

CATERPILLAR C280-08 GENERATOR SET 5500V 50HZ 1000RPM

Standard Consist for C280-08PL

- The engine is a turbocharged, water aftercooled, four stroke cycle, electronic unit injection engine with a 280 mm (11 in) bore by 300 mm (11.8 in) stroke. SAE standard rotation. Counterclockwise viewed from the rear of engine flywheel.

AIR INLET SYSTEM

- Aftercooler, fresh water, corrosion resistant coated (air side)
- Air inlet shutoff
- Breather, crankcase, top-mounted
- Turbocharger, rear-mounted, engine oil lubricated

CONTROL SYSTEM

- Single Caterpillar ADEM A3 Electronic Engine Control Modules with Electronic Unit Injector Fuel System
- Rigid Wiring Harness
- (10 amp 24volt power required to drive Electronic Engine Control Modules)

COOLING SYSTEM

- Engine coolant water drains

EXHAUST SYSTEM

- Dry, gas tight, exhaust manifold

FUEL SYSTEM

- Distillate fuel (requires viscosity ranging from 1.4 cSt to 20 cSt at 38 degrees C)
- Fuel transfer pump (mounted on left hand side)
- Duplex fuel filters
- Electronically Controlled Unit Injectors

LUBE SYSTEM

- Centrifugal oil filters with single shutoff. Service side engine mounted on cylinder block inspection covers. Includes installed oil lines and single shutoff valve. Filters centrifuge bypass oil from the main lubricating oil pump. Can be serviced with the engine running.

- Oil filler and dipstick
- Valve, oil pressure regulating
- Valves, crankcase explosion relief

GENERAL

- Paint, Caterpillar yellow
- Pumps, gear driven: fuel, oil, jacket water, aftercooler/oil cooler water

SVCE TOOLS/SHIP PROT/FACTORY SUPPORT

- Service literature. Included standard with each engine are two (2) complete sets of service literature listed below:
 1. Custom parts book CD (serial number specific)
 2. Service manual, which includes: Operation & Maintenance, Specifications, Systems Operation, Testing and Adjusting, Disassembly and Assembly manual. Available in paper media and English language only.
 3. Technical manual (parts/service information for special equipment). Available in paper media in English language only.

NOTE: Custom parts book CD and service manual can be re-ordered through the normal Caterpillar literature ordering system. The technical manual can only be re-ordered through the Project Services at the Caterpillar Lafayette Engine Center facility.

OFFSHORE ELECTRIC DRILLING DIESEL ENGINE ARRANGEMENTS

THESE ENGINES MEET THE CURRENT IMO EMISSION STANDARDS AS DEFINED BY REGULATION 13 OF ANNEX VI TO THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978, FURTHER MODIFIED BY THE PROTOCOLS OF 1997 AND 2008.

An optional IMO Tier II certificate by GL, EPA or CCS is available as noted. See EMISSION CERTIFICATION under optional attachments and a list of available ratings. Refer to the IMO ordering procedure LEXM7151.

<u>Feature Code</u>	<u>Description</u>
OELEPMD_I	OFFSHORE ELEC DRILLING MODULE This Application applies to all Petroleum Packages
PETAUX1_I	PETROLEUM AUXILIARY ENGINE This application applies to all auxiliary engines or gensets used in the production of electricity for uses other than the main propulsion of a drilling rig, floating production and storage facilities. NOTE: Auxiliary electric power, constant speed, variable load application (D2).
BK02710_I	2710 BKW (3634 BHP) @ 1000 RPM Ratings listed are good for altitudes up to 200 meters, and ambient temperatures not exceeding 45 C. Maximum SCAC temperature of 32-38 C with distillate fuel. Engines are rated under ISO 3046/1 and SAE J1349 with corrections to achieve standard conditions. A special rating request is required for conditions outside of those listed.

50HERTZ_I 50 HERTZ

This 50 hertz designation represents the frequency determined by engine rating. This code does NOT provide a generator, but rather it determines engine consist.

C280P06_I C280-8 PET OFFSHR ENG EPA T2

IMO Tier II EMISSIONS COMPLIANT engine rating: 2710 bkW (3634 bhp) at 1000 rpm, 2530 bkW (3393 bhp) at 900 rpm. TECHNICAL: Standard rotation. REQUIRES: 24VDC power.

