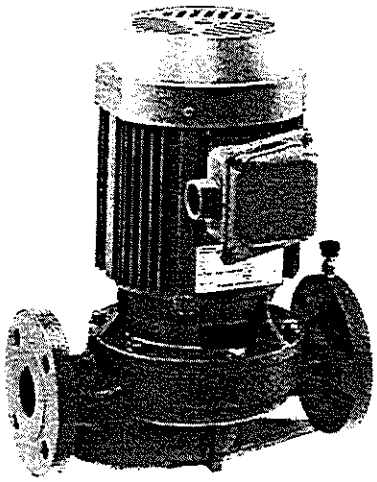
Be sure to issue the customer's pump operation personnel with copies of this manual.

CF1301U-H901 Rev 03

EBARA In-line Pumps

Model LPD

Instruction Manual



⚠ CAUTION

Thank you for choosing the EBARA Model LPD In-line Pump EBARA takes every caution in manufacturing the product for safe use by the customer However, handling this pump in an inappropriate manner may reduce its functional capacity and result in an accident

This operation manual explains the proper procedures concerning the installation, operation, and maintenance of the product This manual should be read before conducting operation and maintenance and inspections on this pump

Installation personnel must provide copies of this manual to the customer's pump operation, maintenance and inspection personnel Keep this manual in a safe place where it can be consulted at any time

To installation personnel.

Be sure to issue the customer's pump operation, maintenance, and inspection personnel with copies of this manual

CONTENTS

1 Warnings

Warnings in this manual provide information needed for safe operation of the pump, and instruc preventing danger or injury to you or other people. So that you will know the degree and imminence c that warnings signify, they are divided into two grades, WARNING and CAUTION, according to the ser of what will happen if their instructions are not heeded. Both grades of warning contain importa information, carry out all the instructions that they give, without fail.

Warning grade	Meaning
⚠ **Warning**	Potentially hazardous situation. Failure to follow the instructions could result in death or serious injury.
⚠ **Caution**	Failure to follow the instructions given could result in minor injury, or damage to the pump.

Note	Used to emphasize important information

Meanings of symbols accompanying WARNINGs and CAUTIONs	⃠	Indicates prohibition (that something must NOT be done). Precisely what must not be done is indicated by pictures or wo inside the circle of the symbol or close to it.
	❗	Indicates an imperative (that something MUST be done). Precisely what must be done is indicated by pictures or words clc symbol.

2 Safety Cautions

⚠ Warning	Perform wiring work correctly as specified by electrical facility technical standards and extension codes Incorrect wiring could result in electric shock and fires	
	Install and ground an earth cable Electric shock could occur during accidents or electric leakage	
	Do not operate the pump for more than 5 minutes with the discharge valve closed Doing so will increase the inner pressure of the pump, damaging the casing or plugs	
	Disassembly and repair of the pump should only be performed by specialist maintenance technicians Otherwise, error by personnel could result in electric shock, and the pump catching fire or operating abnormally and causing injury	
	Always turn the power switch OFF before inspecting or repairing the pump Not doing so could result in the pump starting up suddenly in auto operation, exposing personnel to danger.	
	If there is a power failure, turn the power switch off Otherwise, the pump may start-up suddenly when the power supply is resumed, exposing personnel to danger.	
⚠ CAUTION	Do not operate the pump with 50Hz specifications at 60Hz Doing so will overload the pump, causing the motor to burn	
	Do not operate the pump with 60Hz specifications at 50Hz Doing so will cause the pump to perform poorly.	
	If you have purchased a standard pump, refer to the standard specifications shown below The optional specifications indicate changes made to some pumps to meet the needs of some customers Be sure not to operate your pump outside of the ranges shown in the applicable specifications.	
	Make sure that the floor surface where the pump is installed has been waterproofed and treated for waste water If it has not, severe damage could be caused should leakage occur.	
	Make sure that any one of three terminals of the three-phase motor is not loose or disconnected Running the motor with only two terminals connected could a phase interruption, burning out the motor	
	Do not touch the rotating parts such as the shaft, shaft couplings, etc while the pump is running Since these parts rotate at high speed, doing so could result in injury.	
	If the pumped liquid is hot water, keep your hands off the pump The pump's surfaces will be hot, and you could get burned if you touch them.	
	Do not touch the motor The motor's surfaces will be hot, and you could get burned if you touch them	
	Do not cover the motor with a blanket or cloth Doing so could over heat the motor, setting a fire.	
	To prevent an accident if the pump stops running or an abnormality occurs, immediately turn off the power switch Contact the shop from where you ordered the pump, or EBARA to perform an inspection and maintenance on the pump	
	When the pump is out of use for prolonged periods such as the wintertime, water inside the pump could freeze, causing damage to the pump Accordingly, in such situations, either drain all water from the pump or provide thermal insulation to prevent the water from freezing	

