

One Taurus 60 T7901S Mobile



Taurus 60 Turbine Generator Set

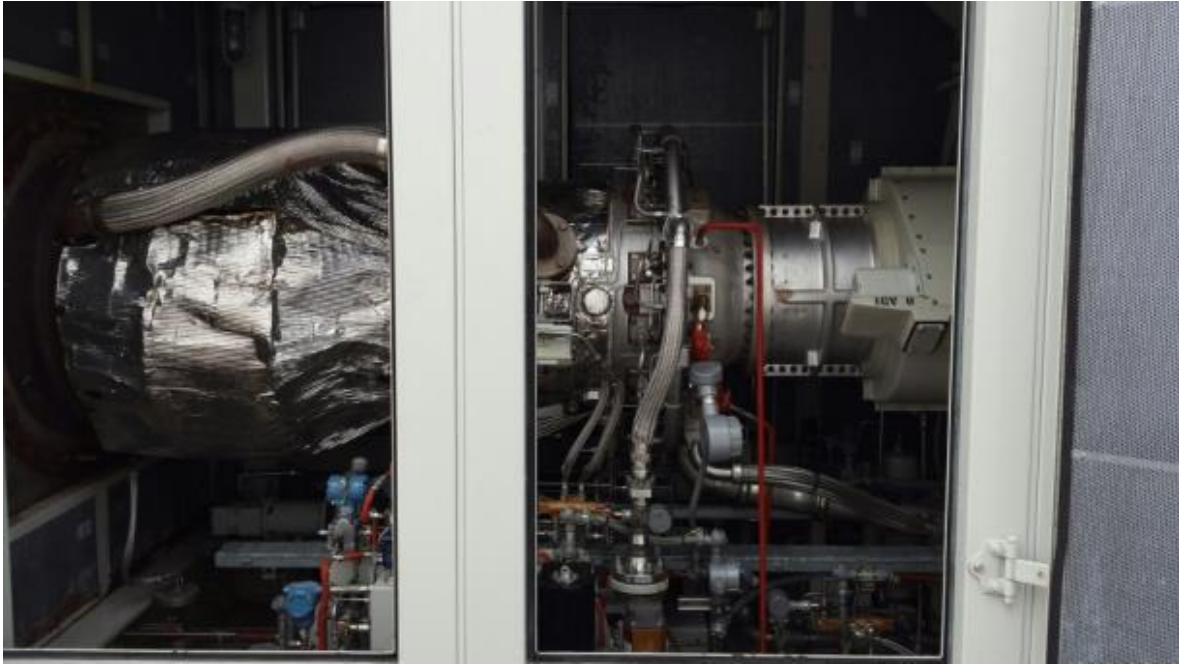
1 Scope Details

This unit is a self-contained mobile generator set comprised of the gas turbine assembly from the air inlet filtration system to the exhaust stack with the Gas Producer, Reduction Gearbox, and Electric Generator. The supplied turbine equipment is mounted on an industrial steel frame and shall include the lubricating oil system with oil cooler and gas fuel operation. Power Control Building (PCB) with quick connect plugs to interface with the turbine skid. The (PCB) contains switchgear for Generator and Package Load Transformer, Battery System for Turbine Control, Battery System for Switchgear, Motor Control Center for Package support system, and Remote Control Computer.

1. Battery chargers/inverters
2. All on skid cabling and pipe-work
3. Ventilation AC motors and fans that are part of the turbine enclosure
4. On Skid ControlLogix based Control System.
5. Weatherproof Acoustical Enclosure
6. Vibration monitoring system
7. AC Direct Drive Start System
8. Main Air Inlet Filter assembly with Silencer
9. Gas and Fire Detection system with CO2 Fire Suppression System
10. Generator control (including synchronization) system
11. AC Generator

Consider the following information as a more detailed description for relevant portions of the scope.