IMOGL46_I IMO/GL CERT/3501-4000 HP

The C280 engine is configured to comply with IMO NOx exhaust emissions limits for standard 900 and 1000 RPM marine propulsion and marine auxiliary ratings. Engine must be supplied with 32 degree C cooling water to the low temperature circuit. Includes statement of compliance or Engine International Air Pollution Prevention (EIAPP) certificate, supplied by the Recognized Organization (RO) where available and technical file to be kept on board per IMO regulations. REQUIRES: 2710 bkW (3634 bhp) at 1000 rpm NOTE: For ratings not listed, evaluation of IMO certification is required by the factory prior to submitting an order.

TWOBRG3_I TWO BEARING GEN SET

Driven from rear of engine. Includes temporary shipping mounting of the free standing accessory module, wiring engine and accessories, mounting and aligning engine and generator to base, and load testing package. Any other work or material requires a Design-To-Order (DTO) request. Accessory module, base and generator are selected separately. REQUIRES: Rigid three point base, engine mounting weld plates, generator installation argt, torsional coupling, and wet sump.

EXVERT1_I VERTICAL EXH ORIENT/NAP

Provides turbocharger water lines for vertical exhaust outlet orientation.

BEC1038_I 8CYL NAP 1000RPM CCW VERT IMO

IMO certifiable. Includes iron specific to engine speed, rotation and duty type. Also includes adapter that expands from 355mm (14in) with DIN connection to 457mm (18in) outlet with Caterpillar bolt pattern. FOR USE WITH: 1000 rpm rating and VERTICAL exhaust orientation EXVERT1.

EUDGDOI_I EUROPEAN DIRECTIVE GENSET DOI

TECHNICAL: Provides Declaration of Incorporation document per 2006/42/EC (Machinery Safety Directive), and 2006/95/EC (Low Voltage Safety Directive). The Declaration of Incorporation allows free movement of goods in the EU per the Machinery Safety Directive, 2006/42/EC, and references demonstrated compliance to other applicable directives. This is required by OEM manufacturers when the subject product is installed in a more complex installation. REQUIRES: Factory package application. NOTE: Not for

use with Hazardous Location engines.

SRV0224_I

RIGHT HAND SER SIDE/INLINES

Viewed from rear of engine (flywheel). Includes lines groups for centrifugal oil and fuel filters. The service side of engine determines the location of dipstick and oil fill, oil and fuel filter access, and interface for remote mounted instrumentation. The engine starting controls are on the same side of the engine for operator convenience. The oil and fuel filters are serviced from RH side at the front of the engine.

MSPETPG_I

PETRO PRODUCTION/PUMPING

All engines utilized in the generation of mechanical and electrical power for exploration, recovery and transmission of petroleum products including gathering, production, pumping, and refining. (BUT NOT GAS COMPRESSION). Applications include camp power, emergency GEN Sets (non-drilling), prime power at production and storage facilities, cranes, fire pumps, air compressors, primary or secondary recovery systems such as down hole pumps, water flood or disposal systems, etc. This includes rental products which fit Petroleum Production Pumping market segment description. This includes Industrial, Marine, and EPG price list products.

MSCPB32_I

LAND PRODUCTION PRIME GENSET

Generator set used to provide power for electric driven gas compressors in a petroleum land production application

MWCODEE_I

PRIME POWER

Other than load management or quality power, any application within any business where the engine powers an electric generator. The term "PRIME" denotes engines in regular, planned, and everyday use as a main power source and output available with varying load.

NOMREQD_I

MCS CERTIFICATION NOT REQUIRED

ELT0230_I

230 VAC,50 HZ,SINGLE PH POWER

ELTAIR1_I

START AIR PRESSURE

ELT0024_I

24 VOLT DC POWER

ELT0400_I

400 VAC,50 HZ,THREE PH POWER

Select the on-site accessory power available for engine attachment (air starting motors, prelubrication motors, heaters and pumps, engine starting controls, engine protection, and engine shutdown). The accessory power is customer provided. Specify as many codes as necessary to define all of the available power sources. The selections made in this category are used to define the compatibility of certain attachments listed later. Caterpillar supplied equipment will be matched to utilize one or more of these power sources. However, not all power sources may be used.

TWOBR08_I

TWO BEARING PACKAGE/8CYL

Includes mounting the accessory module, mounting and aligning

engine and generator to the base. REQUIRES: Factory package applications.