3 Delivery checks

When your pump is delivered, check the following immediately

1. The pump and accessories

(1) Confirm that no damage has occurred during transportation
Check all nuts and bolts to confirm that they are not loose

(2) Confirm that all accessories have been delivered (Refer to chapter 9 "Construction")

2. Nameplate

The basic specifications of the pump are listed on the nameplate Read the data on the nameplate to check that this pump was the product that you ordered, and be aware of the differences between 50 Hz and 60 Hz devices

⚠ Caution	**Be aware of the differences between 50 Hz and 60 Hz devices** • Pumps with 50 Hz specifications will overload when operated at 60 Hz, causing the motor to burn • Pumps with 60 Hz specifications will poorly perform when operated at 50 Hz.	⊘

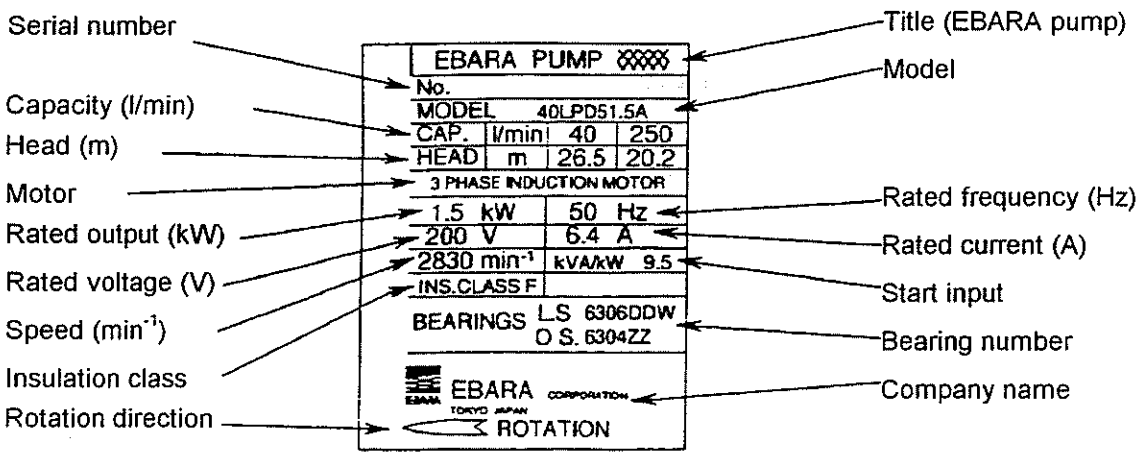


Fig. 1 Data on pump nameplate

4 Specifications

For the head, capacity, speed motor voltage/current and other major specifications of your pump, see the nameplate The standard specifications and optional specifications are given in the tables below

⚠ Caution	· If you have purchased a standard pump, refer to the standard specifications shown below The optional specifications indicate changes made to some pumps to meet the needs of some customers Be sure not to operate your pump outside of the ranges shown in the applicable specifications	⊘

Table 1 Standard specifications

Item			Specifications	
Model			All 32LPD 40 LPD (except 52 2, 63 7) 50 LPD (except 52 2, 53 7, 63.7, 65.5)	40LPD, 52 2, 63 7 50LPD 52 2, 53 7, 63 7, 65 5 All 65LPD All 80LPD
Liquid handled	Type		Fresh water	
	Temperature		0 – 100℃	
Suction total head			-6m (20℃), 80LPD 50Hz -5 5m, 60Hz -3 5m	
Max. working pressure			0.7MPa {7kgf/cm^2}	1MPa {10.2kgf/cm^2}
Allowable charge pressure			(0 7 — shutoff pressure) MPa	(1 0 — shutoff pressure) MPa Max. 0.69MPa
Installation			Single phase. indoors, 3-phase. Indoors and/or outdoors	
Motor	Single phase	Type	Open-drip-proof type 2P	
		Output	0.25, 0.4kW	
		Voltage	100V	
	3-phase	Type	Fully enclosed splash-proof type (for outdoor use)	
		Output	0.25 – 11kW	
		Voltage	50Hz. 200V, 60Hz. 200/220V	

Table 2 Optional specifications

Item	Specifications
Change item	Impeller CAC406 (This applies to the models shown in the left column of the standard specifications table only.)
Other	Witnessed test

