



## **Operating and maintenance manual for construction and drainage pump**

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Edition 2015, rev. 1

type  
Sito P400  
Sito P750

## **Introduction**

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Thank you for selecting Soroto submersible vortex pump.

This instruction manual explains the product operations and gives important precautions regarding its safe use. In order to use the product to maximum benefit, be sure to read the instructions thoroughly and follow them carefully.

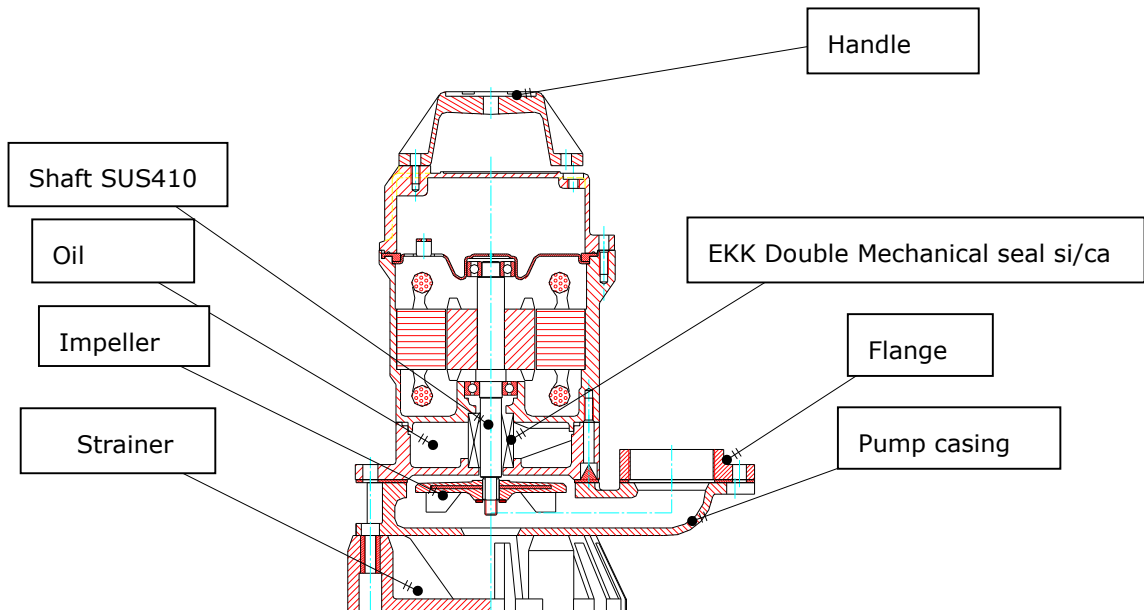
To avoid accident, do not use the pump in any way other than as described in this instruction manual especial on **! WARNING**. After reading this instruction manual, keep it nearby as a reference in case questions arise during use.

If this instruction manual should become lost or damaged, ask your nearest dealer or representative for another copy.

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## Construction



## Prior to operation

Check the following points upon receipt of your pump:

- Is the pump exactly what you ordered? Check nameplate. It is especially important that you check whether the pump is to be used with 50 or 60 Hz.
- Has any damage occurred during shipment? Are any bolts or nuts loose?
- Have all necessary accessories been supplied? (For a list of standard accessories see Construction.)

We recommend that you keep a spare pump on hand in case of emergencies. Keep this instruction manual in a place for future reference.

## Specifications

Check the nameplate for your pump's head (HEAD), discharge volume (CAPACITY), speed (SPEED), motor voltage and current.

Other specifications are noted in the chart next page.

Item		Specifications		
Liquid handled	Type	Sewage, waste water, miscellaneous drain water		
Range	Power Supply	Sito-400/750 <b>S/T</b>	0.4/0,75kW (1/2/1HP)	Single / three phase
		Sito-400/750 <b>SA/SAL</b>	0.4/0,75kW (1/2/1HP)	Single phase, with auto
Materials	Pump Casing	<b>Cast iron</b>		
	Impeller	<b>Urethane Rubber</b>		
	Shaft	<b>SUS410</b> stainless steel		
Motor type		Dry type submersible motor		
Shaft seal lubrication oil		Turbine No.46 ISO <b>VG-46</b>		
Double mechanical seal		<b>EKK silicon / carbide</b>		

## Installation

1. Check the following before beginning installation.

Insulation resistance measurement:

