check that the connections are properly secured.
Thermal contacts	Normally closed circuit; interval 0–1 ohm.
Voltage and amperage	Check the running values.

### 6.3.2 Overhaul

The basic repair kit includes O-rings, seals, and bearings.

For an overhaul, do the following in addition to the tasks listed under Inspection.

Service item	Action
Support and main bearing	Replace the bearings with new bearings.
Mechanical seal	Replace with new seal units.

### 6.3.3 Service in case of alarm

For information about indication values for sensors, see [Sensors connection](#) on page 34.

Alarm source	Action
CLS	Check for water in the oil housing. If the oil contains too much water, then do the following: <ol style="list-style-type: none"> <li>1. Drain the oil and water.</li> <li>2. Replace with new oil.</li> </ol>
FLS	<ol style="list-style-type: none"> <li>1. Check for liquid in the stator housing.</li> <li>2. Drain all liquid, if any.</li> <li>3. Check the mechanical seal unit, the O-rings, and the cable entry, if liquid was found.</li> </ol>
Thermal contact	Check the start and stop levels.
The overload protection	Check that the impeller can rotate freely.

## 6.4 Replace the impeller

Required tools:

- 10 mm hexagon bit adapter with an extension of at least 125 mm (4.92 in)
- Impeller puller

If applicable, contact your local sales and service representative for correct type and size.

- Rod (wood or copper) for locking the impeller in place, if applicable
- Two crowbars, if applicable



### CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

### NOTICE:

When laying the pump on its side, do not allow the weight of the pump to rest on any portion of the impeller. The impeller must not be allowed to make contact with the concrete floor or other hard and rough surfaces.

If you fail with the impeller installation, then you must redo the installation procedure from the beginning.

### 6.4.1 Replace the C- or D-impeller

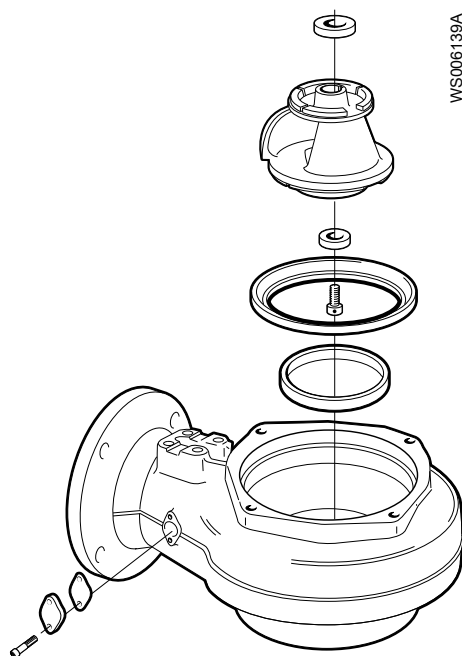


Figure 12: C-Impeller

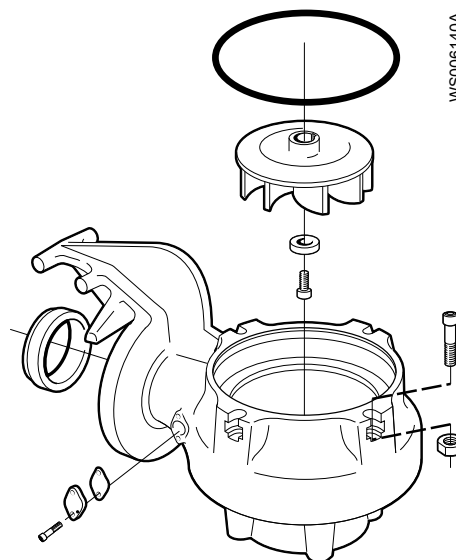


Figure 13: D-Impeller

#### 6.4.1.1 Remove the impeller: C, D



### CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

1. Remove the pump housing or the suction cover.





2. Remove the impeller screw.  
If applicable, use the rod.



Figure 14: C-impeller

3. Remove the washer.
4. Remove the impeller.  
Use the impeller puller or the crowbars.



Figure 15: D-impeller



Figure 16: D-impeller

#### 6.4.1.2 Install the impeller: C, D

1. Prepare the shaft:
  - a) Make sure that the end of the shaft is clean and free from burrs.

- Polish off any flaws with a fine emery cloth.
  - b) Fit the spacer ring to the shaft (applicable for seal type O).
  - c) Make sure that the parallel key is seated in the keyway on the shaft.
  - d) Lubricate the end of the shaft.
2. Mount the impeller:
- a) Lubricate the impeller screw threads and contact surface.  
Ensure that all parts are clean.
  - b) Fit the washer on the lubricated impeller screw.
  - c) Press the impeller onto the shaft with the impeller screw.
3. Tighten the impeller screw.  
If applicable, use the rod.  
Tightening torque: 80 Nm (59 ft-lbs)



WS001941A

Check that the impeller can rotate freely.

4. Mount the suction cover (if applicable):
- a) Fit a new lubricated O-ring to the suction cover.

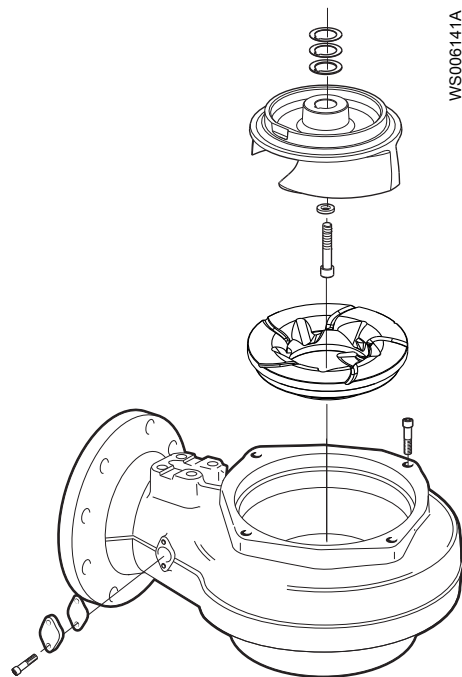


WS002015A

- b) Fit the suction cover.
  - c) Fit and tighten the lubricated screws.  
Tightening torque: 57 Nm (42 ft-lb).
5. Mount the pump housing:
- a) D-impeller: Fit a new lubricated O-ring to the pump housing.
  - b) Fit the pump housing.
  - c) Fit and tighten the lubricated screws.  
Tightening torque: 57 Nm (42 ft-lb).



## 6.4.2 Replace the F-impeller



### 6.4.2.1 Remove the F-impeller



#### CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

1. Remove the suction cover.  
If necessary, then pry off the suction cover.
2. Remove the impeller screw, the ring, and the washers.  
If applicable, use the rod.



WS001976A

3. Remove the impeller.  
 Use the impeller puller or the crowbars.  
 Use the impeller screw to push the impeller.

#### 6.4.2.2 Install the F-impeller

1. Prepare the shaft:
  - a) Make sure that the end of the shaft is clean and free from burrs.  
 Polish off any flaws with a fine emery cloth.
  - b) Lubricate the end of the shaft.
  - c) Make sure that the parallel key is seated in the keyway on the shaft.
2. Mount the impeller:
  - a) Fit the ring and a new lubricated O-ring onto the lubricated impeller screw.
  - b) Fit one or two plain washers with a thickness of 0.3 mm (0.01 in), or one plain washer with a thickness of 0.5 mm (0.02 in) onto the impeller.



WS002021A

- c) Lubricate the impeller screw threads and contact surface.  
 Ensure that all parts are clean.
  - d) Press the impeller onto the shaft with the impeller screw.
3. Fasten the impeller:
  - a) Prevent the impeller from rotating by inserting the rod through the pump housing outlet.
  - b) Tighten the impeller screw.  
 If applicable, use the rod.  
 Tightening torque: 80 Nm (59 ft-lb).



Check that the impeller can rotate freely.

4. Adjust the impeller:

- a) Measure the distance between the edge of the impeller and the pump housing cover.

The correct distance should be 0.5-1.5 mm (0.02-0.06 in). Add or remove the appropriate number of adjusting washers in order to achieve correct distance.



- b) Tighten the impeller screw.

If applicable, use the rod.

Tightening torque: 80 Nm (59 ft-lb).

Check that the impeller can rotate freely.

5. Mount the suction cover:

- a) Fit the studs on the pump housing.

Use Loctite 603 locking liquid in order to secure the studs.

- b) Fit one adjustment washer with a thickness of 1.5 mm (0.06 in) and 7-8 adjustment washers with a thickness of 0.3 mm (0.01 in) onto each stud.



WS002014A

- c) Fit the suction cover to the studs.
  - d) Fit the lock nuts onto the studs.
  - e) Tighten the nuts.
- Tightening torque: 57 Nm (42 ft-lb).



WS001937A

6. Adjust the suction cover:
- a) Measure the distance between the impeller and the suction cover.  
The correct distance should be 0.5-1 mm (0.02-0.04 in). Add or remove the appropriate number of adjusting washers in order to achieve the correct distance. Use adjustment washers with a thickness of 1.5 mm (0.06 in) and 0.3 mm (0.01 in) in order to achieve the correct distance.



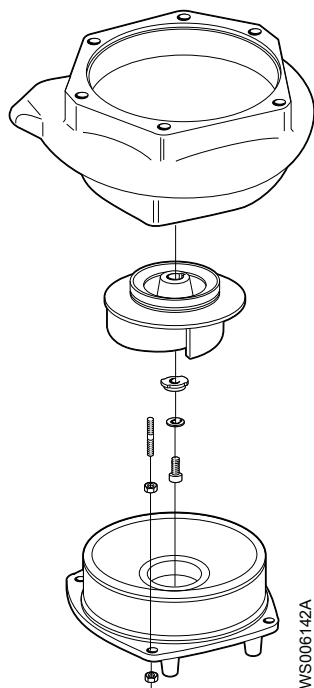
WS002105A

- b) Tighten the nuts.
- Tightening torque: 57 Nm (42 ft-lb).



7. Raise the pump to a vertical position.  
Check that the impeller can rotate freely.

### 6.4.3 Replace the H-impeller



#### 6.4.3.1 Remove the H-impeller



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**CAUTION: Cutting Hazard**

Worn parts can have sharp edges. Wear protective clothing.

---

1. Remove the suction cover.  
If necessary, then pry off the suction cover.
2. Remove the impeller screw and the washer.  
If applicable, use the rod.
3. Remove the impeller from the shaft:
  - a) Insert a M16 screw into the square nut.
  - b) Turn the screw to push off the impeller.
4. Remove the screw and the square nut.

### 6.4.3.2 Install the H-impeller

1. Prepare the shaft:
  - a) Make sure that the end of the shaft is clean and free from burrs.  
Polish off any flaws with a fine emery cloth.
  - b) Make sure that the parallel key is seated in the keyway on the shaft.
2. Mount the impeller:
  - a) Fit the washer and square nut to the lubricated impeller screw.
  - b) Press the impeller onto the shaft with the impeller screw.
3. Tighten the impeller screw.  
Tightening torque: 80 Nm (59 ft-lbs)  
If applicable, use the rod.  
Check that the impeller can rotate freely.
4. Mount the suction cover:
  - a) Fit the studs on the pump housing.
  - b) Fit the first hexagon nut onto the studs.
  - c) Fit the suction cover to the studs.  
Make sure that the impeller rotates freely from the suction cover before tightening the hexagon nuts. The clearance between the impeller and the suction cover should be as small as possible.
  - d) Fit the second hexagon nuts onto the studs.
  - e) Tighten the nuts.  
Tightening torque: 57 Nm (42 ft-lb).
5. Raise the pump to a vertical position.  
Check that the impeller can rotate freely.

### 6.4.4 Replace the M-impeller

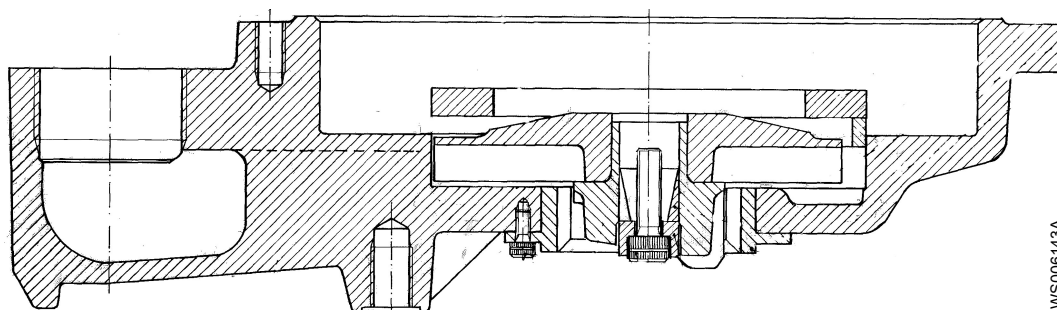


Figure 17: M-impeller

#### 6.4.4.1 Remove the M-impeller



##### CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

1. Remove the pump housing.
2. Remove the impeller screw and outer sleeve.  
If applicable, use the rod.

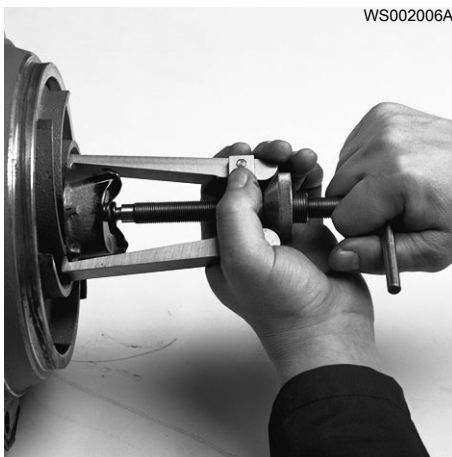




3. Refit the impeller screw.



4. Fit the impeller puller and pull off the impeller and cutting wheel.  
- If used, remove the washer between the impeller and cutting wheel.  
Place a protector between the screw head and the impeller puller.



5. Remove the conical sleeve.



WS001987A

#### 6.4.4.2 Install the M-impeller

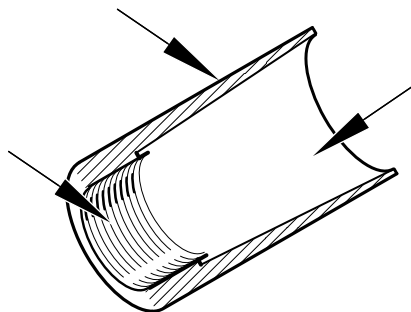
1. Prepare the shaft:
  - a) Polish off any flaws with a fine emery cloth.  
The end of the shaft must be clean and free from burrs.
  - b) Coat the inner conic, the outer cylindrical surfaces, and the thread of the conical sleeve with a thin layer of grease.  
The proper lubrication is grease for bearings, for example Exxon Mobil Unirex N3, Mobil Mobilith SHC 220 or equivalent.

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#### NOTICE:

Surplus grease can cause the impeller to become loose. Remove surplus grease from conical and/or cylindrical surfaces of shafts and/or sleeves.

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2. Mount the impeller:
  - a) Fit the conical sleeve onto the shaft.



