

# **OPERATION & MAINTENANCE MANUAL**

UNICO

LAKE WOOD, COLORADO

INSTRUCTIONS FOR

3170 H.P.

NON-CONDENSING STEAM TURBINE  
TURBINE SERIAL NUMBER D1526  
WELLSVILLE WORKS ORDER NUMBER U-25043

P.O.NO.: 239-102-003  
ITEM NO: C-201-T

JULY 1991

## **DRESSER-RAND**

**STEAM TURBINE, MOTOR & GENERATOR DIVISION**

**•TURBODYNE • TERRY • ELECTRIC MACHINERY**

TURBINE DATA SHEET

Shop Order - U-25043

Serial Number - D1526

Driven Machine - Compressor

Gear Frame - Lufkin N500C

Turbine Frame - S-8

Turbine Rating - 3170 H.P. at 4750 R.P.M.

Number of Turbine Stages - 1 Curtis - 8 Rateau

Turbine Rotation - Counterclockwise

Inlet Steam Conditions - 525 psig. at 700°F.

Exhaust Condition - 20 psig.

Casing Material - Cast Steel

Shaft Packing - Labyrinth Rings - 6-Steam End  
4-Exhaust End  
1-Each Diaphragm

Bearing Oil Pressure - 20 psig.

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Auxiliary Oil Pump - Motor Driven - Capacity 54 G.P.M. at 40 psig.,  
Cut In at - 15 psig. - Cut Out at - 18 psig.

Temperature of Oil Leaving Cooler - 120°F.

Quantity of Cooling Water Required For:

Oil Cooler - 100 G.P.M. at 85°F.

Gland Condenser - 40 G.P.M. at 85°F.

Speed Governor - Tri-Sen TS-310 Electronic

NOTE: AIR PRESSURE SUPPLY TO THE VALTEK ACTUATOR  
SHOULD BE FROM 30 PSIG. TO 40 PSIG. MAXIMUM.  
THIS IS TO AVOID IMPOSING EXCESSIVE FORCE  
ON THE GOVERNOR VALVE STEM.

Calculated Critical Speed - 2820 R.P.M.

Number of Steam Inlet (Governor) Valves - One (1)

Number of Hand Operated Nozzle Control Valve - Three (3)

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| OPERATING CONDITIONS |              |                      |                 |                          |                        |            |
|----------------------|--------------|----------------------|-----------------|--------------------------|------------------------|------------|
| Horsepower           | Speed<br>RPM | Steam Conditions     |                 |                          | Hand Valve<br>Position |            |
|                      |              | Inlet - °F.<br>psig. | - Exh.<br>psig. | Steam Rate<br>Lbs/Hp/Hr. | No. Open               | No. Closed |
| 3170                 | 4750/327     | 525                  | - 700 - 20      | 14.95                    | 2                      | 1          |

Exhaust Relief Valve To Start Opening at 80 psig.; to be  
fully open to pass 52,097 #/hr. at 90 psig.

Journal Bearing Information:

Shaft Bearing Journal Size:

Steam End - 4.000<sup>+.000</sup>  
                  -.001

Exhaust End - 5.000<sup>+.000</sup>  
                  -.001

Bearing Bore:

4.007<sup>+.002</sup>  
                  -.000

5.008<sup>+.002</sup>  
                  -.000

Main Journal Bearing Running Clearances:

Turbine Steam End - .007" to .010"  
Turbine Exhaust End - .008" to .011"

Trip and Alarm Settings:

Emergency Overspeed Governor - 5500 R.P.M. (Mechanical)  
  5450 R.P.M. (Electrical)

Low Oil Pressure Alarm Switch Set At - 12 psig.

Trip Throttle Valve Trip Oil Cylinder To Trip - On Loss of Oil Pressure

Solenoid Dump Valve To Trip When - De-Energized

High Oil Temperature Alarm Switch Set At - 125°F.

Sentinel Warning Valve Set At -70 psig.

Rotor Peak-To-Peak Allowable Vibration:

Normal - 1.60 Mils (Approx.)

Recommended Alarm Setting - 2.00 Mils (Approx.)

Recommended Trip Setting - 3.20 Mils (Approx.)

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ELECTRICAL REQUIREMENTS: See Electrical Wiring Schematic, CE-216769

TURBINE WEIGHTS: See Outline Drawing, CE-217585

WARNING! EYEBOLT IN CASE COVER TO BE USED

FOR LIFTING CASE COVER ONLY

NOTE: The 6" trip throttle valve cover is equipped with a throttle screw that regulates the amount of steam from the inlet side of the valve to the chamber above the main disc. If chattering of the main disc is encountered when opening the valve, it is necessary to increase the leakage to the chamber by turning the throttle screw counterclockwise. If, however, the hand-wheel effort appears excessive, it can be reduced by turning the throttle screw clockwise, thus decreasing the leakage to the chamber.

A pipe tap is provided in the cover to be used for a pressure gauge to check the pressure in the chamber after the pilot valve has been opened. This leakage pressure should be approximately 25% of the line operating pressure.

NOTE: For Stud Tightening Diagram, see CE-201963

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NOTE:

WHEN STEAM PRESSURE SENSING INSTRUMENTS (PRESSURE INDICATORS, PRESSURE SWITCHES AND PRESSURE TRANSMITTERS) ARE FIELD INSTALLED THE FOLLOWING PROCEDURE IS RECOMMENDED.

1. INSTRUMENTS TO BE SUPPORTED TO MINIMIZE VIBRATION AND MECHANICAL INJURY.
  2. INSTRUMENTS TO BE PROVIDED WITH A WATER SEAL, TO ASSURE THAT STEAM DOES NOT CONTACT MECHANICAL INTERNALS, LOCATED ADJACENT TO THE INSTRUMENT.
  3. ADEQUATE VENTILATION TO BE ASSURED SO THAT TEMPERATURE ARUND THE INSTRUMENT AND WATER SEAL DOES NOT EXCEED 160°F.
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