TORCPL1_I

TORSIONAL COUPLING

Provides torsional coupling and drive adapter with split ring to facilitate servicing components on the rear of the engine. Coupling intended for two-bearing generator applications. NOTE: Generator inertia data required with order.

IPWFACT_I
NOSREQM_I

FACTORY SUPPLIED BY A DTO
NO SPECIAL REQUIREMENTS

BSE3208_I

BASE-8 CYL

Includes rigid three-point base intended for use with spring-type vibration isolators. For generator set package in seismic zone and drill rig applications. REQUIRES: Factory packager application.

MTG0213_I

MOUNTING GP/LH DOWEL/PKG

Provides mounting for engine and generator to base. Includes four engine mounting and four generator units with LH dowels. Includes shims alignment retention and for engine thermal growth. Also includes mounting bolts and leveling screws. Required on packaged application. REQUIRES: Factory package application.

VI86537_S

ISOLATORS/VERT RSTRNTS/8-16CYL

Shipped loose. Provides eight isolators for generator set base in seismic zones and drill rig with +/-1.5G vertical restraint and +/-3G horizontal restraint under low cycle conditions. REQUIRES: Factory package application.

MT83655_S

8 ISOLATOR WELD PLATES

Shipped loose. Includes eight weld plates for connection of isolators to customer foundation. The weld plates aid in the ease of genset package installation. The weld plates have threaded holes which match the isolator hole pattern. The weld plates are to be welded to the customer foundation at the time of package installation. Proper installation requires a steel I-beam, or other equivalent means, to be embedded in the customer foundation to provide adequate hold-down. REQUIRES: Vibration isolators.

ACM0008_I

ACC MOD/FACTORY PACKAGED

Accessory module structure reduces installation time and costs. Includes support brackets used to mount attachments such as the expansion tank, heat exchanger, instrument panel and engine controls, annunciator panel, alarm and shutdown contactors, fuel strainer. Mounted to support brackets attached to engine base for shipping purposes. Also includes ship loose brackets for free standing, floor mounted module positioned directly in front of engine, and attaches to the floor. FOR USE WITH: Factory packaged applications

FLY0024_I

FLYWHEEL-HIGH INERTIA

Flywheel has roughly twice the mass moment of inertia as compared

to the standard flywheel. The flywheel has thirty-two 7/8-9-2B THD holes on a 1025 mm (40.25 in.) diameter bolt circle. Also helps meet certain transient response criteria. The flywheel is engine-mounted at the rear. Includes ring gear for starting and barring.

GRD0212_I

HI INERTIA FLY/PACKAGE/INL

Includes installed flywheel guard, coupling guard and support from coupling guard to base. All constructed of steel. Compatible with starters and barring devices. Caterpillar supplied guards for rotating components meet OSHA and IP2X requirements. Guards made of non-sparking material are available as a design to order (DTO). REQUIRES: Factory package application.

GRD6583_I

STD DAMPER GUARD-8/12 CYL

Constructed of perforated steel for strength as well as for adequate air flow for cooling of damper.

LFT0001_S

ENGINE LIFTING EYES - PKG

Shipped loose. Includes two lifting eyes mounted to the cylinder head at each end of engine. These lifting eyes are intended for engine lifting only. Packaged generator sets have provisions for package lifting. For use with two customer provided 50.4 mm (2 in.) shackles. REQUIRES: Factory package application.

BRD0002_I

MANUAL BARRING DEVICE - 50:1

Barring devices are engine-mounted and engage flywheel ring gear. Used to rotate the crankshaft for engine timing and maintenance procedures. Includes provision for interlock with starting controls to prevent engine cranking while the barring device is engaged. Barring devices are located on engine right-hand rear only. With a 50:1 gear reduction. Can be used with electric or air drills.

CST0584_I

SEPT CIRCUIT, 2 ELE OIL COOLER

Separate circuit, two element oil cooler. Cooling circuit is in series with the aftercooler/oil cooler circuit. Requires external circuit temperature regulator (see AC/OC thermostats) and one external heat exchanger (not included). Oil coolers includes two element fixed tube bundle configuration with rubber end sheets and engine mounted oil lines. Mounted at upper front and cannot be cleaned on the oil side for the fresh-water watercooling system. Includes oil temperature regulators to maintain 85 C (185 F) oil to bearings. Water inlet temperature is limited to 32 deg C (90 F). DIN flanges may be ordered via design to order request (DTO).

