

# POWER PLANT - FOR SALE

*GE FRAME 9E*



GE FRAME 9E

OEM: GE

MODEL FRAME 9E

DETAILS

4 UNITS OF GE PG 9171 E  
TURBINE GENERATOR + BOP

ISO RATING

**126 MW**

FREQUENCY

**50 Hz**

EOH

80,000-88,000

STARTS

2,800-3200

FUEL TYPE

**Dual Fuel Capable**

## POWER GENERATION: 126MW ISO

*GE FRAME 9E GAS TURBINE – HEAVY INDUSTRIAL TYPE*

*Turbine and Generator Package - Balance of Plant – Turbine Control System and Generator Controls*

TECHNICAL SPECIFICATION OF THE FOUR (4) UNITS OF FRAME 9E GAS TURBINE (126 MW) AND ITS RESPECTIVE ANCILLARIES AND BALANCE OF PLANT

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## GE FRAME 9E

Introduction – The power plant is a 440 MW open cycle gas turbine power plant which commenced commercial operation in 1995, with capacity output of 110 MW each unit. These units have been operating on a cyclic profile, according to peak demand to support the national grid.

### Total Generation

The total Equivalent Operating Hours (“EOH”) for the gas turbine since commercial operation date until 2020 is as follows:

Unit	Commissioning Year	Total EOH
GT1A	1995	87,197
GT1B	1995	84,706
GT2A	1995	82,519
GT2B	1995	81,626

### Total Starts

The total starts for the gas turbine since commissioning until 2020 is as follows:

Unit	Commissioning Year	Total Starts
GT1A	1995	3,148
GT1B	1995	3,157
GT2A	1995	3,150
GT2B	1995	2,821

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GAS TURBINE DETAILS	
Technology	EGT
Type	GE Frame 9E (PG 9171 E)
Number of GT	4
Fuel	Gas / Liquid Fuel
Liquid fuel type	Distillate
Rating	126 MW
Operating speed	3000 rpm
Number of compressor stages	17
Number of turbine stages	3
Starting system	Starting motor

STARTING SYSTEM
The starting system consist of an induction motor and torque converter coupled to the accessory gear. The induction motor, operating through a torque converter provides the cranking torque and speed required by the turbine for start-up.

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GENERATOR (ALSTOM)	
Type	240-370-Y-3 Phase
Rated speed	3000 RPM
Rated Output	109,740 kW
Rated power factor (cos $\varphi$ )	0.8
Rated voltage	15 kV
Voltage Variation range	$\pm 5 \%$
Rated frequency	50 Hz
Frequency variation range	47 Hz – 53 Hz
Rated current	5280A
Reference standards	IEC
Winding insulation class	F
Ambient air temperature	35 °C
Excitation system	Rotating Diode Exciter
Type of cooling	Air

EXCITER (GEC ALSTHOM)	
Excitation	Rotating diode
Type	TKJ 86-19



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GENERATOR TRANSFORMER	
NOMINAL RATING	148 MVA
NUMBER OF UNITS	4
TYPE	OIL
COOLING METHOD	ONAN/ONAF
RATED HIGH VOLTAGE (HV)	275 kV
NOMINAL HV	275 kV
HV BASIC IMPULSE LEVEL	1050 kV
LOW VOLTAGE (LV)	15 kV
TAP CHANGER (ON LOAD)	17
SERVICE (VECTOR GROUP)	YNd1
TRANSFORMER	
NOMINAL RATING	12MVA
NUMBER OF UNITS	2
TYPE	OIL
COOLING METHOD	ONAN
HIGH VOLTAGE (HV)	15 kV
LOW VOLTAGE (LV)	6.6 kV
TAP CHANGER (OFF-LOAD)	5
SERVICE (VECTOR GROUP)	Yynod11

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TRANSFORMER	
NOMINAL RATING	1.25 MVA
NUMBER OF UNITS	4
TYPE	OIL
COOLING METHOD	ONAN
HIGH VOLTAGE (HV)	6.6 kV
LOW VOLTAGE (LV)	415 V
TAP CHANGER (OFF-LOAD)	5
SERVICE (VECTOR GROUP)	Dyn11

TRANSFORMER	
NOMINAL RATING	2 MVA
NUMBER OF UNITS	2
TYPE	OIL
COOLING METHOD	ONAN
HIGH VOLTAGE (HV)	6.6 kV
LOW VOLTAGE (LV)	415 kV
TAP CHANGER (OFF-LOAD)	5
SERVICE (VECTOR GROUP)	Dyn11

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GENERATOR CIRCUIT BREAKER	
Maker	GEC ALSTOM
Rated Voltage	15 kV
Rated Current	8 kA
Frequency	50 Hz
Asymmetrical Short-Circuit Peak Current	173 kA
Short-Time Current	63 kA - 1s

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SCHEDULED MAINTENANCE HISTORY	
YEAR	MAINTENANCE CARRIED OUT
2002	GT1A – EBI GT1B – EBI GT2A – HGPI GT2B – HGPI
2003	GT1A – MO
2004	GT1B – CI
2005	GT1A – CI GT1B – MI GT2B – HGPI
2006	GT2A – MO
2007	Nil
2008	Nil
2009	Nil
2010	GT1B – CI GT2B – MO
2011	GT1A – HGPI
2012	Nil
2013	Nil
2014	GT1B – HGPI GT2A – Mini HGPI
2015	GT1A – CI + Bearing no.2 inspection
2016	GT1A – MO
2017	GT1A – CI GT1B – HGPI
2018	GT1A – Gen Rotor Swap
2019	GT1B – BI GT2A – CI

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PLANT UPGRADES			
No	Date of Modification	Description	Upgrade Works
1	Aug-14	GT1A CO2 Panel	Upgrade of GT1A CO2 Control Panel due to electronic board faulty and parts were already obsolete.
2	Oct-16	GT hall Fire Alarm Upgrades	New upgrade of the break Glass, the smoke detector and the input module that compatible looping to our system Algorex EP7 located at our Turbine Hall.
3	Apr-17	CO2 control panel upgrades	Upgrade of the control panel for LCR1 LV Room, LCR2, SEB, EDG and Black Start system to repair intermittent fault and issues with the charger.
4	Dec-18	Fire Pump House Fire Alarm Panel upgrade	Replacement of the existing local fire alarm panel and field devices.

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## 15kV / 275kV Generator Transformer



## 15kV / 6.9kV Step Down Transformer



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15 kV / 430 V Step Down Transformer





# POWER PLANT - FOR SALE

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6.6 kV / 430 V Unit/Station Auxiliary Transformer



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## Black Start Diesel Generator



BLACK START DIESEL GENERATOR	
TYPE	18 RP200
ENGINE NO.	760008/8
RATING	3040 KWE
SPEED	1500 RPM

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BLACK START DIESEL GENERATOR ALTERNATOR	
TYPE	LSA 56 M7 / 4P
SERIAL NUMBER	162 027
SYNCHRONOUS	3 PHASES
RATED OUTPUT	5000 kVA
VOLTAGE	6300 V
FREQUENCY	50 Hz
POWER FACTOR	0.8
SPEED	1500 RPM
AVR	RS 190 6112
RECTIFIER/DIODES	SKR 130/12

## 6.6 kV Switchgears (Local Control Room)





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## 6.6 kV Switchgear (Station Electrical Building)



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## 415 V Switchgears and Motor Control Center (Local Control Room)



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415 V Switchgears and Motor Control Center (Station Electrical Building)



Balance of Plant (Water Treatment Plant)





# POWER PLANT - FOR SALE

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## Balance of Plant (Cooling Water System)