WS002081A

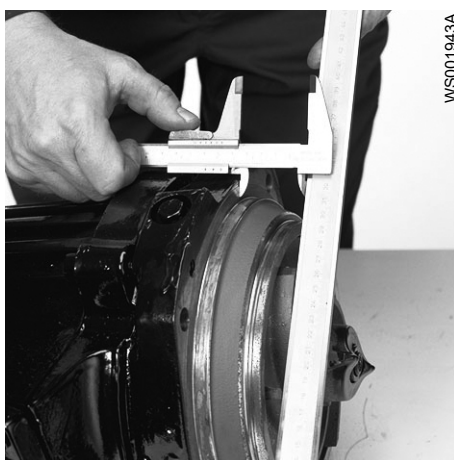
- b) Fit the cutting wheel into the impeller, sometimes including a plain washer.
  - c) Fit the outer sleeve onto the lubricated impeller screw.
  - d) Fit the impeller with the cutting wheel onto the shaft with the impeller screw.
- Do not tighten the impeller screw.

3. Adjust the impeller:

- a) Use a straightedge and a vernier to measure the distance between the vanes of the impeller and the shoulder for the pump housing on the oil housing bottom.

Pressure class	Phase	Hz	Distance
LT, HT	3	50	65.0±0.3 mm (2.56±0.01 in.)
LT, HT	3	60	65.0±0.3 mm (2.56±0.01 in.)
LT	1	60	63.0±0.3 mm (2.48±0.01 in.)
HT	1	60	65.0±0.3 mm (2.56±0.01 in.)

- b) Slide the impeller on to the shaft until you reach the correct distance.



WS001943A

4. Tighten the impeller screw.

If applicable, use the rod.

Tightening torque: 65 Nm (48 ft-lbs)

Tighten a further 1/8 turn, 45° after tightening to the correct torque.



WS001939A

Check that the impeller can rotate freely.

5. Mount the pump housing:
    - a) Fit the pump housing.
    - b) Fit and tighten the lubricated screws.
- Tightening torque: 57 Nm (42 ft-lb).

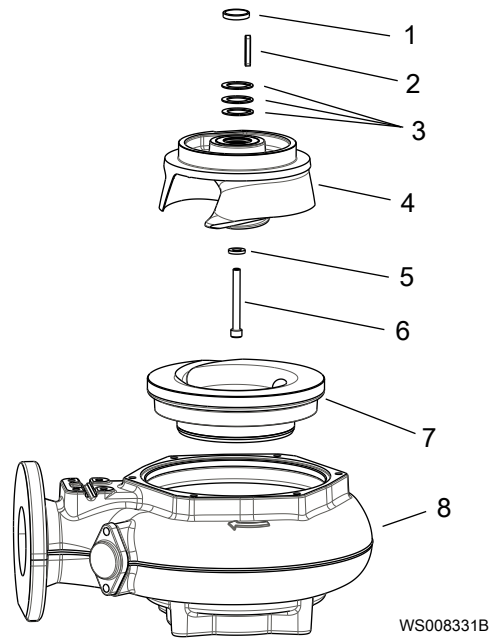


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#### 6.4.5 Replacing the N-impeller

This section is applicable to chopper hydraulics.

This section is not applicable for Adaptive N™ impellers. To see which pumps are Adaptive N™, see [Product Description](#) on page 10.



1. Ring
2. Parallel key
3. Washers
4. Impeller
5. Washer
6. Impeller screw
7. Insert ring
8. Pump housing



#### CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

#### NOTICE:

When laying the pump on its side, do not allow the weight of the pump to rest on any portion of the impeller. The impeller must not be allowed to make contact with the concrete floor or other hard and rough surfaces.

#### 6.4.5.1 Remove the N-impeller: P, S installations

This section is not applicable for Adaptive N™ impellers. To see which pumps are Adaptive N™, see [Product Description](#) on page 10.

1. Remove the pump housing.
2. Remove the plug.
3. Remove the impeller screw.
4. Remove the impeller.  
Use the impeller puller or the crowbars.
5. Remove the plain washers and the adjustment washers.

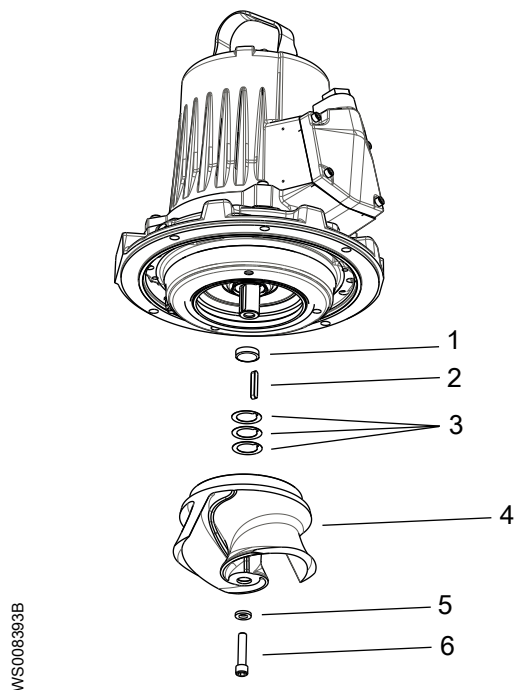
#### 6.4.5.2 Install the N-impeller: P, S installations

This section is not applicable for Adaptive N™ impellers. To see which pumps are Adaptive N™, see [Product Description](#) on page 10.



#### WARNING: Crush Hazard

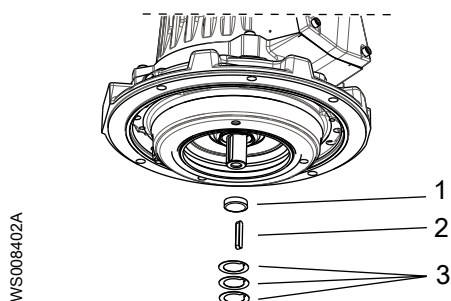
Beware of the pinch point hazard between the rotating impeller and the guide pin.



1. Ring
2. Parallel key
3. Washers
4. Impeller
5. Washer
6. Impeller screw

1. Prepare the shaft:

- a) Make sure that the end of the shaft is clean and free from burrs.  
Polish off any flaws with a fine emery cloth.
- b) Make sure that the ring under the seal is mounted.



1. Ring
2. Parallel key
3. Washers

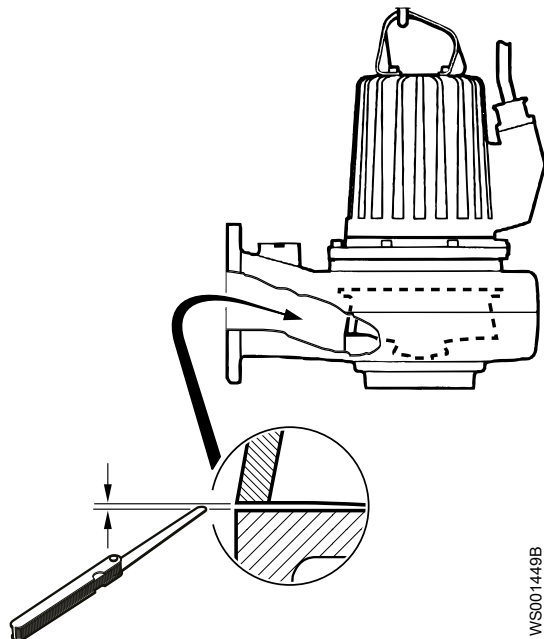
- c) Make sure that the parallel key is seated in the keyway on the shaft.
- d) Lubricate the end of the shaft.
- e) Fit the adjustment washers.

There are three thicknesses for adjustment washers: 0.3 mm, 0.5 mm, and 1.5 mm (0.012, 0.02, and 0.06 in).

The adjustment washers are used to trim the impeller. The exact number of adjustment washers is not known at this point. Start by inserting one shim of each thickness (1×0.3 mm + 1×0.5 mm + 1×1.5 mm = 2.3 mm). This creates a distance between the impeller and the insert ring that can be measured and adjusted in later steps.

2. Mount the impeller:

- a) Fit the impeller to the shaft.
- b) Fit the washer on the lubricated impeller screw.
- c) Tighten the impeller screw to compress the adjustment washers.
- 3. Mount the pump housing:
  - a) Fit the new O-ring to the pump housing.
  - b) Fit and tighten the lubricated screws.
- 4. Trim the impeller clearance:
  - a) Measure the distance (C) with an extended feeler gauge.



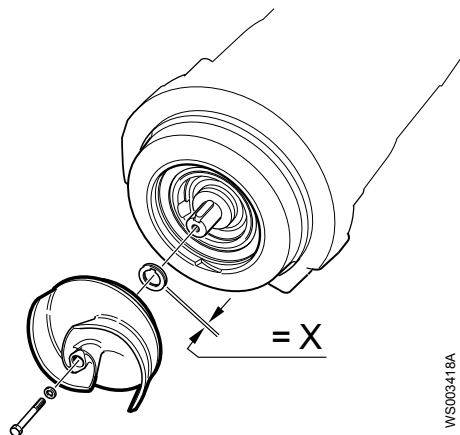
The correct distance is 0.1-0.6 mm (0.004-0.024 in).

Distance measured	Action
Less than 0.1 mm (0.004 in)	Proceed to the next step to trim the impeller clearance.
0.1-0.6 mm (0.004-0.024 in)	No further trimming needed. Fasten the impeller.
Greater than 0.6 mm (0.024 in)	Proceed to the next step to trim the impeller clearance.

- b) Remove the pump housing.
- c) Remove the impeller.
- d) Calculate the correct thickness of adjustment washers by using the following equation.

Metric units (mm): $X = 2.3 \text{ mm} + (C) - 0.2 \text{ mm}$

Imperial units (in): $X = 0.091 \text{ in} + (C) - 0.008 \text{ in}$
- e) Combine the adjustment washers so the total thickness corresponds to the calculated thickness X.



5. Fasten the impeller:
  - a) Fit the impeller to the shaft.
  - b) Tighten the impeller screw.
  - c) Fit the pump housing.
  - d) Fit and tighten the lubricated screws for the pump housing.  
Tightening torque: 57 Nm (42 ft-lb).
  - e) Tighten the impeller screw.  
Tightening torque: 80 Nm (59 ft-lb).
  - f) Check that the impeller can rotate freely.
  - g) Check with a feeler gauge that the gap is 0.1–0.6 mm (0.004–0.024 in).
6. Reinstall the pump.

#### 6.4.6 Replacing the Adaptive N™ impeller

To see which pumps are Adaptive N™, see [Product Description](#) on page 10.



##### CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

##### NOTICE:

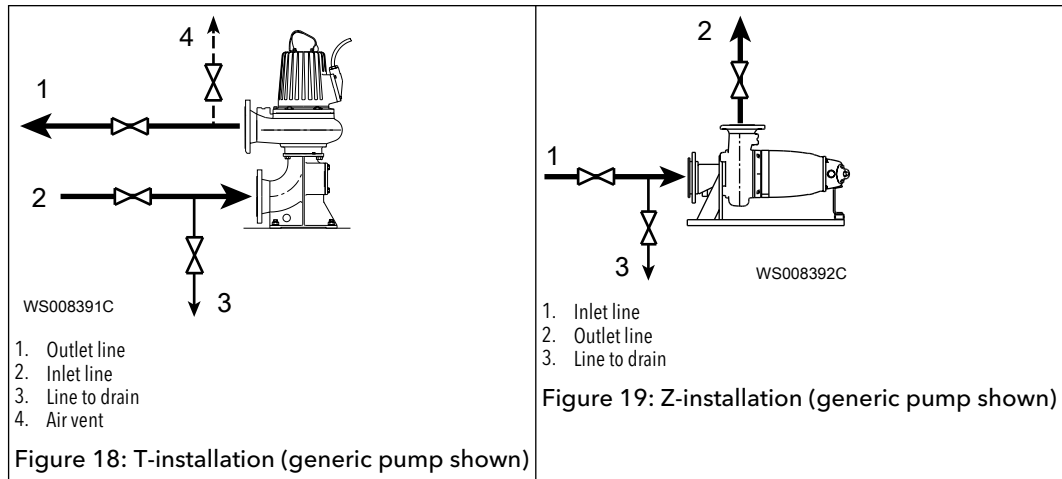
When laying the pump on its side, do not allow the weight of the pump to rest on any portion of the impeller. The impeller must not be allowed to make contact with the concrete floor or other hard and rough surfaces.

#### 6.4.6.1 Prepare the pump for removal: T-, Z-installations

The pump must be removed from the installation to change the impeller.

1. Close the valves on the inlet and outlet lines.  
See the following figures.





2. Drain the pump by opening the valve on the drain line.
3. Remove the pump from the installation.

#### 6.4.6.2 Remove the Adaptive N™ impeller: P, S, T, Z installations



##### CAUTION: Cutting Hazard

Sharp edges. Wear protective clothing.

1. Place the pump in a horizontal position.
2. Remove the impeller:
  - a) Remove the flush valve cover and its gasket.
  - b) Lock the impeller in place by inserting a rod through the hole.

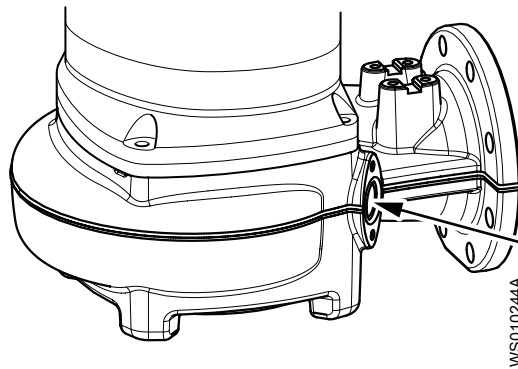


Figure 20: Hole for inserting rod. Generic drive unit shown.

- c) Remove the impeller screw.

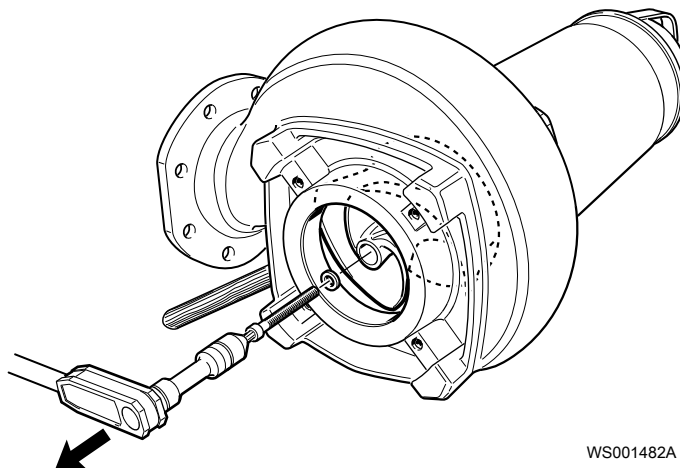


Figure 21: Removing the impeller screw. Generic drive unit shown.

- d) Turn the adjustment screw counterclockwise until the impeller breaks free from the shaft.

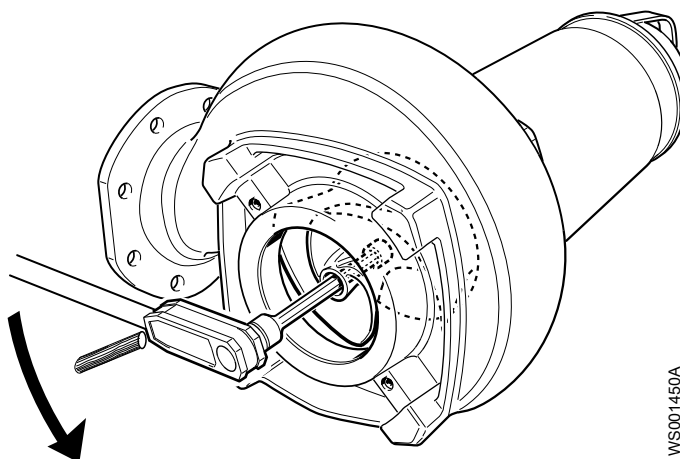


Figure 22: Turning the adjustment screw counterclockwise. Generic drive unit shown.

