

WARREN

CAT



Project Submittal

For

LSJE, LLC - ST. THOMAS

Two (2) Caterpillar Model LC7024J
Replacement Generator Ends

Warren Cat ID No.: M0114819, M0114820

Warren Cat EA No.: CE36503, CE36504

CATERPILLAR

LSJE, LLC - ST. THOMAS

6100 Red Hook Quarter B3
St. Thomas, VI 00802 - 1348

Project Submittal

Replacement Generator Ends
Little St. James
Two (2) Caterpillar Model LC7024J

Customer Purchase Order No.: CBO
Warren Cat ID No.: M0114819, M0114820
Warren Cat EA No.: CE36503, CE36504

Warren CAT

15 North Meridian Avenue
Oklahoma City, Oklahoma 73127

19 July 2018



Warren CAT
15 North Meridian Avenue
Oklahoma City, Oklahoma 73127

SCOPE OF SUPPLY

The following is a listing of the equipment and services to be provided with each of the two (2) generator ends.

One (1) Caterpillar Model LC7024 J alternators with the following configuration:

Configuration

Single Bearing
Random Wound
Series Star Connection
AREP Excitation Type
Four (4) Pole
Three (3) Phase
Twelve (12) Lead
Two (2) Wires per Lead
Sunc Speed 1800 RPM

Rating

500 kW
625 kVA
0.8 Power Factor
Line Voltage 480 VAC
Phase Voltage 277 VAC
Rated Current 751.8 Amps

Unit Consist

Alternator: Frame LC7024J

Generator Arrangement Power: 247-6128

Generator Group: 324-7714



Warren CAT
15 North Meridian Avenue
Oklahoma City, Oklahoma 73127

ALTERNATOR DATA



GENERATOR DATA**JULY 19, 2018**For Help Desk Phone Numbers [Click here](#)**Selected Model**

Engine: C18 **Generator Frame:** LC7024J **Genset Rating (kW):** 500.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 2476128 **Genset Rating (kVA):** 625.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** AREP **Pwr. Factor:** 0.8 **Rated Current:** 751.8
Duty: PRIME **Connection:** SERIES STAR **Application:** EPG **Status:** Current

Version: 40059 /40001 /39521 /1935

Spec Information

Generator Specification		Generator Efficiency			
Frame: LC7024J	Type: LC	No. of Bearings: 1	Per Unit Load	kW	Efficiency %
Winding Type: RANDOM WOUND		Flywheel: 18.0	0.25	125.0	91.0
Connection: SERIES STAR		Housing: 0	0.5	250.0	93.5
Phases: 3		No. of Leads: 12	0.75	375.0	94.4
Poles: 4		Wires per Lead: 2	1.0	500.0	94.4
Sync Speed: 1800		Generator Pitch: 0.6667	1.1	550.0	94.3

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1028	0.0379
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1183	0.0436
TRANSIENT - SATURATED X'_d	0.1289	0.0475
SYNCHRONOUS - DIRECT AXIS X_d	2.6302	0.9696
SYNCHRONOUS - QUADRATURE AXIS X_q	1.5788	0.5820
NEGATIVE SEQUENCE X_2	0.1107	0.0408
ZERO SEQUENCE X_0	0.0076	0.0028

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	2.0390
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.1000
OPEN CIRCUIT SUBTRANSIENT - DIRECT AXIS T''_{d0}	0.0130
SHORT CIRCUIT SUBTRANSIENT - DIRECT AXIS T''_d	0.0100
OPEN CIRCUIT SUBTRANSIENT - QUADRATURE AXIS T''_{q0}	0.1330
SHORT CIRCUIT SUBTRANSIENT - QUADRATURE AXIS T''_q	0.0100
EXCITER TIME CONSTANT T_e	0.0300
ARMATURE SHORT CIRCUIT T_a	0.0150

Short Circuit Ratio: 0.45

Stator Resistance = 0.0089 Ohms

Field Resistance = 0.357 Ohms

Voltage Regulation		Generator Excitation			
Voltage level adjustment: +/-	5.0%	No Load	Full Load, (rated) pf		
Voltage regulation, steady state: +/-	0.5%		Series	Parallel	
Voltage regulation with 3% speed change: +/-	0.5%	Excitation voltage:	9.96 Volts	39.15 Volts	Volts
Waveform deviation line - line, no load: less than	2.0%	Excitation current	0.83 Amps	2.68 Amps	Amps
Telephone influence factor: less than	50				

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Generator Mechanical Information

Center of Gravity		
Dimension X	-643.0 mm	-25.3 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 1550 kg	* Rotor WT = 579 kg	* Stator WT = 971 kg
3,417 LB	1,276 LB	2,141 LB

Rotor Balance = 0.0508 mm deflection PTP
 Overspeed Capacity = 125% of synchronous speed

