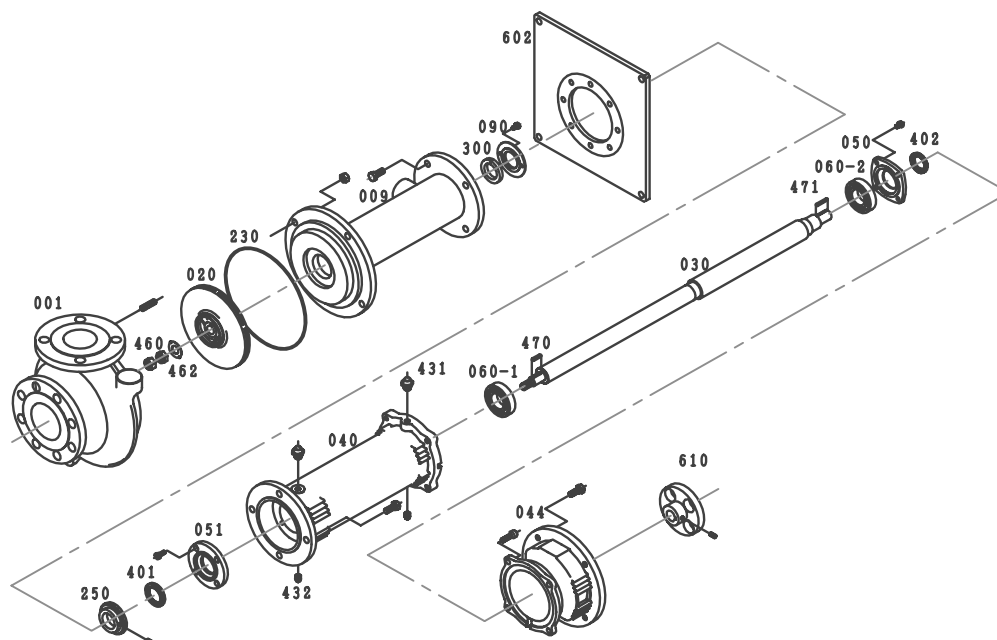


OPERATION MANUAL OF VERTICAL SHAFT PUMP



DRY PIT TYPE

THANK YOU FOR YOUR PURCHASE OF NISHIGAKI PUMP.

PLEASE READ THIS MANUAL THOROUGHLY BEFORE USING YOUR PUMP.

PLEASE ARRANGE FOR THIS MANUAL TO BE READILY AVAILABLE TO THE PERSONNEL OPERATING THIS PUMP.

PLEASE KEEP THIS MANUAL IN A PLACE WHERE IT IS READILY AVAILABLE.

NISHIGAKI. PUMP. MFG. CO., LTD.

HC3 - 488



Danger: Please never do the following usages.

1. To do carrying, installing, plumbing, wiring, operating, maintaining and inspecting is to be done by qualified personnel in a safe manner. Improper acting can result in injury, electrical shock or fire.
2. To do the above with a pump being wired, shut off the power supply for fear of electrical shock or fire.
3. Keep away from rotating parts during operation for avoiding injury.
4. Do not enter any fingers or objects into portion of the opening.
5. Be sure to give careful consideration to turn on the operation switch. Otherwise it can cause damage others.



Warn: Please do not do the following usages.

1. Do not do dry operation or reverse rotation. The pump interior could be damaged due to water hammer or heat.
2. Do not enter foreign materials in the pump. It can damage the pump or burn out the motor.
3. Do not convert the pump without permission. An accident can be occurred.
4. Do not use column pipes for supporting other pipes. It can twist or bend pump parts due to low intensity.
5. Be sure to give careful consideration to unpack the wooden box for removing strip of staples or nails.
6. Turn off the power supply in case of electric power failure. Be sure to use automatic return mechanism with safety.



Attention: In the following cases, please note it.

1. When lubricating oil makes a problem (i.e. at food industry), use the pump after washing out the oil.
2. Always wear gloves when dismantling a pump, and be careful of sharp edges and corners which could cause lacerations.
3. When carrying or lifting the pump, be careful of nipping physical body.