EXP0490_I

EXP TANK-HI VOL-ACM MNT

High volume, module mounted. Includes sight gauge, pressure cap with air vent, and single-point fill. For use with cooling system volume up to 5700 L (1500 gal). Includes installed water lines to engine and connections for heat exchanger water lines (not included). Also includes water lines to AC/OC water pump. REQUIRES: Factory package application, accessory module, separate

circuit and 32C CAT regulator.

REG1935_I

CAT 90C/SEPT/EXPTK/INL

For the jacket water circuit. Multiple element, full modulating temperature regulator in Caterpillar designed regulator housing. Includes one regulator housing and one cover connected directly to Caterpillar expansion tank. REQUIRES: Accessory module mounted or remote expansion tank.

REG5233_S

CAT 32C / INL

Shipped loose. For the AC/OC water circuit. Multiple element, full modulating temperature regulator in Caterpillar designed regulator housing. Includes regulator housing assembly with one regulator for remote mounting.

CNN3379_I

5 INCH ANSI ADAPTER/REG/QTY1

CNN3752_I

5 INCH ANSI ADAPTER/EWAT/QTY1

CNN3753_I

6 INCH ANSI ADAPTER/QTY1

CNN3759_I

4 INCH ANSI ADAPTER/INL/QTY1

WTRCNRH_I

WATER CONNECTIONS-RIGHT HAND

Defines water outlet connection location for the jacket water and aftercooler/oil cooler outlet for separate circuit, or the combined water outlet for single circuit. Connection is located on upper front of engine and/or on accessory module, depending on the package selection made earlier. NOTE: Does not include required flexible connection to customer piping and the outlet connection for the separate circuit oil cooler/aftercooler water flow is available on left hand side of engine only.

JWH0525_I

HTRCOM / 400V / PKG / SEPTCK

Installed on base. Supplies a combination heater which heats the jacket water and lube oil. Includes engine connections and control panel components. There is an 18 kW heater for the jacket water and a 9 kW heater for the lube oil. Heater is DNV and LR approved. Heater voltage will be based on the three phase on-site power selection. TECHNICAL: Meets European 2006/42/EC (Machinery Safety Directive), and 2006/95/EC (Low Voltage Safety Directive). REQUIRES: 400V factory package application

SMP9075_I

WET SUMP W/NO EMRGY LUBE

Includes installed oil lines to engine-driven main lubrication pump.

NOWTPMP_I

NO ENGINE MTD AUX WATER PUMP

This code is intended for the engine not having an auxiliary water pump, or the customer providing their own auxiliary water pump.

LUB0011_I

OIL DRAIN - FRONT

Oil pan mounted manual shutoff with 1-1/2-11-1/2 NPT THD pipe threads at customer connection interface. The oil drain will extend out the front of the base. REQUIRES: Factory package application and wet sump.

FLT0004_I DUPLEX OIL FILTER
 Dual housing, six-element system using Caterpillar filter elements. Filter elements will be accessible from the service side of the engine. Drain valves and element racks are provided for ease of service. Recommended for marine society approval. NOTE: Change valve and pressure gauges are provided. Filter elements can be serviced while the engine is running.

PLP0232_I AIR PRELUBE/C280 INL
 Air motor included. Includes installed air supply line if starting controls are ordered. Mounted to engine oil pan instead of base. Air pressure is required.

PLP8022_I CUSTOMER PROVIDED-CONTINUOUS
 For use with a customer provided, continuous prelubrication system. Provides fittings for connection of customer supplied oil lines and prelubrication pump. NOTE: Prelube function can no longer be provided by an emergency lube system. A separate prelube pump must be provided.

FUL4301_I DPLX FUEL STRAINER - ACM
 Provides filter group and lines from engine block to accessory module. REQUIRES: Accessory module and wet sump. Also requires fuel/pump connection FUL7250 if manual fuel priming pump is selected.

FUL3363_I MANUAL FUEL PRIMING PUMP / RH
 Hand operated pump includes installed fuel priming lines. Mounted on service side of engine.