Generator Torsional Data

TOTAL J = J1 + J2 + J3

K1 = Shaft Stiffness between J1 + J2 (Diameter 1)			K2 = Shaft Stiffness between J2 + J3 (Diameter 2)			
J1	K1	Min Shaft Dia 1	J2	K2	Min Shaft Dia 2	J3
9.9 LB IN. s ²	74.4 MLB IN./rad	5.7 IN.	70.1 LB IN. s ²	73.3 MLB IN./rad	5.5 IN.	3.3 LB IN. s ²
1.12 N m s ²	8.41 MN m/rad	145.0 mm	7.92 N m s ²	8.28 MN m/rad	140.0 mm	0.37 N m s ²
			Total J			
			83.3 LB IN. s ²			
			9.41 N m s ²			

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Generator Cooling Requirements - Temperature - Insulation Data			
Cooling Requirements:		Temperature Data: (Ambient 40 °C)	
Heat Dissipated: 29.7 kW		Stator Rise: 80.0 °C	
Air Flow: 72.0 m ³ /min		Rotor Rise: 80.0 °C	
Insulation Class: H			
Insulation Reg. as shipped: 100.0 MΩ minimum at 40 °C			
Thermal Limits of Generator			
Frequency:	60 Hz		
Line to Line Voltage:	480 Volts		
B BR 80/40	704.0 kVA		
F BR -105/40	800.0 kVA		
H BR - 125/40	880.0 kVA		
F PR - 130/40	880.0 kVA		
H PR - 150/40	933.0 kVA		
H PR27 - 163/27	968.0 kVA		

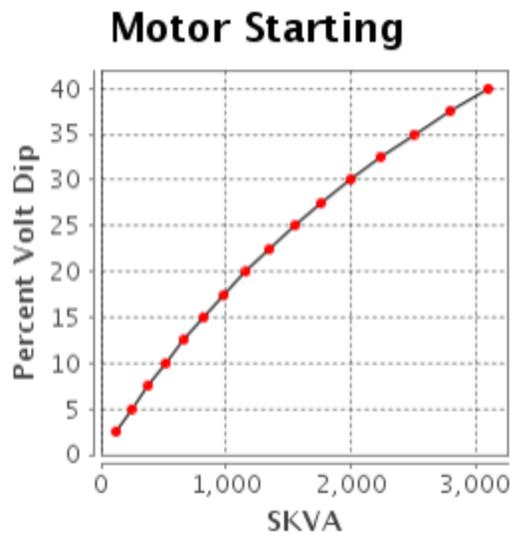
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**Starting Capability & Current Decrement
Motor Starting Capability (0.6 pf)**

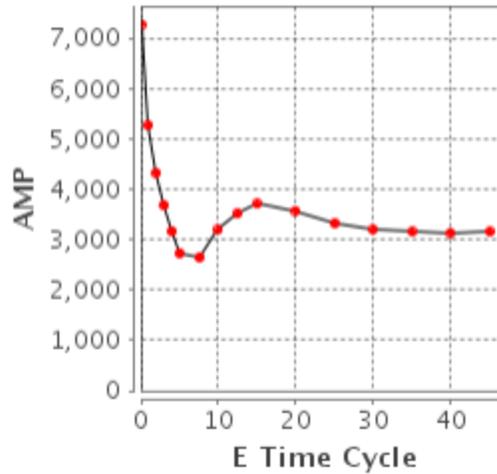
SKVA	Percent Volt Dip
119	2.5
245	5.0
377	7.5
517	10.0
664	12.5
821	15.0
987	17.5
1,163	20.0
1,350	22.5
1,550	25.0
1,764	27.5
1,993	30.0
2,239	32.5
2,504	35.0
2,791	37.5
3,101	40.0



Current Decrement Data

Current Decrement

E Time Cycle	AMP
0.0	7,275
1.0	5,267
2.0	4,327
3.0	3,680
4.0	3,161
5.0	2,726
7.5	2,636
10.0	3,186
12.5	3,516
15.0	3,701
20.0	3,575
25.0	3,320
30.0	3,190
35.0	3,146
40.0	3,140
45.0	3,147



Instantaneous 3 Phase Fault Current: 7275 Amps

Instantaneous Line - Line Fault Current: 6070 Amps

Instantaneous Line - Neutral Fault Current: 10157 Amps

Selected Model

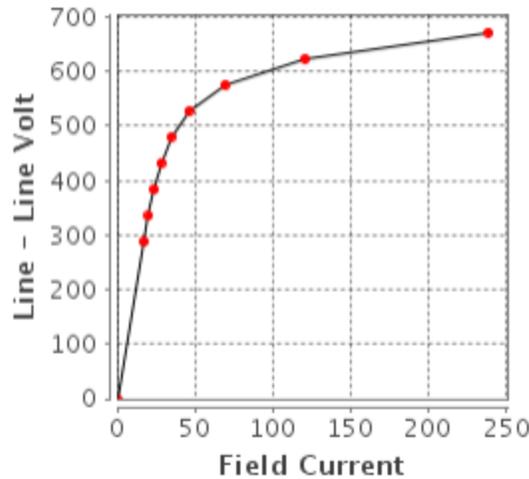
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Fuel: Diesel	Generator Arrangement: 2476128	Genset Rating (kVA): 625.0	Phase Voltage: 277
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Duty: PRIME	Connection: SERIES STAR	Application: EPG	Status: Current

