GENERATOR DATA

(AT400240)-ENGINE (BAA126422A)-CEM

SEPTEMBER 26, 2020

For Help Desk Phone Numbers Click here

Selected Model

Engine: 3406	**Generator Frame:** 447	**Genset Rating (kW):** 170.0	**Line Voltage:** 480
Fuel: Natural Gas	**Generator Arrangement:** 1938722	**Genset Rating (kVA):** 212.0	**Phase Voltage:** 277
Frequency: 60	**Excitation Type:** Permanent Magnet	**Pwr. Factor:** 0.8	**Rated Current:** 255.0
Duty: CONTINUOUS	**Connection:** SERIES STAR	**Application:** EPG	**Status:** Current

Version: 41205 /42996 /42996 /1965

Spec Information

Generator Specification

Frame: 447 **Type:** SR4	**No. of Bearings:** 1
Winding Type: RANDOM WOUND	**Flywheel:** 14.0
Connection: SERIES STAR	**Housing:** 1
Phases: 3	**No. of Leads:** 12
Poles: 4	**Wires per Lead:** 1
Sync Speed: 1800	**Generator Pitch:** 0.75

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	42.5	90.2
0.5	85.0	93.7
0.75	127.5	95.4
1.0	170.0	96.0
1.1	187.0	96.1

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1047	0.1135
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1211	0.1313
TRANSIENT - SATURATED X'_d	0.1849	0.2005
SYNCHRONOUS - DIRECT AXIS X_d	1.9642	2.1297
SYNCHRONOUS - QUADRATURE AXIS X_q	1.1645	1.2626
NEGATIVE SEQUENCE X_2	0.1129	0.1224
ZERO SEQUENCE X_0	0.0386	0.0419

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	1.7410
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.1640
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_{d0}	0.0044
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_d	0.0036
OPEN CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_{q0}	0.0046
SHORT CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_q	0.0038
EXCITER TIME CONSTANT T_e	0.1144
ARMATURE SHORT CIRCUIT T_a	0.0212

Short Circuit Ratio: 0.69	Stator Resistance = 0.0295 Ohms Field Resistance = 1.015 Ohms

Voltage Regulation

Voltage level adjustment: +/-	5.0%
Voltage regulation, steady state: +/-	0.5%
Voltage regulation with 3% speed change: +/-	0.5%
Waveform deviation line - line, no load: less than	5.0%
Telephone influence factor: less than	50

Generator Excitation

	No Load	Full Load, (rated) pf	
		Series	Parallel
Excitation voltage:	8.56 Volts	25.81 Volts	Volts
Excitation current	1.9 Amps	4.71 Amps	Amps

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Generator Mechanical Information

Center of Gravity

Dimension X	-556.3 mm	-21.9 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

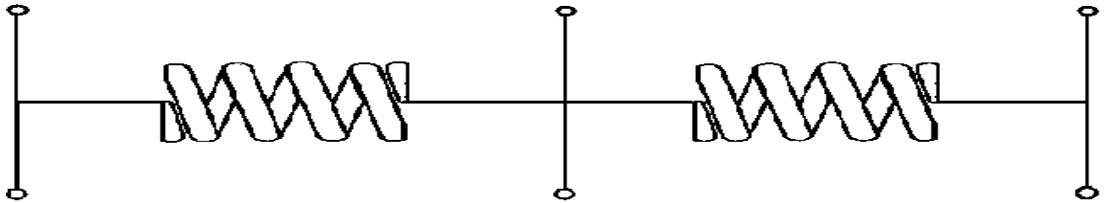
- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 767 kg	* Rotor WT = 287 kg	* Stator WT = 481 kg
1,691 LB	633 LB	1,060 LB

Rotor Balance = 0.0508 mm deflection PTP

Overspeed Capacity = 150% of synchronous speed

Generator Torsional Data



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

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
1.8 LB IN. s^2	36.9 MLB IN./rad	3.8 IN.	22.0 LB IN. s^2	14.9 MLB IN./rad	2.5 IN.	0.7 LB IN. s^2
0.206 N m s^2	4.17 MN m/rad	96.5 mm	2.487 N m s^2	1.68 MN m/rad	63.5 mm	0.081 N m s^2