Check :

After removing the pump from its packing, perform the following inspection:

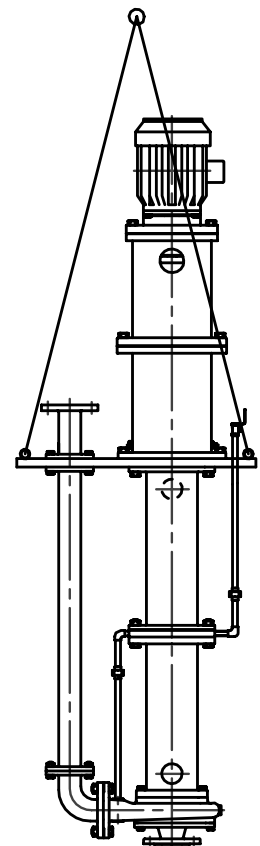
- (1) Verify that there has been no in-transit damage to the wooden frame or package.
- (2) Verify that there has been no unusual crack and modification on the pump or unit.
- (3) Verify that there have been no nuts or bolts have come loose.
- (4) On top of that, verify the things considered to be unusual.

Transportation and installation :

- * As this pump is intended to be used vertically, please convey and transport the pump as vertically as possible.
- * A Column pipe (009) and a lifting pipe (139) have not enough endurance to support horizontal load. Be sure not to use them as a beam or support.
- * Use wooden frame for custody or conveyance of pump lying on its side.

- (1) The pump is to be hung from wire using eyebolts on the four corners of the frame (602). (There is no eyebolt with light weight pump.)
- (2) When wire is interfering with an electric motor, prevent the motor from damaging by rag or battens. (There is no certainty that the center of gravity is on the frame. Reinforce with other wire depending on configurations.)
- (3) The pump foundation should be set in a horizontal position and have enough rigidity. Fix the frame (602) firmly to the foundation at four corners of the frame.
- (4) Adjust the frame (602) exactly in a horizontal position using a spirit level.

Reference a level: JIS B7510 3 kind(0.1)

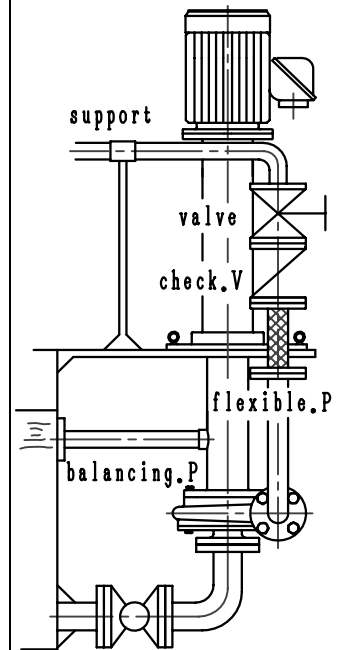


Hoist
Transportation

Pipe Arrangement :

- * Seals adhered to the suction cover (010), the casing (001), the column pipe (009), and the discharge pipe (131) are for preventing them from foreign materials. Please get rid of all seals before using the pump.
- * The suction cover (010) with the strainer (691) is to be given careful consideration not to crush the strainer (691) in inverted.
- * Giving impact shock on the column pipe (009) or the casing (001) by a hammer or whatever can break or bend the metal (069). Do not give impact shock on them.

- (1) Use pipeline support or flexible pipe so that the discharge pipe (131) and the casing (001) do not take pipeline load.
- (2) Use a by-pass type check valve or slow closing type one in order to prevent the pump from water hammer caused by back flow.
- (3) Determine high and low water level in pit according to the dimensional outline drawings.
- (4) If a pipe from the balancing pipe (163) of dry pit type was long, pay attention not to be stuck the pipe with slurry. To prevent that, for example,
1) make the pipe short. 2) The overflow pipe should be laid in an ascent of more than 5/100 toward the pump.