5 Installation

1. Installation location

⚠ Caution	· Make sure that the floor surface where the pump is installed has been waterproofed and treated for waste water If it has not, severe damage could be caused should leakage occur	❗

(1) Pumps with single phase motors are for indoor installation Pumps with 3-phase motors can be installed either indoors or outdoors

(2) Select an airy location with little dust and moisture Ambient temperature should not exceed 40℃

(3) There should be ample space around the pump, or take some other effective measures to prevent unauthorized personnel from coming near it

(4) Provide an enclosure around the pump, or take some other effective measures to prevent unauthorized personnel from coming near it

(5) Install the pump in a location where it is near a water source, suction height (the height from the suction surface to the center of the pump) is low, and the length of the suction piping is short

(6) Set the suction total head to within -6m (for 80LPD, 50Hz -5 5m, 60Hz -3 5m) However, for hot water, the water level may need to be increased

(7) Since water leaks can occur from the mechanical seals and gaskets in the pump, take precautions to prevent water from leaking onto the floor or lower levels

NOTE

After installation, have unneeded packaging disposed of by a specialist disposal company

2. Piping

(1) The pump should be installed to piping as shown in A through D in Fig 2 The piping as shown in Fig 3 is not allowed

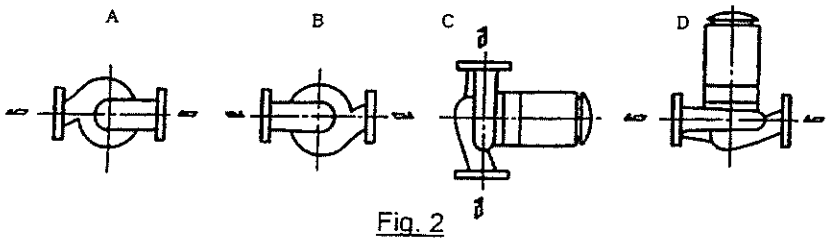


Fig. 2

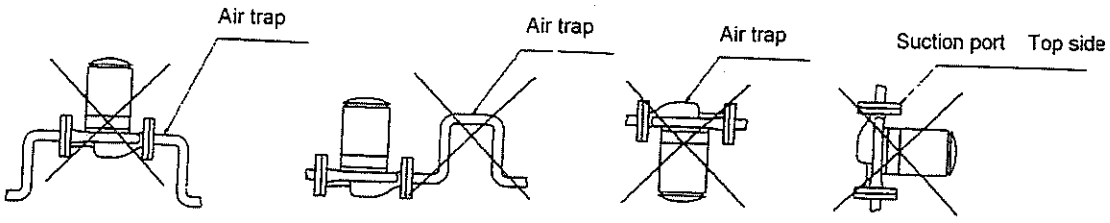


Fig. 3

(2) Install the piping so that the pump casing is not affected by the suction or/and discharge piping

(3) In the following circumstances, a check valve must be installed a) if the pipes are long, b) if the actual pump head is high, c) if the pump is to be used in automatic operation, d) when water is supplied to the pressure tank, and e) if two or more pumps are used in parallel The check valve should be installed between the pump and the discharge side gate valve

(4) If the accumulation of air in the top of the pump is unavoidable, provide air vent valves in the trouble areas However, do not install air vent valves in locations such as suction piping where there is negative pressure, or else air will be sucked

(5) Do not install the pump in the convex areas of the piping
(During operation, air or hot water inside the piping in the pump allows steam to build up and cause dry operation)

(6) If thermal insulation is added to the piping, do not apply it to the motor Also, if it is installed near the boiler, prevent the heat from the boiler to the pump

(7) When piping for hot water circulation is used in closed cycle, install an expansion tank or safety valve on the piping

(8) If there is a possibility of water hammer occurring, install a quick close check valve, and so on

(9) For negative suction application
  (a) Make the end of the suction piping is 2 times deeper than the diameter of the piping and 1 – 1 5 times apart from the bottom
  (b) Install a foot valve with a strainer on the end of the suction piping to prevent foreign matter from being sucked in
  (c) Install the suction piping so that there is an upward gradient toward the pump of at least 1/100 to prevent air from becoming trapped inside Also, install joints carefully to prevent air from being sucked in
  (d) Make the suction piping as short as possible, with as few bents as possible, and do not install a gate valve

(10) For flooding or positive suction application
  (a) Install a gate valve on the suction piping to make disassembly and inspection convenient

3. Electrical wiring

⚠ **Warning**	· Perform wiring work correctly as specified by electrical facility technical standards and extension codes Incorrect wiring could result in electric shock and fires · Install and ground an earth cable Electric shock could occur during accidents or electric leakage.	❗
⚠ **Caution**	· Make sure that any one of three terminals of the three-phase motor is not loose or disconnected Running the motor with only two terminals connected could a phase interruption, burning out the motor	❗