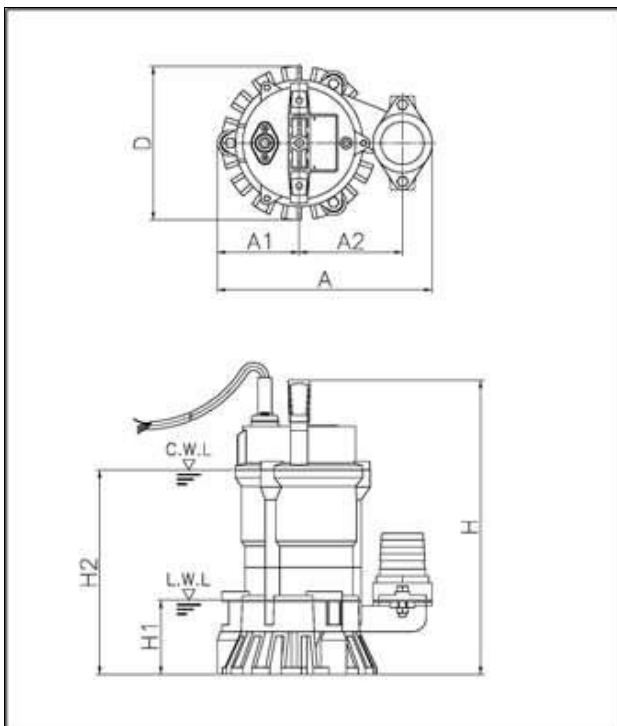
With the motor and cable (excluding the power supply cable) immersed in water, use a Megger to measure the insulation resistance between ground and each phase of the motor, and again between each phase of the motor. The Megger should indicate an insulation resistance of not less than 20mega ohms. While making the measurement, keep the power supply cable off the ground.

We recommend that an auxiliary pump be kept on hand in case of emergency.

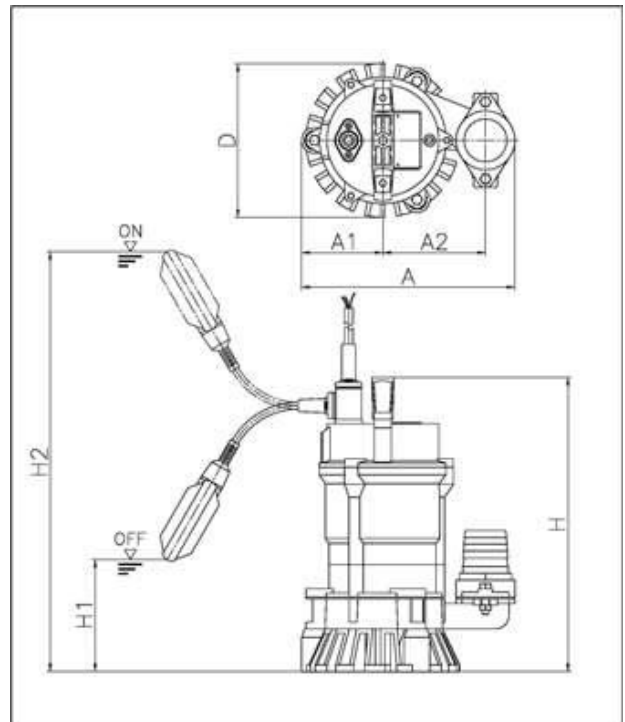
2. Installation-

- (1) **! WARNING : Under no circumstances should cable be pulled** while the pump is being transported or installed.  
Attach a chain or rope to the grip and install the pump.
- (2) This pump must not be installed on its side or operated a dry condition. Ensure that it is installed upright on a secure base.
- (3) Install the pump at a location in the tank where there is the **least turbulence**.
- (4) If there is a flow of liquid inside the tank, **support the piping** where appropriate. Install piping so that air will not be entrapped. If piping must be installed in such a way that air pockets are unavoidable, install an air release valve wherever such air pockets are most likely to develop.

- (5) Do not permit end of discharge piping to be submerged, as backflow will result when the pump is shut down.
- (6) **! WARNING :** **Non-automatic pumps** (models Sito...S/T), have an automatic operating system bump operating water level near the minimum operating level as the automatic cut-off switch incorporated inside the motor will be activated. **To avoid dry operation, install an automatic operating system**, as shown in Fig-1 and maintain a safe operating water level(C.W.L.: Continuous Water Level = 90mm).
- (7) **For automatic pumps** (models Sito...SA/SAL), install the floats as shown in Fig-2. The pump may not start if a floats switch touches the wall of the water tank or the piping. Install the floats so that this will not happen.



