



BTEC Turbines LP
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60 MW GE Frame 7B+ Gas Turbine Generator Package PG 7801B

One (1) remanufactured base mounted, simple cycle, single shaft Frame 7 gas turbine configured with natural gas fuel for a 60 Hz generator drive application.

One (1) remanufactured base mounted, H₂ cooled, 2 pole synchronous generator, 13.8kV, 0.85 pf, 60 Hz, 3600 rpm.

Control system is a state-of-the-art 9070 PLC proprietary architecture.





Scope of Supply and Services

| Item | Component | Description |
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| 1 | Frame 7B+ Turbine Package | PG 7801B single shaft heavy duty industrial gas turbine, suitable for outdoor operation; GT includes modulating inlet guide vanes, anti-corrosion coatings on liners, nozzles, blades. Configured for natural gas fuel. See options list for available fuel and emissions reduction offerings. |
| 2 | Packager | Overall package: BTEC Turbines, LP GT drive: General Electric |
| 3 | Frequency | 60 Hz |
| 4 | Generator | GE, 3600 rpm, 13.8 KV, 3ph, 60Hz, 64 MW, @ .85 PF, H ₂ cooled, PPT excitation system (generator characteristics available on request). Thermostatically controlled space heaters. RTDs for generator stator winding (2 per phase) and (2) for cooling air temperature monitoring. |
| | Generator Cooling | H ₂ cooled via internal water to H ₂ heat exchangers. |
| 5 | Accessory Gearbox | Complete system; drives main lube oil pump and hydraulic pump. |
| 6 | Accessory Module | Acoustical enclosure & single lift base |
| 7 | Turbine Module | Acoustical enclosure & single lift base |
| 8 | Generator Module | Acoustical enclosure on exciter and turning gear end, outdoor generator, single lift base. |
| 9 | Air Filter/Silencer | Complete air inlet filter system consisting of a prefilter, final filter, silencer, transition duct, and expansion joint. Unit is a self-supportive modular design. Air filter is supplied with standard platforms and ladders. |
| 10 | Turbine Control Panel | Highly sophisticated control system using BTEC proprietary control architecture will be supplied; includes turbine-generator sequencing and control, vibration monitoring equipment, fire & gas detection panel. |
| 11 | Gas Fuel System | Gas fuel system includes duplex shutoff valves / vent valve, fuel flow metering (corrected), associated instrumentation, and a control valve all mounted on an independent skid located adjacent to the gas turbine module. System includes latest technology that surpasses original OEM supplied equipment (i.e. electronic fuel control valve). |
| 12 | Turbine Lube Oil System | On-main-skid self-contained lubrication system includes: dual filters, dual oil/water heat-exchangers, gearbox driven main pump, backup AC driven pump, emergency DC driven pump, air/oil mist eliminator (media w/ vacuum type blower), and associated instrumentation. |



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| 13 | Generator / Gearbox Lube Oil System | Skid mounted generator lubrication system including dual filters, dual oil/water heat-exchangers, dual AC driven main and backup oil pumps, emergency DC driven pump, air/oil mist eliminator (media type), and associated instrumentation. |
| 14 | Hydraulic System | Complete system, gearbox driven pump, backup AC driven pump, dual filters used to control the IGV actuator. |
| 15 | Inlet Guide Vane System | Unit is hydraulically operated and controlled to insure smooth starting/stopping. In addition, optimizes performance of the compressor. |
| 16 | Cooling Water System | System includes turbine lube oil heat exchangers, generator lube oil heat exchangers, generator H ₂ heat exchangers, and turbine support legs. |
| 17 | Ventilation System | See item 9 for air filter description. Cooling ventilation air for compartments complete with fans, dampers, and exhaust hoods. |
| 18 | Cooling And Sealing Air System | Complete system, includes control valves. |
| 19 | Turning Gear System | AC motor driven turning gear. |
| 20 | Starting System | 900 HP 4160 VAC motor, motor starters, drive clutch, and torque converter. |
| 21 | Fire System | CO ₂ , fire protection system for accessory, turbine, and exciter compartments. System includes nozzles, heat detectors, CO ₂ storage tank, and independent fire system control panel. |
| 22 | Vibration Monitoring System | Complete system including velocity and proximity probes together with monitoring & alarm panel. |
| 23 | Generator Connections | A neutral cubicle including a grounding resistor is provided. Generator lineside connection is fed direct to 15kV switchgear line-up (see options for details). |
| 24 | Protective Relaying | Protective relaying is supplied. Including: 25,32,40,46,50/51,52G,59,64,81O/U,86,87 |
| 25 | Exhaust Plenum | Exhaust plenum with internal liner is provided. |
| 26 | Inlet Plenum | Complete system |
| 27 | Couplings | Both load and accessory gear system; includes coupling guards. |
| 28 | Paint | Complete internal and external painting is supplied. |
| 29 | Crating and preparation for shipping | Unit is prepared for shipment including crating of certain components. |
| 30 | Installation Manuals | 6 copies |
| 31 | Operation Manuals | 6 copies |
| 32 | Fuel During Startup | To be supplied by client |
| 33 | Warranty | 12 months from startup / 18 months from ready to ship. |