(1) Perform wiring according to Fig 4 below

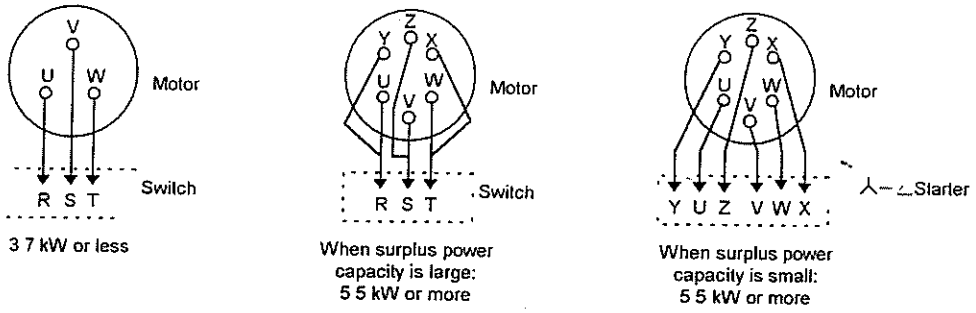


Fig. 4 Wiring Diagram

(2) Check the following conditions before turning on the switch
   (a) Installation of appropriate fuses
   (b) Correct wiring
   (c) Correct grounding

6 Operation

⚠ **Warning**	· Do not operate the pump for more than 5 minutes with the discharge valve closed Doing so will increase the inner pressure of the pump, damaging the casing or plugs.	⊘
⚠ **Caution**	· Do not touch the rotating parts such as the shaft, etc while the pump is running Since these parts rotate at high speed, doing so could result in injury · If the pumped liquid is hot water, keep your hands off the pump The pump's surfaces will be hot, and you could get burned if you touch them · Do not touch the motor The motor's surfaces will be hot, and you could get burned if you touch them · Do not cover the motor with a blanket or cloth Doing so could over heat the motor, setting a fire.	⊘

1. Preparation for operation

(1) From the top of the motor, use a screwdriver and try to turn the shaft, to check that it rotates easily If it turns stiffly or irregularly, inspect internal rusts, etc

(2) Prime the pump Operating the pump without priming it will cause damage Open the suction valve, discharge valve, and air vent valve, and fill the pump to the discharge nozzle with water from the pipe line

(3) When priming, rotate the pump manually to completely remove air from inside the impeller

2. Operation

(1) Close the discharge valve and air vent valve after priming is completed If a suction valve is equipped, open it to full turn

(2) Turn the power briefly on and off again a couple of times, and check that operation is normal Also check the direction of rotation

> **Note**
>
> The correct direction of rotation is clockwise when looking from the motor side

(3) Once the prescribed speed is reached, gradually open the discharge valve to start cycle operation

(4) Check for abnormal pressure, current, vibration, or noise Keep the cocks of the pressure gauge and compound gauge closed, except when taking measurements These gauges may be damaged if their cocks are left open

(5) Before the pump is started up for the second time and before all subsequent startups, conduct the daily inspection specified in 7 Maintenance

> **Note**
>
> Run the pump at a discharge capacity that is suitable for the equipment
> (Capacity that is too large or small will cause noise and vibration, and also waste power.)

3. Stopping

(1) After closing the gate valve on the discharge side, turn off the power to shut down the motor

(2) If there is no check valve on the discharge side, when shutting down operation, gradually close the discharge valve, and then shut down the motor

4. Cautions for operation

(1) If the pump is operated for long periods with the discharge valve closed, the water temperature inside the pump will rise, causing an accident Do not operate the pump with the discharge valve closed for longer than 5 minutes

(2) Starting and stopping the pump repeatedly at short intervals will harm it and shorten its service life The start-up frequency should be limited to 6 times per hour

Motor output	Startup frequency
7 5kW or less	6 times or less per hour
11kW	4 times or less per hour

(3) If there is a power failure, turn the power switch off Otherwise, the pump may start-up suddenly when the power supply is resumed