Figur 1



Figur 2

Explanation: ON=start, OFF=stop, C.W.L. = Level-indicator start, L.W.L. = Level-indicator stop.

## **Electrical Wiring**

### (1) Wiring:

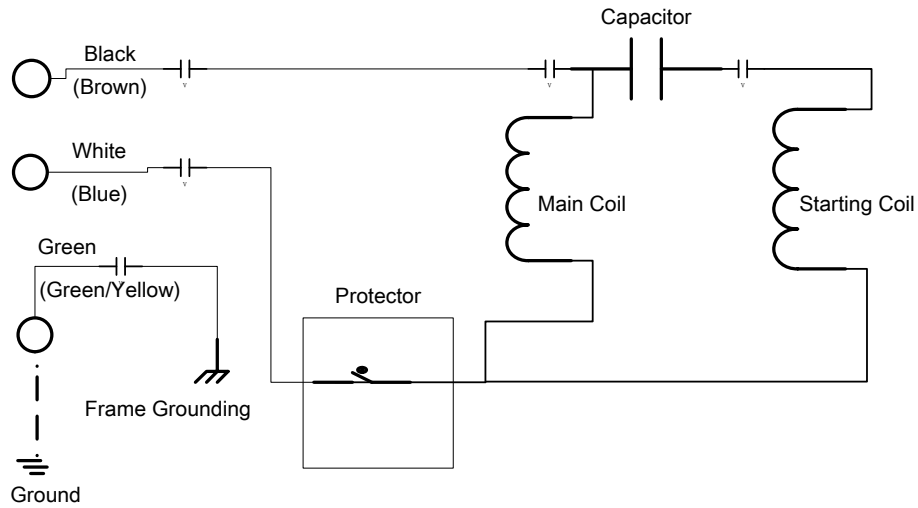
- Wire as indicated for the appropriate start system as shown in Fig-3 for single phase version and Fig-4 for three one.
- Loose connections will stop the pump. Make sure all electrical connections secure

### (2) Cable:

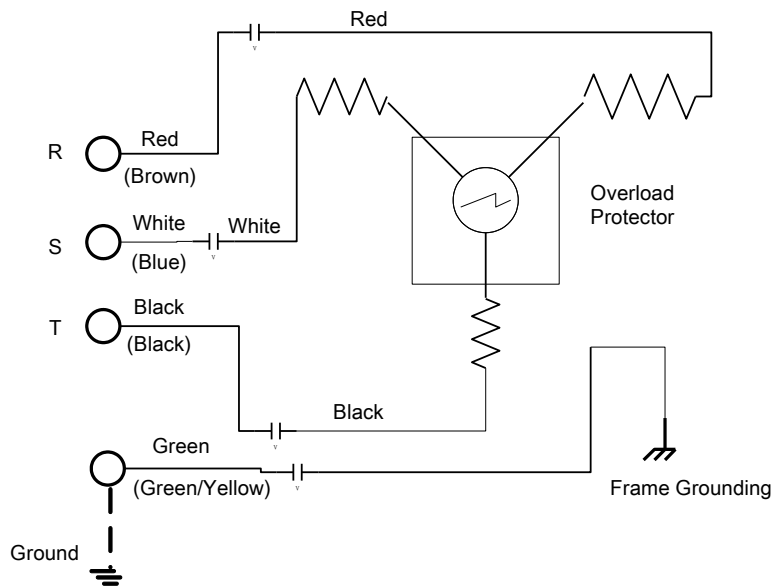
- ! WARNING :** Never let the end of the cable contact water.
- If the cable is extended, do not immerse the splice in water.
- Fasten the cable to the discharge piping with tape or vinyl strips.
- Install the cable so that it will not overheat. Overheating caused by coiling the cable and exposing it to direct sunlight.

- (3) Grounding: To ground the green wire (label G). Under no circumstances should the green wire be connected to the power supply.
- (4) **! WARNING :** Use short circuit breakers to prevent danger of electrical shock.

Figur 3:



Figur 4:



## Operation

### 1. Before starting the pump

- (1) After completing installation, measure the insulation resistance again as described in Installation.
- (2) Check water level.  
If the pump is operated continuously for an extended period of time in a dry condition or **at the lowest water level, the motor protector will be activated**. Constant repetition of this action will shorten pump service life. Do not start the pump again in such a situation until after the motor has completely cooled.

