INSTALLATION & MAINTENANCE MANUAL

PEERLESS PUMP®

CDL

Vertical Stainless Steel Multistage Centrifugal Pump

Member of: Hydraulic INSTITUTE

4854270
Peerless Pump Company
10/06

Read this entire bulletin before attempting to repair this pump. These installation and Operating instructions should be studied carefully.
The installation and operation should also be in accordance with local regulations and accepted codes of good practice. Properly installed, your Peerless pump will give you satisfactory, dependable service. We urge you to carefully read these step-by-step instructions to simplify any problems of installation, operation or repair.

Failure to read and comply with installation and operating instructions will void the responsibility of the manufacturer and may also result in bodily injury as well as property damage.

This bulletin is intended to be a permanent part of your pump installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Peerless Pump. Include pump model and/or serial number with your request.

Model numbers used in Table I are for the commercial pumps. When ordering repair parts, provide the complete model number including suffix letters and the pump serial number.

WARRANTY

New equipment manufactured by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment; Seller's obligation under this warranty being limited to repairing or replacing at its option any part found to its satisfaction to be so defective provided that such part is, upon request, returned to Seller's factory from which it was shipped, transportation prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts repaired outside Seller's factory without prior written approval. Seller makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are usually covered by warranties of the respective manufacturers thereof.

In the event, notwithstanding the terms of this agreement, it is determined by a court of competent jurisdiction that an express warranty has been given by Seller to Purchaser with respect to the head, capacity or other like performance characteristics of said equipment. Seller's liability for breach of the same shall be limited to accepting return of such equipment F.O.B. plant of manufacture, refunding any amount paid thereon by Purchaser (less depreciation at the rate of 15% per year if Purchaser has used equipment for more than thirty [30] days) and cancelling any balance still owing on the equipment.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND SELLER SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

WARNING

Do not operate this pump at any pressure, flow rate, or liquid temperature other than those for which the pump was originally purchased. Do not pump any other liquid than the one for which the pump was originally purchased without the consent of Peerless Pump or its authorized representatives. Disregard of this warning can result in pump failure and serious personal injury or death.

Member of: Hydraulic Institute

MODEL NOMENCLATURE & APPLICATIONS

1. Model Nomenclature

See pump nameplate.

CDLF 8- 4 0 - 1
CDLF: Vertical Multi-Stage Centrifugal Pump
8: Nominal flow rate in m3/h
40: Number of stages*10
1: Numbers of Impeller

2. Applications

CDL Multistage Centrifugal Pumps, are designed for the following applications:

Pump Liquid

Thin, non-explosive liquids, not containing solid particles or fibres. The liquid must not attack the pump materials chemically. When pumping liquids with a density and/or viscosity higher than that of water, motors with correspondingly higher outputs must be used, if required.

CDL(F)

For liquid transfer, circulation and pressure boosting of clean water.

Typical applications

- Municipal water supply and pressure boosting
- Domestic water supply
- Boiler feed and condensate systems
- Cooling water systems
- Irrigation and dewatering
- Fire fighting
- Washing plants and wash down

3. Technical Data

3.1 Ambient Temperature

Maximum+40°C

3.2 Liquid Temperature

-15°C to+120°C

3.3 Minimum Inlet Pressure

According to the NPSH curve

3.4 Maximum Inlet Pressure

3.5 Electrical Data

See motor nameplate

3.6 Dimensions and Weights

See catalog

3.4 Maximum Inlet Pressure

Model	Max. Inlet Press.
CDL. CDLF1-20~1-80	6 bar
CDL,CDLF1-90~1-360	10 bar
CDL,CDLF2-20	6bar
CDL,CDLF2-30~2-110	10bar
CDL,CDLF2-130~2-260	15bar
CDL,CDLF3-20~3-50	6bar
CDL,CDLF3-60~3-290	10bar
CDL,CDLF3-310~3-360	15bar
CDL,CDLF4-20	6bar
CDL,CDLF4-30~4-100	10bar
CDL,CDLF4-120~4-220	15bar
CDL,CDL8-20~8-60	6bar
CDL,CDLF8-80~8-200	10bar

4. Installation

The pump should be installed with the motor shaft positioned vertically. See fig.1. Ensure that an adequate supply of cool air reaches the motor cooling fan.

Arrows on the pump base show the direction of flow of liquid through the pump.
[see Fig.1]

Counter flanges, gaskets, bolts, PJE and CLAMP coupling sets are available as accessories and have to be ordered separately.

