NISHIGAKI PUMP OPERATION MANUAL
FOR CENTRIFUGAL PUMPS AND MULTI-STAGE PUMPS

- Thank you for your purchase of a 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.

This contents of this operation manual are applicable to the following pump series.

Centrifugal Pumps: JFS,JS ,JFSO,JSO,FS,FSH,FSR,UFS,UAS,ULS
JF,J,JFO,JO,F,HN,FF,FH,UF

Multi-stage Pumps: EF

The safety precautions included in this operation manual have been divided into two categories: [Warning] and [Caution]

⚠ Warning Indicates that improper operation could result in the potential danger of severe personal injury or even death.

⚠ Caution Indicates that improper operation could result in the potential danger of moderate to light personal injury, or damage to equipment.

⚠ *Warning*

[Unloading and Installation]

1. *Be sure to give careful consideration to the weight and center of gravity of the crate when unloading.*
   Improper hoisting could cause the crate to fall, resulting in damage to equipment or personal injury.
2. *Some of the pump components, such as metal casings or electrical motors, have eye-bolts attached to them.*
   These eye-bolts are for use in hoisting the individual components during maintenance.
   Do not use these eye-bolts to hoist the entire pump as a single unit. The eye-bolts could break, causing the pump to fall, and resulting in damage to equipment or personal injury.
3. *The pump is to be wired by qualified personnel in a safe manner and in accordance with the appropriate electrical standards.*
   Improper wiring can result in electrical shock or fire.
4. *Install a ground and circuit breaker for protection against short circuits.*
   Failure to do so could result in electrical shock, especially in the event of a malfunction or short circuit.

[During Test Runs and Normal Operation]

1. *The coupling is to be fitted with a coupling guard.*
   Operating the pump without a coupling guard could result in personal injury from contact with rotating parts.
2. *During operation, do not open the priming plug or priming cock, or the air vent valve.*
   To do so could result in danger from the spraying of liquid from the pump interior. It is also necessary to be aware that the pump interior is pressurized even when the pump is stopped.
3. *Do not loosen any plugs, bolts or nuts during operation.*
   To do so could result in danger from the spraying of liquid from the pump interior or the separation of pump components.

[During Inspection and Maintenance]

1. *When performing maintenance on the pump, be sure to disconnect the electrical power source. Also, be sure to display the [Inspection in Progress-Do not Operate] indicator on the operation panel.*
   Failure to do so could result in electrical shock or other personal injuries from unintended operation.
2. *Only qualified maintenance personnel are to be allowed to dismantle or repair the pump.*
   Unqualified personnel are likely to cause personal injury due to improper operation.
3. *If the pump malfunctions, disconnect the electrical power source and contact either your sales agent or a manufacturer's designated service agent to arrange for inspection and repair.*
   Continuing operation with a damaged pump could result in electrical shock, or in a fire from a short circuit.

⚠ Caution

[Product Specifications]

1. *Do not operate the pump except under the conditions described in the product specifications. To do so could result in electrical shock, fire, or leakage.*
2. *Do not modify the pump configuration. To do so could result in accidents.*

[Unloading and Installation]

1. *Avoid installing the pump in places subject to moisture, such as baths or showers. Short circuits could result in electrical shock in such places.*
2. *Avoid installing the pump in places with poisonous substances such as acids, alkalines, organic solvents or paint, or substances that give off corrosive gas, or with large quantities of dust. To do so could result in shorts or fires, or in corrosion and malfunction.*
3. *After attaching the coupling, be sure to double-check the spindle alignment. Poor spindle alignment could result in damage to the pump.*

[During Test Operations and Normal Operation]

1. *Use only with the approved rated voltage. Failure to do so could result in fire or electric shock.*
2. *Do not allow sand or other foreign objects to enter the pump. To do so could result in malfunctions or damage to the pump.*
3. *Do not use the pump for bubbly liquid such a soap water. To do so could result in malfunctions or damage to the pump.*
4. *Absolutely do not perform 'dry' operation (operation without liquid) or operate the pump with the sluice valve closed. To do so could result in damage to the pump.*
5. *Do not operate the pump in reverse. To do so could result in leaks, or in damage to the pump interior.*
6. *Do not touch the pump or electrical motor. In particular, if the liquid is of a high temperature, touching the pump or electrical motor could result in burns.*

[During Inspection and Repair]

1. *Always wear gloves when dismantling a pump, and be careful of sharp edges and corners which could cause lacerations.*
2. *In the event that warning labels or the manual become worn, hard-to-read, or lost, please contact the manufacturer.*

Preface

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

(1) Check the name plate to verify that the contents of the delivery conform with the contents of your order.

(2) Verify that there has been no in-transit damage to the unit, and that no nuts or bolts have come loose.

(3) Verify that any accessories have been delivered as ordered. In the event that a problem is discovered during the above inspection, please contact your sales agent, or the manufacturer right away, and be prepared to inform them of the pump model, serial number and construction symbol.

Installation of the Pump and Piping

1. Location

(1) This pump is intended to be used indoors. In the event that it is installed outdoors, be sure to install a cowling or otherwise protect it from the wind and rain.

⚠ Caution

- *Avoid installing the pump in places subject to moisture, such as bath rooms. Short circuits could result in electrical shock in such places.*

(2) Select a location in which maintenance can be performed easily.

(3) The pump is to be installed as close as possible to the liquid, and the vertical differential between the center of the pump and the lowest liquid level is to be kept as small as possible. In cases where special liquids, liquids at high temperatures, or extra long suction lines are in use, it may be necessary to raise the liquid level.

⚠ Caution

- *When installing ULS model pumps, be sure to install the electrical motor either above or to the side of the pump. Absolutely do not install the motor in a configuration where it is beneath the pump. In cases where the motor is installed beneath the pump, even the slightest leakage can result in liquid entering the motor interior and cause accidents.*

2. Piping

⚠ Caution

● *Remove the label from the suction flange, the discharge flange and the center of the flange packings perfectly. It could result in malfunctions of the pump.*

(1) The suction line is to be kept as short and as straight as possible, so that no air pockets can form.