### 2. Test operation....

Non-automatic pump (Sito....S/T)

Automatic pump (Sito....SA/SAL)

Turn the operating switch on and off a couple of times to check for normal pump start.

- (1) For the Sito....SA/SAL, floating switch must be raised for the pump to start.
- (2) Next, check direction of rotation. If discharge volume is low or unusual sounds are heard when the pump is operating, rotation has been reversed. When this happens, reverse two of the wires.

## Maintenance

Check pressure, output, voltage, current and other specifications. Unusual readings may indicate. Refer to Troubleshooting and correct as soon as possible.

### 1. Daily inspections:

- a) Check current and ammeter fluctuation daily. If ammeter fluctuation is great, even though within the limits of pump rating, foreign matter may be clogging the pump. If the quantity of liquid discharged falls suddenly, foreign matter may be blocking the suction inlet.

### 3. Regular inspections:

#### b) Monthly inspections

Measure the insulation resistance. The value should be **more than 1M ohm**. If resistance starts to fall rapidly even with an initial indication of over 1M ohm, this may be an indication of trouble and repair work is required.

#### c) Annual inspections

To prolong the service life of the mechanical seal by replacing the oil in the mechanical seal chamber once a year. Water mixed the oil or cloudy textures are indications of a defective mechanical seal requiring replacement. When replacing the oil, lay the pump on its side with filler plug on top. Inject suitable amount turbine oil No.32 (ISO VG-32).

d) **Inspections at 3-5 year intervals**

Conduct an overhaul of the pump. These intervals will preclude the possibility of future trouble.

**3. Parts that will need to be replaced**

Replace the appropriate part when the following conditions are apparent.

Replaceable part	Mechanical seal	Oil filler plug gasket	Lubricating oil	O-ring
Replacement guide	Whenever oil in mechanical seal chamber is clouded	Whenever oil is replaced or inspected	Whenever clouded or dirty	Whenever pump is overhauled
Frequency	Annually	A half yearly	A half yearly	Annually

Note: above replacement schedule is based on normal operating conditions.



## Troubleshooting

Trouble	Cause	Remedy
<b>Does not start. Starts, but immediately stops.</b>	(1) Power failure (2) Large discrepancy between power source and voltage (3) Significant drop in voltage (4) Motor phase malfunction (5) Electric circuit connection faulty (6) Faulty connection of control circuit  (7) Fuse blown (8) Faulty magnetic switch (9) Water is not at level indicated by Float (10) Float is not in appropriate level (11) Float effective (12) Short circuit breaker is functioning (13) Foreign matter clogging pump (14) Motor burned out (15) Motor bearing broken	(1)~(3) Contact electric power company and devise counter-measures  (4) Inspect electric circuit (5) Correct wiring (6) Inspect connections and magnetic switch (7) Replace with correct type of fuse (8) Replace with correct one (9) Raise water level (10) Adjust the position of float (11) Repair or replace (12) Repair location of short circuit (13) Remove foreign matter (14) Repair or replace (15) Repair or replace
<b>Operates, but stops after a while.</b>	(1) Prolonged dry operation has activated motor protector and caused pump to stop (2) High liquid temperature has activated motor protector and caused pump to stop (3) Reverse rotation <b>! WARNING :</b>	(1) Raise stop water level (2) Lower liquid temperature (3) Correct rotation
<b>Does not pump. Inadequate volume.</b>	(1) Reverse rotation (2) Significant drop in voltage  (3) Operating a 60Hz pump on 50Hz (4) Discharge head is high (5) Large piping loss (6) Low operating water level causes air suction (7) Leaking from discharge piping (8) Clogging of discharge piping (9) Foreign matter in suction inlet (10) Foreign matter clogging pump (11) Worn impeller	(1) Correct rotation(see Operation) (2) Contact electric power company and devise counter-measures (3) Check nameplate (4) Recalculate and adjust (5) Recalculate and adjust (6) Raise water level or lower pump (7) Inspect, repair (8) Remove foreign matter (9) Remove foreign matter (10) Remove foreign matter (11) Replace impeller
<b>Over current</b>	(1) Unbalanced current and voltage (2) Significant voltage drop (3) Motor phase malfunction (4) Operating 50Hz pump on 60Hz (5) Reverse rotation <b>! WARNING :</b> (6) Low head. Excessive volume of water (7) Foreign matter clogging pump  (8) Motor bearing is worn or damaged	(1) Contact electric power company and devise counter-measure (2) Contact electric power company and devise counter-measure (3) Inspect connections and magnetic switch (4) Check nameplate (5) Correct rotation (see Operation2) (6) Replace pump with low head pump (7) Remove foreign matter  (8) Replace bearing
<b>Pump vibrates; excessive operating noise.</b>	(1) Reverse rotation (2) Pump clogged with foreign matter (3) Piping resonates (4) Gate valve is closed too far	(1) Correct rotation (2) Disassemble and remove foreign matter (3) Improve piping (4) Open gate valve