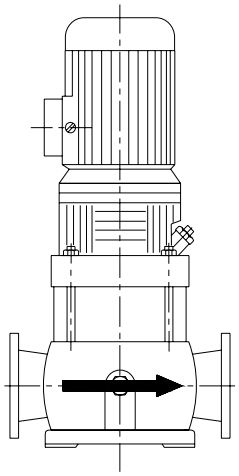

Fig. 1

PJE and CLAMP coupling sets are available with threaded sockets or sockets for welding. Isolating valves should be fitted on either side of the pump to prevent the system being drained if it is necessary to clean, repair of replace the pump. Install the pipes so that air pockets are avoided. Correct pipe work shown in fig. 2.

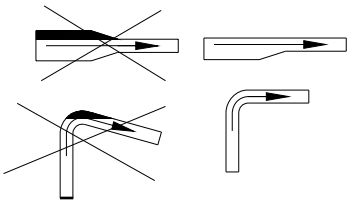

Fig. 2

The pipes should be fitted so that any tension caused by variations in temperature does not affect the pump.

If the pumps are connect to long pipes, these pipes should be adequately supported before and after the pump to avoid tension on the pump.

If there is any risk of the pump being obstructed by stones, leaves, twigs, etc., measures should be taken to prevent this. A strainer should be fitted to the suction pipe.

In the case of installations in which the discharge pipe has been installed horizontally, or it slopes downwards away from the pump, which can or must be drained in certain periods, the pump should be protected against dry-running. This can be done by fitting a loop with a vacuum valve close to the pump.

[see Fig.3]
The highest point of the loop should at least be flush with the lower edge of the pump motor. The discharge pipe can then be drained independently of the pump and vice versa.

Ensure the pump is not allowed to run against a closed discharge valve as this will cause an increase in temperature / formation of steam in the pump which may cause damage to the pump.

If there is any danger of the pump running against a closed discharge valve, ensure a minimum liquid flow through the pump by connecting a bypass/drain to the discharge pipe.

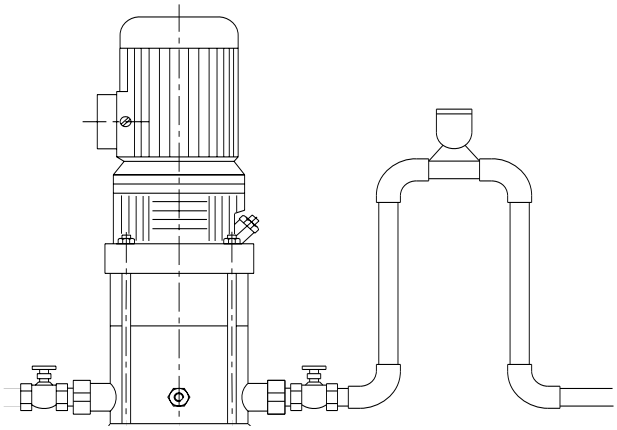

Fig. 3 **Direction of Flow of Liquid**

Minimum Flow Rates

Type	Liquid Temperature	
	-15℃ to+80℃	+80℃ to+120℃
CDL2	0.2m3/h	0.2m3/h
CDL4	0.4m3/h	0.4m3/h
CDL8	0.8m3/h	0.8m3/h

5. Electrical Connections

Before removing the terminal box cover and before any removal / or dismantling of the pump, make sure that the electricity supply has been switched off.

The electrical connections should be carried out by an authorized electrician in accordance with local regulations.

The pump must be connected to an external switch. The operating voltage and frequency are marked on the nameplate. Make sure that the motor is suitable for the electricity supply on which it will be used.

Single-phase motors incorporate a thermal switch and require no additional motor protection. Three phase motors must be connected to a motor starter.

The terminal box can be turned to four positions, in 900 steps. If necessary, remove the coupling guards by means of a screwdriver. Do not remove the coupling.

Turn the motor to the required position. Replace the coupling guards. The electrical connection should be carried out as shown in the diagram inside the terminal box cover.

Do not start the pump until it has been filled with liquid.

6. Start-Up

Do not start the pump until it has been primed and vented.

6.1 Priming

Closed systems or open systems where the liquid level is above the pump inlet:
Close the discharge isolating valve and loosen the vent screw in the pump head.

Pay attention to the direction of the vent hole and take care to ensure that the escaping water does not cause injury to persons or damage to the motor or other components. In hot water installations, special attention should be paid to the risk of injury caused by scalding hot water.

Slowly open the discharge isolating valve in the suction pipe until a steady stream of liquid runs out the vent hole. Tighten the vent screw and completely open the isolating valves.

Open systems where the liquid level is below the pump inlet:

The suction pipe and the pump must be filled with liquid and vented before the pump is started.

6.2 Checking Direction of Rotation

Do not start the pump to check direction of rotation until it has been filled with liquid.

The direction of rotation should not be checked with the motor alone, as an adjustment of the shaft position is required when the coupling has been removed.

The correct direction of rotation is shown by arrows on the pump head and/or on the motor fan cover.

6.3 Starting

Before starting the pump, completely open the isolating valve on the suction side and the valve on the discharge side should be almost closed.

