Solar® Turbines

A Caterpillar Company

APPLICATION CHECK SHEET (ACS)

Titan 130 Generator Set

ACS Description	Custom Feature Description
BASIC PACKAGE	
Titan 130 Oil & Gas AR "Generator Set"	
Site Conditions [Technical Note]	Equipment is suitable for operation in the following environment conditions. Sunset 1 Gas Plant - which will be located close to Fort St. John, BC.Site Elevation - 835 metres Design Ambient Temperature: 33.6C (92.5F) maximum, -40C (-40F) minimum 35C (95F) maximum for cooler design MDMT: -45C (-49F) for outdoors piping & equipment Atmospheric Pressure: Relative Humidity: 100% for equipment design Design Wind Pressure: 0.49 kPa (structural) Ground Snow Load (kPa): Ss = 3.0
CF: Junction Box Labels [0000000781 Ver. B.7]	Provide white labels with black letters. Permanent adhesive will be used to attach the labels to the junction boxes. Labels shall indicate junction box numbers from Project Electrical and Mechanical drawings.
	Special nameplates are provided.Labels for the package are to be provided in phenolic material. In lieu of etched aluminum, package nameplates for all equipment located indoors in ventilated air-conditioned environment or outdoor applications for on-skid gauge boards, control panels and junction boxes shall be white phenolic background with black letters. The warning nameplates shall be red phenolic background with white letters and orange or yellow phenolic background with black letters as applicable for danger, warning, caution, respectively. The warning nameplates on pumps and motors that can start automatically shall be red phenolic background with white letters to indicate danger. All labels shall be attached with double back tape and stainless steel screws where practical. Note: For NEMA 4X junction boxes or other equipment where screws would penetrate the enclosure, a permanent adhesive (without screws) shall be used.
	Brass, bronze, or aluminum alloy parts will not be used in hydrocarbon service or where in contact with hydrocarbon (oil or gas) on the package. Accepted are bronze or brass parts used as bearings, or bushings.
ELECTRICAL SYSTEM TYPE	
NEC, Class I, Group D, Division 2	
3 PHASE AC POWER RATING	
600 Volts / 60 Hz	
1 PHASE AC POWER RATING (Battery Charger)	
600 Volts 50/60 Hz	
1 PHASE AC LIGHTING AND HEATER POWER	
208 Volts, 60 Hz	

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PACKAGE TAGS	
Stainless Steel Tags	
CF: Stainless Steel Instrument Tags [0000000421 Ver. C.11]	316SS stainless steel tags are provided for on-skid instruments and hydromechanical components. The tags are permanently affixed to the body of the instrument or attached by stainless steel wire.
TURBINE MODEL	
SoLoNOx Titan 130-20501S	
INLET ORIENTATION	
Up	
EXHAUST ORIENTATION	
Axial	
SOLONOX GAS FUEL	
25 ppm NOx Emissions, Gas Fuel	
MAIN REDUCTION DRIVE	
1800 RPM 60 Hz	
GENERATOR SUPPLIER	
ABB	
GENERATOR RATING	
6900 Volt, 60 Hz, F Insulation, B Rise	
CF: Custom Generator [0000000892 Ver. -.8]	Brushless synchronous generators are suitable for gas turbine Titan 130. Custom features include: -Frame Code: AMS 900 LH -Machine Type: 4 Pole / 3-Phase / 1800 RPM / 6 Wire, WYE Connection / Insulation Class F with VPI -Machine Rating: 6,900 Volt /60 Hz / 17,500 kVA @ 40°C / 0.8pf / B-Rise (80°C Rise) -(6) Stator RTDs, PT 100 (Single Element), (2 per Phase) -(4) Bearing RTDs, PT 100 (Single Element), (2 per Bearing) -(3) Cooling Air RTDs, PT 100 (Single Element), (2 in cold air, 1 in hot air) -Proximity Type vibration detection (2 probes per bearing) -Black Heat anti condensation space heaters in the Stator & Exciter (208V, 60Hz, 1-Phase) -Bearing prepared for Jacking -IP 54 Ingress protection when connected to ducting (otherwise IP 20) -ABB Epoxy industrial coating, according to ISO 12944 C5i. Color code is RAL7032. -Ambient temperature -30degC to 40 degC -AUX BOX location, RSFVEE (Stainless steel)
START SYSTEM TYPE	