Available Optional Equipment To Be Quoted Separately:

| Item | Component | Description |
|------|---|--|
| A | Package Test | Full load package test is supplied. Test utilizes dedicated packaged equipment for this unit (ie. MCC, turbine control panel...). |
| B | Power Control Module | <p>Control module, 12' x 30' on separate structural steel skid with weatherproof enclosure containing:</p> <ul style="list-style-type: none"> • 4160 Switchgear lineup • Auxiliary transformer, 4160 VAC to 480 VAC • GTG 480 VAC MCC / Lighting and Distribution transformer • 120 volt distribution panel • Turbine Control System • Complete battery set • Batteries and Chargers – Two battery systems are provided: (1) 125 VDC control system, one hr supply, dual chargers, and disconnects. (2) 24 VDC fire system battery system. <p>Space is available in the control house for a customer supplied operating station.</p> <p>Ventilation: HVAC included</p> <p>Miscellaneous: Cable trays, lighting, interior cable....</p> <p>Equipment descriptions for components prepackaged in the control module are contained elsewhere</p> |
| C | 15 kV switchgear | 15kV generator switchgear unit located in NEMA 3R enclosure, mounted adjacent to generator skid, bus duct interconnection between generator and switchgear unit. Outgoing connection is bottom entry. CTs for metering, relaying and voltage regulation |
| D | GTG interconnect piping | Interconnects between the supplied sub-skids (ie water wash to package interconnect...) |
| E | GTG Interconnect Wire / Cable And Conduit /Tray | Wire and cable sufficient for electrical interconnect between modules. Interconnect option includes cable trays. |
| F | Walkways / Platforms | |
| G | Exhaust Stack | A simple cycle exhaust can be provided. Customer to provide height requirement. Exhaust expansion joint is included with this option. |
| H | Steam system | Quoted separately. |
| J | Liquid Fuel System | Quoted separately. |



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| K | Air filter options | Options on pulse clean, chiller coils, spray mist fogging, and heating coils |
| L | Winterization of package | Quoted separately. |
| M | Foundation bolts and sole plates | Quoted separately. |
| N | Transportation | Quoted separately. |
| O | Spare parts | Spare parts are for routine and long term spares. Please note that the base gas turbine has startup spares. |
| P | Training | 5 days, up to 10 customer operators, location is TBD |
| Q | Long-term service agreement (LTSA) | Quoted separately |
| R | Startup / Commissioning | Quoted separately as T&M. |
| S | Compressor Cleaning System | System is configured for both on-line wash. A separate wash skid is supplied and is configured with the following: 550 gallon heated water tank, pressurization pump, eductor, automated shutoff, and associated instrumentation. |
| T | Motor Control Center | A motor control center is provided to supply power to all packaged loads. Unit is configured 480V, 60 Hz 3ph, 4 wire, 1200 amp main bus. |
| S | GLO/TLO (Generator and Turbine Lube Oil) | Quoted separately. |