GENERATOR DETAIL

(FTH15417)-ENGINE (LWL03276)-GENERATOR (LNA03995)-GENSET

SEPTEMBER 15, 2021

For Help Desk Phone Numbers Click here

Selected Model

Engine: C15	**Generator Frame:** A2985L4	**Genset Rating (kW):** 410.0	**Line Voltage:** 480
Fuel: Diesel	**Generator Arrangement:** 5029783	**Genset Rating (kVA):** 512.5	**Phase Voltage:** 277
Frequency: 60	**Excitation Type:** Permanent Magnet	**Pwr. Factor:** 0.8	**Rated Current:** 616.4
Duty: PRIME	**Connection:** SERIES STAR	**Application:** EPG	**Status:** Current

Version: 42789 /42741 /42856 /2897

Spec Information

Generator Specification

Frame: A2985L4 **Type:** SR500	**No. of Bearings:** 1
Winding Type: RANDOM WOUND	**Flywheel:** 14.0
Connection: SERIES STAR	**Housing:** 0.5
Phases: 3	**No. of Leads:** 12
Poles: 4	
Sync Speed: 1800	**Generator Pitch:** 0.6667

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	102.5	93.4
0.5	205.0	95.4
0.75	307.5	96.3
1.0	410.0	96.4
1.1	451.0	96.2

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1014	0.0456
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1555	0.0699
TRANSIENT - SATURATED X'_d	0.1107	0.0498
SYNCHRONOUS - DIRECT AXIS X_d	3.2949	1.4813
SYNCHRONOUS - QUADRATURE AXIS X_q	1.4547	0.6540
NEGATIVE SEQUENCE X_2	0.1268	0.0570
ZERO SEQUENCE X_0	0.0068	0.0030

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	2.4870
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.0840
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_{d0}	0.0033
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_d	0.0030
ARMATURE SHORT CIRCUIT T_a	0.0190

Short Circuit Ratio: 0.362	Stator Resistance = 0.0102 Ohms Field Resistance = 0.875 Ohms

Voltage Regulation	
Voltage level adjustment: +/-	5.0%
Voltage regulation, steady state: +/-	1.0%
Voltage regulation with 3% speed change: +/-	1.0%
Waveform deviation line - line, no load: less than	2.0%
Telephone influence factor: less than	50

Generator Excitation

	No Load	Full Load, (rated) pf
		Series
Excitation voltage:	12.0 Volts	33.05 Volts
Excitation current	1.0 Amps	3.41 Amps

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Generator Mechanical Information

Center of Gravity

Dimension X	-505.0 mm	-19.9 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

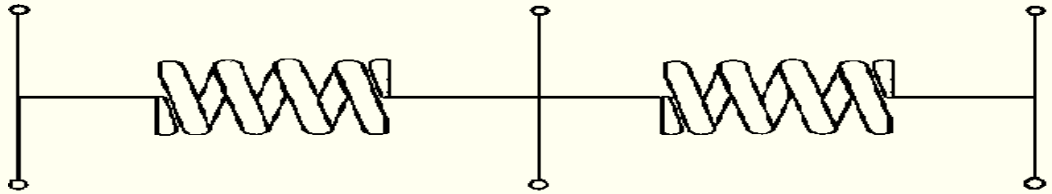
- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 1104 kg * Rotor WT = 421 kg * Stator WT = 530 kg
2,434 LB 928 LB 1,168 LB

Rotor Balance = 0.05 mm deflection PTP

Overspeed Capacity = 125% of synchronous speed

Generator Torsional Data



J1 = Coupling and Fan | **J2 = Rotor** | **J3 = Exciter End**

Total J

62.4 LB IN. s^2

7.05 N m s^2

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Generator Cooling Requirements - Temperature - Insulation Data

Cooling Requirements:		**Temperature Data: (Ambient 40 ^{0}C)**	
Heat Dissipated:	15.5 kW	**Stator Rise:**	105.0 ^{0}C
Air Flow:	65.8 m^3/min	**Rotor Rise:**	105.0 ^{0}C