1.1 Prime Mover



	Scope of Supply	Work scope
1	Gas Producer, Taurus 7901S gas fuel DLN Combustion	Refurbished unit, effectively 0 hours with full warranty.
2	Reduction Gearbox 1800 RPM	Refurbished

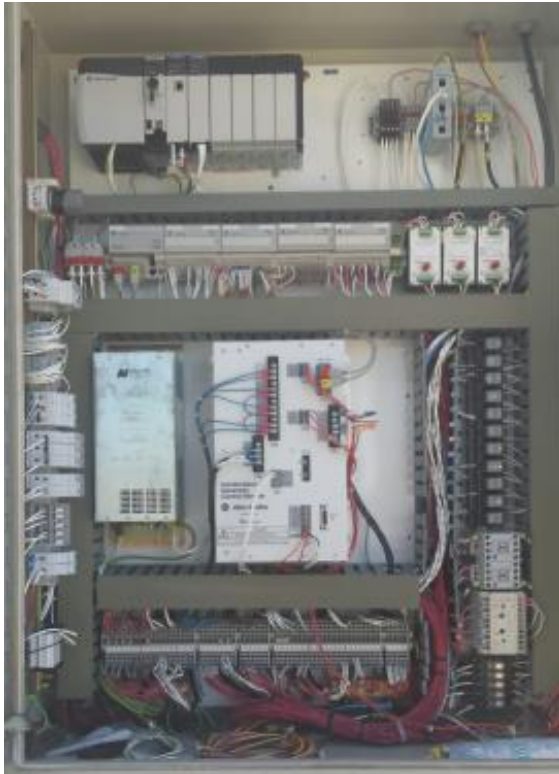
	Scope of Supply	Work scope
3	Generator, 1800RPM, 60Hz, 13,800 volts	Tested, continuous duty

1.2 Generator Skid Trailer Mounted



	Scope of Supply	Work scope
4	Generator Skid, Lube Oil Tank,	Steel construction with Drip Pans and Integral Lube Oil Tank
5	Start system – AC Direct	AC Direct Drive with VFD in PCB
6	Fuel system – Gas Only SoLoNOx	PECC Electronic High Force Gas Valve x 2 (primary and pilot)
7	Lube oil system. (Pre/Post Lube Pumps, Main Lube Pump, Regulators, Thermostats, Filters)	All new components with no run time. Stainless steel lube oil piping and Solberg oil tank vent demister. Duplex oil filters,
8	Lube Oil Cooler	On skid, mounted on Generator Trailer, solid welded Stainless Steel supply and return piping.
9	Tubing/Fittings.	All skid tubing Stainless Steel with compression fittings.
10	On Skid Electrical.	On skid junction boxes, NEMA 4 or NEMA 7, wiring, connectors and terminal blocks will be suitable industrial grade.

1.3 Controls



	Scope of Supply	Work scope
11	PLC Control (On Skid)	The integrated control system incorporates the turbine fuel control, gas turbine start-stop sequencing, Generator Control, temperature monitoring and shutdown protection into a single Allen Bradley ControlLogix Based System. Controls for the turbine package includes operator interface (HMI).
12	Generator Control and Monitoring System	Integrated monitoring and control of the generator is provided using Combined Generator Control Module (CGCM)
12a	Icon Remote Monitoring	Integrated monitoring and reporting of all operational parameters.

1.4 Generator Enclosure



	Scope of Supply	Work scope
13	Gas Turbine Skid Enclosure	Weatherproof sound attenuating enclosure
14	Reducing Vent Silencers and Exhaust Fan	Reducing vent silencers with fire shutters and exhaust fan.
15	Fire detection and suppression system	Eagle Premier Fire Monitor with CO ₂ Suppression, UV flame detectors, and rate of rise thermal detectors will be used to detect enclosure fires; The Fire monitor will control the release of the Main and extended-release CO ₂ systems and send signals to shut down the turbine.