DRY PIT TYPE

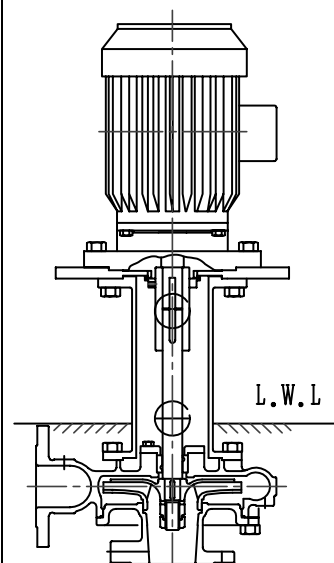
Operation :

At the beginning of the pump operation, whole the casing (001), the metal (069) are to be sunk into or filled with the liquid. Do not perform any 'dry' operation avoiding water hammer. To do so could result in damage to the metal (069).

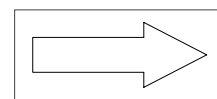
Do not perform 'zero discharge operation'. To do so could result in damage to the bearing by temperature rise or overflow.

Do not perform 'full-bore operation'. To do so could result in defective pumping or breaking the pump by air inclusion.

- (1)After wire connection finishes, check the rotational direction on arrow label.
- (2)Turn the motor and pump with your hand to be sure it turns lightly and smoothly. [If the contact noise of metal to metal came out, the pump has to be disassembled and checked.]
- (3)Make a test run 2 or 3 times by inching, and check whether there is neither unusual noise nor vibration in the pump. [Open 1/5 of the sluice valve.]
- (4)Check the liquid filled with at least up to 'low water level of pit (L.W.L)' before operation.
- (5)When the pump rotation speed come to the specified speed, adjust the total head of the pump to its specified value gradually by opening the sluice valve. [If the valve opens too much, it could result in aeration.]
- (6)Check the current value of the motor less than in a rated value.
- (7)Adjust the pipes if there is any leaky pipe.



WET PIT TYPE



Direction of
Rotation

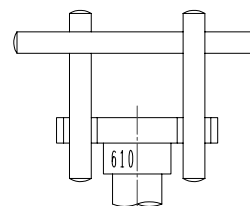
Disassembling :

* Mach-marks with a permanent maker before disassembly for your reference.

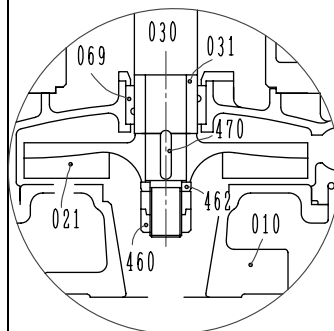
- (1) Remove the suction cover (010) or the casing (001) from the pump. [Caution about the cover or the casing dropping]
- (2) Remove impeller nuts (460) and washers (462). [Loosen the nut with an impact wrench or with the coupling (610) stabilized]
- (3) Remove the impeller (020,021) and the impeller key (470). [Caution about the impeller dropping]
- (4) Remove the shaft sleeve (031) from the shaft (030). [This line does not apply to non-metal type]
- (5) Remove the sealing pipe (320-1). [This line apply to middle metal.]
- (6) Remove the casing (001) or the casing cover (011). [Some types of the casing (001) or the casing cover (011) are combined with a column pipe]
- (7) Pick up the metal (069) out of the casing (001) or the casing cover (011). [This line does not apply to non-metal type]
- (8) Remove the column pipes (009-1 ...) sequentially. [If there are other intermediate metals on the shaft, remove the shaft sleeve (031) and the metal]
- (9) Loosen hexagon socket set screws of flinger (250), then pick the flinger from the shaft. [This line apply to the pump protected from vapor and heat]

When you change the ball bearing (060), refer to the following procedures. [except for small size pump.]

