

Instructions For Operation And Maintenance

12" DAMAGE CONTROL PUMP

Installed Aboard Aircraft Carrier

CV-3 U.S.S. SARATOGA

Bureau of Supplies and Accounts Contract NOS-86526
 Worthington Pump and Machinery Corp. Order P-218149

Manufacturer's Serial Numbers

Ship	Pump	Turbine	Priming Pump	Priming Motor
CV-3				

Average weight of Pump with Base	=	3238#
" Pump weight	=	2000#
" Turbine weight	=	2297#
" Unit weight	=	5535#
" Priming Unit weight	=	275#

Operating
Characteristics- Main Pump

Capacity	5000 GPM
Total Dynamic Head	60#/sq.in.
Speed	1600 RPM
Specific Gravity	1.03
Lift	20 ft.
B.H.P.	211
Pump Efficiency	83%
Water Temperature	85°
W.R. - LBS./H.P./Hr.	51
Total Steam Flow - LBS./Hr.	10761

Design Steam Conditions

Steam Pressure 250# per sq.in. G. dry saturated at
10# " " " " back pressure

Emergency Steam Conditions

Steam Pressure 200# per sq.in. G. dry saturated at
10# " " " " back pressure

Steam Pressure 250# " " " " dry saturated at
15# " " " " back pressure

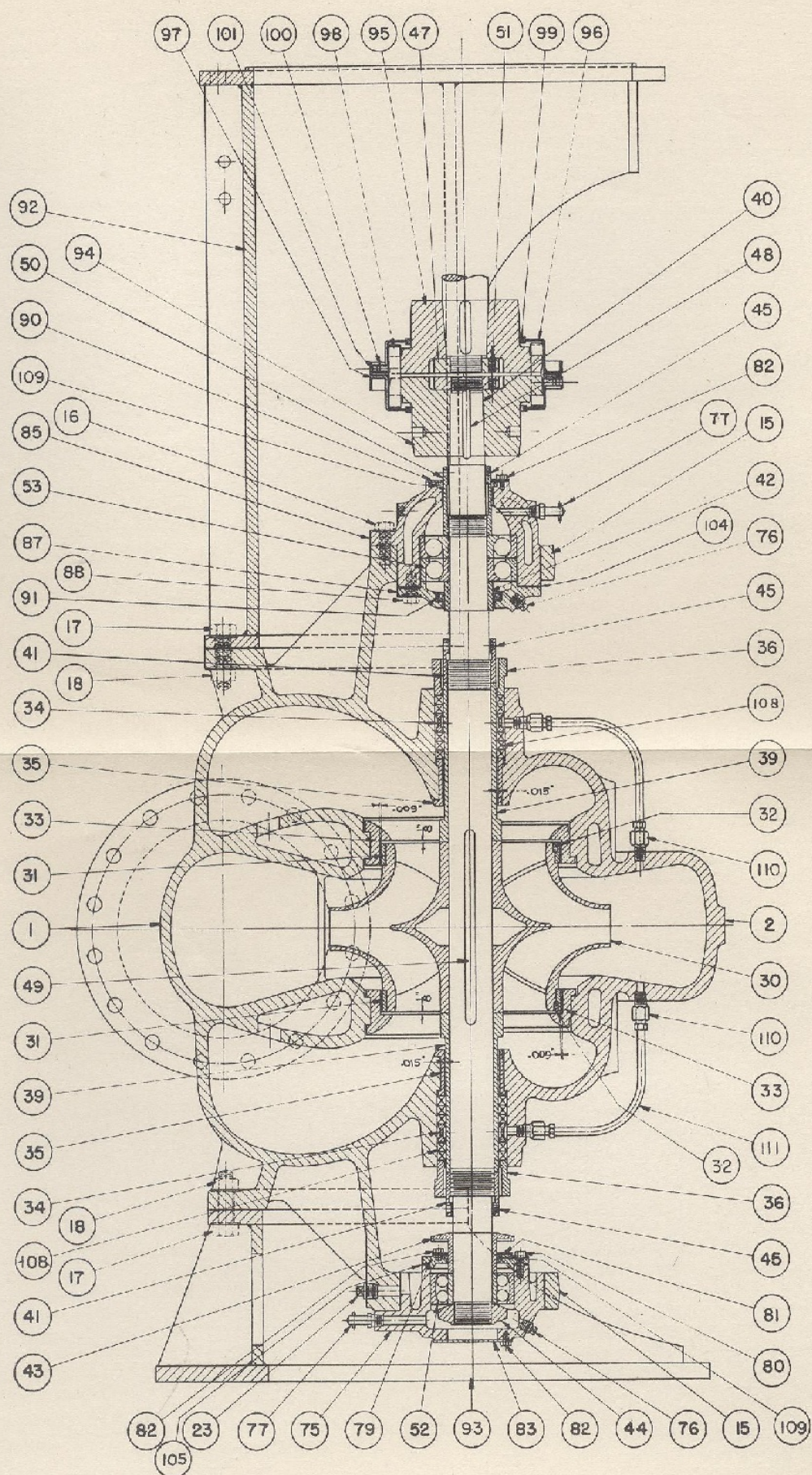
Steam Pressure 300# " " " " ,50° superheat