- e) Hand-tighten the impeller screw to prevent it from falling off.

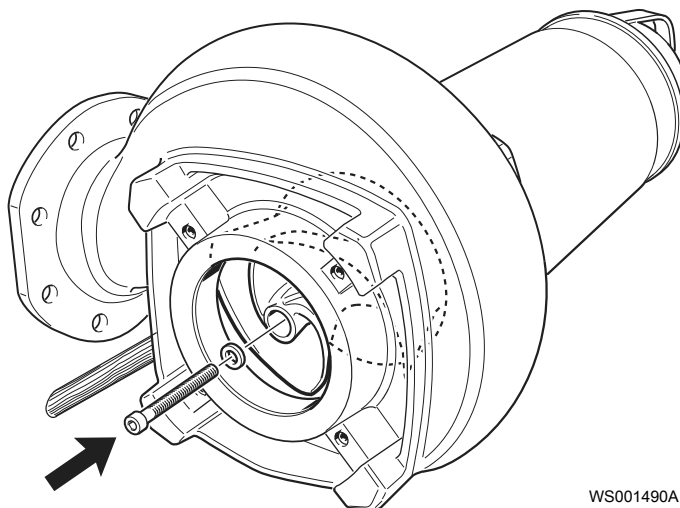


Figure 23: Hand-tightening the impeller screw. Generic drive unit shown.

- f) Remove the rod.
3. Raise the pump.
  4. Remove the drive unit from the pump housing:
    - a) Remove the pump housing screws.

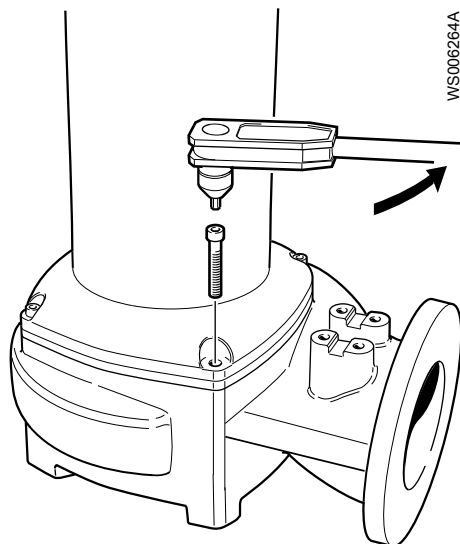


Figure 24: Removing the pump housing screws. Generic drive unit shown.

- b) Remove the drive unit from the pump housing.

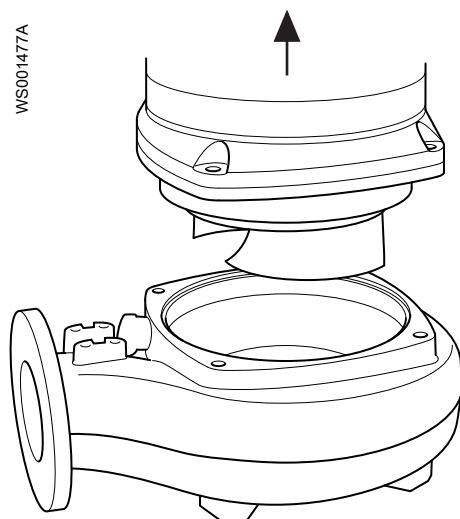
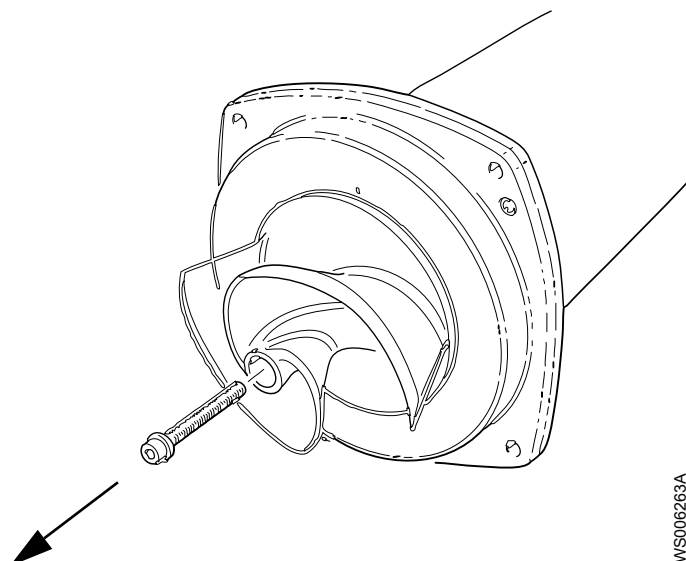


Figure 25: Removing the drive unit. Generic drive unit shown.

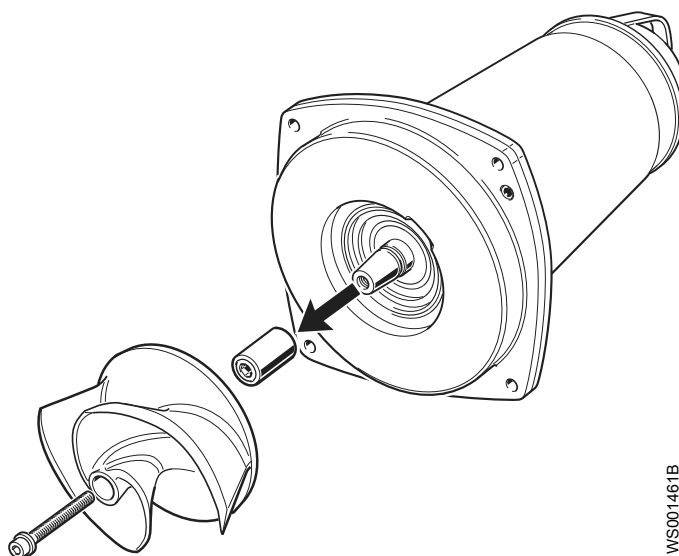
5. Remove the impeller:
- Place the drive unit horizontally.
  - Remove the impeller screw.



WS006263A

Figure 26: Removing the impeller screw. Generic drive unit shown.

c) Remove the impeller and the conical sleeve.



WS001461B

Figure 27: Removing the impeller and the conical sleeve. Generic drive unit shown.

#### 6.4.6.3 Install the Adaptive N™ impeller: P, S, T, Z installations

To see which pumps are Adaptive N™, see [Product Description](#) on page 10.

1. Prepare the shaft:

a) Make sure that the end of the shaft is clean and free from burrs.

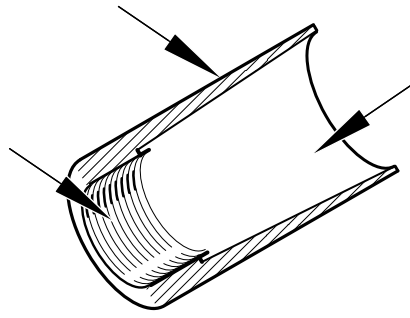
Polish off any flaws with a fine emery cloth.

b) Coat the inner conic, the outer cylindrical surfaces, and the thread of the conical sleeve with a thin layer of grease.

The proper lubrication is grease for bearings, for example Exxon Mobil Unirex N3, Mobil Mobilith SHC 220 or equivalent.

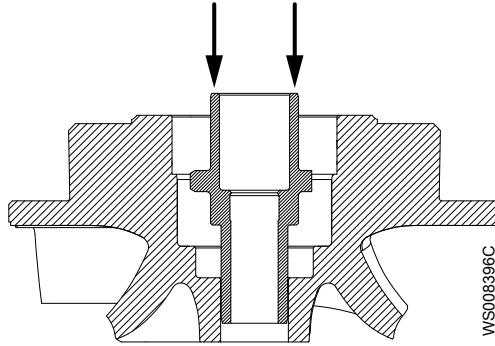
#### NOTICE:

Surplus grease can cause the impeller to become loose. Remove surplus grease from conical and/or cylindrical surfaces of shafts and/or sleeves.



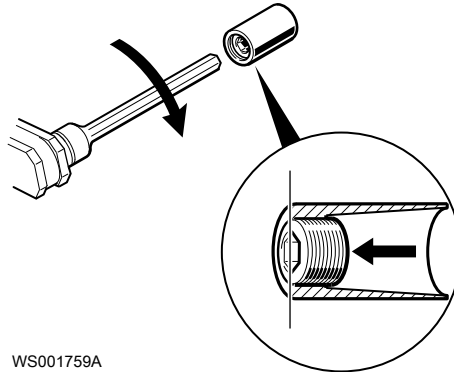
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2. Before mounting the impeller, check that the sleeve moves freely up and down. If the sleeve does not move freely, then replace the impeller unit.



WS008396C

3. Mount the impeller:
- Lubricate the threads of the impeller screw and the washer. Always use a new impeller screw.
  - Adjust the adjustment screw so that it is flush with the sleeve.



WS001759A

- Fit the sleeve and impeller to the shaft.
- Hand-tighten the impeller screw to prevent it from falling off.

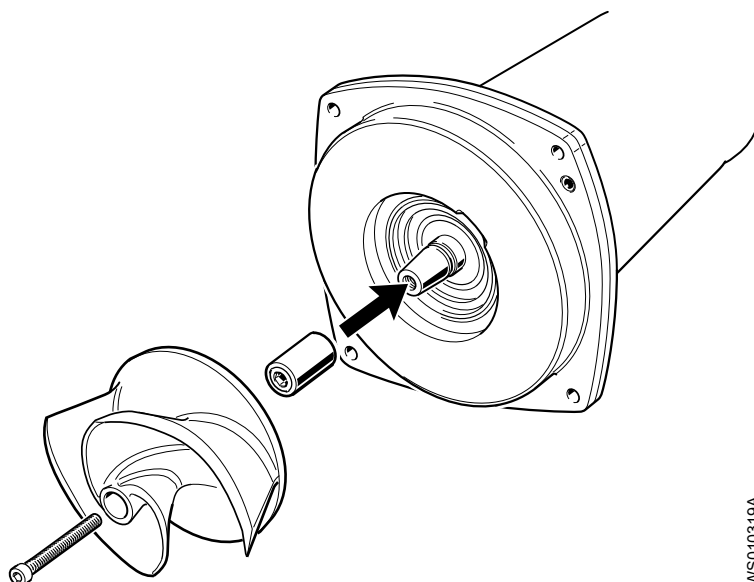


Figure 28: Fitting sleeve and impeller to the shaft. Generic drive unit shown.

4. Fit the pump housing:
  - a) Fit a new and lubricated O-ring on the seal housing cover.
  - b) Lubricate the pump housing screws.
  - c) Raise the drive unit.
  - d) Place the drive unit into the pump housing.
  - e) Adjust its position so that the inspection hole is on the same side as the flush valve.
  - f) Tighten the screws in diagonal sequence.

For tightening torque, see [Torque values](#) on page 41.

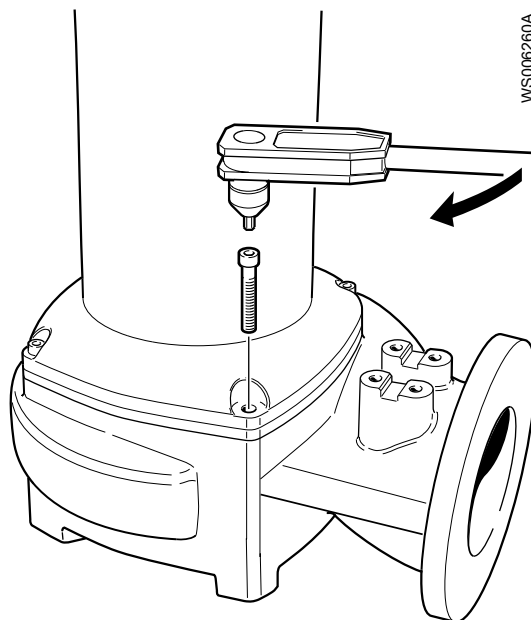


Figure 29: Fitting the pump housing. Generic drive unit shown.

5. Remove the impeller screw:
  - a) Place the pump horizontally.
  - b) Lock the impeller in place by inserting a rod through the hole.
  - c) Remove the impeller screw and the washer.

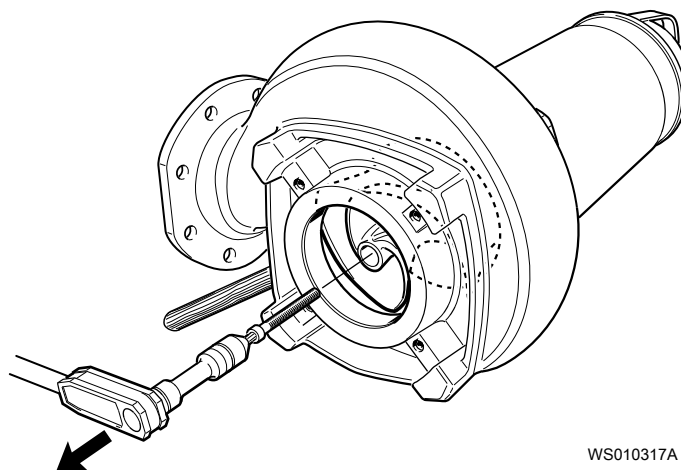


Figure 30: Removing the impeller screw. Generic drive unit shown.

6. Adjust the impeller:

- a) Using a hexagon-bit adapter, turn the adjustment screw clockwise until the impeller makes contact with the pump housing.

For tightening torque, see [Torque values](#) on page 41.

- b) Tighten it a further 1/8 turn (45°).

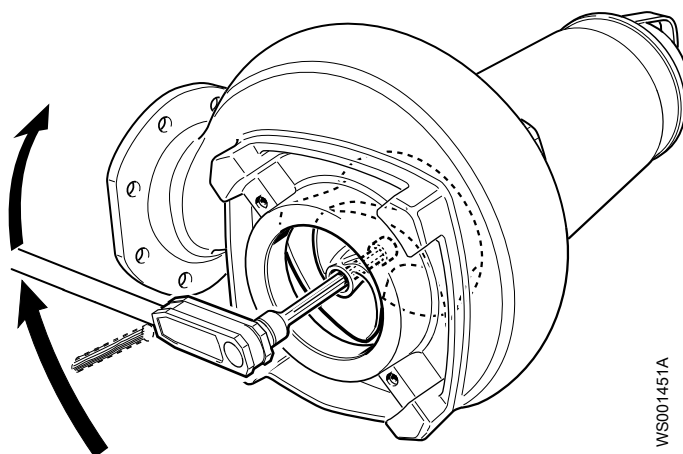


Figure 31: Adjusting the impeller. Generic drive unit shown.

7. Fasten the impeller:

- a) Fit the lubricated washer and impeller screw.
- b) Tighten the impeller screw.

For tightening torque, see [Torque values](#) on page 41.

- c) Tighten it a further 1/8 turn (45°).