7 Maintenance

⚠ Warning	· Disassembly and repair of the pump should only be performed by specialist maintenance technicians Otherwise, error by personnel could result in electric shock, and the pump catching fire or operating abnormally and causing injury	⊘
	· Always turn the power switch OFF before inspecting or repairing the pump Not doing so could result in the pump starting up suddenly in auto operation, exposing personnel to danger · If there is a power failure, turn the power switch off Otherwise, the pump may start-up suddenly when the power supply is resumed, exposing personnel to danger.	❗
⚠ Caution	· Do not touch the rotating parts such as the shaft, etc while the pump is running Since these parts rotate at high speed, doing so could result in injury · If the pumped liquid is hot water, keep your hands off the pump The pump's surfaces will be hot, and you could get burned if you touch them · Do not touch the motor The motor's surfaces will be hot, and you could get burned if you touch them.	⊘
	· To prevent an accident if the pump stops running or an abnormality occurs, immediately turn off the power switch Contact the shop from where you ordered the pump, or EBARA to perform an inspection and maintenance on the pump · When the pump is out of use for prolonged periods such as the wintertime, water inside the pump could freeze, causing damage to the pump Accordingly, in such situations, either drain all water from the pump or provide thermal insulation to prevent the water from freezing.	❗

1. Daily inspection

(1) If pressure, current, capacity, vibration, or noise differ markedly from normal, trouble of some kind is probably going to occur, and you should take prompt corrective action Refer to 8 Troubleshooting for diagnosis and corrective action You are advised to post a Daily Operation Condition Check Sheet

NOTE

Standard performance curves can be obtained from EBARA sales office or dealers

(2) There should be almost no leakage if the mechanical seal is normal If there is a large amount of leakage, replace the mechanical seal

(3) Standard value of vibrations for when the pump is installed correctly and piping work has been performed correctly are shown in Fig 5 Wrong piping work can often cause excessive vibrations

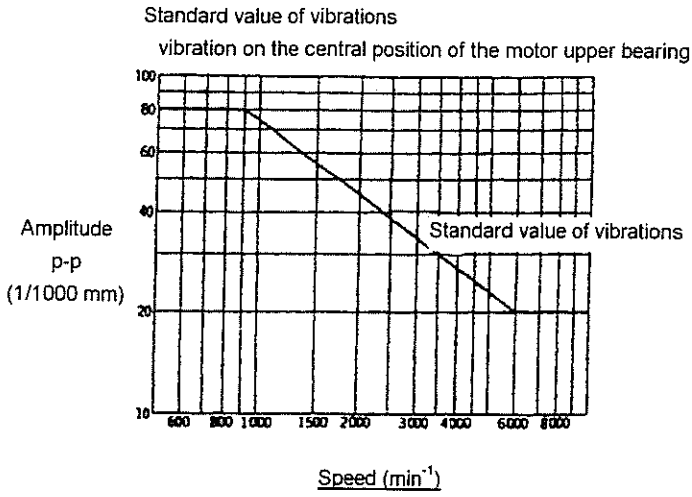


Fig. 5

2. When the pump is out of use for long periods

(1) When the pump is out of use for prolonged periods in the wintertime or in cold climates, the water inside the pump could freeze, causing damage to the pump Accordingly, in such situations, provide thermal insulation to prevent the water from freezing

(2) If you have installed a spare pump, run it from time to time and keep it ready for operation at any time

3. Consumable parts

(1) Replace the parts according to the conditions shown in Table 3

Table 3 Inspection list

Consumable part	Replacement condition	Approximate replacement interval
Mechanical seal	Large amount of leakage	Once per year
Sealed ball bearing	Loud or abnormal noises occur, grease leaks out	Once every 2 – 3 years
O-ring	Whenever disassembly for inspection is performed	—

The replacement intervals shown above are standard for normal operation

(2) The consumable parts list is as follows

Motor output kW	Sealed ball bearing	
	Contact type	Non-contact type
	Pump side	Opposite side
Single phase 0 25, 0 4	6204DDW	6202VV
3-phase 0 25, 0 4	6204DDW	6203ZZ
0 75	6205DDW	6204ZZ
1 5, 2 2	※ 6306DDW	6304ZZ
3 7	6306DDW	6305ZZ
5 5, 7 5	6308DDW	6306ZZ
11	6309DDU	6208ZZ

※ 6305DDW are used for the following models
40LPD52 2, 50LPD52 2
65LPD51 5, 52 2, 61 5, 62 2
80LPD51 5, 52 2, 62 2

Stamped impeller

Bore size	Motor output (kW) 50Hz	Motor output (kW) 60Hz	Mechanical seal	O-ring
32		0.25	FH-150	3 × 150
	0.25	0.4		
	0.4	0.75		
	0.75			
		1.5	FH-20B	
40	0.25	0.4	FH-150	
	0.4	0.75		
	0.75			
		1.5	FH-20B	
	1.5			
		2.2		
50	0.4	0.75	FH-150	
	0.75			
		1.5	FH-20B	
	1.5			
		2.2		