## Disassembly and Assembly

### 1. Disassembly-

When disassembling pump, have a piece of cardboard or wooden board ready to place the different parts on as you work. Do not pile parts on top of each other. They should be laid out neatly in rows. The “O” ring and gasket cannot be used again once they are removed. Have replacement parts ready. Disassemble in the following order, referring to the sectional view.

**! WARNING :** Be sure to cut off power source beginning disassembly.

- (1) Remove pump casing bolts, raise the motor section and remove pump casing.
- (2) Remove shaft head bolt and impeller.
- (3) Remove oil filler plug and drain lubricating oil.
- (4) Remove intermediate casing bolts and intermediate oil chamber.

(Remember that any lubricating oil remaining in the mechanical seal chamber will flow out.)

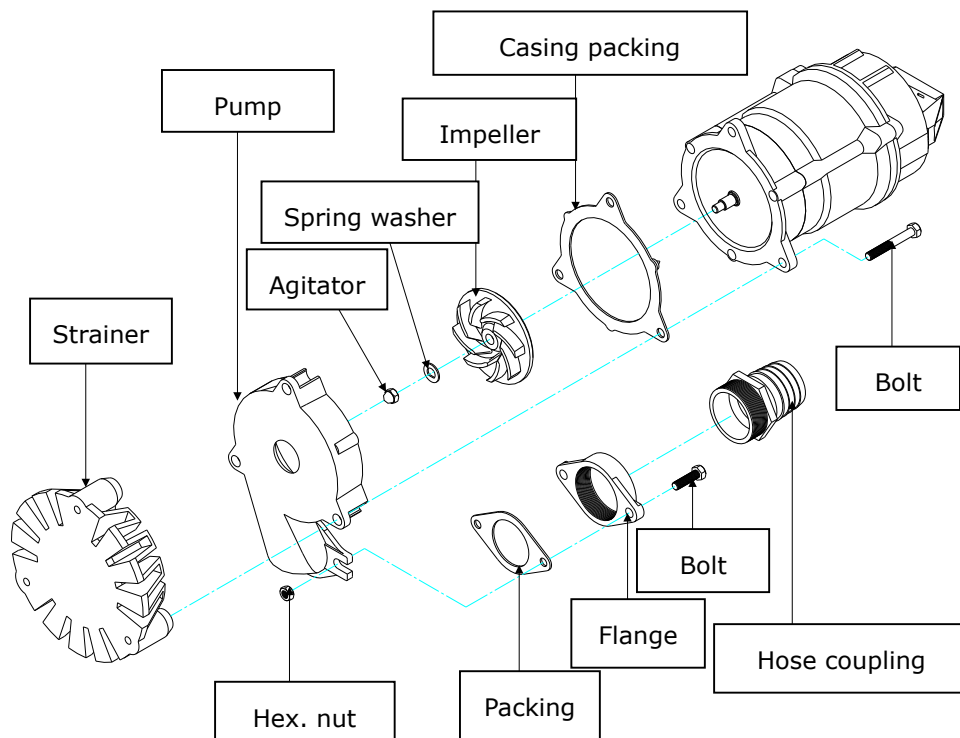
- (5) Carefully remove mechanical seal, taking care not to scratch sliding surface or motor shaft.

### 2. Assembly - Re-assemble in reverse order of disassembly.

Be careful of the following points.

- (1) During re-assembly, rotate the impeller by hand and check for smooth rotation. If rotation is not smooth, perform steps-(3) through -(5) again.
- (2) Upon completion of re-assembly step -(1) rotate the impeller by hand from the suction the suction inlet and check that it rotates smoothly without touching the suction cover before operating the pump.

Please obtain “O” rings, packing, shaft seals and other parts from, pump dealer. The table of dimensions is given in “Maintenance”.



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