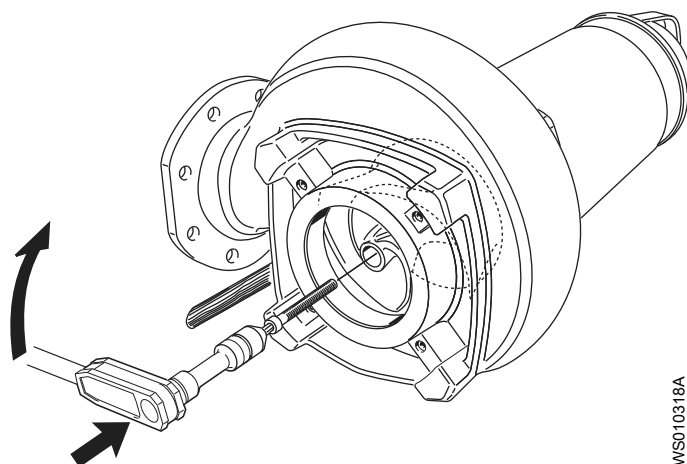


Figure 32: Fastening the impeller. Generic drive unit shown.

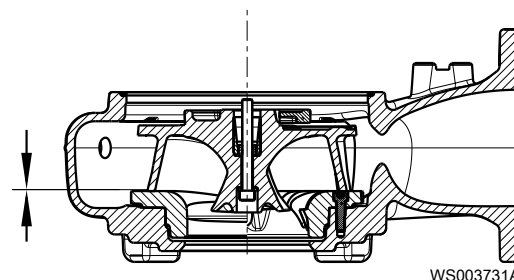
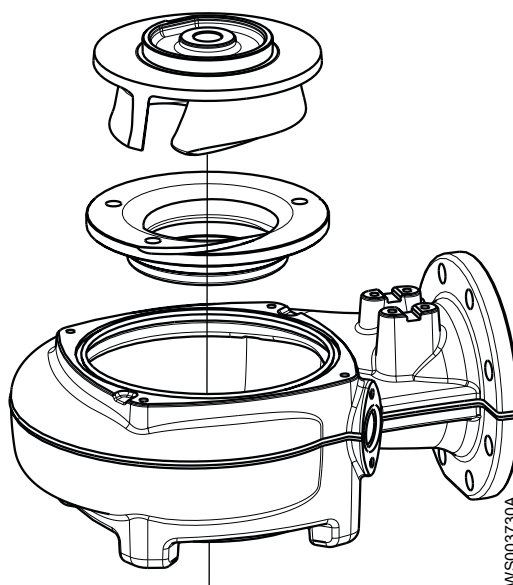
- d) Remove the rod that is used to lock the impeller.
- e) Fit the gasket and flush valve cover and fasten it with screws.
- f) Check that the impeller can rotate freely.



**WARNING: Crush Hazard**

Beware of the pinch point hazard between the rotating impeller and the guide pin.

- g) Check that the clearance between the impeller and the insert ring is 0.1–0.6 mm (0.004–0.024 in).





## 6.5 Replace the propeller

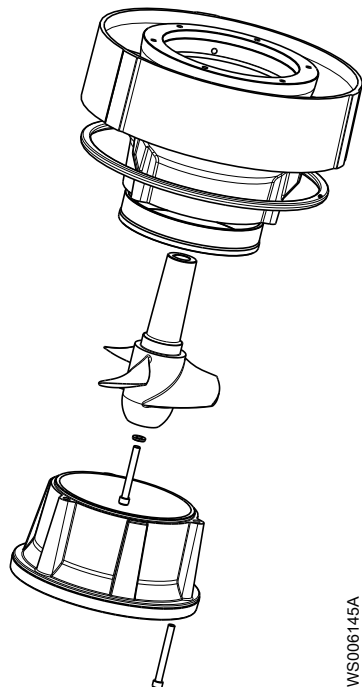


Figure 33: Propeller

Required tools:

- 10 mm hexagon bit adapter with an extension of at least 125 mm (4.92 in.)
  - Rod (wooden or copper) for locking the propeller in place, if applicable
  - Propeller puller
- If applicable, contact your local sales and service representative for correct type and size.
- Two crowbars, if applicable



---

**CAUTION: Cutting Hazard**

Worn parts can have sharp edges. Wear protective clothing.

---

---

**NOTICE:**

When laying the pump on its side, do not allow the weight of the pump to rest on any portion of the propeller. The propeller must not be allowed to make contact with the concrete floor or other hard and rough surfaces.

---

If you fail with the propeller installation, you must redo the installation procedure from the beginning.

---

### Remove the propeller



---

**CAUTION: Cutting Hazard**

Worn parts can have sharp edges. Wear protective clothing.

---

1. Lay the pump on its side.
2. Remove the bell mouth.
3. Remove the propeller screw.

- If applicable, use the rod.
- 4. Remove the washer.
- 5. Remove the propeller.  
Use the impeller puller or the crowbars.
- 6. Remove the diffuser.

### Install the propeller

1. Prepare the shaft:
  - a) Make sure that the end of the shaft is clean and free from burrs.  
Polish off any flaws with a fine emery cloth.
  - b) Make sure that the parallel key is seated in the keyway on the shaft.
2. Mount the diffuser:
  - a) Fit the diffuser.
  - b) Fit and tighten the lubricated screws.  
Tightening torque: 57 Nm (42 ft-lb).
3. Mount the propeller:
  - a) Fit the washer to the lubricated propeller screw.
  - b) Fit the propeller to the shaft.
  - c) Tighten the propeller screw.  
If applicable, use the rod.  
Tightening torque: 80 Nm (59 ft-lbs)
4. Mount the bell mouth:
  - a) Fit the bell mouth:
  - b) Fit and tighten the lubricated screws.  
For tightening torque, see [Torque values](#) on page 41.
  - c) Raise the pump to a vertical position.  
Check that the propeller can rotate freely.

# 7 Troubleshooting

## Introduction



**DANGER: Electrical Hazard**

Troubleshooting a live control panel exposes personnel to hazardous voltages. Electrical troubleshooting must be done by a qualified electrician.

Follow these guidelines when troubleshooting:

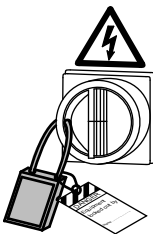
- Disconnect and lock out the power supply except when conducting checks that require voltage.
- Make sure that no one is near the unit when the power supply is reconnected.
- When troubleshooting electrical equipment, use the following:
  - Universal instrument multimeter
  - Test lamp (continuity tester)
  - Wiring diagram

## 7.1 The pump does not start



**DANGER: Crush Hazard**

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.



**WARNING: Electrical Hazard**

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

**NOTICE:**

Do NOT override the motor protection repeatedly if it has tripped. Doing so may result in equipment damage.

Cause	Remedy
An alarm signal has been triggered on the control panel.	Check that: <ul style="list-style-type: none"><li>• The impeller rotates freely.</li><li>• The sensor indicators do not indicate an alarm.</li><li>• The overload protection is not tripped.</li></ul>

Cause	Remedy
The pump does not start automatically, but can be started manually.	Check that: <ul style="list-style-type: none"> <li>• The start level regulator is functioning. Clean or replace if necessary.</li> <li>• All connections are intact.</li> <li>• The relay and contactor coils are intact.</li> <li>• The control switch (Man/Auto) makes contact in both positions.</li> </ul> Check the control circuit and functions.
The installation is not receiving voltage.	Check that: <ul style="list-style-type: none"> <li>• The main power switch is on.</li> <li>• There is control voltage to the start equipment.</li> <li>• The fuses are intact.</li> <li>• There is voltage in all phases of the supply line.</li> <li>• All fuses have power and that they are securely fastened to the fuse holders.</li> <li>• The overload protection is not tripped.</li> <li>• The motor cable is not damaged.</li> </ul>
The impeller is stuck.	Clean: <ul style="list-style-type: none"> <li>• The impeller</li> <li>• The sump in order to prevent the impeller from clogging again.</li> </ul>

If the problem persists, then contact a sales or authorized service representative.

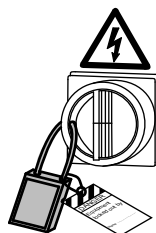
Always state the serial number of the product, see [Product Description](#) on page 10.

## 7.2 The pump does not stop when a level sensor is used



### DANGER: Crush Hazard

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.



### WARNING: Electrical Hazard

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

Cause	Remedy
The pump is unable to empty the sump to the stop level.	Check that: <ul style="list-style-type: none"> <li>• There are no leaks from the piping and/or discharge connection.</li> <li>• The impeller is not clogged.</li> <li>• The non-return valve(s) are functioning properly.</li> <li>• The pump has adequate capacity. For information: Contact a sales or authorized service representative.</li> </ul>

Cause	Remedy
There is a malfunction in the level-sensing equipment.	<ul style="list-style-type: none"> <li>• Clean the level regulators.</li> <li>• Check the functioning of the level regulators.</li> <li>• Check the contactor and the control circuit.</li> <li>• Replace all defective items.</li> </ul>
The stop level is set too low.	Raise the stop level.

If the problem persists, then contact a sales or authorized service representative.

Always state the serial number of the product, see [Product Description](#) on page 10.

### 7.3 The pump starts-stops-starts in rapid sequence

Cause	Remedy
The pump starts due to back-flow which fills the sump to the start level again.	Check that: <ul style="list-style-type: none"> <li>• The distance between the start and stop levels is sufficient.</li> <li>• The non-return valve(s) work(s) properly.</li> <li>• The length of the discharge pipe between the pump and the first non-return valve is sufficiently short.</li> </ul>
The self-holding function of the contactor malfunctions.	Check: <ul style="list-style-type: none"> <li>• The contactor connections.</li> <li>• The voltage in the control circuit in relation to the rated voltages on the coil.</li> <li>• The functioning of the stop-level regulator.</li> <li>• Whether the voltage drop in the line at the starting surge causes the contactor's self-holding malfunction.</li> </ul>

If the problem persists, then contact a sales or authorized service representative.

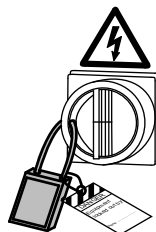
Always state the serial number of the product, see [Product Description](#) on page 10.

### 7.4 The pump runs but the motor protection trips



#### DANGER: Crush Hazard

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.



#### WARNING: Electrical Hazard

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

#### NOTICE:

Do NOT override the motor protection repeatedly if it has tripped. Doing so may result in equipment damage.

Cause	Remedy
The motor protection is set too low.	Set the motor protection according to the data plate and if applicable the cable chart.
The impeller is difficult to rotate by hand.	<ul style="list-style-type: none"> <li>• Clean the impeller.</li> <li>• Clean out the sump.</li> <li>• Check that the impeller is properly trimmed.</li> </ul>
The drive unit is not receiving full voltage on all three phases.	<ul style="list-style-type: none"> <li>• Check the fuses. Replace fuses that have tripped.</li> <li>• If the fuses are intact, then notify a certified electrician.</li> </ul>
The phase currents vary, or they are too high.	Contact a sales or authorized service representative.
The insulation between the phases and ground in the stator is defective.	<ol style="list-style-type: none"> <li>1. Use an insulation tester. With a 1000 V DC megger, check that the insulation between the phases and between any phase and ground is &gt; 5 megaohms.</li> <li>2. If the insulation is less, then do the following: Contact a sales or authorized service representative.</li> </ol>
The density of the pumped fluid is too high.	<p>Make sure that the maximum density is 1100 kg/m<sup>3</sup> (9.2 lb/US gal)</p> <ul style="list-style-type: none"> <li>• Change the impeller, or</li> <li>• Change to a more suitable pump</li> <li>• Contact a sales or authorized service representative.</li> </ul>
There is a malfunction in the overload protection.	Replace the overload protection.

If the problem persists, then contact a sales or authorized service representative.

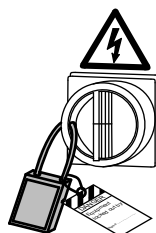
Always state the serial number of the product, see [Product Description](#) on page 10.

## 7.5 The pump delivers too little or no water



### DANGER: Crush Hazard

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.



### WARNING: Electrical Hazard

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

### NOTICE:

Do NOT override the motor protection repeatedly if it has tripped. Doing so may result in equipment damage.

Cause	Remedy
The impeller rotates in the wrong direction.	<ul style="list-style-type: none"><li>• If it is a 3-phase pump, then transpose two phase leads.</li><li>• If it is a 1-phase pump, then do the following: Contact a sales or authorized service representative.</li></ul>
One or more of the valves are set in the wrong positions.	<ul style="list-style-type: none"><li>• Reset the valves that are set in the wrong position.</li><li>• Replace the valves, if necessary.</li><li>• Check that all valves are correctly installed according to media flow.</li><li>• Check that all valves open correctly.</li></ul>
The impeller is difficult to rotate by hand.	<ul style="list-style-type: none"><li>• Clean the impeller.</li><li>• Clean out the sump.</li><li>• Check that the impeller is properly trimmed.</li></ul>
The pipes are obstructed.	To ensure a free flow, clean out the pipes.
The pipes and joints leak.	Find the leaks and seal them.
There are signs of wear on the impeller, pump, and casing.	Replace the worn parts.
The liquid level is too low.	<ul style="list-style-type: none"><li>• Check that the level sensor is set correctly.</li><li>• Depending on the installation type, add a means for priming the pump, such as a foot valve.</li></ul>

If the problem persists, then contact a sales or authorized service representative.

Always state the serial number of the product, see [Product Description](#) on page 10.

# 8 Technical Reference

## 8.1 Application limits

Data	Description
Liquid temperature	40°C (104°F) maximum The pump can be operated at full load only if at least half the stator housing is submerged. 3127.060/.161/.182/.185/.350/.761 warm-liquid version: <ul style="list-style-type: none"> <li>Warm-liquid version: 70°C (158°F) maximum</li> </ul>
pH of the pumped media (liquid)	5.5–14
Liquid density	1100 kg/m <sup>3</sup> (9.2 lb per US gal) maximum
Depth of immersion	Maximum 20 m (65 ft)
Other	For the specific weight, current, voltage, power ratings, and speed of the pump, see the data plate of the pump.

## 8.2 Motor data

Feature	Description
Motor type	3127.060/.070/.091/.095/.161/.170/.182/.185/.191/.350/.390/.761/.771/.890: <ul style="list-style-type: none"> <li>Squirrel-cage induction motor</li> </ul> 3127.800/.810/.820/.830/.840/.850/.901/.911/.920/.930/.961/.971: <ul style="list-style-type: none"> <li>Line-started, permanent-magnet synchronous motor</li> </ul>
Frequency	50 Hz or 60 Hz
Supply	1-phase or 3-phase
Starting method	Star-delta Soft starter Direct on-line Variable Frequency Drive (VFD)
Maximum starts per hour	30 evenly spaced starts per hour
Code compliance	IEC 60034-1
Voltage variation without overheating	±10%, if it does not run continuously at full load
Voltage imbalance tolerance	2%
Stator insulation class	H (180°C [360°F])

### Motor encapsulation

Motor encapsulation is in accordance with IP68.



# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to [www.xylem.com](http://www.xylem.com)

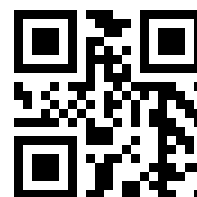


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and more information

The original instruction is in English. All non-English  
instructions are translations of the original instruction.

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# Flygt 3127.060/.070

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# 1 Introduction

## Purpose of this manual

The purpose of this manual is to provide necessary information on spare parts and accessories order.

## Disclaimer

Always use genuine Flygt parts. The use of other spare parts or accessories can invalidate any claims for warranty or compensation. Xylem does not take any responsibility for damages that are caused by the use of non-original parts. For more information, contact your local sales and service representative.

## Data for ordering spare parts

The following information is needed for spare part orders:

- Serial number of the product
- Part number
- Quantity of bulk material, see \* in tables

## 1.1 Specially approved products

### Qualification of personnel

Only Xylem or Xylem-authorized service personnel may undertake repair work on specially approved products.