1.5 Power Control Building & Trailer



	Scope of Supply	Work scope
16	High Voltage Switchgear	Breakers for Generator & Package Transformer
17	Motor Control Center	MCC for package support motors.
18	Battery Systems	Battery Chargers & Battery Sets for Switchgear and Turbine Package.
19	Generator Grounding Resistor	
20	Transformer	Stepdown transformer, 11KV to 380V, for package loads

1.5.1 fireExtended Description

The PCB trailer offered has been completely rebuilt under contract by Electro-Tech Industries of Houston to the following exacting specification;

ELECTRICAL EQUIPMENT ROOM

Air Conditioning and Heating: One 3-ton, air conditioning unit with 15kw heat wall mounted unit. 480 volt, 60hz

Interior Lighting: Five (5) 2 bulb, 32 watt fluorescent lighting fixtures. Fixtures equipped with fluorescent light bulb protection tubes, two (2) fluorescent light bulb straps, and two (2) reflector straps.

Exterior Lighting: Three (3) 200 watt incandescent light fixtures all photocell controlled.

Emergency Lighting: Two (2) emergency lights dual head with maintenance free rechargeable battery, solid state charger and test switch. Unit will provide 90 minutes of emergency lighting upon AC power failure.

Domestic Services: Two (2) 3-way light switches, 20 ampere rated. Five (5) receptacles; 20 ampere rated.

Grounding: One (1) control building interior ¼" x 2" perimeter ground bus, all equipment mounted in the control building will have grounds connected to the perimeter ground bus; wire to be sized per NEC. All equipment mounted on the trailer and external to the control building will be grounded back to the control building ground pads.

Interconnect Cables: 600 volt rated inter-connect cables with plugs.

Miscellaneous Equipment:

- Two (2) 10lb ABC handheld extinguisher and mounting bracket
- Two (2) Smoke detectors
- 15kv cable interconnect; switchgear to auxiliary transformer.
- 15kv Generator cable equipped with quick disconnects
- 15kv Patton and Cooke receptacle for customer connection, plug will be connected to
- 15kv main bus
- Side boxes and tongue enclosure supplied for interconnect cables transport
- Four (4) receptacles mounted and wired. Located on side of trailer for temporary power connection. 35' of cables will be supplied with lugs terminated
- Allen Bradley PLC and associated equipment for computer console.
- Turbine start VFD
- DC Back up lube pump starter
- Air compressor
- CO2 Bottles and rack

The following equipment will be mounted and wired as required in the EER:

15KV SWITCHGEAR

Generator control and distribution switchgear shall be designed, manufactured and tested in accordance with the latest published standards of NEMA, ANSI, UL and IEEE.

Enclosure:

Type : Nema-I

Finish : Light gray enamel; ANSI-61

Bus System:

Voltage : 15kv

Phase : 3

Bus Bracing : 40ka @ 15000 volt

Bus Supports : Flame retardant track glass polyester

Bus Material : Copper

Bus Plating : Silver plated connections

Ground Bus : Continuous throughout; 1/4" x 2 "

Circuit Breakers:

Frame Size : 1200 ampere

Interrupting Rating : 40ka @ 15kv

Voltage : 15kv

Interrupting Medium : Vacuum

Closing Voltage : 125vdc

Charging Voltage : 125vdc

Tripping Voltage : 125vdc

Auxiliary Contacts : 4

MOC : 6 stage

TOC : 4 stage

Manufacturer : General Electric

Type : Power Vac

Protective Relays for Generators:

Manufacturer : Bechwith

Type : M-3425A

Protective Relays for Feeder:

Manufacturer : Schweitzer

Type : 551

Wiring:

Type: All control wiring #14 SIS, all current circuits #12 SIS

Wire Tags: Yes

Termination: Insulated fork tongue except current circuits, which will be insulated ring tongue

One (1) Generator control cubicle shall consist of the following components:

