

WESTINGHOUSE PUMPS
PROPELLER PUMPS

Description

Figure 1 shows a vertical propeller type pump with the motor drive on the top of the pump. The motor and pump shafts are connected by a rigid coupling. A thrust bearing located at the top of the motor carries the thrust developed by the pump and the weight of the entire rotating element.

The propeller "5" is secured to the lower end of the shaft by key "7" and held in place by nut "6". The hand of the threads is such that proper rotation of the pump tends to tighten the nut on the shaft. A renewable liner "2", held in place by screws "22", is provided in the lower casing as indicated in Figure 1. Directly above the propeller are stationary guide vanes "8" which direct the flow from the propeller and eliminate undesirable turbulence. The pump casing above the propeller is shaped to form a diffuser which assists in converting the kinetic energy (or velocity) of the water leaving the propeller into potential energy (or pressure) at the discharge. To insure a taper fit, both the guide vanes and the diffuser portion of the casing are machined.

The guide vanes are held in place by stationary sleeve "10" with the aid of spring "19". To prevent possible rotation of the guide vanes, the key "11" is provided. The position of the key with reference to the vanes is shown in Section A-A, Figure 1.

The pump steady bearing "13" is located in the hub of the guide vanes. The bearing is lined with rubber and is lubricated by the water in the pump. In case the pumped water is contaminated by acids or alkali, the design must be altered somewhat and clean water must be applied for lubrication of the bearing. The pump unit must be installed so that this bearing is submerged under all operating conditions. The bearing is held in place by set screw "24" and it can be removed when the pump is dismantled.

Leakage at the upper end of the pump shaft is eliminated by a water sealed packed gland. Water free from sand and grit should be used for this gland in order to prevent abrasion of the shaft.

In order to dismantle this unit, the following points should be noted:

1. Remove drain nipple "17" which extends through the upper casing into the cover "3".
2. Place blocks between the hub of the lower half of coupling and the gland, and then break the coupling.
3. Remove bolts from both flanges of the motor support and then remove the motor and motor support.
4. Lift out the entire rotating element including cover "3". (When reassembling it may be necessary to rotate the guide vanes slightly so as to insure straddling of key "11".)

5. With the rotating element removed from the casing, the procedure for further dismantling is evident; the propeller and guide vanes being removable from the lower end of the shaft.

The characteristics of a propeller pump are such that the power consumption is at a minimum when the valve in the discharge line is wide open. Throttling the discharge valve increases the power consumption and therefore it is not recommended to operate the pump with this valve partially closed. Before starting the pump, the discharge valve gate should be lifted at least $1/5$ from its seat in order to prevent overloading the motor drive. With two pumps serving a condenser, whenever the second pump is started, there will be some reverse rotation due to the back flow from the pump already in service. The starting of the motor, as soon as the valve is open $1/5$, will produce pump rotation in the proper direction before the reverse rotation has attained any speed.

A propeller pump is relatively a low head pump, 25 ft. being the maximum. Positive pressure at the inlet is required and therefore the propeller should be submerged at least 3 ft.

List of Parts

The following list, covering major parts, has been compiled to facilitate ordering repair parts by item number and name when serial number of the pump is given;-

<u>Item No.</u>	<u>Name</u>
1.	Casing (lower)
2.	Linier
3.	Casing Cover
4.	Casing (Upper)
5.	Propeller
6.	Propeller Nut
7.	Propeller Key
8.	Guide Vanes
9.	Shaft
10.	Stationary Sleeve
11.	Guide Vanes Key
12.	Coupling
13.	Bearing
14.	Gland
15.	Gland Spacer
16.	Gland Packing
17.	Drain Nipple
18.	Motor
19.	Stationary Sleeve Spring
20.	Gaskets
21.	Guide Vanes Key Washer
22.	Linier Screws
23.	Propeller Screw
24.	Bearing Screws
25.	Guide Vanes Key Bolts
26.	Motor Support
27.	Casing (Middle)

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