Insulation Class: H

Insulation Reg. as shipped: 100.0 MΩ minimum at 40 ^{0}C

Thermal Limits of Generator

Frequency:	60 Hz
Line to Line Voltage:	480 Volts
B BR 80/40	485.0 kVA
Marine 90/50	485.0 kVA
F BR -105/40	545.7 kVA
H BR - 125/40	606.3 kVA
F PR - 130/40	606.3 kVA
H PR - 150/40	636.3 kVA
H PR27 - 163/27	667.5 kVA

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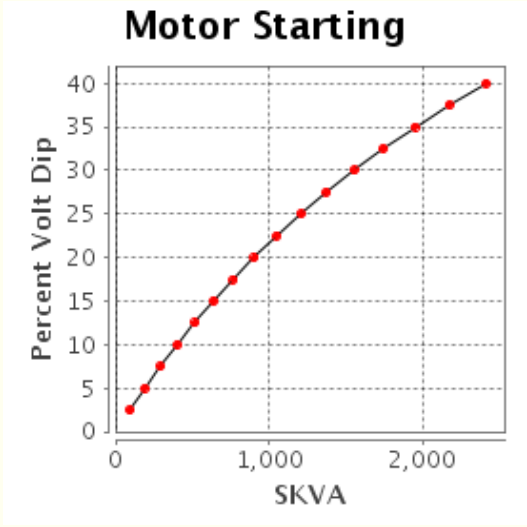
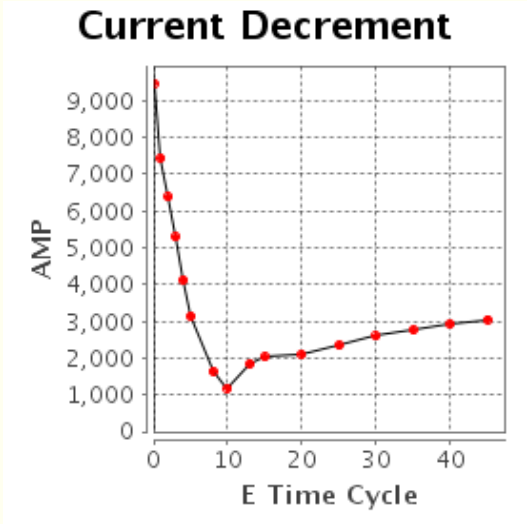
Starting Capability & Current Decrement
Motor Starting Capability (0.6 pf)

SKVA	Percent Volt Dip
93	2.5
191	5.0
294	7.5
403	10.0
518	12.5
639	15.0
769	17.5
906	20.0
1,052	22.5
1,208	25.0
1,374	27.5
1,553	30.0
1,745	32.5
1,951	35.0
2,174	37.5
2,416	40.0



Current Decrement Data

E Time Cycle	AMP
0.0	9,475
1.0	7,438
2.0	6,376
3.0	5,286
4.0	4,118
5.0	3,140
8.0	1,644
10.0	1,187
13.0	1,844
15.0	2,028
20.0	2,103
25.0	2,346
30.0	2,593
35.0	2,765
40.0	2,928
45.0	3,053



Instantaneous 3 Phase Fault Current: 9475 Amps

Instantaneous Line - Line Fault Current: 8243 Amps

Instantaneous Line - Neutral Fault Current: 12317 Amps

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GENERATOR INFORMATION (EM7980)

1.DUTY
Duty (rating type) refers to the package generator set not the generator. PP represents Prime, SB represents Standby.

2. EXCITATION TYPE
A) SE (Self Excited)
Voltage regulator and exciter are powered by voltage from generator output terminals. Excitation relies on residual magnetism in generator to start producing generator voltage to power exciter voltage.