- 1 - 1200 ampere, 40ka, 15kv, vacuum circuit breaker
- 1 - circuit breaker control switch
- 1 - red indicating light
- 1 - green indicating light
- 1 - white indicating light
- 1 - voltage transformer rollout tray
- 3 - potential transformers
- 3 - current transformers, for relaying
- 4 - phasing and synchronizing lights with associated synch switch
- 1 - Bechwith 3425A multifunction protective relay
- 1 - lockout relay
- 4 - auxiliary relays
- 3 - lightning arrestors
- 1 - surge capacitor; 3-phase
- 3 - 15kv bushing with copper studs for inter-connect to turbine

One (1) Transformer feeder cubicle shall consist of the following components:

- 1 - 1200 ampere, 40ka, 15kv, vacuum circuit breaker
- 1 - circuit breaker control switch
- 1 - red indicating light
- 1 - green indicating light
- 1 - voltage transformer rollout tray
- 2 - potential transformers; bus potential transformers
- 3 - current transformers, for relaying
- 1 - 3-phase over-current relay; 50/51

Accessories:

- 1 - circuit breaker levering crank
- 1 - circuit breaker charging lever

Miscellaneous Equipment:

- 2 - vertical structures, 95"H x 36"W x 94"D
- 2 - thermostat controlled space heaters

LOW VOLTAGE MOTOR CONTROL

Low voltage motor control center shall be designed and manufactured in accordance with the latest published standards of ANSI, NEMA, UL and IEEE.

Enclosure:

Type : Nema IA

Finish : Light gray enamel; ANSI 61

Bus System:

Phase : 3

Main Bus Ampacity : 600 ampere

Vertical Bus Ampacity : 300 ampere

Ground Bus Ampacity : 1/4" x 1"

Bus Bracing : 65 ka RMS symmetrical

Bus Insulation : no insulation, Insolated vertical bus

Bus Supports : Flame retardant track resistance glass polyester

Bus Material : Tin-plated copper

Starters:

Type : Full voltage non-reversing, unless otherwise indicated

Control Power : Individual control power transformers with two (2) primary fuses and one (1) secondary fuse (Control power transformers supplied with dual secondary windings and extra capacity as required)

Feeder Circuit Breakers:

Type : Molded case

Wiring:

Class : I

Type : B

Wire : All control wiring; #14 AWG MTW

Wire Tags : yes

Termination : Control terminal blocks (pull apart)

Motor control center shall consist of the following components:

Incoming Line Compartment

1 - 400 ampere closed transition automatic transfer switch equipped with normal and emergency circuit breakers.

Motor Starters and Contactors

2 - size 1 FVNR rated for 10hp max. with 3-pole circuit breaker disconnect with the following:

- ambient compensated overload relays with heaters
- two (2) normally open and two (2) normally closed auxiliary contacts
- HOA selector switch
- red run pilot light
- green off pilot light

2 - size 2 FVNR rated for 25hp max. with 3-pole circuit breaker disconnect with the following:

- ambient compensated overload relays with heaters
- two (2) normally open and two (2) normally closed auxiliary contacts
- HOA selector switch
- red run pilot light
- green off pilot light

1 - size 1 FVC 27 ampere rated with 3-pole thermal magnetic circuit breaker disconnect with the following:

- green off pilot light
- red run pilot light
- HOA selector switch
- two (2) normally open and two (2) normally closed auxiliary contacts

1 - size 1 FVC rated for 27 ampere rated wired to distribution panel with the following:

- two (2) normally open and two (2) normally closed auxiliary contacts
- HOA selector switch
- red run pilot light
- green off pilot light

Circuit Breaker Feeders

3 - 150af/50at max. 3-pole thermal magnetic molded case circuit breaker, type HFD

1 - 150af/150at 3-pole thermal magnetic molded case circuit breaker, type HFD

1 - 400af/400at max. 3-pole thermal magnetic molded case circuit breaker, type HKD;

Turbine Start VFD Feeder

Miscellaneous Equipment

1 - 30 circuit panelboard with main circuit breaker and required branch circuit breakers

1 - 25kva distribution transformer; supplied with primary circuit breaker

1 - marshalling panel

6 - thermostat controlled space heaters

6 - vertical structures

NEUTRAL GROUNDING RESISTOR

Neutral grounding resistor shall be designed, manufactured and tested in accordance with the latest published standards of NEMA, and IEEE.