Total J

24.6 LB IN. s^2

2.774 N m s^2

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Generator Cooling Requirements - Temperature - Insulation Data

Cooling Requirements:		Temperature Data: (Ambient 40 ^{0}C)	
Heat Dissipated:	7.1 kW	**Stator Rise:**	80.0 ^{0}C
Air Flow:	64.2 m^3/min	**Rotor Rise:**	80.0 ^{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	259.0 kVA
F BR -105/40	313.0 kVA
H BR - 125/40	344.0 kVA
F PR - 130/40	344.0 kVA

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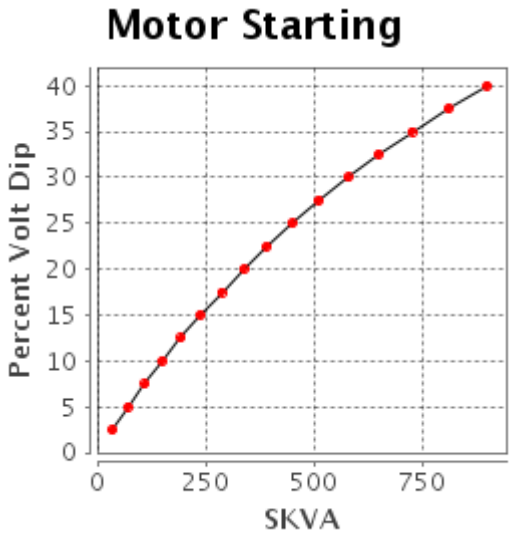
Starting Capability & Current Decrement

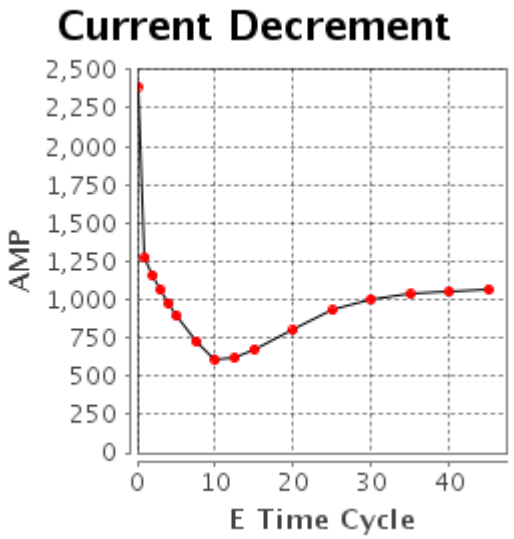
Motor Starting Capability (0.4 pf)

SKVA	Percent Volt Dip
35	2.5
71	5.0
110	7.5
150	10.0
193	12.5
238	15.0
287	17.5
338	20.0
392	22.5
450	25.0
512	27.5
579	30.0
650	32.5
727	35.0
811	37.5
901	40.0



Current Decrement Data

E Time Cycle	AMP
0.0	2,392
1.0	1,274
2.0	1,157
3.0	1,061
4.0	974
5.0	895
7.5	730
10.0	605
12.5	620
15.0	675
20.0	801
25.0	929
30.0	1,004
35.0	1,035
40.0	1,051
45.0	1,064



Instantaneous 3 Phase Fault Current: 2392 Amps

Instantaneous Line - Line Fault Current: 1993 Amps

Instantaneous Line - Neutral Fault Current: 2931 Amps

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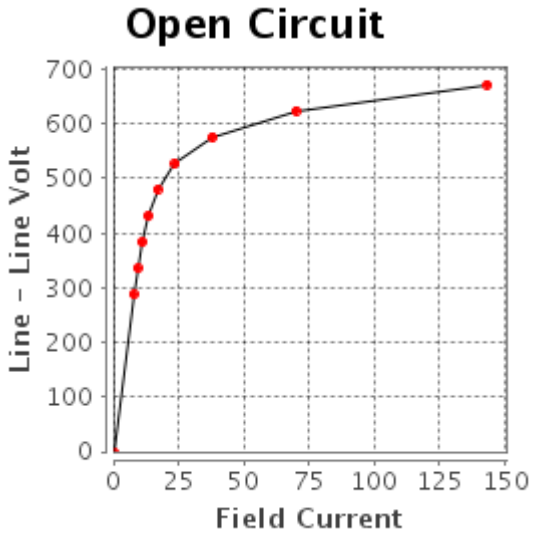
Generator Output Characteristic Curves