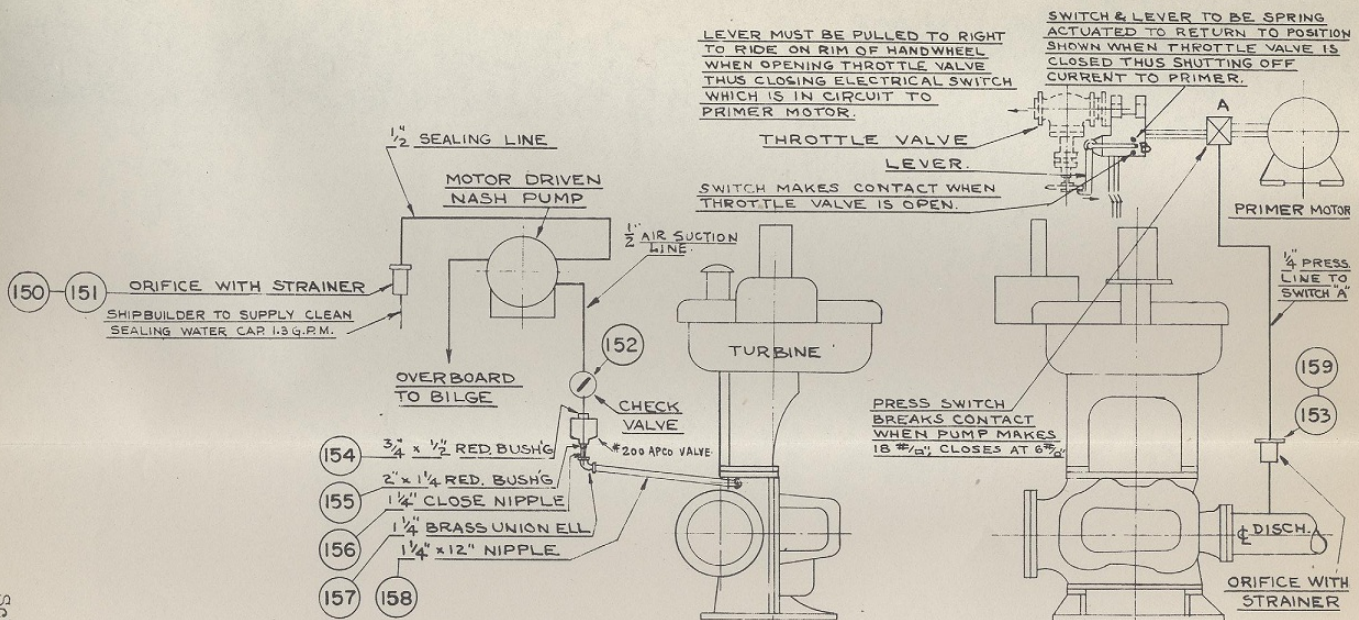
Description:

These units each consist of a Worthington vertical double suction, single stage centrifugal pump driven through a flexible coupling by a Sturtevant size VD-8, 211 H.P., 1600 R.P.M. vertical steam turbine, all as shown on page 12.

Operating
Characteristics- Priming Pump

Capacity	40 Cu.ft./min.(Appr.)
Vacuum	15" Hg.
Speed	1750 R.P.M.
B.H.P.	2.4
Pump Efficiency	21.2%
Water temperature	60°





SCHEMATIC PRIMING ARRANGEMENT

SEQUENCE OF OPERATIONS:

WHEN STEAM VALVE TO TURBINE IS OPENED IT MECHANICALLY CLOSES SWITCH "B" WHICH COMPLETES CIRCUIT TO NASH PUMP AND BOTH NASH AND MAIN PUMP OPERATE TOGETHER.

AS MAIN PUMP GENERATES 18 #/sq. PRESS. SWITCH "A" OPENS & SHUTS NASH PUMP DOWN. WHEN MAIN PUMP PRESS. DROPS TO 6 #/sq. NASH PUMP STARTS. ON BILGE CONDITION, SAME OPERATIONS OCCUR & WHEN NASH SHUTS DOWN THE CHECK VALVE IN AIR SUCTION LINE CLOSES THUS PREVENTING BACK FLOW OF AIR.

PRESSURE SWITCH TO BE GOOD FOR MAX. PRESSURE OF 110 #/sq.

CHECK VALVE IN AIR SUCTION LINE PREVENTS AIR FROM ENTERING PUMP WHEN PRIMER IS INOPERATIVE.

OPERATION.

STARTING.

1. Make sure that the oil tank is filled to the recommended level with a good clean mineral oil of the correct viscosity.
2. Open valve body and exhaust casing drains allowing all the condensate to drain.
3. Open the exhaust valve.
4. In warming up the turbine, prior to putting into service, open the main valve enough to start the bucket wheel turning over then close the valve as much as can be done without the wheel stalling. NEVER ALLOW LIVE STEAM TO BLOW MORE THAN MOMENTARILY ON A STATIONARY BUCKET WHEEL.
5. When live steam appears at the drains close them.
6. Bring the turbine up to speed slowly.

OPERATING CONDITIONS.

Under normal operating conditions these turbines will be supplied with dry saturated steam at 250# pressure per square inch gauge and exhaust against a back pressure of 10# per square inch gauge. With these conditions the performance will be:-

<u>B.H.P.</u>	<u>R.P.M.</u>	<u>Water Rate #/BHP/Hr.</u>	<u>Total Steam #/Hr.</u>
211	1600	51	10761

These turbines will also deliver their rated capacities under the following steam conditions.

1. Throttle inlet steam pressure 200# per square inch gauge, dry saturated, 10# back pressure per square inch gauge.
2. Throttle inlet steam pressure 250# per square inch gauge, dry saturated, 15# back pressure per square inch gauge.
3. All parts of the turbine exposed to steam at inlet pressure must be capable of withstanding a steam pressure of 300# per square inch gauge with 50° superheat.