One (1) neutral grounding resistor shall be constructed per the following:

Initial Amperes : 300

Time On : 10 seconds

Max. Temperature Rise : 760 degree C

Current Transformer : 150:5 Bar type; T200 accuracy

Enclosure : Outdoor louvered, galvanized steel with stainless steel hardware.

125VDC SWITCHGEAR BATTERY SYSTEM

One (1) Battery charger:

Model : 1-phase-125-15

Output : 125vdc, 10 adc (nominal)

Regulation : +/- 0.5 from 0-100% load with +/-10% input voltage range

Current limit : 115% at full voltage (set at 110%)

Ripple : 2% (without battery connected)

ACCESSORIES:

- Digital meter
- Charger ac circuit breaker (3-pole)
- Charger dc circuit breaker (2-pole)
- Float adjust
- Equalize adjust
- Equalize circuit
- Low dc voltage alarm relay and LED
- High dc voltage alarm relay and LED
- High dc voltage shutdown relay and LED
- Discharge pre-alarm relay and LED
- End of discharge relay and LED
- Battery disconnect

125VDC BATTERY

Each battery system is configured as follows

These units will be connected in series to form a 125vdc, 55 ampere hour lead-acid calcium-grid, sealed, maintenance-free battery.

125VDC TURBINE BATTERY SYSTEM

One (1) Battery charger:

Model : 1-phase-125-15

Output : 125vdc, 15 adc (nominal)

Regulation : +/- 0.5 from 0-100% load with +/-10% input voltage range

Current limit : 115% at full voltage (set at 110%)

Ripple : 2% (without battery connected)

ACCESSORIES:

- Digital meter
- Charger ac circuit breaker (3-pole)
- Charger dc circuit breaker (2-pole)
- Float adjust
- Equalize adjust
- Equalize circuit
- Low dc voltage alarm relay and LED
- High dc voltage alarm relay and LED
- High dc voltage shutdown relay and LED
- Discharge pre-alarm relay and LED
- End of discharge relay and LED
- Output circuit breakers as required

125VDC BATTERY

Each battery system is configured as follows;

These units will be connected in series to form a 125vdc, 55 ampere hour lead-acid calcium-grid, sealed, maintenance-free battery.

DRY TYPE PAD MOUNTED TRANSFORMER

Transformer shall be designed, manufactured and tested in accordance with the latest published standards of NEMA, ANSI, C-UL, and IEEE.

One (1) 300 kva, 3-phase, transformer with the following characteristics:

- 150 degree C rise temperature rise
- 220 degree C winding insulation
- Copper windings
- Frequency; 60hz
- High-voltage-13800 delta
- 60kv BIL basic insulation primary
- Low-voltage-480 wye
- 10kv BIL basic insulation secondary
- Two (2) 2.5% above
- Two (2) 2.5% below
- Nema-3R padmount enclosure
- Primary connection; bottom terminated
- Secondary connection; bottom terminated
- UL/CSA listed

1.6 Turbine Inlet and Exhaust Systems



	Scope of Supply	Work scope
16	Inlet Filter System	Donaldson Static Air Inlet Filter with silencer.
17	Exhaust System	Exhaust Silencer mounted on Turbine Trailer (New supply from Durr Universal)

Site Services

Site services are available with teams of multi-disciplined, specialist engineers, and technicians on call 24 hours a day, 365 days a year. We can supply engineering and a field team, installation, commissioning, and maintenance of your equipment. In the event of an operations problem resulting from an alarm or trip within the turbine controls panel, we also provide immediate solutions with our 24-hour telephone support.

Our Site Service teams routinely complete job scopes covering the complete skid, gas producer, power turbine, gearboxes, driven equipment and package control systems. We have a strategic supply of parts available for immediate dispatch to support our field service teams and your procurement department.