FUL7250_I DPLX FUEL/MAN FUL PRIMING PUMP
 Provides lines between accessory module mounted duplex fuel strainer and manual fuel priming pump if right hand service. REQUIRES: Duplex fuel strainer, manual fuel priming pump and right hand service.

AIN0280_I 90 DEG ADAPTER/NAPIER/INL/RH
 Includes 90 degree elbow with air cleaner adapter to be mounted to turbocharger inlet, shipped loose. Also includes air restriction lines. The customer connection is a 508 mm (20 in.) round connection. Standard orientation is vertical. REQUIRES: Right hand service.

ACL0269_S ACL / STD DUTY / HIGH VOL /HOR
 Shipped loose. Includes two cleaner groups. High volume, three element, horizontal mounted air cleaner.

AC37103_S ACL /SOOT FILTER /HIGH VOLUME
 Ship loose. Three 2nd stage slip-on filter covers capable of extending paper filter life in some applications. The soot filter

is washable and reusable. REQUIRES: High volume air cleaners.

ASM0305_I

TDI SNGL STARTING MOTOR / CCW

Provides one TDI starting motor mounted at rear left side. Also includes shut off valve, relay valve, prelube solenoid valve, connections to barring device and pressure sender.

APREG02_S

AIR PRESSURE REGULATOR

Shipped loose. 40 Cv, 2 inch NPT female connection full flow pressure regulator for air starting systems with operating pressures above the starters maximum operating limits. TECHNICAL: Maximum system pressure is 31 bar (450 psi). It is required to install #300 mesh screen prior to this reducing valve. REQUIRES: Air starting motor.

EXH8063_I

HARD SHIELD/NAP/8CYL

Shielding constructed of a steel outer cover with high temperature insulation and an inner foil lining. Joints are bolted for serviceability. CANNOT BE USED WITH: MCS Certifications.

EXH7889_S

FLEX EXH FITTING-18 INCH(1-10)

Shipped loose. 457 mm (18 in) diameter. Includes one fitting, gasket and mounting hardware. All exhaust fittings have Caterpillar flange bolt patterns. Weld flanges selected separately.

EXCFL12_S

FLANGE-EXH 18 IN(457 MM)(1-10)

Shipped loose. Includes 457 mm (18 in) diameter weld flange, gasket and mounting hardware.

PRO0622_I

PLC PROTECTION / RH / ACM

Provides protection, monitoring and control. Housed in a NEMA 4 enclosure. All critical shutdowns have relay and PLC based protection. Includes junction box and engine wiring with instructions. REQUIRES: Accessory module and magnetic pickup bracket MPU5389. PROTECTION SYSTEM PLC (Programmable Logic Controller) Based System The PLC (programmable logic controller) based system provides protection, monitoring, and control housed in a NEMA 4 (IP66) enclosure. All critical shutdowns have both relay based and PLC based protection. Sensors are factory wired directly to an engine mounted terminal box for a ship loose package or an engine only selection. Sensors are wired directly to the control panel when an accessory module is ordered and is factory packaged otherwise control panel is shipped loose for customer mounting. Use of PLC eliminates the need for a separate gauge panel and annunciator panel.

Features

* 254 mm (10.0 in.) color monitor to display all engine parameters and alarm annunciation. The color monitor has a general overview screen, an exhaust screen, lube oil screen, cooling screen, air and fuel screen and an auxiliary screen. The alarms are

annunciated with a time & date stamp.

- * Annunciation of all engine shutdowns, alarms and status points.
- * Start/prelube control switch, fuel control switch and emergency stop button.
- * Selection of idle/rated control of engine.
- * Equipped for remote communication.
- * Four 4-20 mA outputs (programmable.)
- * Relay contact signals to the remote monitoring system (summary shutdown, summary alarm, local operation/remote, engine running, PLC failure, fuel control and idle/rated).

Engine Sensors

All package mounted sensors are wired to a common junction box. The following are the different sensor types and their descriptions.