B) AUX (Auxiliary Winding) or IE (Internally Excited)
Separate coils in stator to generate power for AVR and exciter. Generators equipped with AUX or IE excitation systems will sustain 300% of rated armature current for 10 seconds for 60 Hz and 250% of rated armature current for 10 seconds for 50 Hz.

C) PMG: Permanent Magnet Generator
Small, rotor mounted generator (permanently magnetized) provides power for voltage regulator and exciter. Generators equipped with PMG excitation systems will sustain 300% of rated armature current for 10 seconds for 60 Hz and 250% of rated armature current for 10 seconds f or 50 Hz.

3. CONNECTION TYPE
A) STAR (or WYE) 4, 6, 10, 12 lead design..

B) DELTA
6 or 12 lead generator. Phase coil groups connected in a triangular fa shion.

C) OPEN DELTA (or Zig-Zag)
6 or 12 lead generator, single-phase output only.12 lead maybe series connected or parallel connected. Provides line-to-line voltage connection and line-to-neutral (50% of L-L)

D) DOUBLE DELTA
12 lead generator, single-phase output. Two 6-wire Delta connections connected in series. Line-to-line voltage will be double that of the l ine-to-neutral voltage.

4. RESISTANCES
Coil resistance provided at 20Â°C. Stator resistance provided for main stator line to line coil.

5. ROTOR BALANCE
Maximum peak-to-peak shaft deflection.
6. HEAT DISSIPATED

Represents heat dissipated by generator only during steady state generator operation at the rating selected.

7. AIR FLOW
Represents air flow required for generator only.

8. TEMPERATURE â€“ INSULATION DATA
A) 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.

B) INSULATION RESISTANCE AS SHIPPED
This value is the minimum insulation resistance of generator stator. It is measured according to NEMA and IEC procedures using two times the rated voltage plus 1000 volts. Insulation of the rotor is also within this minimum. The rotor resistance is measured at 1500 volts.

9. THERMAL LIMITS OF GENERATOR
The generator thermal limits table indicates the various kVA ratings at which the generator temperature rise meets the predefined IEC/NEMA insulation limits for peak or base rated operation.

Generators (only) are specified as having a "base" rating (BR) or a "peak" rating (PR) (kVA or ekW). "Base" (or prime) ratings imply that the unit can run on a continual basis at the specified load point. "Peak" (or stand-by) ratings, as defined by IEC, allow temperature rises upto 25C above those for prime rated operation with a reduced insulation life.

10. MOTOR STARTING CAPABILITY
Motor starting curves are presented in accordance with NEMA/IEC.

A). The Motor starting curves predicts the maximum percent voltage dip at the generator terminals for a given starting KVA (SKVA) under the following conditions:
a. Generator is driven by a synchronous driver.
b. Assumes the induction motor inrush power factor is as listed.
c. A rotating exciter is used to supply excitation

B). Voltage Dip
Prediction of the generator synchronous voltage dip can be made by con sulting the plot for the voltage dip value that corresponds to the des ired motor starting kVA value.

The generator synchronous voltage dip is not equal to the generating set voltage dip upon load application, as the effect of the GENERATOR INFORMATION (EM7980)

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B). 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.

The generator synchronous voltage dip is not equal to the generating set voltage dip upon load application, as the effect of the engine has not been considered.

11. CURRENT DECREMENT
The displayed generator current decrement curve indicates the generator armature current arising from a symmetrical three-phase fault at the generator terminals.

12. REACTIVE CAPABILITY CURVE
The reactive capability curve illustrates the acceptable region within which the generator may operate while considering the thermal limits

of the rotor and stator windings. On this plot, the theoretical engine limit is displayed to further define the practical range of operation when considering the generator set package.

13. GENEARTOR EFFICIENCY CURVE

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 generator set efficiency curve. There is no consideration of engine or parasitic losseS.

Generator efficiency is the percentage of engine flywheel (or other prime mover) power that is converted into electrical output. The generator efficiency shown is calculated by the summation of all losses method, and is determined in accordance with the IEC Standard 60034.