⚠ Caution

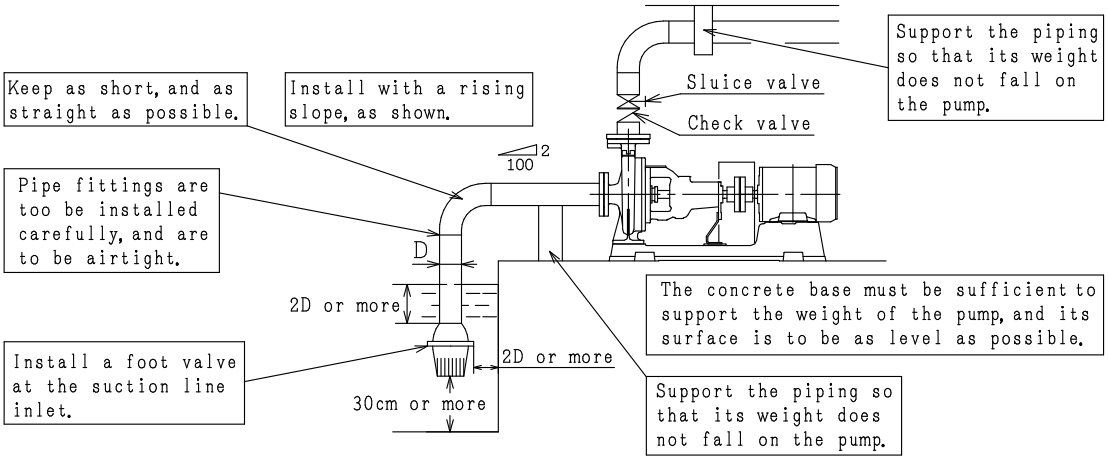
● *Do not install the pump in a location where it is higher than the piping. If an air pocket forms inside the pump, the pump interior could be damaged.*

(2) Be sure to sufficiently support both the suction line and the discharge line so that none of their weight falls on the pump.

(3) In cases where liquids of a high temperature are to be pumped, be sure to install expansion joints, so that no stress from heat expansion falls on the pump.

(4) Be sure to install a sluice valve on the discharge line to be used in adjusting the discharge flow, and in preventing overloads on the electrical motor.

(5) In cases where the piping is long, the actual head is large, two or more pumps are operating in parallel, or the liquid is being discharged into a pressure tank, install a check valve between the pump and the sluice valve.



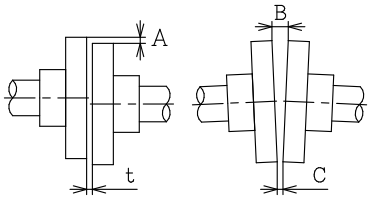
※ For gravity feed inlet lines:

(1) For ease of operation when breaking down or inspecting the pump, install a sluice valve on the suction line.

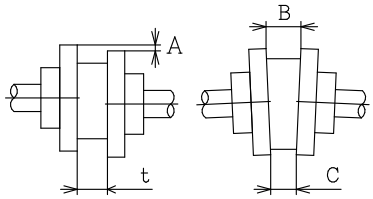
(2) To insure that no air pockets form in the suction line, install the suction line with a descending slope toward the pump.

Installing the pump

① Be sure to place a common base, pump and electric motor on a rigid base (made of completely cured concrete, etc.).
The common base placed upon an unstable base may be distorted or warped since it is not a complete rigid body.
If the common base is installed on a steel structure, such as a structural channel or angle, ensure that the bottom of the common base is in a full contact with the structure. Do not fix the common base to the structure only with foundation bolts. Do not use foundation bolt holes for purposes other than fixing the common base. Doing so may deform the common bese or cause misalignment of shaft couplings.
② Insert a metal wedge or the like between the common base and the base to keep the level.
③ Fill foundation bolt holes with mortar and tighten the foundation bolts uniformly after the mortar is completely cured.
④ Mount piping and be sure to perform coupling alignment before operating the pump.



≪Flexible flanged shaft coupling≫



≪Rubber shaft coupling≫

Couplings shall be adjusted as follows: (Unit: mm)

Shaft coupling	A	B–C	t
Flexible flanged shaft coupling	8/100 or less	15/100 or less	2～4
Rubber shaft coupling (0.2kW)	12/100 or less	15/100 or less	Approx. 10
Rubber shaft coupling (0.4kW)	25/100 or less	30/100 or less	Approx. 10
Rubber shaft coupling (0.75・1.5kW)	25/100 or less	40/100 or less	Approx. 17

⚠ *Caution*

- *Although we perform a simple coupling alignment using a scale immediately before the shipment, a coupling misalignment may occur during transfer or installation (due to the load of piping) or due to distortion or warp of the common base caused by tightening of the foundation bolts. Be sure to perform coupling alignment before operating the pump.*
  Coupling misalignment reduces the life of shaft couplings or ball bearings. In the worst case scenario, abnormal vibrations may damage the pump or motor.

⑤ Be sure to tighten the setscrew of a shaft coupling.
⑥ Mount the shaft coupling guard.

⚠ *Warning*

- *For a pump equipped with a shaft coupling, be sure to fix a shaft coupling guard in place. Operating the pump without the shaft coupling guard may cause an operator to be caught in a rotary section and get injured.*

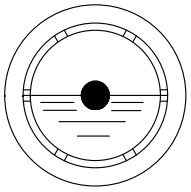
Pre-operation Preparation

(1) Check the lubrication.

① For sealed grease ball bearings (units with no grease cup or oil cap) :No need to lubricate.

② For grease lubricated ball bearings (units with a grease cup or nipple) :Fill the grease cap or nipple with grease.

③ For oil lubricated ball bearings (units with an oil cap) :Verify that there is a sufficient quantity of oil contained in the metal casing.



The oil amount level should be kept within the center circle.