Contactors:

- * Lube oil pressure (hi/low speed)
- * Jacket water pressure
- * AC/OC pressure
- * Start air pressure
- * Crankcase pressure

4-20 mA Transducers:

- * Lube oil pressure (to filter/to engine)
- * Fuel pressure (to filter/to engine)
- * Inlet air manifold pressure

RTD (PT 100):

- * Lubricating oil to engine temperature
- * Inlet air manifold temperature
- * Fuel to engine temperature
- * AC/OC inlet temperature
- * Jacket water outlet temperature (alarm)
- * Jacket water outlet temperature (shutdown)
- * Generator rear bearing temperature (Genset only)
- * Generator front bearing temperature (Genset only)
- * Generator stator A temperature (Genset only)
- * Generator stator B temperature (Genset only)
- * Generator stator C temperature (Genset only)

Switches:

- * Jacket water detector
- * Metal particle detector

* Starting oil pressure or detector

Thermocouples:

* Exhaust thermocouples (one per cylinder plus inlet to turbine and stack)

Interfacing

Engine is factory equipped with the required sensors needed for the PLC.

Accepts remote signals for starting/interlock, stopping, and emergency stop. All monitored parameters and status available on a DH+ network. An Ethernet connection is available by a Design-To-Order (DTO) request.

MODBUS communication available in optional feature code selection.

ALARMS

Pressure:

- * Low oil pressure
- * High oil filter differential
- * Low fuel pressure
- * High fuel filter differential
- * High inlet air manifold pressure
- * Low starting air pressure
- * Low jacket water pressure
- * Low AC/OC water pressure
- * Low raw/sea water pressure (customer supplied contact)

Temperatures:

- * High lube oil temperature
- * High inlet air manifold temperature
- * High fuel temperature
- * High AC/OC inlet temperature
- * High jacket water outlet temperature
- * High generator rear bearing temperature (Genset only)
- * High generator front bearing temperature (Genset only)
- * High generator stator A temperature (Genset only)
- * High generator stator B temperature (Genset only)
- * High generator stator C temperature (Genset only)
- * High individual exhaust port temperature
- * High turbine inlet temperature
- * High exhaust stack temperature
- * High exhaust port deviation temperature

Other:

- * Low battery voltage
- * Low oil level
- * Jacket water detection
- * Low coolant level (Switch supplied with an expansion tank or customer supplied if an expansion tank is not selected).
- * Metal particle detection

Shut Downs

Pressure:

- * Low oil pressure
- * High crankcase pressure

Temperature:

- * High jacket water temperature
- * High lube oil temperature
- * High generator bearing temperature (Genset only)

Other:

- * Metal particle detector
- * Engine overspeed
- * Customer shutdown (normally open contact customer supplied)

Programmable Inputs:

The customer can wire, display and alarm on two customer supplied RTD's, and two customer supplied 4-20mA (0-10 VDC) sensors, three discrete alarms, and three discrete shutdowns.

Gauges:

In addition to the 10 inch color monitor that displays all engine parameters, there are also three engine mounted gauges and three control panel gauges. The three engine mounted gauges are fuel pressure, lube oil pressure and inlet air restriction. The three control panel gauges are an engine hour meter, digital tachometer, and a starting air pressure gauge.

Lights:

Four lights are included on the control panel for displaying prelube status, summary alarm, summary shutdown and PLC failure.

Construction: enclosure - NEMA 4 (IP66)

WIR0920_I

UPGRADE WIRING ACC/PLC/ECP MAX

Provides additional cable and wiring connections that meet waterproof or severe service requirements specific to a package gen set. REQUIRES: Factory packaging application. NOTE: Meets ABS, DNV, BV, GL, NK, RS AND KRS marine society requirements for wiring. For others not mentioned, contact the marine consultant.

PLC6350_S

BEACON AND HORN

Shipped loose. Provides a beacon and horn assembly to panel.

PLC8812_I MODBUS COMMUNICATIONS
 Adds a modbus card to panel.

PLC0200_I RAW/SEA PRESSURE TRANSDUCER
 Adds a raw/sea water transducer.

PLC0335_I UPGRADED ALARM PRES SWITCHES
 Provides oil, fuel, AC/OC, jacket water, air start and air manifold pressure switches for alarm and or shutdown. Mounted on plate at front of engine. Upgrades AC/OC, JW and start air pressure from contactors to transducers. CANNOT BE USED WITH: Alarm pressure contactor switches.

MPU5389_I 4 HOLE MAG SPD PICKUP BRACKET
 Bracket provides four locations for the installation of additional magnetic pickups. Does not include magnetic pickups.

PLC3170_I FUEL TEMP SENSOR / RH / INLINE
 Provides fuel temperature sensor group

ALSLSM1_S LOAD SHARING MODULE
 Shipped loose. CANNOT BE USED WITH: Direct rack module DRMPLC1.