Cast impeller

Bore size	Motor output (kW) 50Hz	Motor output (kW) 60Hz	Mechanical seal	O-ring
32		0.25	FS-15B	3 × 150
	0.25			
		0.4		
	0.4			
		0.75		
	0.75			
		1.5		
40	0.25			
		0.4		
	0.4			
		0.75		
	0.75			
		1.5		
	1.5		FH-20B	
		2.2		
	2.2			3 × 185
		3.7		
50	0.4		FS-15B	3 × 150
		0.75		
	0.75			
		1.5		
	1.5		FH-20B	
		2.2		
	2.2			3 × 185
		3.7		
	3.7		FH-25B	3 × 200
		5.5		

Bore size	Motor output (kW) 50Hz	Motor output (kW) 60Hz	Mechanical seal	O-ring
65	0.75		FH-20B	3 × 150
		1.5		
	1.5			
		2.2		
	2.2			
		3.7		
	3.7			3 × 185
		5.5		
	5.5		FH-25B	3 × 225
		7.5		
80	1.5		FH-20B	G-120
		2.2		
	2.2			
		3.7		
	3.7		FH-25B	3 × 165
		5.5		
		7.5		
	5.5			
	7.5			3 × 185
		11		
	11			3 × 225

8 Troubleshooting

1. Pump

Trouble	Cause	Remedy
Motor won't turn	· Start-up conditions of the control panel are not met · The motor is damaged · Power supply abnormality · Rotating parts in contact Rust Burning · Foreign material caught in the contacting surfaces	· Check the conditions · Repair the motor · Inspect and repair · Manually rotate Re-assemble Have repaired by a specialist workshop · Remove the foreign material.
Priming not possible	· Foreign material caught in the foot valve · Foot calve seat surface is worn · Leakage from the suction piping · Air sucked into suction piping/shaft seal.	· Remove the foreign material · Replace the foot calve seat · Inspect suction piping · Inspect suction piping/shaft seal.
Pump operates, but no water is discharged Water is not discharged at the rated capacity	· Pump not primed · Gate valve is closed or half open · Actual pump head is larger than the total pump head · Suction head is too high for the pump · Reverse rotation direction · 60 Hz pump in a 50 Hz region · Voltage is too low · Foot valve or strainer is clogged · Impeller is clogged · Piping is clogged · Air is being sucked in · Leakage from discharge piping · Impeller is corroded · Impeller is worn · Liner ring is worn · Large loss in the piping · High fluid temperature or volatile fluid · Cavitation	· Prime the pump · Open the gate valve · Review the plan · Review the plan · Check the rotation arrow, and correct the wiring · Check the nameplate · Check the power supply · Remove the foreign material · Remove the foreign material · Remove the foreign material · Inspect, repair suction piping and shaft seal · Inspect, repair · Check the fluid, change material · Replace the impeller · Replace the liner ring · Review the plan · Review the plan · Consult with a specialist.
Water is discharged, but stops	· Not primed sufficiently · Air is being sucked in · Air is trapped inside the suction piping · Suction head is too high for the pump.	· Sufficiently prime the pump · Inspect, repair suction piping and shaft seal · Refit the piping · Review the plan.
Overload (over current) occurs	· Voltage has dropped or phase imbalance is large · Head is low Too much water flow · 50Hz pump in a 60Hz region · Foreign material in the pump · Improper setting of the mechanical seal · Bearing is damaged · Rotating parts in contact Shaft is bent · Fluid specific gravity, viscosity is too great.	· Check the power supply · Throttle the discharge valve · Check the nameplate · Remove the foreign material · Reassemble the mechanical seal correctly · Replace the bearing · Have repaired by a specialist workshop · Review the plan
Bearing heats up	· Bearing is damaged · Pump is operated for prolonged period at shut-off pressure.	· Replace the bearing · Stop shut-off pressure operation
More leakage from the shaft seal	· Poor assembly of mechanical seal · Mechanical seal is damaged · Shaft is worn · Suction pressure is too high · Shaft is bent.	· Install correctly · Replace mechanical seal · Replace the shaft · Reexamine the design · Have repaired by a specialist workshop.
Shaft seal heats up	· Sealing water is not injected (sealing hole is clogged).	· Disassemble and inspect