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Direct-Drive AC Motor Driven	
FUEL SYSTEM TYPE	
Natural Gas	
FUEL CONTROL VALVE MATERIAL	
Gas Fuel Stainless Steel Valve Body	
LUBE FILTER SYSTEM MATERIALS	
Carbon Steel	
LUBE OIL TANK AND TANK COVER MATERIAL	
Carbon Steel	
CF: Stainless Steel Oil Tank Flame Arrestor [0000000418 Ver. -.10]	The lube oil tank flame arrestor (Including 316SS attaching hardware includes nuts, bolts, and washers.) will be provided in 316SS stainless steel.
LUBE OIL COOLER	
CF: Custom Lube Oil Cooler [0000000875 Ver. -.21]	Features of the lube oil cooler as follows: -AXC 113210 RO / 1,435,764 BTU/hr heat load -Standard Noise Model 72HS Air-X-Changer -(1) 100% fan, V-belt drive by 10hp TEFC motor -XP vibration switch with 115 VAC remote reset coil -Alyeska through-the-wall louver system with Fisher temperature controller and Garzo actuators -Carbon steel tubes and headers -Shutters C&D to/from inside and Shutters A&B to/from outside -ASME code stamp, CRN for British Columbia
LUBE OIL TANK HEATER SYSTEM	
3 Phase AC Lube Oil Tank Heater	

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LUBE OIL TYPE	
Petroleum Base, Viscosity Grade C32	
CONTROL SYSTEM TYPE	
Onskid Control System	
CF: Additional Ethernet Connections [0000000267 Ver. E.6]	Ethernet Customer Interface to the Load Shed Panel.
CF: Fuel Shut Down Valve Status [0000000623 Ver. A.5]	The customer will provide shutdown valve (SDV) status to Solar which will be displayed on the HMI.The customer will provide a single contact for the gas fuel SDV status. When the contact is closed, it indicates a closed valve and when a contact is open, it indicates an open valve. Solar will display on the HMI an indication of the position of the valve. Start permissive logic will be provided for the off skid fuel gas shutdown valve (provided by the customer). The fuel supply valve must be confirmed to be open prior to start.
CF: Generator Alarms and Shutdowns [0000001239 Ver. -.2]	The alarms and unit shutdowns are modified as follows: Alarm and trip turbine breaker on generator under voltage without turbine shutdown.
CF: Generator Load Shed Panel [0000000991 Ver. -.17]	Provide a Load Shed Panel. The load shedding panel (contained in a NEMA 4 box) is a programmable controller-based system, primarily intended to protect a power plant from real power overload. The panel monitors power generation, plant loads, power flow, circuit breaker status, and operator inputs including load priority settings.
CF: Interface with Solar Station Control [0000035262 Ver. -.5]	Solar will add one each ControlNet interface module to the unit controller rack to provide for dedicated communication to a Solar Station Control or to provide unit to unit communication. This CF adds the ControlNet module and the supporting software for communication to the Load Shed Panel.
CF: Unit Based Generator Load Sharing [0000043680 Ver. -.7]	Solar will supply Unit Based Generator Load Sharing. This feature will allow Solar units with Logix PLCs to have unit based generator real and reactive load sharing in a multiunit installation via a digital communication network (ControlNet). It will change and simplify the design, eliminate the use of external analog load sharing circuitry and will substantially increase the possible distance between the load sharing units.
OFFSKID AUXILIARY CONTROL INTERFACE	
Auxiliary Control Console	
REMOTE CONTROL AND DISPLAY	