LDF9431_I 4-20MA LOAD FEEDBACK SIG / PLC
 Includes isolation module that outputs 4-20mA signal that corresponds to zero rated load.

TVATRS2_I CUSTOM GENSET TVA REPORT
 NOTE: There may be additional charges for analysis of applications where more than one engine drives a single load. A separate torsional analysis is required for each engine with different driven equipment in multiple engine installations. One complete set of technical data (see below) must be submitted to Caterpillar before calculations are undertaken. The report will include a mathematical determination of the natural frequency, critical speeds, relative amplitudes of angular displacement, approximate nodal locations of the complete elastic system (both engine and driven equipment). NOTE: IF ALL TECHNICAL DATA REQUIRED IS NOT RECEIVED, ANALYSIS MAY BE DELAYED UNTIL THE MISSING INFORMATION IS PROVIDED. TECHNICAL DATA REQUIRED.

1. The operating speed range.
2. Load demand curve on sets which have a load dependent variable rigidity coupling.
3. General arrangement drawing or sketch of complete system, including data on special crankshaft pulleys and equipment driven from front of engine.
4. With driven equipment on both ends of the engine, the horsepower demand of each end is required. In addition, simultaneous front and rear horsepower (maximum engine load) is

required.

5. Make, model, WR2 and torsional rigidity on all couplings used between the engine and driven equipment.

6. WR2 of each rotating mass. Weight of each reciprocating mass. (Needed for all pumps, compressors, gears, pinions, propellers.)

7. Torsional rigidity and minimum shaft diameter or detailed dimensions of all shafting in the driven system whether separately mounted or installed in a housing.

ADDITIONALLY, if an order has not been placed, the following information must also be submitted:

1. Damper part number (not top level or pricing arrgt.)

2. Flywheel part number (not top level or pricing arrgt.)

3. Horsepower

4. Operating speed

5. Coupling part number; or indicate one or two-bearing

A torsional vibration analysis is required for each engine installation. It may be performed by either Caterpillar or the dealer/customer, depending on the customer's preference. Dealer/customer performed analysis are subject to Caterpillar review and approval. For Caterpillar performed analysis, a complete set of technical data (refer to ASC website) must be submitted to Caterpillar before calculations are undertaken. NOTE: A separate torsional vibration analysis is required for each engine with different driven equipment in multiple engine installations.

TRKSHIP_I

PREP FOR TRUCK SHIPMENT IN USA

Provides for the preparation of the engine/package for truck shipment. Does not include cost of truck freight. Mandatory for truck shipments.

SHOTRAN_I

OCEANIC TRANSPORT

Used for shipments that will utilize a form of water transportation for the engine or package to arrive at the site. REQUIRES: Shrink wrap or tarp.

SW00549_I

SHRINK WRAP & TARP / GEN PKG

Provides approximately one year external protection from moisture, sun and wind under transport and storage conditions, if engine is to be stored for an extended period of time. Includes factory supplied tarpaulin cover to protect engine. REQUIRES: Factory package application.

EXB7942_I

EXPORT BOXING-GENSET PKG

Provides export boxing of the package for either rail or truck transportation. Requires the corresponding shrink wrap, or shrink wrap and tarp option. REQUIRES: Factory package application and shrink wrap or shrink wrap/tarp.

FACCOM5_I FACTORY COMMISSIONING

Commissioning will be invoiced at a flat daily rate, plus expenses, to the selling dealer. This charge will be deducted from the total cost of the commissioning. Factory commissioning is required for the first installation in the Dealer territory. For multiple unit sites, the commissioning feature code/charge must be added to each unit that is ordered.

INSPEC3_I SGS INSPECTION-GENSET

REQUIRES: Factory packaged generator set.

LITPAPR_S PAPER PARTS BOOK-ENGLISH(1-10)

Shipped loose. English only. This literature is in addition to the two parts book CD's that are shipped at no charge with each engine. NOTE: Extra custom paper parts books may be ordered through the Caterpillar literature orders system after engine shipment by ordering form SEBP3600 and specifying the specific engine serial number in the comments column. Can order up to ten additional paper parts books.