Start the pump.

Vent the pump during start up by loosening the vent screw in the pump head until a steady stream of liquid runs out the vent hole,

When the piping system has been filled with liquid, slowly open the discharge isolating valve until it is completely open.

When pumping liquids containing air, it is advisable to vent the pump regularly. To vent the pump, loosen the vent screw in the pump head during operation.

6.4 Frequency of Starts and Stops

Motors smaller than 4KW should not start more than 100 times per hour.

Other motors should not start more than 20 times per hour.

7. Maintenance

Before starting work on the pump, make sure that no power is supplied to the pump and that it cannot be accidentally switched on.

Pump bearings and shaft seal are maintenance-free.

If the pump is to be drained for a long period of inactivity, remove one of the coupling guards to inject a few drops of silicone oil on the shaft between the pump head and the coupling. This will prevent the shaft seal faces from sticking.

Motor Bearings:

Motors which are not fitted with grease nipples are maintenance-free. Motors fitted with grease nipples should be lubricated with a high-temperature lithium-based grease. In case of seasonal operation (motor is idle for more than 6 months of the year),it is recommended to grease the motor when the pump is taken out of operation.

8. Frost Protection

Pumps which are not being used during periods of frost should be drained to avoid damage.

Drain the pump by loosening the vent screw in the pump head and by removing the drain plug from the base.

Care must be taken to ensure that the escaping water does not cause injury to persons or damage to the motor or other components. In hot water installations, special attention should be paid to the risk of injury caused by scalding hot water.

Do not tighten the vent screw and replace the drain plug until the pump is to be used again. Before replacing the drain plug in the base, unscrew the bypass valve. Replace the drain plug by tightening the large union nut first, then the bypass valve.

9. Trouble Shooting Chart

Before removing the terminal box cover and before any removal / dismantling of the pump, make sure that the electricity supply bas been switched off.

Trouble	Cause
1. Motor does not run when started.	a) Supply failure. b) Fuses blown. c) Motor starter overload has tripped out. d) Main contacts in motor starter are not making contact or the coil is faulty. e) Control circuit fuses are defective. f) Motor is defective.
2. Motor starter overload trips out immediately when supply is switched on.	a) One fuse is blown. b) Contacts in motor starter overload are faulty. c) Cable connection is loose or faulty. d) Motor winding is defective. e) Pump mechanically blocked. f) Overload setting too low.
3. Motor starter overload trips out occasionally.	a) Overload setting too low. b) Low voltage at peak times.

Fault	Cause
4. Motor starter has not tripped out but the pump does not run.	a) Check 1 a), b), d) and e).
5.Pump capacity not constant.	a) Pump inlet pressure is too low. b) Suction pipe / pump partly blocked by impurities. c) Pump draws in air.
6. Pump runs but gives no water.	a) Suction pipe / pump blocked by impurities. b) Foot or non-return valve blocked in closed position. c) Leakage in suction pipe. d) Air in suction pipe or pump. e) Motor rotates in the wrong direction.
7. Pump runs backwards when switched off.	a) Leakage in suction pipe. b) Foot or non-return valve defective. c) Foot valve blocked in open or partly open position. d) Non-return valve leaks or is blocked in partly open position.
8. Leakage in shaft seal.	a) Pump shaft position is incorrect. b) Shaft seal is defective.
9. Noise.	a) Cavitation in the pump. b) Pump does not rotate freely (frictional resistance) because of incorrect pump shaft position.

10. Service

If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

11.Calculation of Minimum Inlet Pressure

The minimum inlet pressure "H" in meters of head required to avoid cavitation in the pump is calculated as follows:

H = pb10.2-NPSH-Hf-Hv-HS
(Barometric pressure can be set to 1 bar).
In closed systems "Pb" indicates the system pressure in bar.
NPSH = Net Positive Suction Head in meters head (to be read from the NPSH curve on page 75 at the highest flow the pump will be delivering).
Hf = Friction loss in suction pipe in meters head.
Hs = Safety margin = 0.5 meters head.

If the calculated "H" is negative, an inlet pressure of minimum "H" meters head is required. There must be a pressure equal to the calculated H during operation.

Example:

Pb = 1 bar
Pump type: VMS16, 50Hz
Flow rate: 16m3/h
NPSH: 1.5 meters head
Hf = 3.0 meters head
Liquid temperature: +90° C
Hv = 7.2 meters head
H = Pb*10.2-NPSH-Hf-Hv-Hs meters head
H = 1*10.2-1.5-3.0-7.2-0.5 = -2.0 meters head
This means that an inlet pressure of 2.0 meters head is required during operation.
The pressure calculated in bar:
2.0*0.0981 = 0.20 bar
The pressure calculated in kpa:
2.0*9.81 = 19.7kpa

CDL

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