OIL,GREASE / MANUF.	BEARING OILS		ROLLER BEARING GREASE 1-2 (NLG1-2)
	ISO VG 32	ISO VG 68	
IDEMITSU	DAPHNE MECHANIC OIL 32	DAPHNE MECHANIC OIL 68	DAPHNE EPONEX No. 2
SHOWA-SHELL	SHELL TELLUS S2M 32	SHELL TELLUS S2M 68	STAMINA EP2
JX NIPPON OIL & ENERGY	FBK OIL RO 32	FBK OIL RO 68	MALTINOC GREASE 2
ESSO-STANDARD	TELESSO 32	TELESSO 68	BEACON 2
MOBIL	DTE OIL LIGHT	DTE OIL HEAVY-MEDIUM	MOBILUX 2
COSMO OIL	COSMO ALLPUS 32	COSMO ALLPUS 68	COSMO GREASE DYNAMAX 2
JAPAN ENERGY (JOMO)	JOMO RARTUS 32	JOMO RARTUS 68	JOMO REZONIC GREASE 2

※1. Choose a type of bearing oil that maintains a viscosity of 30mm²/s at normal operating temperatures. As a rule of thumb, for operating temperatures of 80℃ or less, use ISO VG 32, and for operating temperatures of more than 80℃, use ISO VG 68.

※2. As a rule of thumb, for operating temperatures between 0℃ and 80℃, use a lithium based grease equivalent to JIS roller bearing grease 1-2, or NLG1-2.

(2) Prime the pump.

Open the air vent valve or cap. Fill the pump and suction line interior with liquid from the priming funnel or priming plug. Rotate the coupling manually to expel any remaining air from around the impeller.

⚠ *Caution*

- *Absolutely do not perform 'dry' operation (operation without liquid). To do so could result in damage to the pump interior.*

(3) Start the flow of liquid at the necessary quantity and pressure, whether it be an external source, for water cooling, or any other type of application.

Name	Flow quantity (ℓ/min)	Pressure (MPa)
External source	as desired	Sealed spindle pressure + 0.05
Water cooling	5 to 20	0.2 MPa or less
Water cooling with cooler	5 to 20	0.2 MPa or less

【Reference】 1 MPa = 10.197kgf/cm²·G

(for both grand packing and mechanical seals)

※ For methods other than those shown above, refer to the appropriate operation manual.

⚠ Caution

- *Always start the flow of liquid before operating the pump.*
  Failure to do so could cause damage to the pump interior and result in leakage.
- *Avoid as much as possible the use of small sized piping on coolant outlets.*
  To do so could result in coolant leakage.
- *When siphoning water directly from an industrial water supply, always install check valves on the piping.*
  Failure to do so could allow liquid from the pump interior to back-flow into the water supply, and result in unexpected accidents.

(4) Fully open the suction line sluice valve.
(5) Close, either fully or partially, the discharge line sluice valve.

Operation

(1) Push the switch once or twice to verify that the pump rotates in the proper direction.
If the pump should rotate in reverse, switch two of the 3-phase connections.
(The proper direction of rotation is indicated on the metal casing or on the pump casing.)

⚠ Caution

- *Do not operate the pump in reverse.*
  To do so could result in leaks, or in damage to the pump interior.

(2) After verifying that there are no unusual vibrations, sounds or other malfunctions allow the pump to operate.
(3) After the pump has reached its rated rpm, gradually open the discharge line sluice valve until the proper operating pressure is attained.

⚠ Caution

- *Do not use the suction line sluice valve to adjust the flow.*
  To do so could cause unusual vibrations or noise, and result in damage to the pump interior.
- *Do not operate the pump at less than the rated pressure.*
  Operation at less than rated pressure could place an overload on the electrical motor.

(4) Check the pressure, voltage, discharge flow, vibration and noise to be sure that there are no malfunctions. When not making measurements, however, be sure that the pressure gauge and vacuum gauge cocks are closed. Leaving them open could cause damage.
(5) When ceasing operation, close the discharge line sluice valve slowly, and stop the electrical motor. Afterwards, stop the flow of liquids. (In cases where the air cannot be allowed to enter the piping, continue the flow of liquid even after stopping the pump.)

Maintenance

⚠ Warning

- *When performing maintenance on the pump, be sure to disconnect the electrical power source. Also, be sure to display the [Inspection in Progress -Do not Operate] indicator on the operation panel.*
  Failure to do so could result in electrical shock or other personal injuries from unintended operation.

(1) Inspect the following items daily:

① Verify that there are no extreme changes in pressure, discharge flow, voltage, vibration or noise.
② Verify that the bearing temperature is no more that 40℃ above the room temperature, and less than 75℃ overall. (If cool enough to be touched, then there is no problem.)
③For pumps with gland packing, verify that the liquid is flowing onto the packing at an appropriate rate. (3 to 30ml/minute)

⚠ Caution

- *Do not over-tighten the gland packing.*
  If over-tightened, the resultant heat could shorten the life of the packing, the shaft and its sleeve, or place an overload on the electrical motor.

④ For pumps with mechanical seals, verify that there is no more than 10ml/hour leakage.
If the leakage exceeds that amount, prepare a replacement seal.

⚠ Caution

- *Do not perform any 'dry' operation with mechanical seals.*
  To do so could result in damage to the pump interior or leakage.

⑤ Verify that there is no oil leakage from the bearing lubricant or oil seals.

(2) In addition to the daily inspections, inspect the following items monthly:

① Verify that the pump and electric motor coupler is attached securely. If not, refer to the section on installation, and redo accordingly.

⚠ Caution

- *Do not operate the pump with the spindle out of alignment.*
  To do so could result in unusual vibrations and noise, or damage to the pump.

② Verify that the bearing lubrication is clean, and replenish as necessary.

(3) In addition to the daily inspections, inspect the following items once every 6 months:

① Inspect the gland packing, shaft and sleeve for wear, and replace as necessary.

② Change the bearing lubricant.

※ The bearing lubricant is to be changed after the first 500 hours of operation, and after every 2000 hours of operation thereafter.

(4) Inspect the following items once a year:

① Dismantle the pump, and inspect the coupling, shaft, balance ring, liner ring and other rotating parts for wear and proper alignment, and replace as necessary.

② Inspect the pump interior for wear.

③ Replace expendable parts, such as lubricants, grease and packing.

(5) Always follow the precautions shown below during operation:

① **⚠ Caution**

- *Do not operate the pump for long periods of time while the discharge line sluice valve is closed, or at extremely low flow levels.*
  To do so could result in the pump interior over-heating, and cause unexpected accidents.