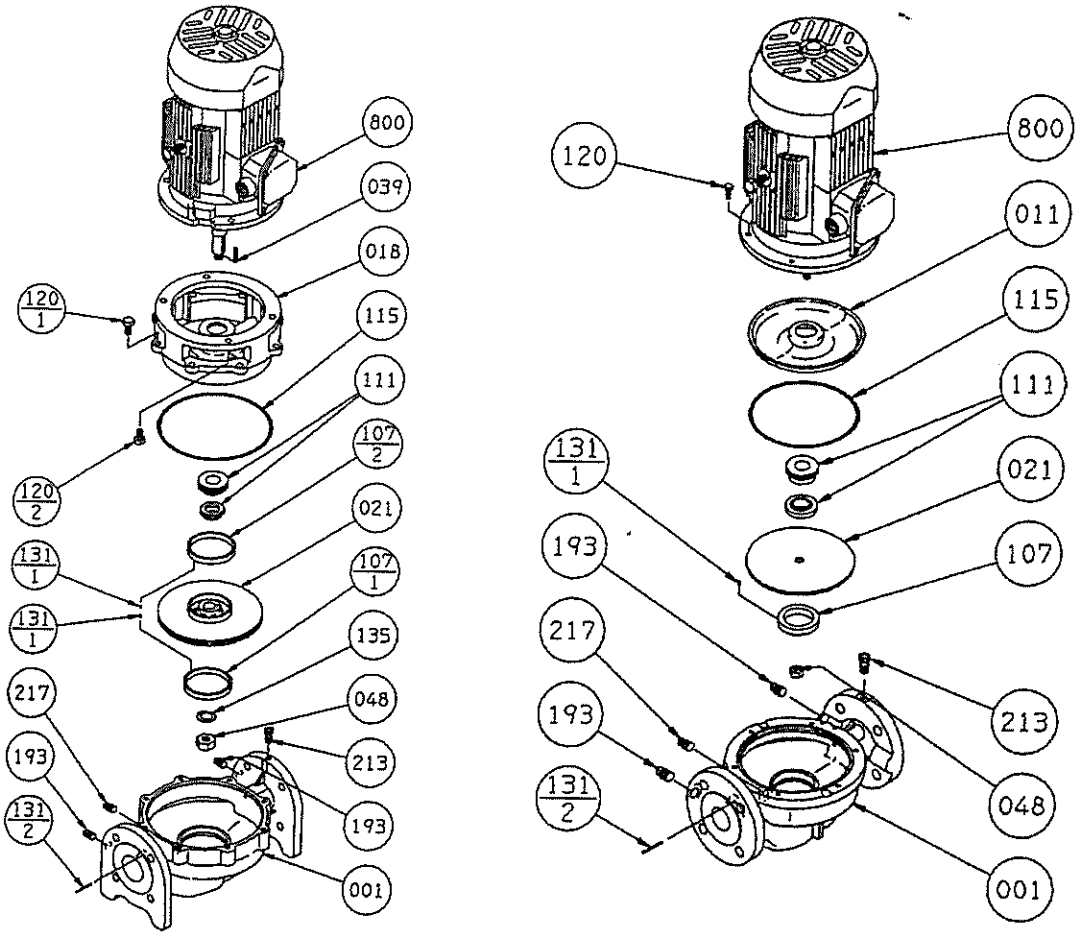
2. Motor

Trouble	Cause	Remedy
Motor won't start-up	· Coil disconnection · Coil short · Tight bearings · Voltage is low · Power supply phase interruption	· Have repaired by a specialist workshop · Have repaired by a specialist workshop · Repair bearings · Use the rated voltage · Remove the cause of the phase interruption
Abnormal noise/excessive vibration	· Phase interruption · Voltage has dropped or phase imbalance is large · Overload · Poor air gap · Contact between stator and rotor · Foreign material in cooling fan · Poor motor installation	· Remove the cause of the phase interruption · Check the power supply · Close the pump discharge valve · Replace the bearings · Re-centering Replace the bearings · Remove the foreign material · Connect completely with the bracket
Temperature rises large Smoke and odor emitted	· Overload · Voltage has dropped or phase imbalance is large · Airway is blocked · Incorrect frequency · Incorrect voltage · Tight bearings · Coil short circuit · Coil grounding · Poor switching between 人– △	· Throttle pump discharge valve · Check the power supply · Remove the blockage · Replace with a pump of correct frequency · Replace with a motor of correct voltage · Replace the bearings · Have repaired by a specialist workshop · Have repaired by a specialist workshop · Correct switching between 人– △.
Damage and large temperature rise in bearings	· Looseness in bearing bracket · Shaft is bent · Insufficient cooling · Damage/corrosion to bearings	· Tighten the bracket bolts · Have repaired by a specialist workshop · Remove the cause of insufficient cooling · Replace bearings.
Speed does not increase	· Voltage is low · Poor switching between 人– △ · Overload · Poor contact.	· Set to the rated voltage · Correct switching between 人– △ · Decrease load · Connect correctly. Tighten.