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ACS Description	Custom Feature Description
Remote Desktop PC (Quantity 1, to be shared by both units)	
CF: Multi Unit Remote PC [0000000961 Ver. -.16]	Provide a TT4000 multi unit display. The display will duplicate the project specific TT4000 screens. This CF is for multiple unit projects, this TT4000 multi unit display is capable of monitoring and control of the units. Solar will supply in each unit a dedicated communications module.
SUPERVISORY COMMUNICATIONS INTERFACE	
Ethernet Network Interface	
ENGINEERING UNITS	
Metric - kPa	
LANGUAGE, CONTROL SCREEN DISPLAY	
English	
PERFORMANCE MAP DISPLAY	
Engine Performance Map	
ELECTRIC METERING PANEL	
Electric Control and Metering Panel	
CF: Spinning Reserve Calculation [0000000836 Ver. -.9]	Spinning reserve shall be calculated and displayed on the TT4000. The algorithm for the spinning reserve calculation will be based on the Capacity Prediction Method (uses parameter estimates). Provide a 4-20ma output for customer use.
GENERATOR SEQUENCING	
Auto Start and Synchronizing	
KW CONTROL	
Kilowatt Control (Single Unit)	
VIBRATION MONITORING SYSTEM - GENERATOR	
2X and 2Y Proximity Probes, 4 Channels	
AIR SUPPLY - SELF CLEANING FILTER	
Turbine Compressor Bleed Air	
120 VDC CONTROL AND ACCESSORY POWER SUPPLY	
120 Vdc Power Supply with NiCd Batteries	
ENGINE CLEANING SYSTEM	
On-Line / On-Crank Cleaning System	
ENGINE CLEANING SYSTEM TANK	
Cleaning Tank - ASME Certified (Quantity 1, to be shared by both units)	
PREPARATION FOR SHIPMENT	
Long Term Preservation	
OMI LANGUAGE	
English Language OMI	
OMI MANUALS FORMAT & QUANTITY	
CD-ROM OMI, Standard Quantity	
PACKAGE & CONSOLE LABELS, LANGUAGE	

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ACS Description	Custom Feature Description
English Language Labels	
VIBRATION ANALYSIS	
Torsional Vibration Analysis	
Lateral Vibration Analysis	
ALIGNMENT TOOL	
Alignment Tool (Quantity 1, to be shared by both units)	

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STANDARD TESTING	
Standard Testing per Solar Specifications	
NEC, CEC OR OTHER CERTIFICATION	
	Solar shall provide an electrical device certification list and individual certificates for all devices listed on the electrical device certification list. Solar is to include these certificates in the manual.
CRN Certificates [Technical Note]	Obtain a Certificate number for all project pressure vessels.
CARBON STEEL AIR FILTRATION SYSTEMS	
CF: Manual Initiation of Air Inlet Filter Cleaning System [0000000997 Ver. E.7]	Solar to provide remote Initiation of Air Inlet Filter Cleaning System. Ventilation equipment provider will provide a manual push button to be installed on the air inlet leg kit.
Self Cleaning Barrier Filter, Oversized, Updraft, Synthetic Spiderweb Media, Cold Weather	
ACCESSORIES FOR AIR FILTRATION SYSTEMS	
CF: Custom turbine air Inlet system maintenance platform and ladder [0000000216 Ver. -.10]	Includes: -Leg Kit w/Maintanence Platform, Ladder, for TTD 160, with Manual Clean Switch -Insect Screen Kit for TTD-160 Leg Kit -Cold Weather design (-45C)
CARBON STEEL AIR INLET SILENCER	
Air Inlet Silencer, Carbon Steel	
CARBON STEEL DUCTING COMPONENTS	
Duct, Unlined, 8 ft x 8 ft, 4 ft Long	
CF: Custom Ancillary Ducting [0000000877 Ver. -.23]	Modify the 4 ft long duct to have a cutout panel for the customer supplied gas sensors.
Duct, Flexible, Unlined, 8 ft x 8 ft, 3 ft Long	
Duct, Unlined, 8 ft x 8 ft, 3 ft Long, w/Access Hatch	
Elbow, 90°, Unlined, 8 ft x 8 ft	

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CF: Custom Ancillary Inlet Elbow [0000000877 Ver. -.23]	Duct Transition Flex, 96" x 96" to 51" x 82.8" x 20.84" Long CS, Insulated
Duct, Transition, Lined, 82.8 in. x 51 in. to 8 x 8 ft, 3 ft Long	
PCD AIR HEAT EXCHANGER	
Heat Exchanger in Duct, Carbon Steel	
EXHAUST SILENCER, CARBON STEEL	
Exhaust Silencer, Floor Standing, Carbon Steel	
EXHAUST SYSTEM DUCTING, CARBON STEEL	
CF: Emission Sampling Ports [0000000198 Ver. V.12]	Four 4 inch 150# ANSI flanges are required at 90 degree spacing.
Duct, Exhaust, 6 ft Diameter, 10 ft Long	
Bellows, 6 ft Diameter, 24-1/4 in. Long	
Stack, Rain Protection, 6 ft Diameter Connection	