② Repeated starting and stopping of operation will reduce the life of the pump. The pump should be operated as much as possible under the conditions shown below:

Electrical output	Start/Stop Frequency
7.5kW or less	6 times/hour or less
11 to 22kW	4 times/hour or less
30kW or more	3 times/hour or less

⚠ Warning

- *In the event of a power outage, be sure to turn off the power switch.*
  Sudden operation of the pump when power is restored could result in personal injury or unexpected accidents.

(6) Follow the precautions shown below when ceasing operation for long period of time, or storing the pump:

① **⚠ Caution**

- *Whether ceasing operation for long or short periods of time, always remove the drain plug and release any waste water.*
  Frozen water could cause damage to the pump.

② If a spare pump is kept on hand, operate it occasionally to be sure that it is operable.

③ The gland packing sometimes rusts if the pump is not operated for long periods of time. Remove the gland packing, and remove any traces of moisture from it if it is to be reused, or replace it with a new one. (For cast iron pumps)

List of Expendable Parts

The following list contains standard expendable parts. For custom or special parts, refer to the pump drawings, or consult your sales agent or the manufacturer.

MODEL and DIAMETER	GLAND PACKING ㉚	BALL BEARING ㊿ 1	BALL BEARING ㊿ 2	OIL SEAL ㊶	OIL SEAL ㊷	LUBRICANT QUANTITY (mℓ)
FS (FF) -32	□6.5-φ33-φ20-quan.4	6204ZZ	6304ZZ	(20367)	(20367)	(140)
FS- 40	□6.5-φ33-φ20-quan.5					
50,65	□9.5-φ44-φ25-quan.4	6205ZZ	6305ZZ	(25387)	(25387)	(200)
80	□10-φ50-φ30-quan.4	6206ZZ	6306ZZ	(30458)	(30458)	(350)
100	□10-φ55-φ35-quan.4	6207ZZ	6307ZZ	(35508)	(35508)	(500)
125A,150A	□10-φ60-φ40-quan.4 (quan.5)	6208	6308	40588	37537	800
200,200A	□10-φ70-φ50-quan.4 (quan.5)	6210	6310	507212	456812	600
FSH (FH) -25 (32)	□6.5-φ33-φ20-quan.5	6304ZZ	6304ZZ	(20367)	(20367)	(150)
FSH- 40	□9.5-φ44-φ25-quan.4	Close type 6205ZZ Semi-open type 6305ZZ	6305ZZ	(25387)	(25387)	(200)
50	□10-φ50-φ30-quan.4	Close type 6206ZZ Semi-open type 6306ZZ	6306ZZ	(30458)	(30458)	(350)
65,80	□10-φ55-φ35-quan.4	Close type 6207ZZ Semi-open type 6307ZZ	6307ZZ	(35508)	(35508)	(500)
80A	□10-φ55-φ35-quan.4	6207ZZ	6307ZZ	(35508)	(35508)	(500)
100	□10-φ60-φ40-quan.4 (quan.5)	6208	Close type 6308 Semi-open type 7308BDB	40588	37537	800
125, 150	□10-φ70-φ50-quan.4 (quan.5)	6210	37kW or less 6310 45kW 7310BDB	507212	456812	600
UFS (UF) -25 (32)	□6.5-φ33-φ20-quan.5	6304ZZ	6304ZZ	(20367)	(20367)	(150)
		(Semi-open type 1.5kW or more 6204	7205BDB	20367	20367	130)
40B	□9.5-φ44-φ25-quan.4	6205	7305BDB	25387	22388	280
50B	□10-φ50-φ30-quan.4	6206	7306BDB	30458	274711	430
65,66 80,88	□10-φ55-φ35-quan.4	6207	7307BDB	35508	30458	600
UAS- 40,50	□9.5-φ44-φ25-quan.4	6305ZZ	6305ZZ	(25387)	(25387)	(200)
80	□10-φ50-φ30-quan.4	6306ZZ	6306ZZ	(30458)	(30458)	(350)
100	□10-φ55-φ35-quan.4	6207	7307BDB	35508	30458	600
ULS-40,50,80	□9.5-φ44-φ25-quan.4	——	——	——	——	——
JFS (JF) -43C 43D,54C 54D,54E 65CX,65D 86CX,86D	□8-φ41-φ25-quan.4	6305ZZ	6305ZZ	(25387)	(25387)	(200)
JFS (JF) -65E	□8-φ51-φ35-quan.4	6307ZZ	6307ZZ	(35508)	(35508)	(250)
JFS (JF) -86E 86F,108CX 108D,108E 1210E,1512D	□8-φ51-φ35-quan.4	6307ZZ	6307ZZ	(35508)	(35508)	(450)
JFS (JF) -108F 1210F,1512E	□10-φ65-φ45-quan.4 (quan.5)	6309	6309	456812	456812	1000
JFS -1210G	□10-φ80-φ60-quan.4 (quan.5)	6310	6310	507212	456812	1400
JFS (JF) -1512F	□10-φ70-φ50-quan.4 (quan.5)	6310	6310	507212	456812	1400