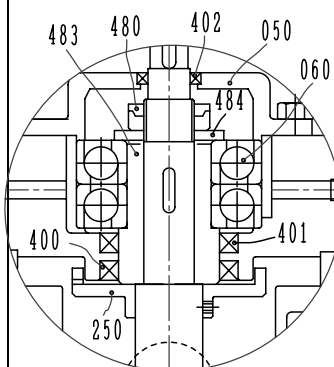
- (10) Remove the motor (680) from the metal casing (040). [Be careful of wiring.]



The Shaft Coupling
is Fixed



SEMI OPEN
IMPELLER

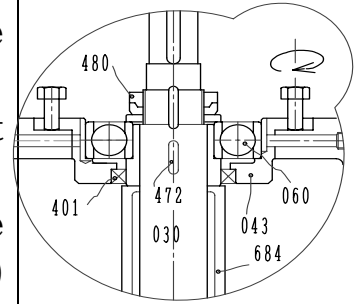


Double Angular
Ball Bearing

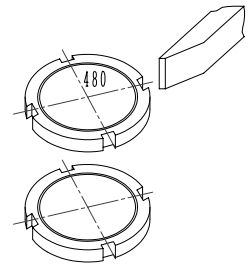
- (11) Remove the coupling (610) and the coupling key (471). [Loosen the hexagon socket head bolts.]
- (12) Remove the bearing cover (050) from the metal casing (040). [Be careful of oil flute.]
- (13) Remove the bearing nut (480) from the shaft (030). [Be careful of the shaft dropping.]
- (14) Remove the bearing with the bearing sleeve (483) and the bearing washer (484) simultaneously from the shaft.
- (15) When the pump has the bearing box (043), remove the bearing box (043) with jacking up by bolts.
- (16) Remove the bearing key (472), then remove the adapter (684) from the shaft (030).
- (17) Do (15) again.
- (18) Remove the shaft (030) from the metal casing (040).
- (19) Remove the oil seal (400,401,402)

“When you change a discharge pipe or a lifting pipe (139,131), refer to the following procedures.

- (20) Remove the discharge flange (131) and the flange packing (244) from the frame.
- (21) Remove the discharge elbow (132) and the lifting pipe (139) from the frame.



Double Span
Ball Bearing



Double Nut

Assembling :

* Refer to mach-marks and assemble in an order contrary to disassembling.

(1) The gap between the impeller (020,021) and the suction cover (010) or between the impeller and the casing is to be determined the following data.

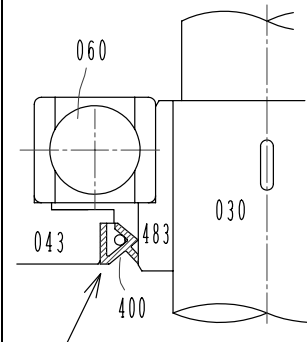
	closed impeller	semi open impeller
axial direction	2mm	0.5 ~ 2mm
radial direction	0.6 ~ 1.5	0.8 ~ 2.0

(2) If the gap between the metal and the shaft sleeve more than 0.3mm by worn out, change The metal and the shaft sleeve for new one.

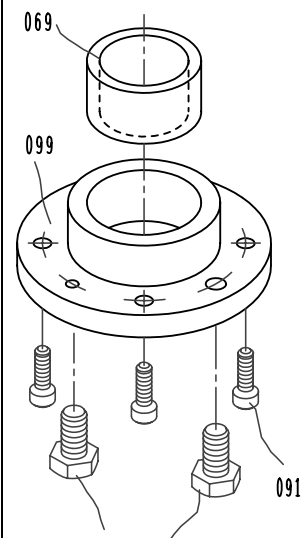
(3) An oil seal has suitable direction to set. Insert the dust bellow side of the oil seal against the ball bearing. [Grease the groove.]

(4) The gap in the coupling (610) to be between 3 ± 1 mm. [When the bearing sleeve (483) to be changed, remove the spring of the oil seal for prevention of over-heating.]