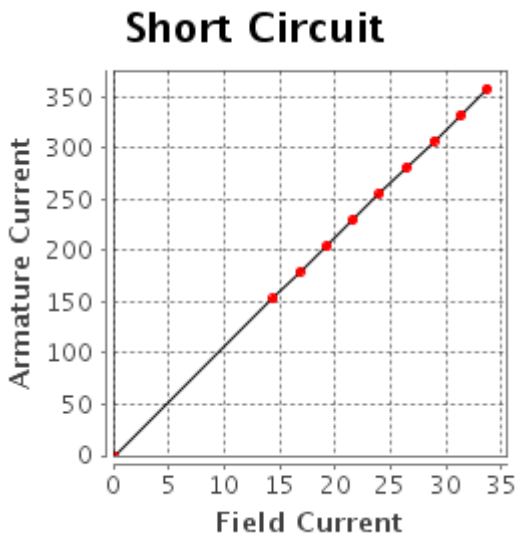
Open Circuit Curve

Field Current	Line - Line Volt
0.0	0
7.8	288
9.3	336
11.0	384
13.3	432
16.9	480
23.7	528
38.0	576
69.9	624
143.2	672



Short Circuit Curve

Field Current	Armature Current
0.0	0
14.4	153
16.8	179
19.2	204
21.6	230
24.0	256
26.4	281
28.9	307
31.3	332
33.7	358



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Application: EPG

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Phase Voltage: 277
Rated Current: 255.0
Status: Current
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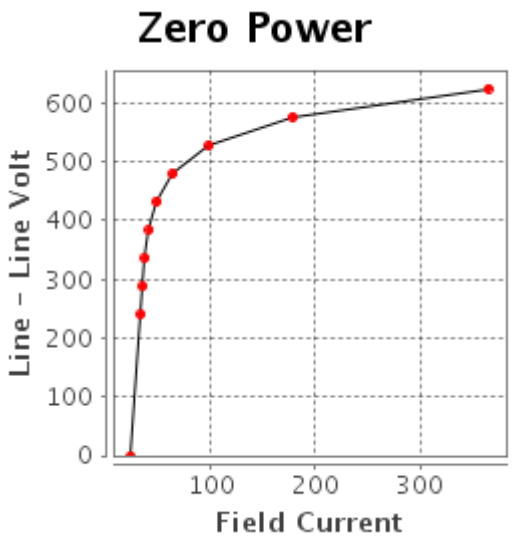
Generator Output Characteristic Curves

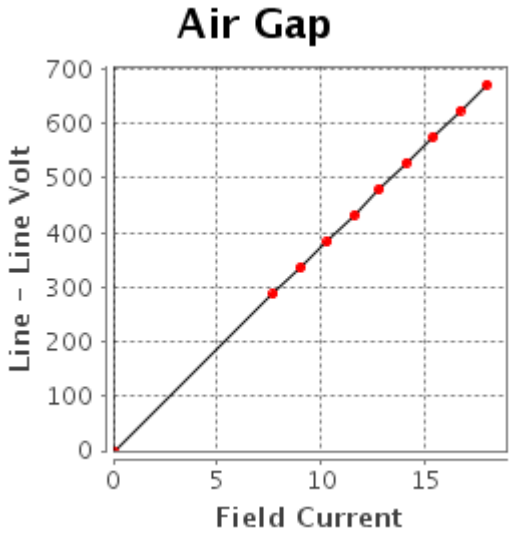
Zero Power Factor Curve

Field Current	Line - Line Volt
24.0	0
33.2	240
35.0	288
37.4	336
41.3	384
48.6	432
64.1	480
98.7	528
178.6	576
364.6	624



Air Gap Curve

Field Current	Line - Line Volt
0.0	0
7.7	288
9.0	336
10.3	384
11.6	432
12.8	480
14.1	528
15.4	576
16.7	624
18.0	672