MODEL and DIAMETER	GLAND PACKING ㉚	BALL BEARING ㊿ 1	BALL BEARING ㊿ 2	OIL SEAL ㊶	OIL SEAL ㊷	LUBRICANT QUANTITY (mℓ)
JS- 43C	□6.5-φ33-φ20-quan.5	6304ZZ	6304ZZ	(20367)	(20367)	(180)
JS (J) -43BX 43CX,43D 54C,54DX 65CY,65D 86BX,86C 108B	□8-φ41-φ25-quan.4	6305ZZ	6305ZZ	(25387)	(25387)	(200)
JS- 54D	□8-φ41-φ25-quan.4	6205	7206BDB	25387	25387	200
JS- 43E	□8-φ51-φ35-quan.4	15kW or less 6307ZZ quan.2		(35508)	(35508)	(250)
		18.5kW or more 6307 quan.2		35508	35508	250
J- 86BY	□8-φ41-φ25-quan.4	6305ZZ	6305ZZ	(25387)	(25387)	(200)
JS (J) -65DH 86CH,108BH	□8-φ51-φ35-quan.4	6307ZZ	6307ZZ	(35508)	(35508)	(250)
JS (J) -65EA 86D,108C	□8-φ51-φ35-quan.4	15kW or less 6307ZZ quan.2		(35508)	(35508)	(250)
		18.5kW or more 6307 quan.2		35508	35508	250
JS- 65ER	□8-φ51-φ35-quan.4	15kW or less 6307 quan.2		35508	35508	250
		18.5kW or more 6207	7208BDB			250
JS (J) -108DX	□8-φ51-φ35-quan.4	22kW or less 6307 quan.2		35508	35508	450
		30kW or more 6207	7208BDB			450
JS (J) -108EX	□10-φ65-φ45-quan.4 (quan.5)	6209	7309BDB	456812	426512	1000
JFSO (JFO) -43D 54C,54E 65D,86D	□8-φ41-φ25-quan.4	6205	7206BDB	25387	25387	200
JFSO-65CX,86CX	□8-φ41-φ25-quan.4	6205	7206BDB	25387	25387	200
JFSO (JFO) -65E	□8-φ51-φ35-quan.4	6207	7208BDB	35508	35508	250
JFSO (JFO) -86E 108D,108E 1210E	□8-φ51-φ35-quan.4	6207	7208BDB	35508	35508	450
JFSO- 108CX	□8-φ51-φ35-quan.4	6207	7208BDB	35508	35508	450
JSO (JO) -43CX 43D,54C 65CY,65D 86BX,86C	□8-φ41-φ25-quan.4	6205	7206BDB	25387	25387	200
JSO (JO) -65DH 86CH,86D 108C	□8-φ51-φ35-quan.4	6207	7208BDB	35508	35508	250
F- 32	□6.5-φ30-φ17-quan.4	——	6303ZZ	——	——	——
40	□6.5-φ33-φ20-quan.4	6204ZZ	6304ZZ			
50,65	□9-φ43-φ25-quan.4	6205ZZ	6305ZZ			
80	□9-φ48-φ30-quan.4	6206ZZ	6306ZZ			
100A	□9-φ53-φ35-quan.4	6207ZZ	6307ZZ			
125A,150A	□9-φ58-φ40-quan.4	6208ZZ	6308ZZ	(40588)	(37537)	(800)
HN- 40	□6.5-φ33-φ20-quan.4	6304ZZ	6304ZZ	(20367)	(20367)	(150)
50	□9-φ43-φ25-quan.4	6305ZZ	6305ZZ	(25387)	(25387)	(200)
65,80	□9-φ48-φ30-quan.4	6306ZZ	6306ZZ	(30458)	(30458)	(400)

MODEL and DIAMETER	STAGE	GLAND PACKING ㉚ 1	GLAND PACKING ㉚ 2	BALL BEARING ㊿ 1	BALL BEARING ㊿ 2
EF- 40	2・3	□9-φ48-φ30-quan.4	□8-φ39-φ23-quan.4	6306ZZ	7306B
	4・5				7306BDB
50	2～5	□9-φ48-φ30-quan.3	□8-φ44-φ28-quan.4	6306ZZ	7306BDB
65	2～4	□9-φ58-φ40-quan.4	□9-φ48-φ30-quan.4	6310ZZ	6308ZZ
	5				7311BDB
80	2～4		□9-φ53-φ35-quan.4		6308ZZ
	5				7311BDB

Note 1: Gland packing nominal size − outer diameter − inner diameter − quantity

Note 2: Nominal sizes beginning with □ 9 or □ 10 indicate custom packings for Nishigaki pumps.

Note 3: The gland water-cooled versions of the following models require a quantity of 5 gland packings: (FS-125A~200, FSH-100~150, HN-40~80, JFS (JF) -108F, 1210F, 1210G, 1512E, 1512F, JS (J) -108EX
The nominal size for HN-50-80 becomes □ 8.)

Note 4: For models and diameters shown in parenthesis, (UF-40B, FH-80A, etc) the number in parenthesis is the quantity of gland packings.

Note 5: For oil seals and lubricant quantities shown in parenthesis, the number shown indicates a ZZ bearing unit that was converted to an oil bath bearing unit per standard specifications. (For oil bath or grease lubricated ball bearings, the ball bearing is an open type.)
[Example] 6305ZZ becomes 6305

Gland packing

Use the following replacement parts for gland packings.
(It is most trust worthy to use the genuine parts.)