9 Construction

1. Exploded view

This figure shows a LPD model Depending on the model, your pump may vary slightly



No.	Name	Q'ty
120-2	Bolt	4
120-1	Bolt	4
		6
		8
		10
115	O-ring	1
111	Mechanical seal	1
107-2	Casing ring	1
107-1	Casing ring	1
048	Impeller nut	1
039	Key	1
021	Impeller	1
018	Bracket	1
001	Casing	1

No.	Name	Q'ty
800	Motor	1
217	Drain plug	1
213	Air vent valve	1
193	Pipe plug	2
135	Washer for impeller nut	1
131-2	Spring pin	1
131-1	Spring pin	2

No.	Name	Q'ty
800	Motor	1
217	Drain plug	1
213	Air vent valve	1
193	Pipe plug	2
131-2	Spring pin	1
131-1	Spring pin	1
120	Bolt	6
115	O-ring	1
111	Mechanical seal	1
107	Casing ring	1
048	Impeller nut	1
021	Impeller	1
011	Casing cover	1
001	Casing	1

Washer for impeller nut is also used for the impeller nuts of 1 5 and 2 2 kW

2. Accessories

Companion flange · · 2 sets

NOTE

Cross-section drawings indicating the materials of the components can be obtained from EBARA sales offices or dealers.

10 Disassembly and reassembly

1. Disassembly

When disassembling the pump, refer to 9 Exploded View, and the following procedure.

(1) Remove the casing installation bolt, and remove the motor with the rotor

(2) Remove the impeller nut (right-hand thread) and washer, and remove the impeller If the impeller cannot be removed due to rust, lightly tap the end of the shaft with a mallet to knock it loose
(Some press impellers do not have an impeller nut washer)

(3) Remove the key (a key is not used in a press impeller), and remove the rotating portion of the mechanical seal

(4) Remove the bracket installation bolt Remove the bracket from the motor
(For a press impeller application, use a screwdriver and lift off the press casing cover from a slot located on the periphery portion of the motor flange)

(5) Use a standard screwdriver to lightly push the fixed part of the mechanical seal out from the motor side shaft extension of the bracket (casing cover) Be careful not to damage the contacting surfaces when removing the mechanical seat
All parts other than the motor can now be inspected

NOTE

If dissassembly of the motor is necessary consult the specialized manufacturer

2. Reassembly

Assembly should be performed reverse to disassembly Be careful of the following when assembling the pump

(1) Use a dry cloth to wipe the contacting surfaces of the mechanical seal

(2) Replace the O-rings with new ones

(3) Replace all worn and/or damaged parts

(4) Check the rotation of the ball bearings If they do not rotate smoothly or discharge grease, replace them

(5) Tighten the bolts gradually and in order

(6) After assembly is complete, check that the pump can be turned easily and smoothly by hand

(7) Request O-rings and mechanical seals from where you purchased the pump The dimensions are listed on a table in 7 Maintenance

11 Limited Warranty

Repair or servicing of the pump shall be requested to your dealer or to EBARA
EBARA's liability under this Warranty is limited to bearing the costs of parts necessary for repair, EBARA's liability shall not extend to any other costs beyond these

(1) This warranty valid for a period of twelve (12) months from the date of shipment
(2) During the said period, EBARA will repair the pump free of charge provided that the trouble is due to shortcomings in design, workmanship, etc , that can be attributed to EBARA, and that the pump was being operated correctly and in a normal manner when the trouble occurred Ebara takes full responsibility to repair the pump including parts necessary for replacement, however, EBARA do not take any other damages caused by the trouble
(3) Fees will be charged for repair in the following circumstances
(a) if the trouble occurs after the Warranty has expired
(b) if the trouble is caused by misoperation, and/or caused during storage
(c) if the trouble is caused by fire, flood, earthquake or other circumstances beyond EBARA's control,
(d) if the trouble is caused by use of parts other then those recommended by EBARA
(e) if the trouble is caused by repair or remodeling of the pump carried out by a party other than EBARA or unapproved by EBARA

Note

EBARA will not be liable for any compensation for damage or injury resulting from breakdown of the pump Should you notice anything abnormal in the pump's operation, stop the pump immediately and inspect for malfunction
"Consumable items" refers to bearings, bearing sleeves, O-rings and other parts that will eventually require replacement
If a trouble occurs, to order repairs or servicing, please contact EBARA Corporation or an authorized Agent/Distributor, stating the data on the nameplate and details of the trouble.

If you have any enquiries about the pump, please contact EBARA

EBARA CORPORATION

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