### Dimensional accuracy inspection

Spare parts marked with (Ex) after the part number are subject to dimensional accuracy inspection when used in specially approved products.

# 2 Product Description

## Products included

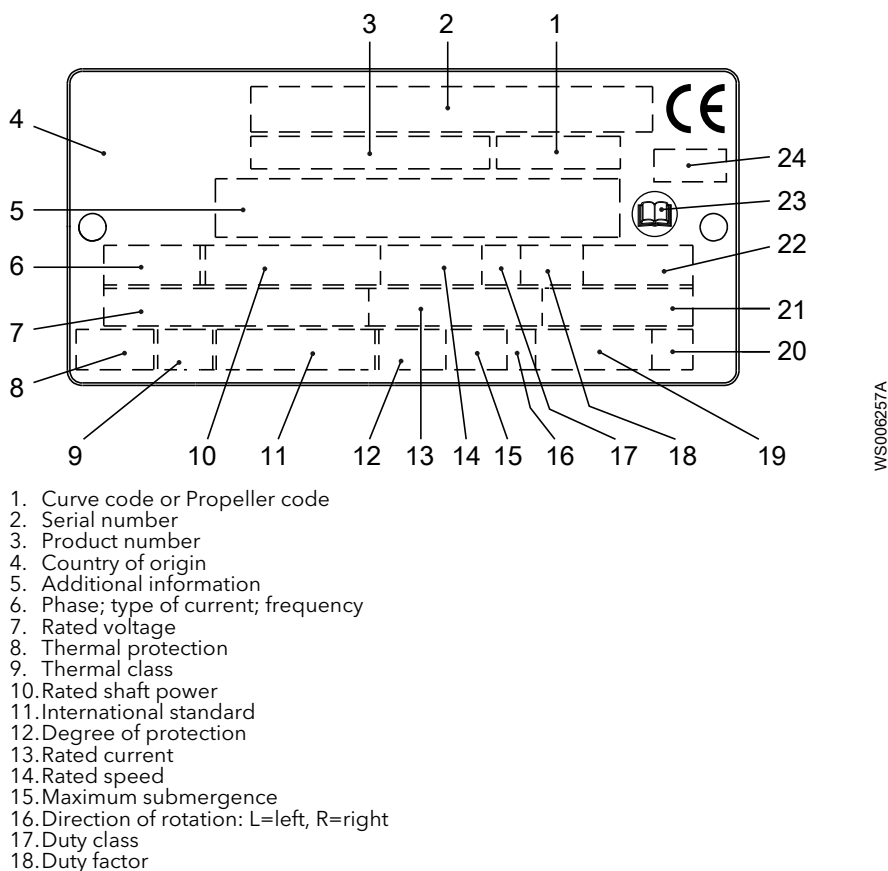
Pump	Non-explosion proof drive unit	Explosion proof drive unit	High Efficiency motor (LSPM)	C-hydraulic	D-hydraulic	F-hydraulic	H hydraulic	L hydraulic	P hydraulic	M-hydraulic (Grinder)	Chopper hydraulics	N hydraulic (Hard-Iron™)	Adaptive N™ hydraulic
3127.060	X												X <sup>1</sup>
3127.070		X											X <sup>1</sup>
<sup>1</sup> Hard-Iron™ <sup>2</sup> Stainless steel <sup>3</sup> Cast iron, gray													

## Pump-specific information

For the specific weight, current, voltage, power ratings, and speed of the pump, see the data plate of the pump.

## 2.1 The data plate

The data plate is a metal label that is located on the main body of the products. The data plate lists key product specifications. Specially approved products also have an approval plate.




- 19.Product weight
- 20.Locked rotor code letter
- 21.Power factor
- 22.Maximum ambient temperature
- 23.Read installation manual
- 24.Notified body, only for EN-approved Ex products

Figure 1: The data plate

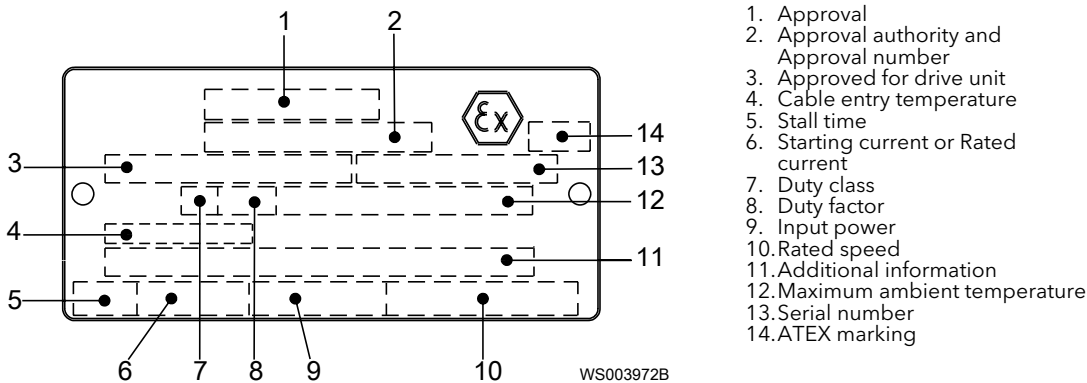
2.2 Approvals

Product approvals for hazardous locations

Pump	Approval
<ul style="list-style-type: none"><li>3127.070</li></ul>	European Norm (EN) <ul style="list-style-type: none"><li>• ATEX Directive</li><li>• EN 60079-0:2012/A11:2013, EN 60079-1:2007, EN 13463-1:2009, EN 13463-5:2011</li><li>•  II 2 G c Ex d IIB T4 Gb</li></ul>
	IEC <ul style="list-style-type: none"><li>• IECEx scheme</li><li>• IEC 60079-0, IEC 60079-1</li><li>• Ex d IIB T4 Gb</li></ul>
	FM (FM Approvals) <ul style="list-style-type: none"><li>• Explosion proof for use in Class I, Div. 1, Group C and D</li><li>• Dust ignition proof for use in Class II, Div. 1, Group E, F and G</li><li>• Suitable for use in Class III, Div. 1, Hazardous Locations</li></ul>
	CSA Ex <ul style="list-style-type: none"><li>• Explosion proof for use in Class I, Div. 1, Group C and D</li></ul>

EN approval plate

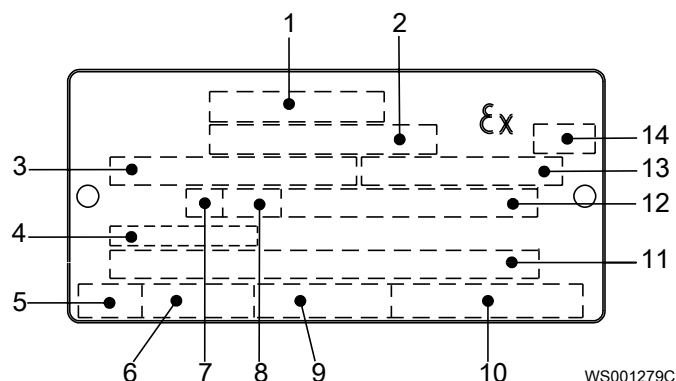
This illustration describes the EN approval plate and the information that is contained in its fields.



IEC approval plate

This illustration describes the IEC approval plate and the information that is contained in its fields.

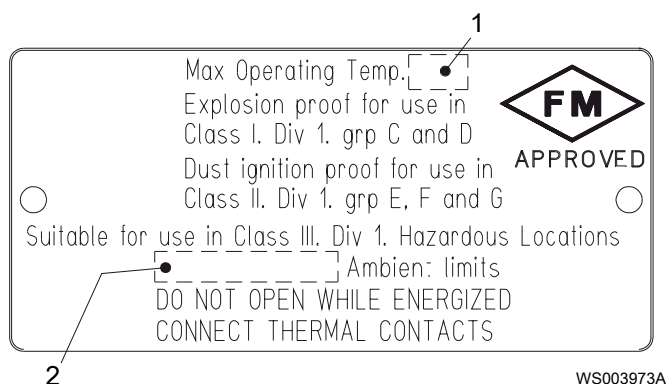
International Norm; not for EU member countries.



1. Approval
2. Approval authority and Approval number
3. Approved for drive unit
4. Cable entry temperature
5. Stall time
6. Starting current or Rated current
7. Duty class
8. Duty factor
9. Input power
10. Rated speed
11. Additional information
12. Maximum ambient temperature
13. Serial number
14. ATEX marking

### FM approval plate

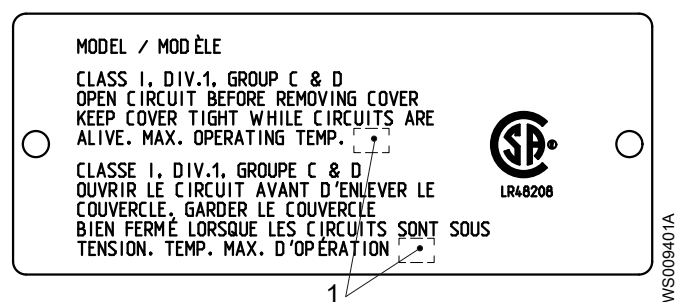
This illustration describes the FM approval plate and the information that is contained in its fields.



1. Temperature class
2. Maximum ambient temperature

### CSA approval plate

This illustration describes the CSA approval plate and the information that is contained in its fields.



1. Temperature class

## 2.3 Product denomination

### Reading instruction

In this section, code characters are illustrated accordingly:

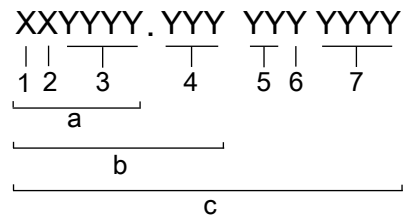
X = letter

Y = digit

The different types of codes are marked up with a, b and c. Code parameters are marked up with numbers.



## Codes and parameters



WS006265B

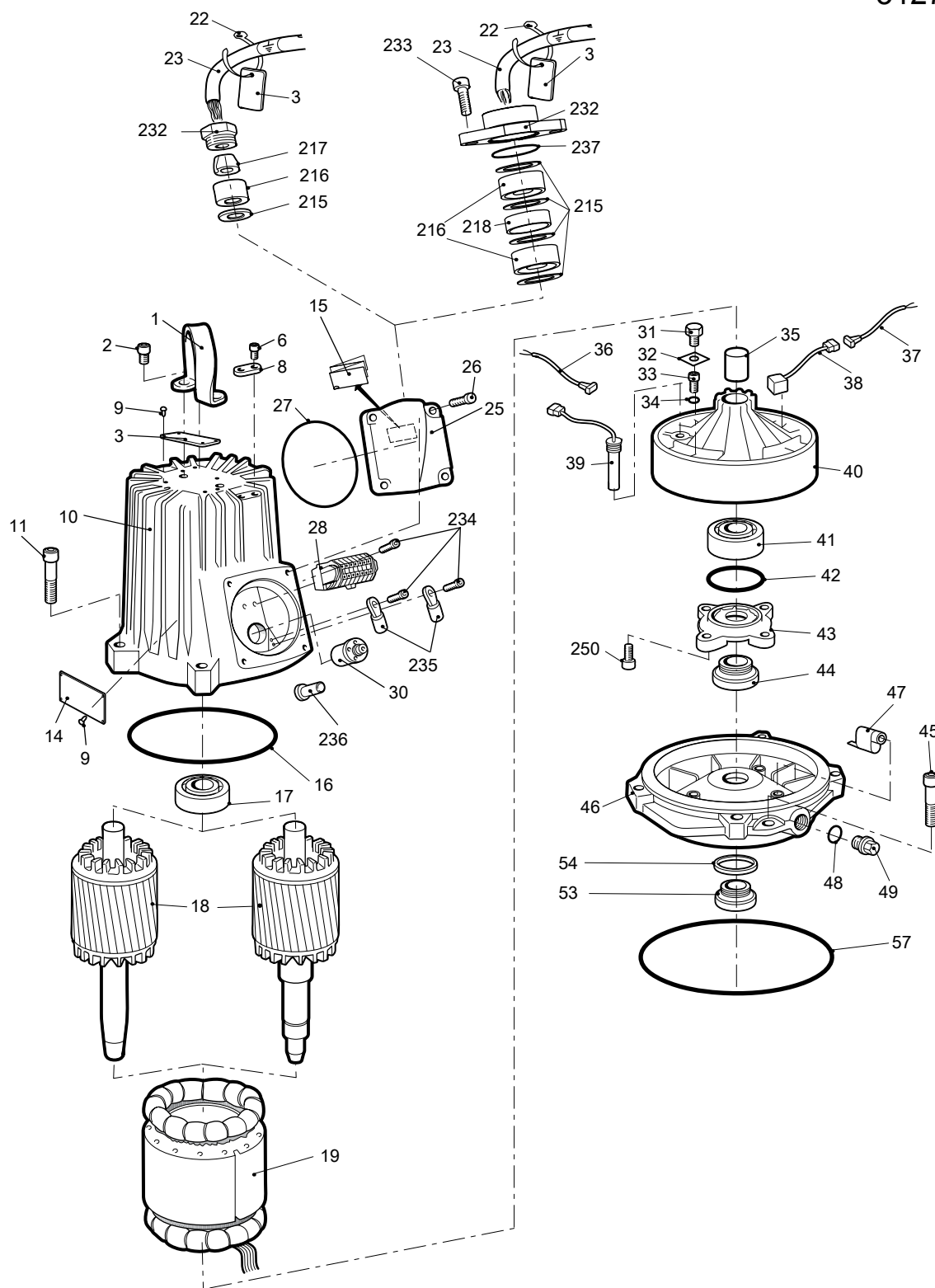
Type of Callout	Number	Indication
Type of code	a	Sales denomination
	b	Product code
	c	Serial number
Parameter	1	Hydraulic end
	2	Type of installation
	3	Sales code
	4	Version
	5	Production year
	6	Production cycle
	7	Running number