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Generator Output Characteristic Curves
Open Circuit Curve

Open Circuit

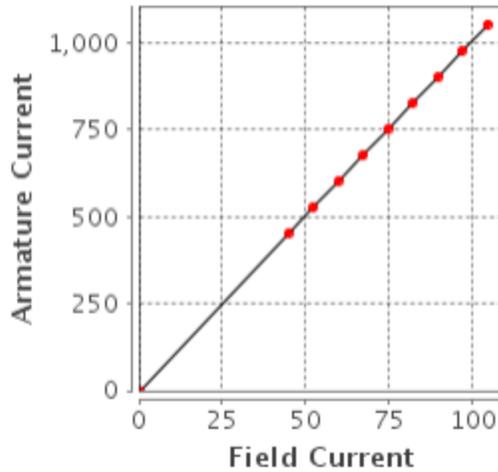
Field Current	Line - Line Volt
0.0	0
17.2	288
20.3	336
23.8	384
28.2	432
34.6	480
46.1	528
69.5	576
120.9	624
238.6	672



Short Circuit Curve

Short Circuit

Field Current	Armature Current
0.0	0
44.8	451
52.3	526
59.8	601
67.3	677
74.7	752
82.2	827
89.7	902
97.1	977
104.6	1,052



Selected Model

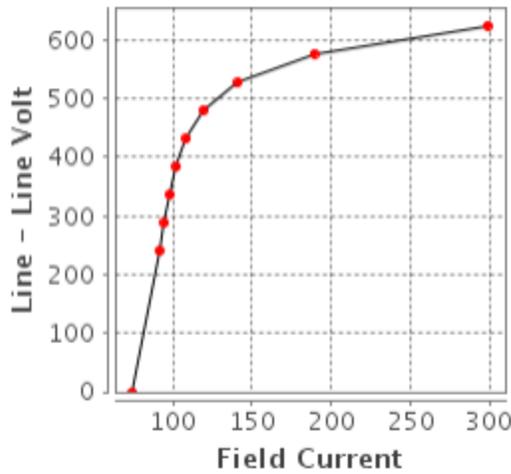
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Generator Output Characteristic Curves
Zero Power Factor Curve

Zero Power

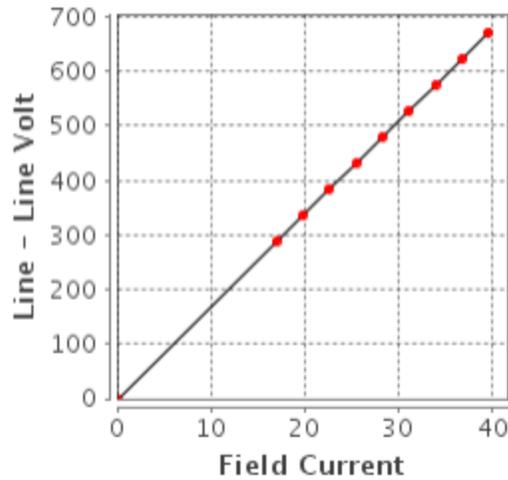
Field Current	Line - Line Volt
74.7	0
91.5	240
94.6	288
98.1	336
102.3	384
108.6	432
119.4	480
141.3	528
189.1	576
298.4	624



Air Gap Curve

Air Gap

Field Current	Line - Line Volt
0.0	0
17.0	288
19.8	336
22.6	384
25.5	432
28.3	480
31.1	528
34.0	576
36.8	624
39.6	672



Selected Model

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Reactive Capability Curve

[Click to view Chart](#)

Selected Model

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Frequency: 60	Excitation Type: AREP	Pwr. Factor: 0.8	Rated Current: 751.8
Duty: PRIME	Connection: SERIES STAR	Application: EPG	Status: Current

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General Information

GENERATOR INFORMATION (DM7900)

1. Motor Starting

Motor starting curves are obtained in accordance with IEC60034, and are displayed at 0.6 power factor.

2. Voltage Dip

Prediction of the generator synchronous voltage dip can be made by consulting the plot for the voltage dip value that corresponds to the desired motor starting kVA value.

3. Definitions

A) Generator Keys

Frame: abbreviation of generator frame size

Freq: frequency in hertz.