MANUFACTURER	PRODUCT NAME
	PTFE IMPREGNATED
NICHIAS	TOMBO No. 9038
VALQUA	VALQUA No. 7202
NIPPON PILLAR	PILLAR No. 4527L

Request

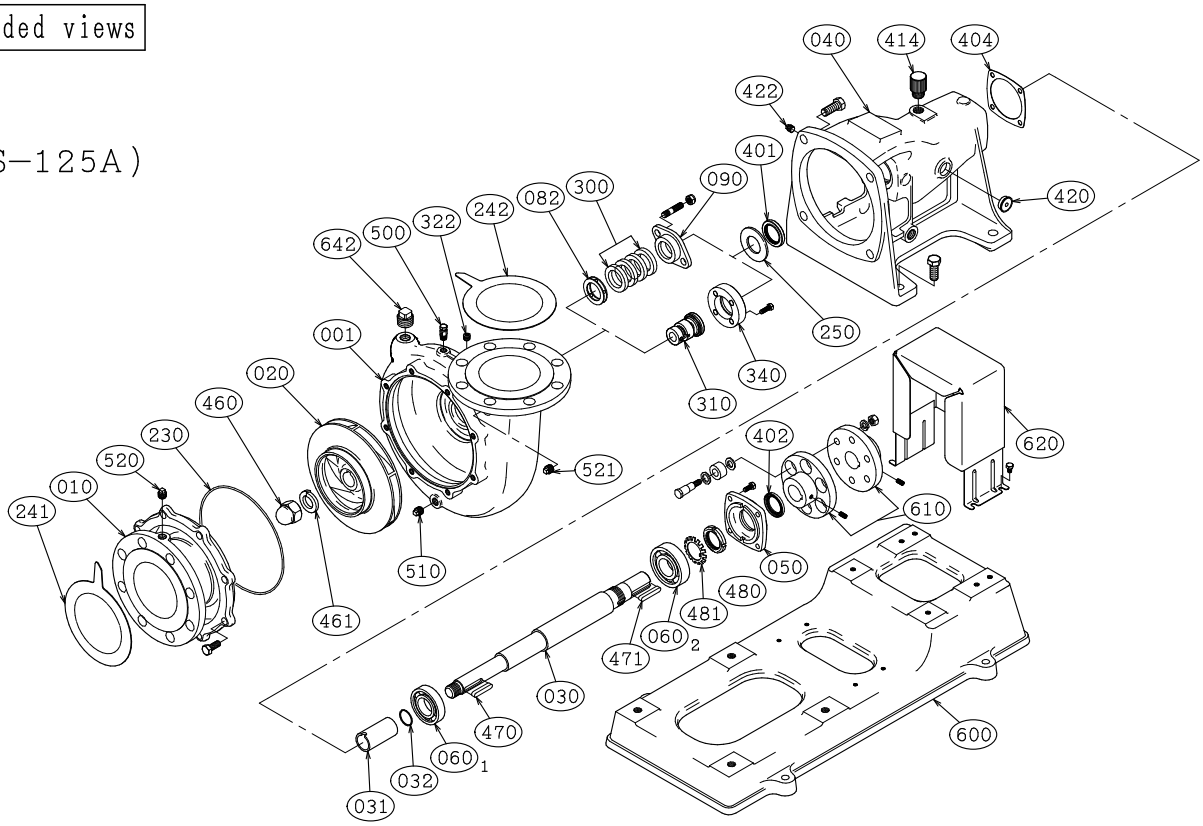
When ordering parts, be sure to tell the necessary matters according to "When Ordering Parts", which is reported in last page of this manual.

Troubleshooting

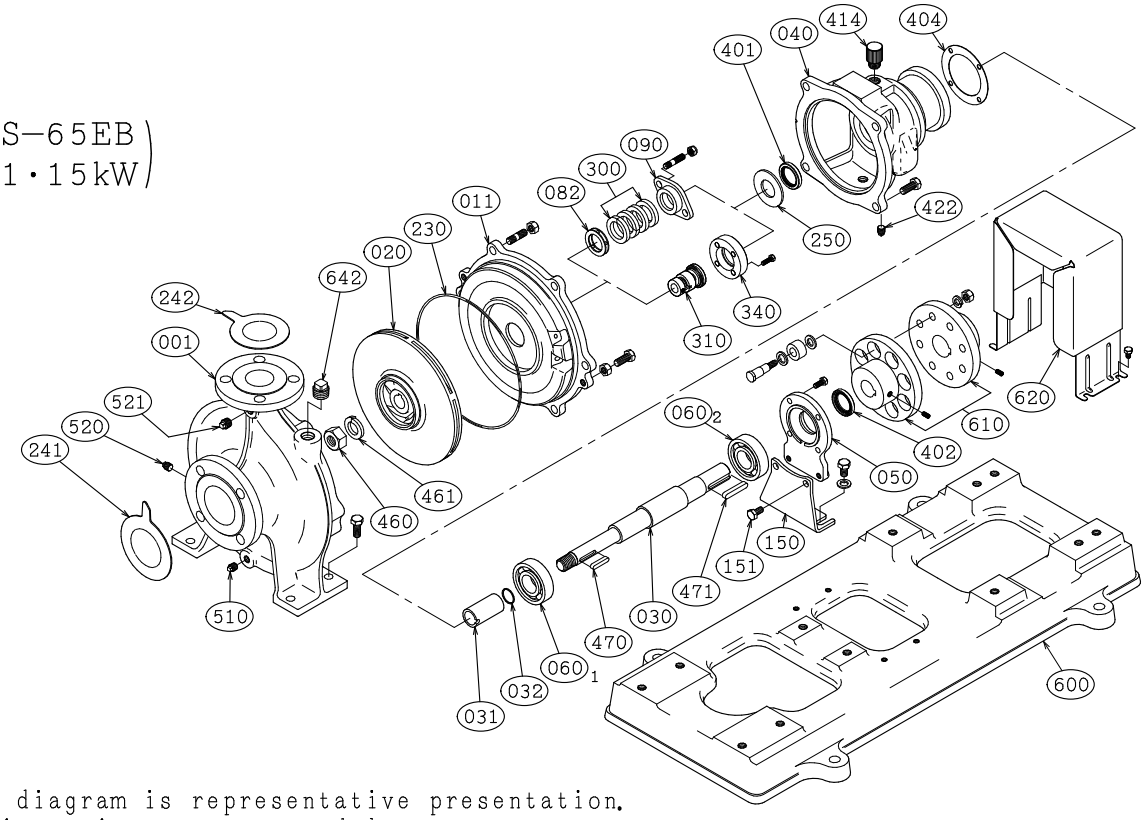
Problem	Cause	Remedy
Does not start.	○ Electrical motor malfunction. ○ Electrical power source malfunction. ○ Pump malfunction (corrosion, burnout or foreign object).	○ Repair electrical motor. ○ Inspect and repair. ○ Break down, clean and repair.
Starts, but does not pump.	○ Insufficiently primed. ○ Closed sluice valve. ○ Large discharge head (heavy resistance). ○ Large suction head (heavy resistance). ○ Primer does not remain inside pump. ○ Low RPM. ○ High liquid temperature. ○ Liquid is too heavy or viscous. ○ Air in the line from shaft seal.	○ Prime the pump and suction line. ○ Open the sluice valve. ○ Replace the pump, or repair the piping. ○ Lower the head. ○ Inspect the foot valve. ○ Consult with the motor manufacturer. ○ Ensure proper steam pressure for the suction resistance. ○ Replace pump, or mix liquid at intake. ○ Retighten all components. Inspect seald parts.
Does not perform to the rated flow or head.	○ Foreign object in strainer or foot valve. ○ Insufficient liquid at the suction line intake. ○ Air in the line. ○ Foreign object in the pump impeller. ○ Pump is operating in reverse. ○ Worn liner rings. ○ The semi-open pump impeller are worn. ○ The pump impeller are corroded.	○ Break down and clean. Install a screen. ○ Add enough liquid so that there is no intake of air. ○ Retighten all components. Inspect sealed parts. ○ Break down and clean. ○ Re-connect the electrical wiring properly. ○ Replace worn parts. ○ Adjust alignment of parts, replace worn parts. ○ Replace worn parts.
Occurrence of overloads	○ Small head. (Flow quantity is large) ○ Liquid is heavy or viscous. ○ The pump and electrical motor are in poor alignment. ○ Too many RPM. ○ The gland packing has been over tightened. ○ The shaft is deformed. ○ Rotating parts are rubbing against each other.	○ Trim the discharge line sluice valve to reduce the flow. ○ Change the pump. Use a larger electrical motor. ○ Realign and tighten the bolt. ○ Check the voltage. ○ Adjust so that a proper amount of leakage occurs. ○ Repair or replace parts. ○ Break down and repair.
Bearings overheat or are noisy.	○ Insufficient lubricant. ○ Too much grease. ○ The pump and electrical motor are in poor alignment. ○ The ball bearing is damaged. ○ The shaft is deformed. ○ The inappropriate type of lubricant. ○ The lubricant has deteriorated. ○ The coupling key has moved.	○ Replenish lubricant. Replace ball bearing. ○ Remove excess lubricant. ○ Realign and tighten the bolt. ○ Replace worn parts. ○ Repair, replace worn parts. ○ Replace with specified type. ○ Replace more often. ○ Tighten set bolt.
Unusual vibrations or noise from the pump.	○ Pump base is incomplete. ○ Foundation bolts or shims are loose. ○ Coupling rubber is worn. ○ The pump and electrical motor are in poor alignment. ○ Occurrence of cavitation surges. ○ Flow of the liquid is causing noise. ○ The entire unit is resonating.	○ Rebuild the base. ○ Tighten or replace. ○ Replace worn parts. ○ Realign and tighten the bolt. ○ Consult manufacturer. ○ Build discharge line with as few bends as possible. Use a shock-absorbing valve. ○ Use flexible pipe, or anti-resonating rubber.