# 3 Exploded View

## 3.1 Drive Unit

### 3.1.1 Standard and explosion-proof

3127



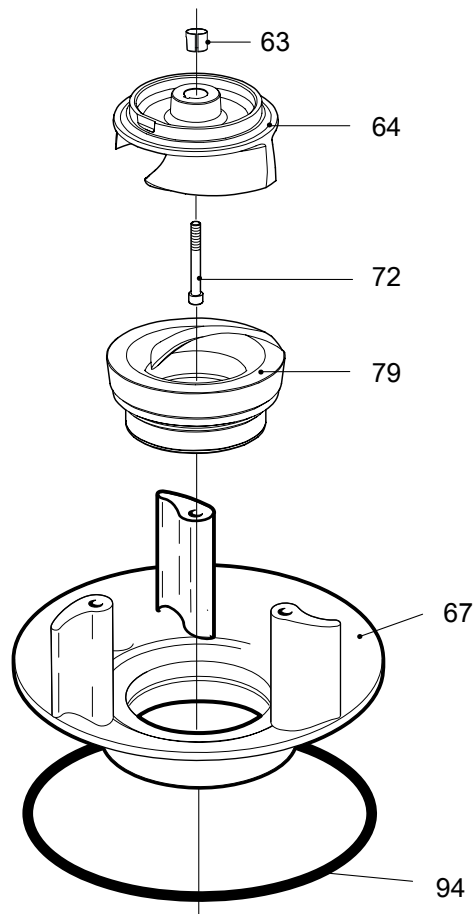
31582C

## 3.2 Hydraulic Unit

### 3.2.1 N\_LT

LL, Curve: 420 – 422

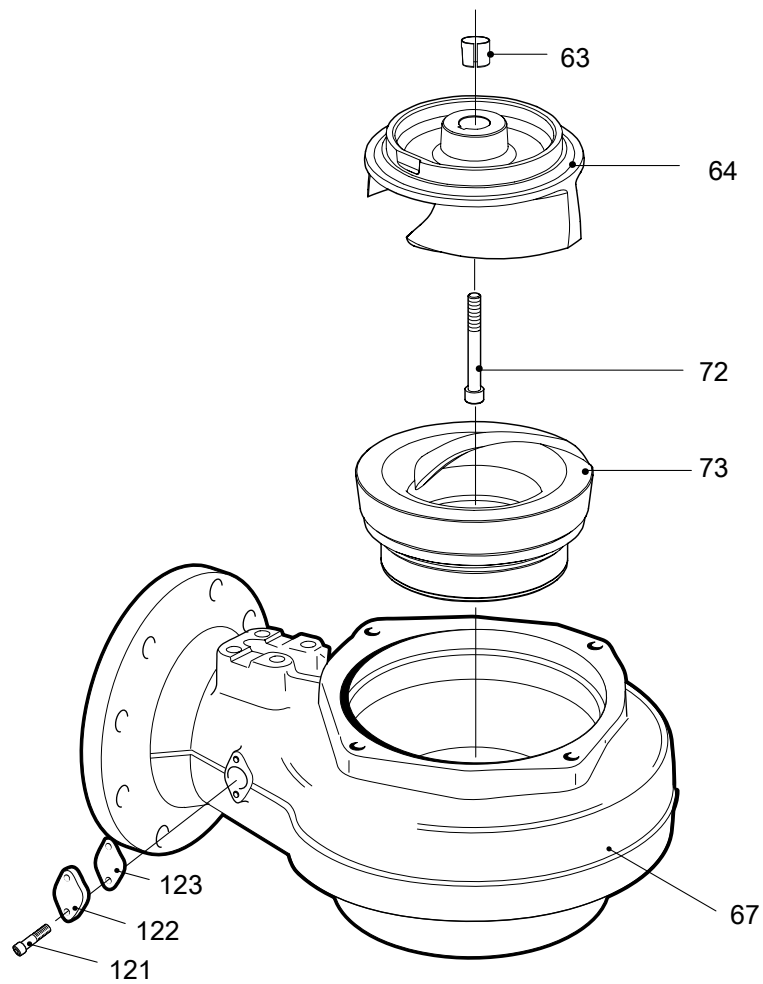
NL 3127 LT



30490B

### 3.2.2 N\_LT

Pump housing,  
N\_3127 LT

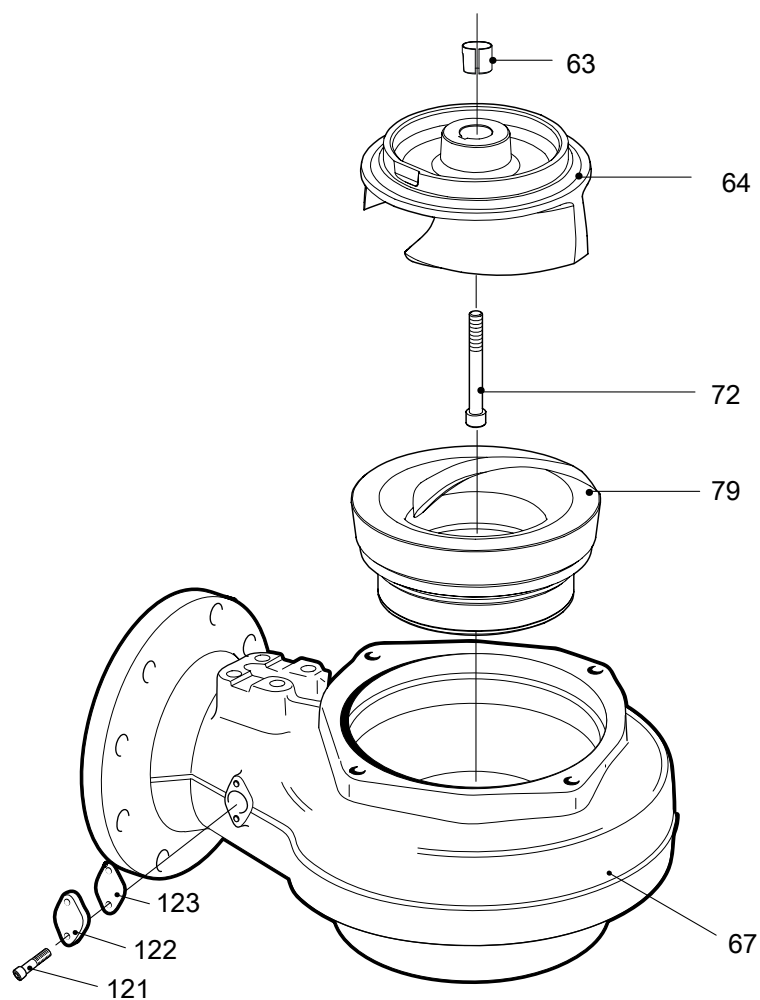


30491C

### 3.2.3 N\_ MT

Curve: 437 – 439

N\_ 3127 MT

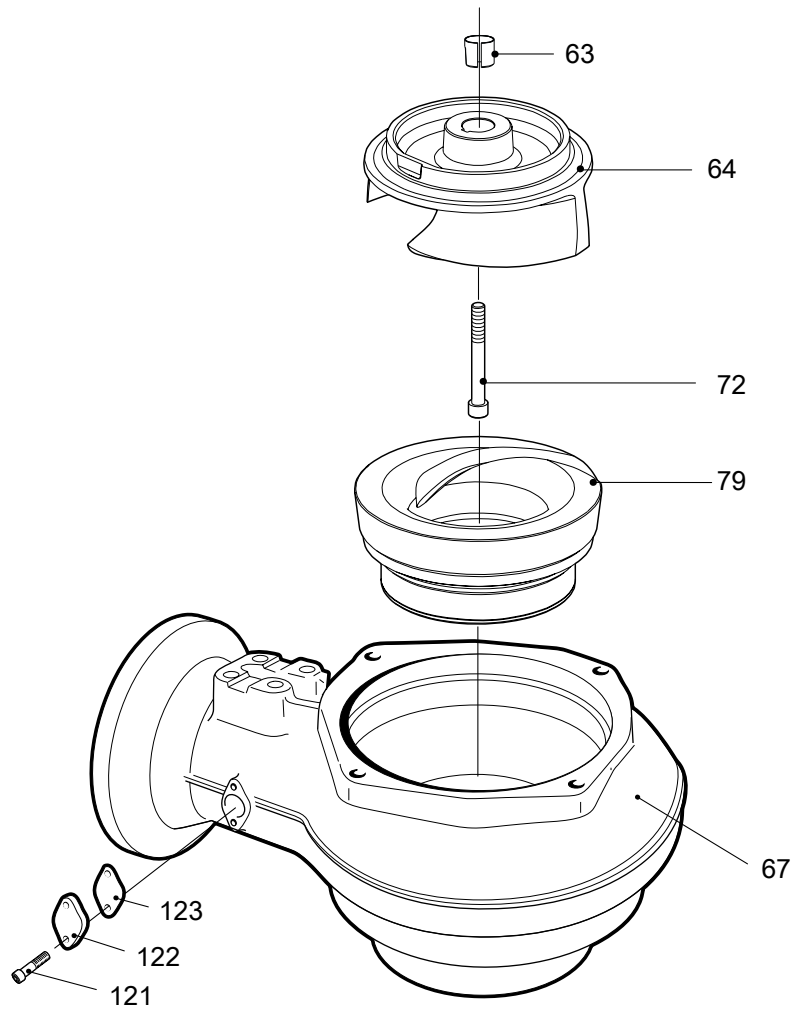


30564C

## 3.2.4 N\_HT

Curve: 486 – 489

N\_ 3127 HT

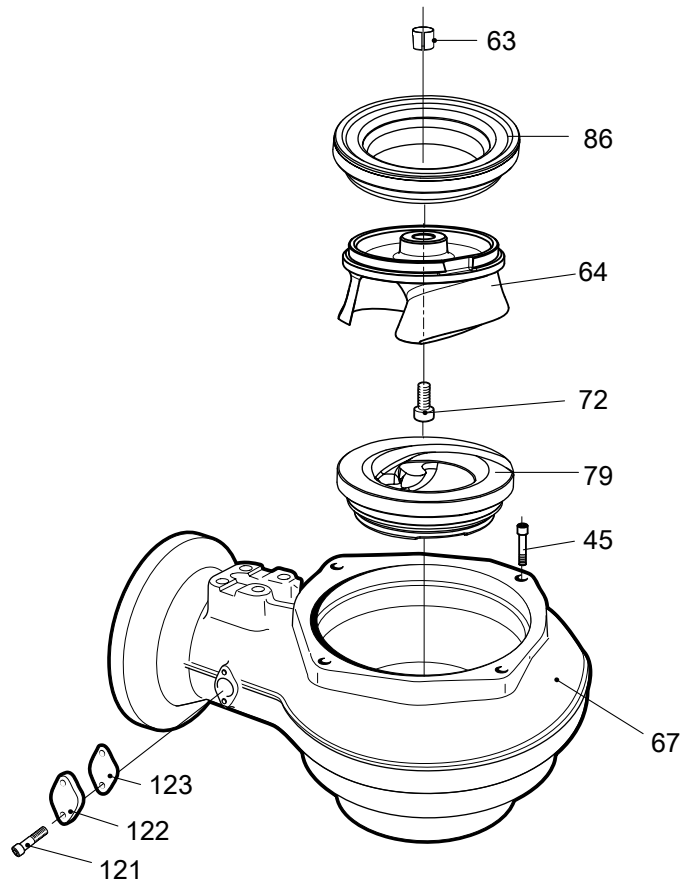


30931B

### 3.2.5 N\_SH

Curve: 245 – 249

N\_3127 SH

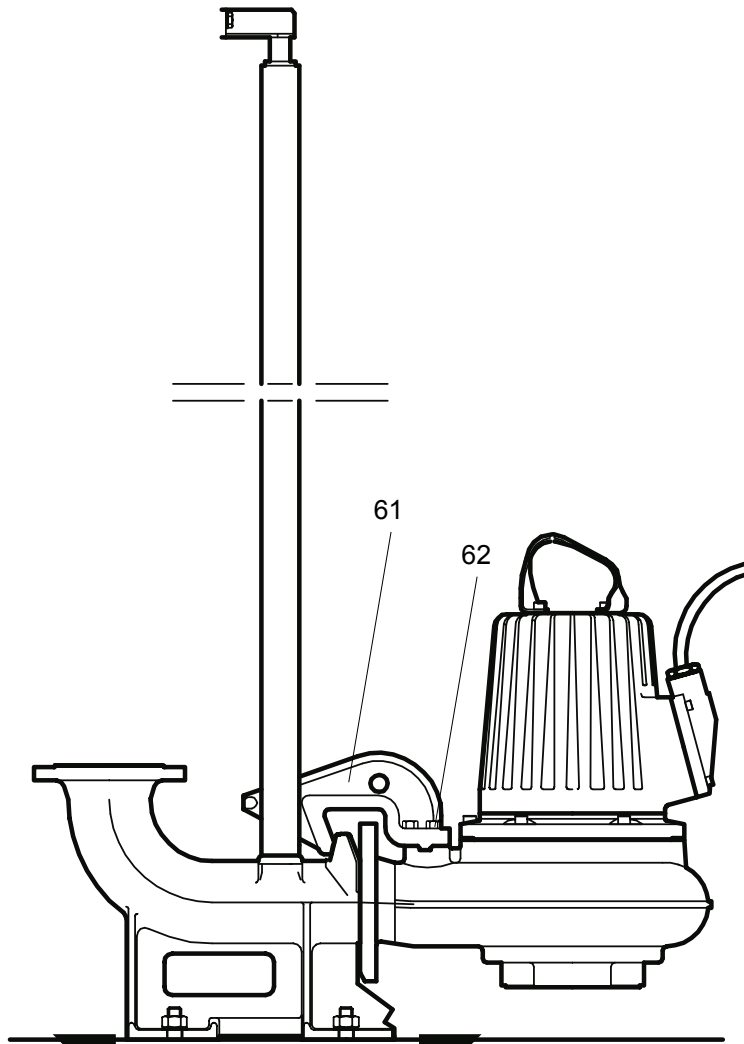


31400A

## 3.3 Installation Components

### 3.3.1 CP/FP/NP

CP/FP/NP 3127

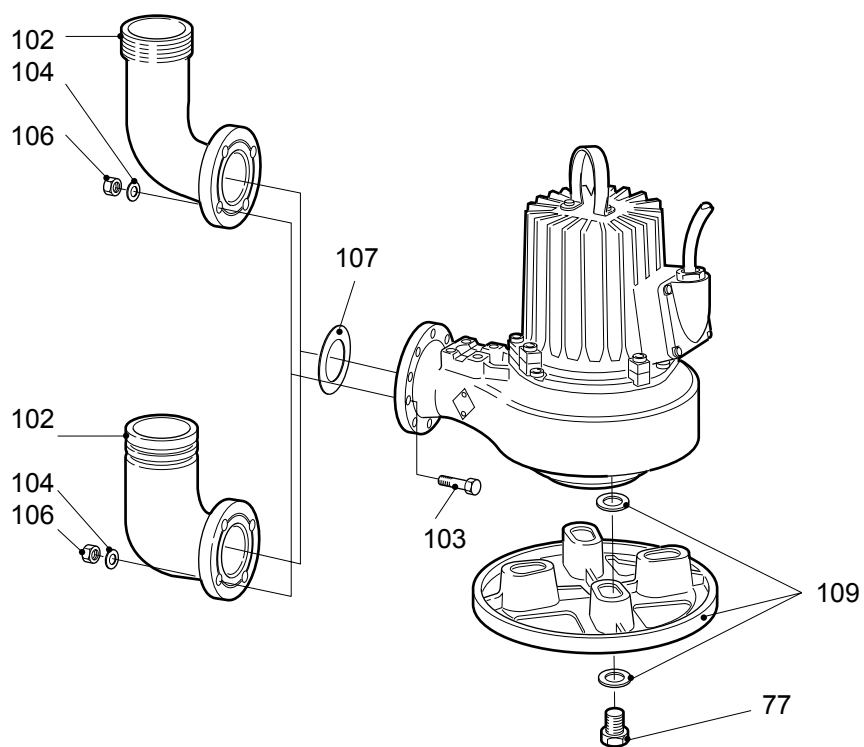


30741



### 3.3.2 CS/FS/NS

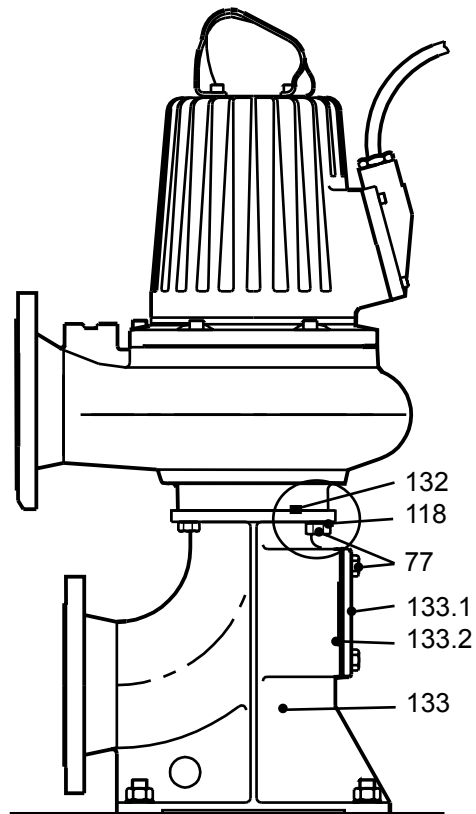
#### CS/DS/FS/NS 3127



30253B

## 3.3.3 CT/FT/NT

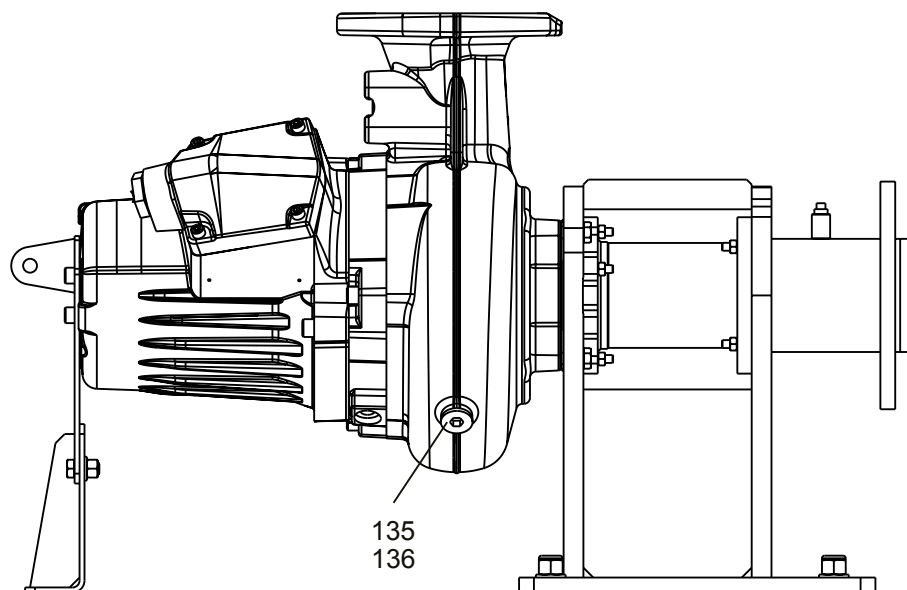
## CT/FT/NT 3127



30742

### 3.3.4 CZ/FZ/NZ

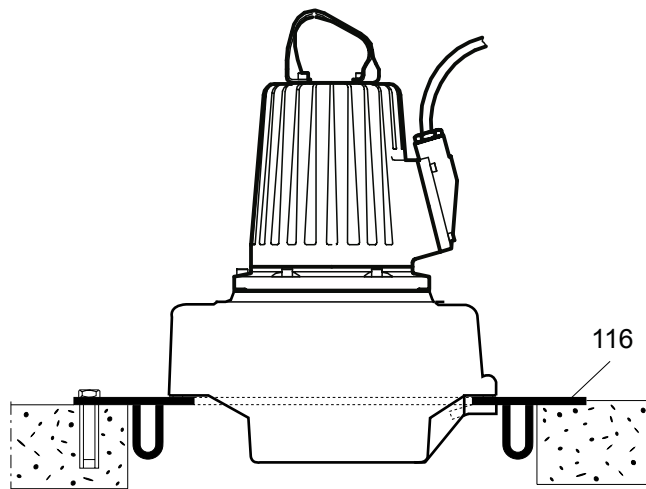
CZ/FZ/NZ 3127



31500

## 3.3.5 LL/NL

## LL/NL 3127



30275A

# 4 List of Parts

## 4.1 3127.060/.070

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
1	477 11 01		Lifting handle	1	1
2	83 03 23		Hex.socket hd screw M10X25-A4-70	2	2
3	630 68 00		Data plate USE 6306801 AS SPARE PART	2	2
6	83 02 58		Hex.socket hd screw M5X12-A4-70		2
8	279 29 00		Earthing plate		1
9	82 20 88		Drive screw 4X5-A2/A4	6	10
9	82 20 88		Drive screw 4X5-A2/A4	2	
10	443 53 00		Stator housing	1	
10	443 53 05	(Ex)	Stator housing		1
11	83 03 30		Hex.socket hd screw M10X60-A4-70	4	4
13	630 76 00		Plate HOT WATER PRODUCT	1	
14	630 69 00		Certificate plate EN		2
14	630 69 01	(Ex)	Certificate plate IECEX		2
14	630 70 00		Certificate plate FM		2
14	801 03 00		Name plate		1
15	772 17 00		Connection plate	1	1
16	82 74 97		O-ring 239.5X5.7 NBR	1	
16	82 80 86		O-ring 239.3X5.7 FPM	1	
16	82 74 97		O-ring 239.5X5.7 NBR		1
17	83 32 36		Ball bearing 6207,35X72X17	1	1
18	443 59 05		Shaft unit	1	
18	801 35 00		Shaft unit	1	
18	798 93 00	(Ex)	Shaft unit		1
18	798 92 00	(Ex)	Shaft unit		1
19	426 63 02		Stator 21-10-4a	1	1
19	426 63 01		Stator 21-10-4a	1	1
19	426 63 12		Stator 21-10-4a	1	1
19	426 63 28		Stator 21-10-4a	1	1
19	426 63 34		Stator 21-10-4a	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
19	426 63 38		Stator 21-10-4a 50 Hz 4-poles 380V D 660V Y P2=4,70kW 60 Hz 4-poles 440V-460V D P2=5,60kW/7,50hp	1	1
19	426 63 44		Stator 21-10-4a 50 Hz 4-poles 400V-440V D P2=4,70kW 60 Hz 4-poles 480V D P2=5,60kW/ 7,50hp	1	1
19	309 44 12		Stator 21-12-4a 60 Hz 4-poles 220V-230V Y// 440V-460V YSER Max P1=7KW 60 Hz 4-poles 220V-230V Y// 440V-460V YSER P2=7,50kW/10hp 1-phase 60 Hz 4-poles 220V-240V P2=5,60kW/7,50hp	1	1
19	309 44 28		Stator 21-12-4a 50 Hz 4-poles 190V-200V D P2=5,90kW 60 Hz 4-poles 200V-220V D P1=6,80KW 50 Hz 4-poles 190V-200V D Max P1=6,20KW 60 Hz 4-poles 200V-220V D P2=7,50kW/10hp	1	1
19	309 44 29		Stator 21-12-4a 60 Hz 4-poles 220V D 380V Y P1=6,80KW 60 Hz 4-poles 220V D 380V Y P2=7,50kW/10hp	1	1
19	309 44 30		Stator 21-12-4a 60 Hz 4-poles 380V D P1=6,80KW 60 Hz 4-poles 380V D 660V Y P2=7,50kW/10hp	1	1
19	309 44 34		Stator 21-12-4a 50 Hz 4-poles 220V-230V D 380V-400V Y P2=5,90kW 60 Hz 4-poles 260V D 440V-460V Y P1=6,80KW 50 Hz 4-poles 220V-230V D 380V-400V Y Max P1=6,20KW 60 Hz 4-poles 260V D 440V-460V Y P2=7,50kW/10hp 50 Hz 4-poles 230V D 400V Y P2=7,50kW	1	1
19	309 44 38		Stator 21-12-4a 50 Hz 4-poles 380V-415V D 690V Y P2=7,50kW 50 Hz 4-poles 380V-400V D 660V-690V Y P2=5,90kW 60 Hz 4-poles 440V-460V D P1=6,90KW 50 Hz 4-poles 380V-400V D 660V-690V Y Max P1=6,30KW 60 Hz 4-poles 440V-460V D P2=7,50kW/10hp	1	1
