

# GENERATOR DETAIL

(LYM01833)-ENGINE (G7G05751)-GENERATOR

MARCH 01, 2021

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## Selected Model

**Engine:** 3516    **Generator Frame:** 1844    **Genset Rating (kW):** 2500.0    **Line Voltage:** 480  
**Fuel:** Diesel    **Generator Arrangement:** 3723056    **Genset Rating (kVA):** 3125.0    **Phase Voltage:** 277  
**Frequency:** 60    **Excitation Type:** Permanent Magnet    **Pwr. Factor:** 0.8    **Rated Current:** 3758.8  
**Duty:** PRIME    **Connection:** SERIES STAR    **Application:** EPG    **Status:** Current

Version: 41205 /40749 /42670 /12005

## Spec Information

Generator Specification		Generator Efficiency			
Frame: 1844	Type: SR5	No. of Bearings: 2	Per Unit Load	kW	Efficiency %
Winding Type: FORM WOUND		Flywheel: 21.0	0.25	625.0	92.8
Connection: SERIES STAR		Housing: 00	0.5	1250.0	95.3
Phases: 3		No. of Leads: 6	0.75	1875.0	95.8
Poles: 4		Wires per Lead: 8	1.0	2500.0	95.7
Sync Speed: 1800		Generator Pitch: 0.6667	1.1	2750.0	95.6

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS $X''_d$	0.1194	0.0088
SUBTRANSIENT - QUADRATURE AXIS $X''_q$	0.1139	0.0084
TRANSIENT - SATURATED $X'_d$	0.1804	0.0133
SYNCHRONOUS - DIRECT AXIS $X_d$	2.8673	0.2114
SYNCHRONOUS - QUADRATURE AXIS $X_q$	1.2709	0.0937
NEGATIVE SEQUENCE $X_2$	0.1166	0.0086
ZERO SEQUENCE $X_0$	0.0081	0.0006

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS $T'_{d0}$	5.3930
SHORT CIRCUIT TRANSIENT - DIRECT AXIS $T'_d$	0.3395
OPEN CIRCUIT SUBTRANSIENT - DIRECT AXIS $T''_{d0}$	0.0079
SHORT CIRCUIT SUBTRANSIENT - DIRECT AXIS $T''_d$	0.0066
OPEN CIRCUIT SUBTRANSIENT - QUADRATURE AXIS $T''_{q0}$	0.0071
SHORT CIRCUIT SUBTRANSIENT - QUADRATURE AXIS $T''_q$	0.0060
EXCITER TIME CONSTANT $T_e$	0.2580
ARMATURE SHORT CIRCUIT $T_a$	0.0414

Short Circuit Ratio: 0.48	Stator Resistance = 0.0012 Ohms	Field Resistance = 0.9703 Ohms
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Voltage Regulation		Generator Excitation		
		No Load	Full Load, (rated) pf	
			Series	Parallel
Voltage level adjustment: +/-	5.0%			
Voltage regulation, steady state: +/-	0.5%			
Voltage regulation with 3% speed change: +/-	0.5%	Excitation voltage:	12.98 Volts	52.73 Volts    Volts
Waveform deviation line - line, no load: less than	3.0%	Excitation current	1.19 Amps	3.99 Amps    Amps
Telephone influence factor: less than	50			

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### Generator Mechanical Information

Center of Gravity		
Dimension X	-1145.5 mm	-45.1 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 = 4938 kg	* Rotor WT = 1835 kg	* Stator WT = 2452 kg
10,886 LB	4,045 LB	5,406 LB

Rotor Balance = 0.0508 mm deflection PTP  
Overspeed Capacity = 125% 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
30.1 LB IN. s <sup>2</sup>	61.3 MLB IN./rad	5.0 IN.	557.6 LB IN. s <sup>2</sup>	58.4 MLB IN./rad	3.8 IN.	3.8 LB IN. s <sup>2</sup>
3.397 N m s <sup>2</sup>	6.93 MN m/rad	127.0 mm	63.0 N m s <sup>2</sup>	6.6 MN m/rad	96.5 mm	0.43 N m s <sup>2</sup>
<b>Total J</b>						
			591.5 LB IN. s <sup>2</sup>			
			66.827 N m s <sup>2</sup>			