Exploded views

(FS−125A)



(JS−65EB
11・15kW)



This diagram is representative presentation.
Configurations on some models may vary.

NO.	NAME OF PART	NO.	NAME OF PART	NO.	NAME OF PART	NO.	NAME OF PART
001	Casing	150	Bearing Support	404	Gasket	520	Vacuum Gauge Plug
010	Suction Cover	151	Bolt	414	Oil Cap	521	Pressure Gauge Plug
011	Casing Cover	230	Cover Packing	420	Oil Gauge	600	Common Base
020	Impeller (close)	(241)	Flange packing	422	Oil Drain Plug	610	Coupling
030	Shaft	(242)	Flange packing	460	Impeller Nut	620	Coupling Guard
031	Shaft Sleeve	250	Deflector	461	Lock Washer	642	Priming Plug
032	Sleeve Packing	300	Gland Packing	470	Impeller Key		
040	Metal Casing	310	Mechanical Seals	471	Coupling Key		
050	Bearing Cover	322	Plug	480	Bearing Nut		
060½	Ball Bearing	340	Mecha Cover	481	Lock Washer		
082	Seal Ring	401	Oil Seal	500	AirVent Valve		
090	Gland	402	Oil Seal	510	Drain Plug		

Breaking Down the Pump

■ For multi-stage pumps and ULS models, refer to the manual included with the pump.

① Close both the suction line and discharge line sluice valves. Remove the drain plug (510), and drain any residual liquid.

② Remove any auxiliary piping, such as from blow off valves, etc.

③ Disconnect the pump from the suction and discharge lines, and remove the suction cover (010) or casing cover (011) from the casing (001). The pump interior can now be inspected. Check to be sure that there is no conspicuous wear or damage. (For models such as the JFS·JS series, which have the casing (001) attached to the common base (600), removing everything after the casing cover (011) will allow the pump interior to be inspected without separating it from the piping.)

④ Remove the impeller nut (460) and the lock washer (461), and then remove the impeller (020) or (021), and the impeller key (470).

※1. Regarding mechanical seals
Remove the mecha cover (340) from the casing (001) or casing cover (011).

⑤ Remove the casing (001) or casing cover (011) from the metal casing (040), and remove the deflector (250) from the shaft (030). (For models with a sleeve, remove the sleeve (031) and sleeve packing (032) as well.)

※2. Regarding mechanical seals
Loosen the set screw, and remove the mechanical seal (310) from the shaft (030) or the sleeve (031).

⑥ Remove the bearing cover (050) from the metal casing (040), and remove the shaft (030).
(For oil bath bearings, be sure to remove the oil drain plug (422), and drain any residual oil beforehand.)

⚠ *Caution*

- *Take care not to damage the lip on the oil seals (401) and (402).*
  To do so could result in leakage.

※3. About gland packing models
Remove the gland (090) from either the casing (001) or the casing cover (011), and remove the gland packing (300) and the seal ring (082).

Reassembling the Pump

Reassemble the pump following the breakdown procedure in reverse order. At that time, follow the precautions shown below:

(1) Adjust the gap between the semi-open impeller (021) and the suction cover (010), casing (001) to be between 0.4 and 0.8mm. If necessary, insert an adjust ring (sold separately) between the back of the impeller (021) and the ridge on the shaft (030).

(2) Replace all old packing with new ones.

(3) Replace all worn or damaged parts.

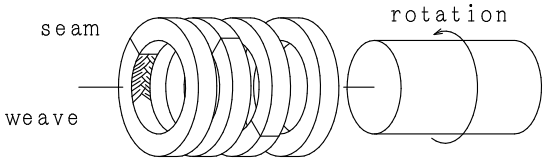
(4) Clean all parts.

Replacing the Gland Packing

In cases where there is conspicuous leakage from the shaft even after tightening the packing, or when there is conspicuous heat, in is necessary to replace the gland packing.
Be sure that the packing seams are offset when inserting.
For woven packing, orient the weave to the rotation of the shaft as shown in the diagram below.

