

OPERATION & MAINTENANCE MANUAL

Instructions for
3000 KW
Non-Condensing Steam Turbine
with Lufkin Reduction Gear
and Kato Generator
Turbine Serial No.
D3456

July 1994

DRESSER-RAND
STEAM TURBINE, MOTOR & GENERATOR DIVISION
•TURBODYNE • TERRY • ELECTRIC MACHINERY



Serial No.: D3456

Turbine Frame: 4TNI

Gear Frame: Lufkin

Generator: Kato

Turbine Rating: 3000 KW at 4615 RPM

Rotation Viewed From Governor End of Turbine: Clockwise

Casing Material: Nodular Iron Steam End / Cast Steel Exhaust End

Number of Turbine Stages: 4 Rateau

Shaft Packing, Labyrinth Rings: 5 at Steam End
4 at Exhaust End
1 in each of 3 Interstage Diaphragms

Sentinel Valve sounds a warning at 70 psig

Exhaust Relief Valve starts opening at 80 psig;
opens fully at 90 psig to pass 132000 lbs/hr of steam

Oil: Light Turbine Oil

Bearing Lubrication: Pressure Lubed 48 GPM at 20 psig

	<u>Flow</u>	<u>Pressure</u>	<u>Driver</u>
Auxiliary Oil Pump:	54 GPM	40 psig	Motor

Cooling Water Required

For Oil Cooler: 40 GPM at 80°F
For Gland Condenser: 48 GPM at 80°F

Control Setpoints

	Trip	Reset
Trip Throttle Valve (Hydraulic)	9 psig	With psig

	Alarm	Trip
High Oil Temperature	125°F	130°F
Axial Position	±.017"	±.022"
Radial Vibration	2.0 Mils	3.2 Mils

Electronic Overspeed Trips the Turbine at	5030	RPM
Mechanical Overspeed Trips the Turbine at	5076	RPM

Auxiliary Oil Pump	15 psig Start	18 psig Stop
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De-Energizing the Solenoid Valve vents a Hydraulic Actuator (Bellows or Cylinder) to Trip the Turbine

Calculated Critical Speed, NC1: 3860 RPM
NC2: 9200 RPM

Bearing Clearances

	Steam End	Exhaust End
Shaft	4.0000" +.0000" -.0005"	5.0000" +.0000" -.0005"
Bore	4.007" +.002" -.000"	5.008" +.002" -.000"
Clearance	.0070" to .0095"	.0080" to .0105"

Note: These values represent the fit of the parts when new. In general, add 50% to the clearance to determine wear limits. Ultimately, bearings are serviceable provided they show normal wear and give smooth running.

Governor Valve Size: 6-3/4"

Governor: Woodward Electronic 505

Speed Specifications of the Gear and Turbine

	Gear	Turbine
maximum RPM	1890	4846
normal RPM	1800	4615
minimum RPM	1710	4384

OPERATING CONDITIONS

KW	R P M		Steam Inlet psig	Conditions Exhaust °F psig		Steam Rate LB·KW·HR	Hand Valve Setting:Qty	
	Turbine	Gear					Open	Closed
2749	4615	1800	220	492	40	40.48	0	4
3000	4615	1800	220	482	40	-----	3	1
2981	4615	1800	220	482	40	-----	3	1
1575	4615	1800	220	506	40	-----	0	4

■ This row represents normal conditions.

SERIAL NUMBER 10654

CIRCULATING OIL LUBRICATION

LUBRICATE BEARINGS WITH A
CIRCULATING LUBE OIL SYSTEM WHICH
MAINTAINS OIL LEVEL AT THE CENTER
OF THE SITE GLASS.

USE A HIGH QUALITY, DOUBLE INHIBITED
MINERAL OIL WITH VISCOSITY, PRESSURE
AND FLOW RATES INDICATED BELOW. THE
OIL SHOULD CONTAIN OXIDATION AND RUST
INHIBITORS AND DEFOAMANTS.

OPPOSITE DRIVE
END

DRIVE END

BEARING NUMBER

012-64019-02

012-64019-02

SUMP CAPACITY

1.6 GALLON

1.6 GALLON

OIL VISCOSITY

SAE 20

SAE 20

OIL FLOW RATE (GPM)

1 GPM

1 GPM

OIL PRESSURE

20 PSIG

20 PSIG

157-00128-00

KATO ENGINEERING

RELIANCE ELECTRIC