19	309 44 40		Stator 21-12-4a 60 Hz 4-poles 400V D P1=6,90KW 60 Hz 4-poles 400V D P2=7,50kW/ 10hp	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
19	309 44 44		Stator 21-12-4a 50 Hz 4-poles 400V-440V D P2=5,90kW 50 Hz 4-poles 400V-440V D P1=6,20kW	1	1
19	309 49 12		Stator 21-11-2a 60 Hz 2-poles 220V-230V Y// 440V-460V YSER P2=8,20kW/11hp	1	1
19	309 49 28		Stator 21-11-2a 50 Hz 2-poles 190V-200V D P2=7,40kW 60 Hz 2-poles 200V-220V D P2=8,20kW/11hp	1	1
19	309 49 29		Stator 21-11-2a 60 Hz 2-poles 220V-230V D 380V Y P2=8,20kW/11hp	1	1
19	309 49 30		Stator 21-11-2a 60 Hz 2-poles 380V D 660V Y P2=8,20kW/11hp	1	1
19	309 49 34		Stator 21-11-2a 50 Hz 2-poles 220V D 380V Y P2=7,40kW 60 Hz 2-poles 260V D 440V-460V Y P2=8,20kW/11hp	1	1
19	309 49 38		Stator 21-11-2a 50 Hz 2-poles 380V D 660V Y P2=7,40kW 60 Hz 2-poles 440V-460V D P2=8,20kW/11hp	1	1
19	309 49 40		Stator 21-11-2a 60 Hz 2-poles 400V D P2=8,20kW/ 11hp	1	1
19	309 49 44		Stator 21-11-2a 50 Hz 2-poles 400V-440V D P2=7,40kW 60 Hz 2-poles 480V D P2=8,20kW/ 11hp	1	1
19	309 49 52		Stator 21-11-2a 50 Hz 2-poles 500V D P2=7,40kW 60 Hz 2-poles 575V-600V D P2=8,20kW/11hp	1	1
19	309 49 01		Stator 21-11-2a 50 Hz 2-poles 230V D 400V Y P2=7,40kW	1	1
19	309 49 02		Stator 21-11-2a 50 Hz 2-poles 400V D 690V Y P2=7,40kW	1	1
22	83 45 59		Cable tie 200X2.4 PA 6/6 -55+105	1	1
23	94 20 42		Motor cable subcab 4G2.5	*	*
23	94 20 43		Motor cable subcab 4G4	*	*
23	94 20 59		Motor cable subcab 4G2.5+2X1.5	*	*
23	94 20 60		Motor cable subcab 4G4+2X1.5	*	*
23	94 20 82		Motor cable subcab 7G2.5+2X1.5	*	*
23	94 20 80		Motor cable subcab 7G4+2X1.5	*	*
23	94 20 56		Motor cable subcab 4G6+2X1.5	*	*
23	94 19 81		Motor cable subcab 4G10+S(2X0.5)	*	*
23	94 17 23		Motor cable 3X2,5MM	*	*
23	94 19 90		Motor cable subcab S3X2.5+3X2.5/3+S(4X0.5)	*	*
23	94 17 24		Motor cable SCREENED 6X2,5+2*1,5	*	*
25	443 51 00		Entrance cover	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
25	443 50 00	(Ex)	Entrance cover	1	1
25	443 50 03		Entrance cover		1
26	83 04 45		Hex.socket hd screw M8X35-A4-80	4	4
27	82 74 78		O-ring 124.5X3.0-NBR	1	
27	82 95 60		O-ring 123X3 FPM	1	
27	82 74 78		O-ring 124.5X3.0-NBR		1
30	734 59 00		El.lead through unit 12X + 6X	1	
30	734 59 00		El.lead through unit 12X + 6X		1
			Sealed stator housing Leakage detector in the stator house: FLS SmartRun possible Sealed stator housing		
31	439 44 01	(Ex)	Screw M14X1.25		3
32	596 07 00	(Ex)	Square washer		3
33	82 17 64		Cutting screw TAPTITE-M6X20	3	3
34	82 50 60		Sealing washer DUBO NR 301	3	3
35	443 57 00		Sleeve SIS 14 41 04-6	1	
35	443 57 01		Sleeve SIS 14 41 04-6	1	
36	504 78 06		Cable unit	1	
37	504 78 07		Cable unit	1	1
38	518 89 02		Leakage sensor (FLS)	1	1
39	505 12 00		Leakage sensor (CLS30)	1	
40	800 27 00		Bearing holder	1	
40	800 27 02		Bearing holder	1	
40	443 55 11		Bearing holder EX.VERSION		1
41	83 30 17		Ball bearing 35X80X34.9 MM	1	1
42	82 78 15		O-ring 78X4 NBR	1	
42	82 79 18		O-ring 78X4 FPM	1	
42	82 78 15		O-ring 78X4 NBR		1
43	614 49 00		Bearing cover	1	1
44	720 63 31		Mechanical seal AL203/WCCR FPM	1	
44	720 63 30		Mechanical seal WCCR/WCCR FPM	1	
44	720 63 31		Mechanical seal AL203/WCCR FPM		1
44	720 63 30		Mechanical seal WCCR/WCCR FPM		1
45	83 03 48		Hex.socket hd screw M12X40-A4-70	5	5
46	761 16 00		Oil housing bottom MECH. SEAL 720 63 XX	1	
46	761 16 01		Oil housing bottom MECH. SEAL 549 07 XX	1	
46	761 16 00		Oil housing bottom MECH. SEAL 720 63 XX		1
47	443 49 00		Sleeve	1	1
48	82 73 90		O-ring 19.2X3 NBR	2	
48	82 72 95		O-ring 19.2X3 FPM	2	
48	82 73 90		O-ring 19.2X3 NBR		2
49	428 22 17		Inspection screw BRASS	2	2



Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
53	720 63 00		Mechanical seal WCCR/WCCR FPM, NBR	1	1
53	720 63 02		Mechanical seal RSIC/RSIC FPM	1	1
53	549 07 01		Mechanical seal WCCR/WCCR FPM	1	
54	591 79 00		Insert ring	1	
57	82 74 98		O-ring 249.3X5.7 NBR	1	1
59	436 10 00		Ring		1
61	380 91 00		Sliding bracket	1	1
62	83 04 53		Hex.socket hd screw M12X45-A4-80	4	4
63	798 81 00		Sleeve unit	1	1
64	798 70 03		Impeller unit LT 50Hz Curve code: 424	1	1
64	798 70 19		Impeller unit LT 50Hz Curve code: 425 LT 60Hz Curve code: 425	1	1
64	798 70 41		Impeller unit LT 50Hz Curve code: 426 LT 60Hz 1-phase Curve code: 426	1	1
64	798 64 00		Impeller unit MT 50Hz Curve code: 437	1	1
64	798 64 18		Impeller unit MT 50Hz Curve code: 438 MT 60Hz Curve code: 438	1	1
64	798 64 32		Impeller unit MT 50Hz Curve code: 439 MT 60Hz 1-phase Curve code: 439	1	1
64	798 52 00		Impeller unit SH 50Hz Curve code: 245	1	1
64	798 52 07		Impeller unit SH 50Hz Curve code: 246	1	1
64	798 52 16		Impeller unit SH 50Hz Curve code: 247 SH 60Hz Curve code: 247	1	1
64	798 52 25		Impeller unit SH 50Hz Curve code: 248 SH 60Hz Curve code: 248	1	1
64	798 52 34		Impeller unit SH 50Hz Curve code: 249 SH 60Hz Curve code: 249	1	1
64	798 58 03		Impeller unit HT 50Hz Curve code: 486	1	1
64	798 58 23		Impeller unit HT 50Hz Curve code: 487 HT 60Hz Curve code: 487	1	1
64	798 58 43		Impeller unit HT 50Hz Curve code: 488 HT 60Hz Curve code: 488	1	1
64	798 58 63		Impeller unit HT 50Hz Curve code: 489 HT 60Hz 1-phase Curve code: 489	1	1
67	309 27 22		Pump housing LT N DN 150 Installation: P	1	1
67	465 14 22		Pump housing HT N DN 100 Installation: P	1	1
67	309 25 20		Pump housing MT N DN 150 Installation: P	1	1
67	426 44 20		Pump housing MT N DN 100 Installation: P	1	1
67	309 26 30		Pump housing SH N DN 80 Installation: P	1	1
67,1	84 90 93		Seal ring	1	
67	309 27 26		Pump housing LT N DN 150 Drilled acc. to: EN 1092-2 tab. 9 ANSI B16.1-89; tab.5 Installation: P S T X	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
67	309 25 26		Pump housing MT N DN 150 Drilled acc. to: EN 1092-2 tab. 9 ANSI B16.1-89; tab.5 Installation: P S T X	1	1
67	426 44 22		Pump housing MT N DN 100 Drilled acc. to: EN 1092-2 tab. 9 Installation: P S T X	1	1
67	426 44 21		Pump housing MT N DN 100 Drilled acc. to: ANSI B16.1-89; tab.5 Installation: P T X	1	1
67	465 14 24		Pump housing HT N DN 100 Drilled acc. to: EN 1092-2 tab. 9 Installation: P S T X	1	1
67	465 14 05		Pump housing HT N DN 100 Drilled acc. to: ANSI B16.1-89; tab.5 Installation: P T X	1	1
67	309 26 61		Pump housing SH N DN 80 Drilled acc. to: EN 1092-2 tab. 9 Installation: P S T X	1	1
67,1	84 90 93		Seal ring	1	
67	309 26 05		Pump housing SH N DN 80 Drilled acc. to: ANSI B16.1-89; tab.5 Installation: P S T X	1	1
67	309 27 36		Pump housing LT N DN 150 Drilled acc. to: EN 1092-2 tab. 9 ANSI B16.1-89; tab.5 Installation: Z Drainage plug	1	1
67	309 25 36		Pump housing MT N DN 150 Drilled acc. to: EN 1092-2 tab. 9 ANSI B16.1-89; tab.5 Installation: Z Drainage plug	1	1
67	426 44 31		Pump housing MT N DN 100 Drilled acc. to: EN 1092-2 tab. 9 Installation: Z Drainage plug	1	1
67	426 44 35		Pump housing MT N DN 100 Drilled acc. to: ANSI B16.1-89; tab.5 Installation: Z Drainage plug	1	1
67	465 14 31		Pump housing HT N DN 100 Drilled acc. to: EN 1092-2 tab. 9 Installation: Z Drainage plug	1	1
67	465 14 35		Pump housing HT N DN 100 Drilled acc. to: ANSI B16.1-89; tab.5 Installation: Z Drainage plug	1	1
67	309 26 81		Pump housing SH N DN 80 Drilled acc. to: EN 1092-2 tab. 9 Installation: Z Drainage plug	1	1
67	309 26 85		Pump housing SH N DN 80 Drilled acc. to: ANSI B16.1-89; tab.5 Installation: Z Drainage plug	1	1
67	396 73 00		Diffuser coat. LT N Column pipe DN 600 Installation: L	1	1
72	83 02 67		Hex.socket hd screw M12X70-A4-70	1	1
77	81 41 81		Hexagon head screw M16X40-A4-70	4	4
77	81 49 12		Hexagon head screw M12X35-A4-70	4	4
79	817 99 00		Insert ring LT 50Hz LT 60Hz	1	1
79	705 80 00		Insert ring MT 50Hz MT 60Hz	1	1
79	725 39 00		Insert ring SH 50Hz SH 60Hz	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
79	705 82 00		Insert ring HT 50Hz HT 60Hz	1	1
86	769 79 00		Insert ring	1	1
87	80 97 40		Stud 12X35-A4-70	2	2
94	82 83 41		G-ring	1	1
97	84 34 38		Hexagon head screw M20X120-A2-70	4	4
98	82 35 26		Plain washer 21X37X3-A2-170HV	4	4
99	82 23 62		Hexagon nut M20-A2-70	4	4
102	309 80 00		Discharge connection 8" LT DN 200	1	1
102	259 82 04		Discharge connection DN100 SH DN 100 HT DN 100	1	1
102	259 84 05		Discharge connection 4-8 NPSM HT Thread: 4-8 NPSM Outer DN 100 MT Thread: 4-8 NPSM Outer DN 100	1	1
102	259 84 06		Discharge connection ISO G4" MT Thread: ISO G4A Outer DN 100 HT Thread: ISO G4A Outer DN 100	1	1
102	295 57 00		Discharge connection DN150 MT LT DN 150	1	1
102	309 31 00		Discharge connection DN150 MT LT Thread: 6-8 NPSM Outer DN 150	1	1
102	385 52 04		Discharge connection ISO G3" SH Thread: ISO G3 Outer DN 75 Quick coupling: Storz	1	1
102	309 31 01		Discharge connection DN150 MT Thread: ISO G6A Outer Quick coupling: Storz DN 150	1	1
102	340 88 00		Discharge connection 4" HT DN 100	1	1
102	340 89 00		Discharge connection 4-8 NPSM HT Thread: 4-8 NPSM OuterDN 100	1	1
102	310 03 01		Discharge connection DN80 HT DN 75	1	1
102	385 52 03		Discharge connection 3-8 NPSM SH Thread: 3-8 NPSM Outer DN 75	1	1
103	81 49 60		Hexagon head screw M20X70-A4-70 MT LT	8	8
103	81 49 35		Hexagon head screw M16X60-A4-70 HT MT SH	4	4
103	81 49 36		Hexagon head screw M16X65-A4-70 HT SH	4	4
103	84 34 32		Hexagon head screw M20X70-A2-70 Optional	2	
104	82 35 78		Plain washer 17X30X3-A4-170HV HT MT SH	4	4
104	82 38 00		Plain washer 13X24X4-A4-170HV HT SH	8	8
106	82 23 38		Hexagon nut M20-A4-70 MT LT	8	8
106	82 23 37		Hexagon nut M16-A4-70 HT MT SH	4	4
106	82 23 35		Hexagon nut M12-A4-70 HT	2	2
107	295 64 00		Gasket 6" MT LT	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
107	259 83 00		Gasket 4" HT MT SH	1	1
107	310 05 00		Gasket 3" HT SH	1	1
107	339 87 00		Gasket HT	1	1
109	436 94 01		Stand unit MT LT SH	1	1
109	436 94 00		Stand unit HT SH	1	1
111	83 18 46		Coupling part SH Thread: ISO G3 Outer DN 75 Quick coupling: Storz	1	1
111	83 19 36		Coupling part MT Thread: ISO G6A Outer Quick coupling: Storz DN 150	1	1
111	83 18 28		Coupling part Optional	1	
116	416 13 01		Plate 393X8	1	
118	82 35 78		Plain washer 17X30X3-A4-170HV LT MT	4	4
118	82 35 77		Plain washer 13X24X2.5-A4-170HV HT SH	4	4
121	83 03 23		Hex.socket hd screw M10X25-A4-70	2	2
122	433 56 00		Cover	1	1
123	647 99 00		Gasket	1	1
125	396 70 00		Puller screw compl. M16X265 10.9	1	1
125	438 58 00		Hexagon head screw M16X218 10.9 Optional	1	1
132	82 74 88		O-ring 174.3X5.7 NBR	1	1
132	82 74 86		O-ring 164.3X5.7 NBR	1	1
132	82 74 17		O-ring 124.3X5.7-NBR	1	1
133	309 46 00		Suction connection Undrilled	1	1
133,1	309 48 00		Cleaning door	1	1
133,2	303 88 00		Gasket	1	1
133,3	81 41 81		Hexagon head screw M16X40-A4-70	4	4
133	309 46 06		Suction connection LT Drilled according to : EN 1092-2 tab. 8 ANSI B16.1-89; tab.5 DN 200	1	1
133,1	309 48 00		Cleaning door	1	1
133,2	303 88 00		Gasket	1	1
133,3	81 41 81		Hexagon head screw M16X40-A4-70	4	4
133	309 46 07		Suction connection LT Drilled according to : EN 1092-2 tab. 9 DN 200	1	1
133,1	309 48 00		Cleaning door	1	1
133,2	303 88 00		Gasket	1	1
133,3	81 41 81		Hexagon head screw M16X40-A4-70	4	4
133	303 85 00		Suction connection STATIONARY Undrilled MT	1	1
133,1	303 87 00		Cleaning door	1	1
133,2	303 88 00		Gasket	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
133	303 85 06		Suction connection STATIONARY MT Drilled according to : EN 1092-2 tab. 9 ANSI B16.1-89; tab.5 DN 150	1	1
133,1	303 87 00		Cleaning door	1	1
133,2	303 88 00		Gasket	1	1
133,3	81 41 81		Hexagon head screw M16X40-A4-70	4	4
133	303 72 00		Suction connection STATIONARY Undrilled HT SH	1	1
133,1	81 49 06		Hexagon head screw M12X30-A4-70	4	4
133,2	303 76 00		Cleaning door	1	1
133,3	303 77 00		Gasket	1	1
133	303 72 01		Suction connection STATIONARY HT SH Drilled according to : EN 1092-2 tab. 9 DN 100	1	1
133,1	81 49 06		Hexagon head screw M12X30-A4-70	4	4
133,2	303 76 00		Cleaning door	1	1
133,3	303 77 00		Gasket	1	1
133	303 72 05		Suction connection SH HT Drilled according to : ANSI B16.1-89; tab.5 DN 100	1	1
133,1	81 49 06		Hexagon head screw M12X30-A4-70	4	4
133,2	303 76 00		Cleaning door	1	1
133,3	303 77 00		Gasket	1	1
134	554 30 15		Starter START 351-400-B-532-14	1	
135	80 14 41		Gasket LT	1	1
			MT		
			SH		
			HT		
135	80 14 41		Gasket LT	2	2
			MT		
			SH		
			HT		
136	80 14 39		Plug LT	1	1
			MT		
			SH		
			HT		
136	80 14 39		Plug LT	2	2
			MT		
			SH		
			HT		
162	93 00 77		Shrink hose ID=6.4 MM	*	*
169	667 40 00		Sticker	2	2
215	82 40 61		Plain washer 24.5X35X2-A2-70	1	1
215	82 40 82		Plain washer 34.5X52X2-A2-70	4	4
216	84 17 91		Seal sleeve (12)-14 MM FPM	1	1
216	84 17 93		Seal sleeve (16)-18 MM NBR	1	1
216	84 18 02		Seal sleeve (20)-23 MM NBR	2	2
216	84 18 03		Seal sleeve (23)-26 MM NBR	2	2
216	84 17 92		Seal sleeve (14)-16 MM NBR	1	1
216	84 17 94		Seal sleeve (18)-20 MM NBR	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
217	678 58 14		Cable clip 12-(14) MM	1	1
217	678 58 18		Cable clip 16-(18) MM	1	1
217	678 58 16		Cable clip 14-(16) MM	1	1
217	678 58 20		Cable clip 18-(20) MM	1	1
218	597 98 02		Sleeve	1	1
229	82 70 86		Cap 6X16 MM PVC	1	1
230	83 44 23		Closed-end splice 4.0-9.0 (AWG 8)	2	2
230	83 42 62		Closed-end splice 0.33-0.82 (AWG 22-18)	2	2
231	94 03 33		Shrink hose ID=3.2 MM	*	*
231	94 03 34		Shrink hose ID=6.4 MM	*	*
232	397 81 00		Gland screw Pr 37	1	1
232	642 17 00		Entrance flange (20)-32 MM	1	1
233	83 03 48		Hex.socket hd screw M12X40-A4-70	2	2
234	82 17 61		Cutting screw TAPTITE-M6X12	3	3
235	83 43 58		Cable lug UL/CSA 1.04-2.62 MM2 M6	1	1
235	83 42 96		Cable lug 2.5-6 MM2 M6	1	1
235	83 43 48		Cable lug CSA 10 MM2 M6	1	1
235	83 43 62		Cable lug UL/CSA 0.50-1.65 MM2 M6	1	1
236	83 44 23		Closed-end splice 4.0-9.0 (AWG 8)	1	1
236	83 42 65		Terminal block 600V/20A UL	2	2
236	83 42 65		Terminal block 600V/20A UL	3	3
236	83 42 65		Terminal block 600V/20A UL	1	
236	83 42 67		Terminal block 600V/20A UL	2	
236	83 44 24		Closed-end splice 3-6 (AWG 12-10)	2	2
237	82 74 63		O-ring 49.5X3 NBR	1	1
238	83 53 21		Terminal clamp SAK6/35 038056 EL-AUTOM	6	6
238	83 53 30		Terminal clamp SAK10/35 EL-AUTM	6	
238	83 53 30		Terminal clamp SAK10/35 EL-AUTM		6
239	83 53 22		End plate APPA - 11796	1	1
240	83 53 31		End support 35X15	2	2
241	443 68 00		Rail 35X15	1	1
242	722 00 00		Marking plate 5-GW (U1,V1,W1,W2,U2,V1)	2	
242	722 00 00		Marking plate 5-GW (U1,V1,W1,W2,U2,V1)		2
243	471 77 01		Marking strip 5-GW (U1,V1,W1,W2,U2,V1)	2	2
250	82 17 64		Cutting screw TAPTITE-M6X20	4	4
350	799 11 00		Cable entry kit	1	1
350	799 56 00		Cable entry kit	1	1
800	80 32 33		O-ring kits 3127.090,170,180,890 <40 GR NOT FOR: D,F,ST	1	1
800	80 32 74		O-ring kits 3127.090/180F,D,SUP.HT <40 GR FOR D,F,ST NBR	1	1

Pos. No	Part. No	Type	Denomination	Qty/Version	
				060	070
900	601 89 09		Basic repair kit 3127.090,180 TUNGSTEN CARBIDE - TUNGSTEN CARBIDE. TUNGSTEN CARBIDE - TUNGSTEN CARBIDE.	1	1
900	601 89 10		Basic repair kit 3127.090,180 TUNGSTEN CARBIDE - TUNGSTEN CARBIDE. TUNGSTEN CARBIDE - TUNGSTEN CARBIDE.	1	1
900	693 19 00		Basic repair kit NBR D 35MM, WCCR/WCCR D35WCCR/AI203 ACTIVE	1	1
900	693 19 01		Basic repair kit NBR D 35MM, WCCR/WCCR D35WCCR/AI203 ACTIVE	1	1
900	693 19 02		Basic repair kit NBR D 35MM, SIC/SIC D35WCCR/AI203 ACTIVE	1	
900	693 19 03		Basic repair kit NBR D 35MM, SIC/SIC D35WCCR/AI203 ACTIVE	1	
900	693 19 06		Basic repair kit	1	1
900	693 19 07		Basic repair kit	1	1
901	90 17 52		Oil ISO VG 32	2	2
904	436 97 00		Mounting tool	1	1
912	82 73 90		O-ring 19.2X3 NBR	4	
912	82 74 78		O-ring 124.5X3.0-NBR	1	
912	82 72 95		O-ring 19.2X3 FPM	4	
912	82 95 60		O-ring 123X3 FPM	1	
912	82 73 90		O-ring 19.2X3 NBR		4
912	82 74 78		O-ring 124.5X3.0-NBR		1





# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to [www.xylem.com](http://www.xylem.com)



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The original instruction is in English. All non-English  
instructions are translations of the original instruction.

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