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Generator Cooling Requirements - Temperature - Insulation Data	
<b>Cooling Requirements:</b>	<b>Temperature Data: (Ambient 40 °C)</b>
<b>Heat Dissipated:</b> 112.3 kW	<b>Stator Rise:</b> 125.0 °C
<b>Air Flow:</b> 199.2 m <sup>3</sup> /min	<b>Rotor Rise:</b> 125.0 °C
<b>Insulation Class: H</b>	
<b>Insulation Reg. as shipped: 100.0 MΩ minimum at 40 °C</b>	
Thermal Limits of Generator	
<b>Frequency:</b>	60 Hz
<b>Line to Line Voltage:</b>	480 Volts
<b>B BR 80/40</b>	2500.0 kVA
<b>F BR -105/40</b>	2844.0 kVA
<b>H BR - 125/40</b>	3125.0 kVA
<b>F PR - 130/40</b>	3125.0 kVA
<b>H PR - 150/40</b>	3438.0 kVA

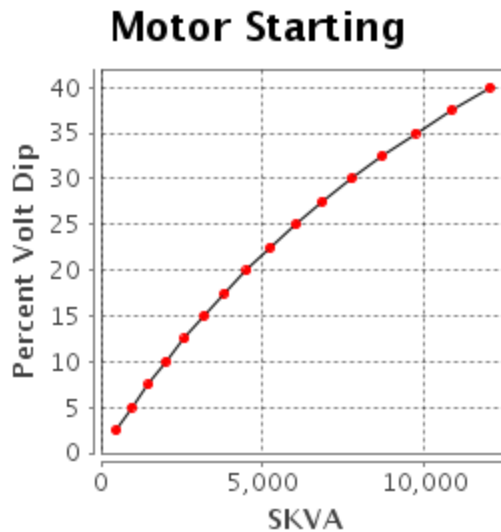
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### Starting Capability & Current Decrement Motor Starting Capability (0.4 pf)

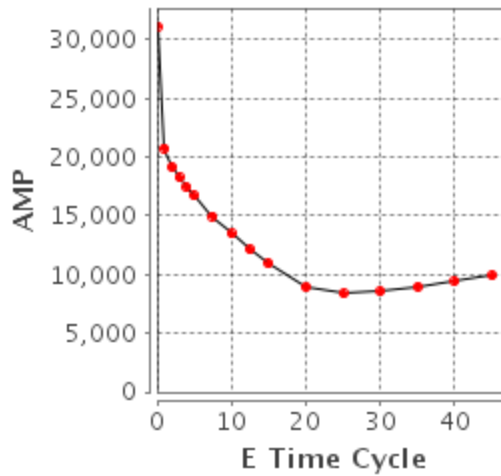
SKVA	Percent Volt Dip
463	2.5
950	5.0
1,464	7.5
2,006	10.0
2,579	12.5
3,185	15.0
3,829	17.5
4,513	20.0
5,240	22.5
6,017	25.0
6,847	27.5
7,736	30.0
8,691	32.5
9,719	35.0
10,830	37.5
12,034	40.0



**Current Decrement Data**

E Time Cycle	AMP
0.0	31,132
1.0	20,768
2.0	19,122
3.0	18,234
4.0	17,442
5.0	16,692
7.5	14,973
10.0	13,452
12.5	12,107
15.0	10,917
20.0	8,934
25.0	8,359
30.0	8,564
35.0	8,968
40.0	9,431
45.0	9,915