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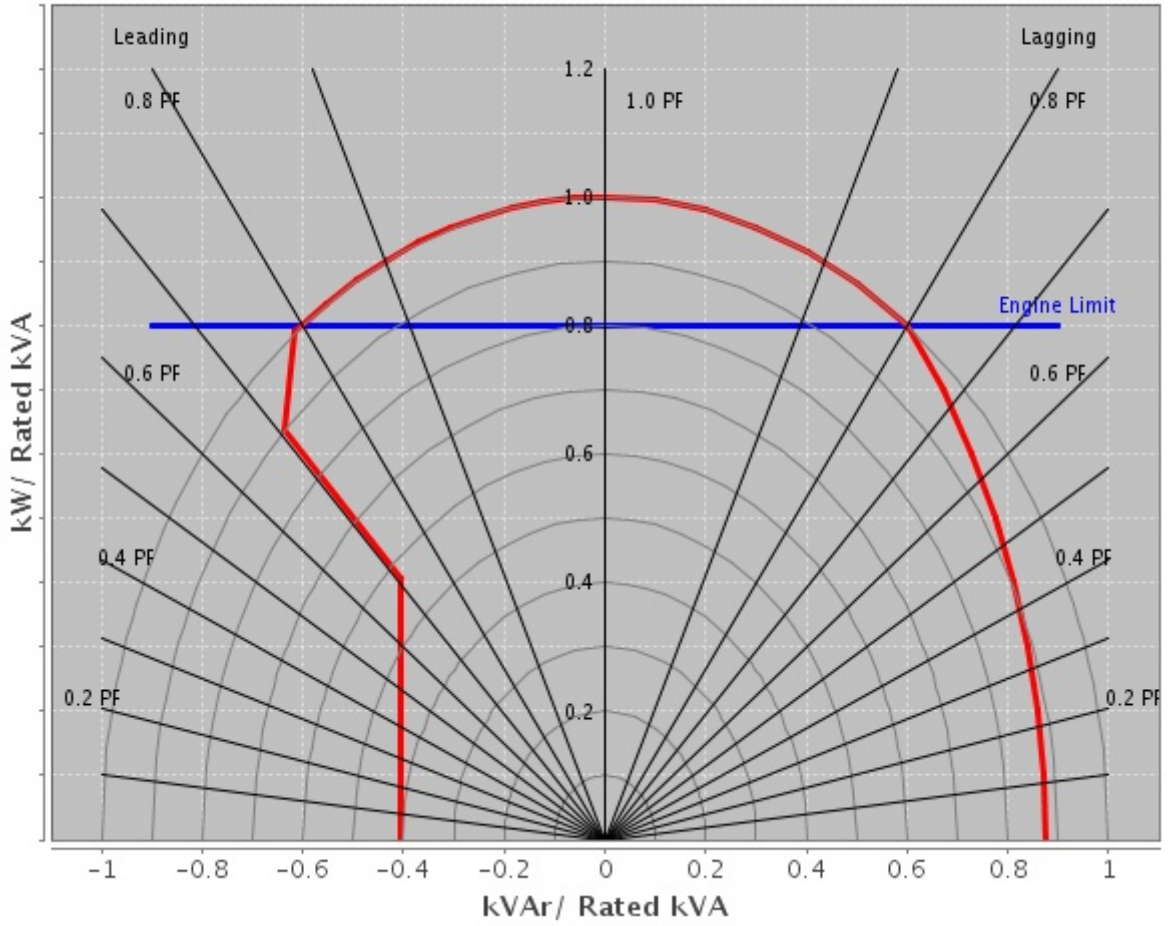
Reactive Capability Curve

Operating Chart



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General Information

DM7823 Caterpillar SR4 Generators (50 Hz, 60 Hz)
Data for 360, 440, 580, 680 and 800 frames Caterpillar SR4 generators built by Leroy Somer - USA (and predecessors).

Refer to DM7821 for explanation of all generator data in Technical Marketing Information (TMI) except generator efficiency for which the explanation is given below.

GENERATOR EFFICIENCY
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. The efficiency considers only the generator. There is no consideration of engine or parasitic losses here.