PP/SB: prime/standby duty respectively

Volts: line - line terminal voltage

kW: rating in electrical kilo watts

Model: engine sales model

B) Generator Temperature Rise

The indicated temperature rises are the IEC/NEMA limits for standby or prime power applications. The quoted rise figures are maximum limits only and are not necessarily indicative of the actual temperature rise of a given machine winding.

C) Center of Gravity

The specified center of gravity is for the generator only. For single bearing and double bearing close coupled generators, the center of gravity is measured from the generator/engine flywheel-housing interface and from the centreline of the rotor shaft.

For double bearing standalone generators, the center of gravity is measured from the end of the rotor shaft and from the centerline of the rotor shaft.

D) Generator Current Decrement Curves

The generator current decrement curve indicates the generator armature current arising from a symmetrical three-phase fault at the generator terminals. Generators equipped with AREP or PMG excitation systems will sustain 300% of rated armature current for 10 seconds.

E) Generator Efficiency Curves

The efficiency curve is displayed for the generator only under the given conditions of rating, voltage, frequency and power factor. This is not the overall generating set efficiency curve.

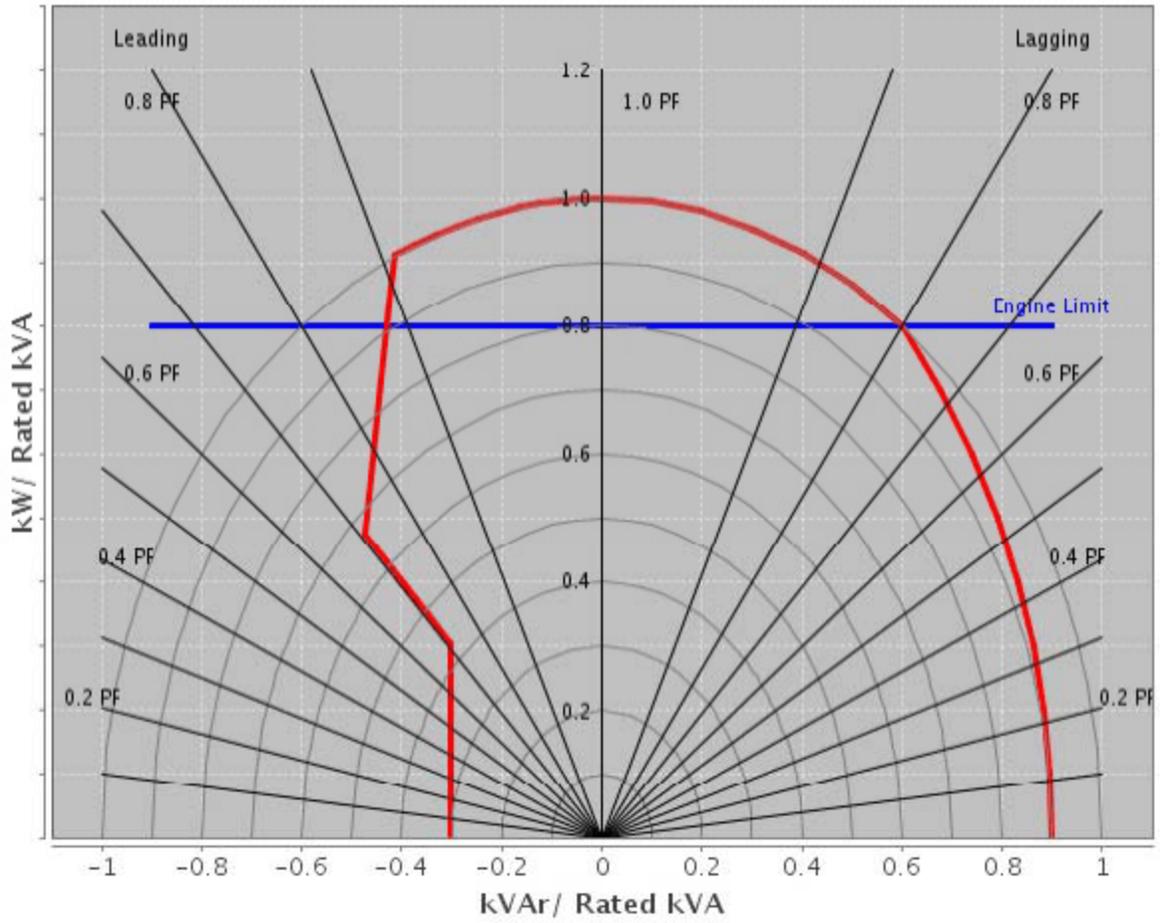
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Operating Chart





Warren CAT
15 North Meridian Avenue
Oklahoma City, Oklahoma 73127

ELECTRICAL DRAWINGS

NUMBER	TITLE	PAGE
368-4116	Diagram – Wiring (Leroy Winding Configs)	1 of 1