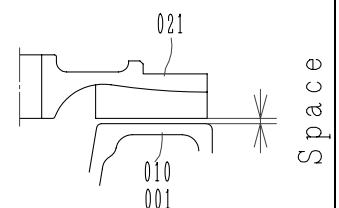
(5) For a pump type inserted a metal (069) into a metal cover (099), the metal (SiC : Silicon Carbide) (069) have to be installed within the metal cover (099) before setting the metal cover to the casing (001) or the column pipe (009). [If the pump was assembled lying on the floor, keep the shaft and the shaft sleeve straight and horizontal. Because the shaft can be distorted by its own weight.]



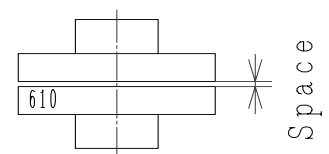
Spring



Jacking up Bolt (Option)



EX: Semi Open



Coupling

Maintenance :

- (1) Grease No.2 is used as standard. Lubricate every 2000 hours or every single year of operation. [Remove a drain plug, then lubricate about 15g grease from a grease nipple with a grease pump.]

When you change the ball bearing, use the grease equivalents as follows,

NLG1-2

Bardahl ... SPG-2 (Special-purpose grease)

IDEMITSU ... Daphne Eponex grease

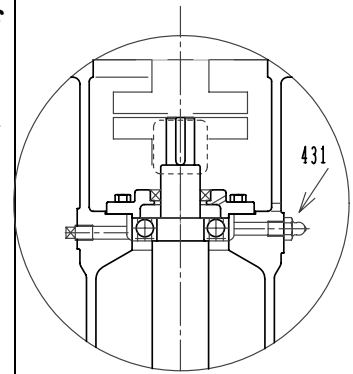
Showa-Shell ... Shell Alvania grease

- (2) Silicone grease is used in unusual circumstances.

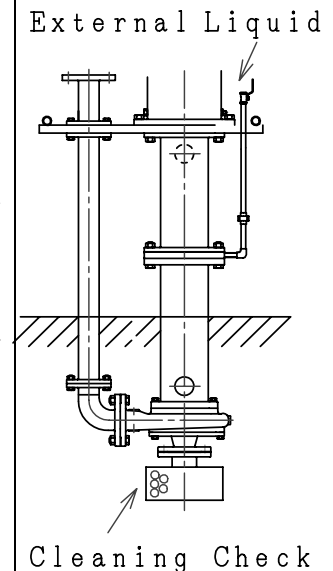
Ref. [Toshiba TSK5422L, Shin-Etsu Chemical G40H, ThreeBond 1855]

(When you use specialized pump, please ask a dealer which grease is appropriate.)

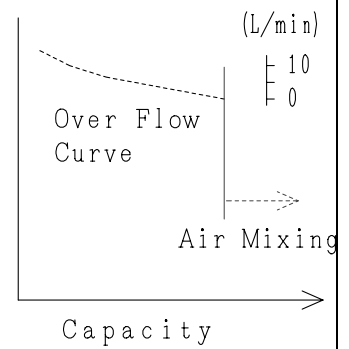
- (3) Whenever you request any part for repair, please let the dealer know the product number. Product number is unique and consists of 6 characters shown at the bottom line on the name plate.
- (4) Do not give any shock to the metal and the shaft sleeve.
- (5) If fluid level in the tank was below the intermediate metal, and if the pump was not liquid cooling type, pour external liquid into the pump before operation. Pour the external liquid until rotating speed reach constant rate. Once rotating speed come to constant rate, you don't have to pour more liquid. Because liquid circulate by itself.



With The
Grease Gun



- (6) Keep the strainer clean and check it periodically. The strainer blocked up objects may crumple the punch metal of the strainer due to vacuum.
- (7) The overflow pipe (163) of dry pit type pump limits to overflow onto the column pipe (009). The inside of the pipe connected to the overflow pipe (163) may cause scale buildup. The pump test result table shows flow volume from the overflow pipe (163). Adjust the flow volume with discharge valve according to the table as much as possible. With the fluid may cause trouble if air mixed, operate the pump except for aeration range shown on the pump test result table .



Maintenance Check Record Table

Pump Model (Man . Serial No .)			
Date	Record		Sign