LIT0002_S ADDITIONAL SET OF LIT (1-10)

LIT0003_S ADDTL PARTS BK (CD)(1-10)

LIT0004_S ADDITIONAL SRV MANUAL(1-10)

LIT0005_S ADDITIONAL TECH MANUAL(1-10)

LIT0007_S INSTALL DRAWINGS-PROJ SPECIFIC

* PROJECT SPECIFIC INSTALLATION DRAWINGS*

Provides three sets of drawings during the execution phase of the project. Submit for Approval Drawings - The timeline for providing this set of drawings will be determined during a Customer Coordination Meeting to be scheduled and held by the Petroleum Packaging Project Manager within 10 working days after order acknowledgement from the factory. This set of drawings will use the proposal drawings and dealer mark ups as a baseline and include 5 views (right, front, rear, left, top) of the engine/package configuration with design concepts for the custom/DTO items, installation footprint, cooling schematic, customer connection details, estimated engine/package wet and dry weight with center of gravity, ship loose items, A targeted timeline for delivery of Submit for Approval drawings would be 8-12 weeks after the Customer Coordination Meeting. Upon receipt of these drawings, the dealer/end customer will have 1-2 weeks to review/approve these drawings with comments and return to the Project Manager. Electronic Files of these drawings will be made available for dealers by way of email/Secure Internet File Transfer (SIFT). Certified for Build Drawings - This set of drawings will use the Submit for Approval drawings as a baseline with updates from the customer comments provided by the dealer. The timeline for the Certified for Build drawings will be 3-6 weeks after receipt of customer comments to the Submit for

Approval drawings. Electronic files of these drawings will be made available for dealers by way of email/SIFT. As Built Drawings - This set of drawings will use the Certified for build drawings as a baseline with updates from the shop floor build of the packages. The timeline for the As Built drawings will be 2-4 weeks after the first package shipment. Electronic files of these drawings will be made available for dealers by way of email/SIFT

NOTE:

1. All drawings are provided in the form of electronic files. If paper and/or CDs are needed, please specify in the Customer Coordination Meeting.
2. Revisions requested after the Customer Coordination Meeting order may void the 8-12 weeks completion time.
3. If the project involves customer/dealer supplying free issue items, the deliverables listed below have to be received and acknowledged by the Project Manager before the start of the timeline for providing the "Submit for Approval" drawings as agreed upon at the customer coordination meeting:

Generator Drawing of the generator

Coupling hub drawing / detail Cooling datasheet (if required)

Bearing lubrication data sheet (if required)

Electrical schematic

Heat Exchanger Drawing Data sheet

Generator Lube Module Drawing

Other Free Issue Items

Drawing Data sheet

NOTE: P & IDs and electrical drawings are not provided by LIT0007 feature code. See LIT0010 & LIT0011 in optional attachments for P&IDs and electrical drawings.

LIT0011_S

ELECTRICAL DRAWINGS

Provides electrical drawings. (electrical wiring diagram and electrical interface diagram.) These drawings will be shipped with and will follow the same delivery time lines of the project specific drawings. If the project involves customer/dealer supplying free issue items, the deliverables listed below have to be received and acknowledged by the Project Manager before the start of the timeline for providing the "Submit for Approval" drawings as agreed upon at the customer coordination meeting:
Generator customer connections Engine/Auxiliary electrical equipment customer connections Electrical schematic Other Free Issue Items

LIT0010_S

P&ID DRAWINGS

Provides piping and instrumentation drawings. (P&ID) these drawings will be shipped with and will follow the same delivery time lines of the project specific drawings. If the project involves customer/dealer supplying free issue items, the

deliverables listed below have to be received and acknowledged by the Project Manager before the start of the timeline for providing the "Submit for Approval" drawings as agreed upon at the customer coordination meeting:

Air System

Fuel System

Exhaust System

Cooling System

Lubrication System

SPPKT33_S

AIR/EXHAUST COMMON(1-2)

Gasket, exhaust and cylinder gaskets

SPPKT35_S

EXH BELLOWS KIT/8CYL(1-2)

Bellows assembly and gaskets

SPK6999_S

TURBO KIT/COMMON (1-2)

Turbo-inlet gasket, gaskets, o-ring seals, cover, plates, and o-ring plug.

SPPKT54_S

COOLING SYS KIT/COMMON(1-2)

Shipped loose. Gaskets, lip type seals, o-ring seals, regulator, and basic seal gps.

WARRANTY

Caterpillar standard 12-month