⚠ *Caution*

- *Be sure to orient the packing properly when inserting.*
  Failure to do so could accelerate the rate of wear of the shaft and sleeve.

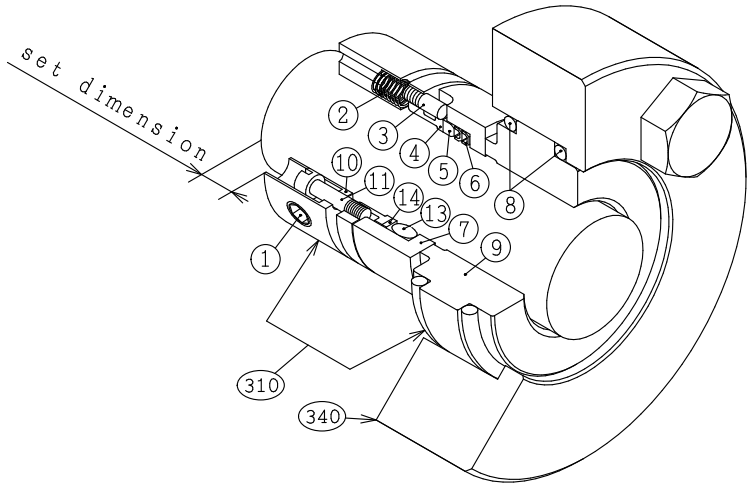


Replacing Mechanical Seals

(1) Break down the pump as described previously.
(2) Verify the mechanical seal set dimensions beforehand.
(3) During reassembly, apply a coat of detergent oil (spindle oil, etc.) or the liquid to be pumped, to the shaft, sleeve, and sliding parts of the mechanical seal.
(Use a detergent oil compatible with the liquid to be pumped.)

⚠ *Caution*

- *Be careful not to damage the shaft or sleeve.*
  To do so could result in leakage.
- *Be careful not to damage the packing, or any sliding surfaces.*
  To do so could result in leakage.



NO.	NAME OF PART
1	Set screws
2	Springs
3	Drive pins
4	Comp ring
5	Adapter
6	Shaft packings
7	Seal ring
8	Insert packings
9	Insert
10	Coller
11	Spring pins
13	Shaft packings
14	Backup ring

310	Mechanical seals
340	Mecha cover

Repairs

(1) Repairs to damage and correction of malfunctions due to any one of the causes shown below, as well as the replacement of expendable parts, will be performed on a remuneratory basis.
① Damage and malfunctions that are caused by improper use, or as a result of storage.
② Damage and malfunctions that occur while using parts or components other than those approved by the manufacturer.
③ Damage and malfunctions that are caused by modifications or repairs other than those approved by the manufacturer.
④ Damage and malfunctions caused by fire, earthquake or other types of natural disasters.
⑤ Damage and malfunctions, or corrosion and wear, caused by the physical characteristics of the liquid that is pumped.
⑥ Damage and malfunctions caused by the use of parts that have exceeded their normal life expectancy.

(2) The determination of the applicability of items ①, ②, ③, ④, ⑤ and ⑥ shown above will be done on a case by case basis, in cooperation with the customer.
(3) The manufacturer accepts no responsibility for damage to other equipment, loss of production time, or personal injury caused by malfunctions occurring in the pump.
※ The expression 'expendable parts' refers here to lubricants, rubber coupling bushes, packing, mechanical seals, oil seals, sleeves, and any other parts which can be expected to deteriorate with normal use.
(4) When requesting repairs
Before requesting inspection and repair, read the manual carefully, and reinspect the pump.
In the even of a malfunctions contact your sales agent.
(5) Precautions when returning a pump for repair
In order to protect the personal safety of maintenance personnel, as well as the environment, always follow the precautions shown below:

⚠ *Caution*

- *Always clean the pump thoroughly, and include a repair request form when returning a pump.*
- *Pumps returned without a repair request form may be refused.*
- *Regardless of whether or not a repair request form has been included, pumps that are evaluated as being dangerous to repair will be refused.*

※ *Repair request forms may be obtained at the locations shown below.*

(6) Minimum period of inventory for replacement parts
Replacement parts are kept in inventory for a minimum of 7 years after the discontinuation of the manufacture of a pump model. The expression 'replacement parts' refers to all parts necessary to maintain the performance of the pump.

Consultations

If you have any questions regarding repairs covered. or other after-sales-services, please consult your sales agent, or the Nishigaki office nearest you.

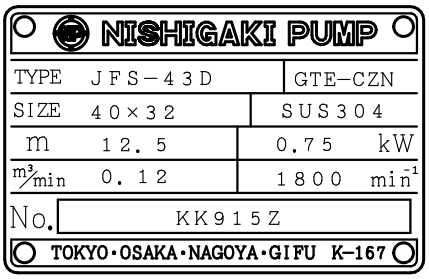
When Ordering Parts

(1) When ordering parts, or requesting a consultation, be sure to have on hand the following informations, which can be found on the name plate.

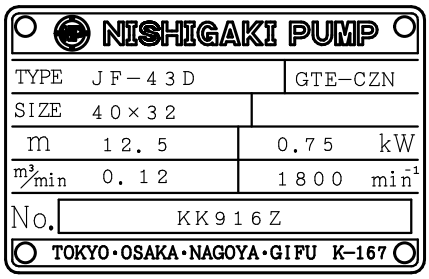
(2) Name plate
- ① TYPE ———— pump model
- ② CONSTRUCTION SYMBOL
  (shown for reference on the name plate, GTE-CZN, GGR-CZN, etc.) pump configuration
- ③ SIZE ———— inlet／outlet size
- ④ SUS ———— pump material
  (S for cast iron pumps, number of stages for multi stage pumps)
- ⑤ m･m^3/min ———— pump specifications
- ⑥ kW ———— electrical motor output
- ⑦ min^{-1} ———— synchcronous revoling speed
- ⑧ No. ———— pump serial number

Note: FSR･E-kata･EF and UE series have no construction symbol.

Example of a stainless steel pump (JFS-43D)



Example of a cast iron pump (JF-43D)



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HB3-068
(2017. 4)