**Current Decrement**



**Instantaneous 3 Phase Fault Current: 31132 Amps**

**Instantaneous Line - Line Fault Current: 27270 Amps**

**Instantaneous Line - Neutral Fault Current: 45568 Amps**

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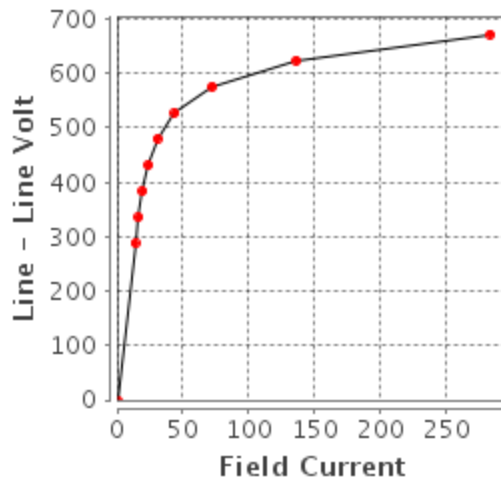
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**Generator Output Characteristic Curves  
Open Circuit Curve**

**Open Circuit**

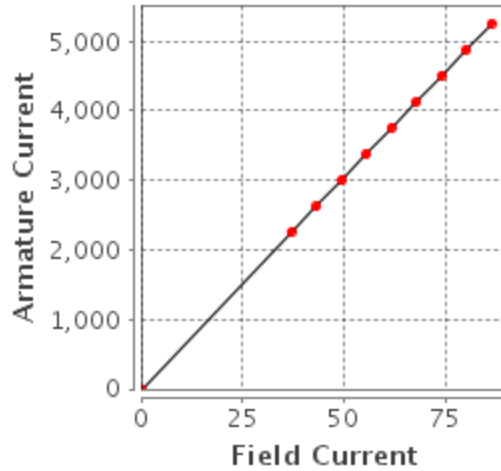
Field Current	Line - Line Volt
0.0	0
13.7	288
16.3	336
19.4	384
23.7	432
30.6	480
44.0	528
72.4	576
136.3	624
283.6	672



## Short Circuit Curve

### Short Circuit

Field Current	Armature Current
0.0	0
37.0	2,255
43.2	2,631
49.4	3,007
55.5	3,383
61.7	3,759
67.9	4,135
74.1	4,511
80.2	4,886
86.4	5,262



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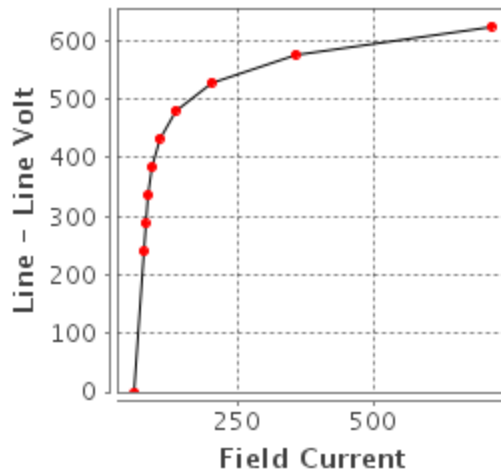
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## Generator Output Characteristic Curves

### Zero Power Factor Curve

### Zero Power

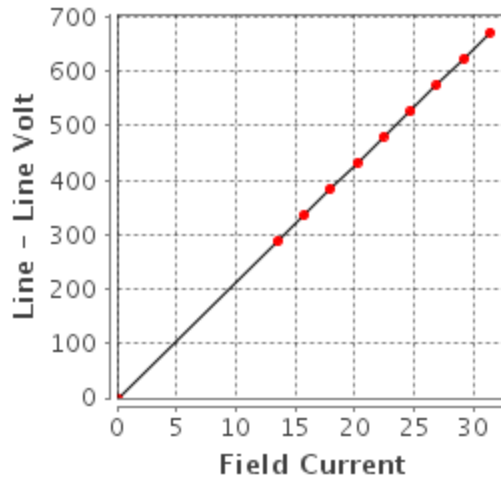
Field Current	Line - Line Volt
61.7	0
77.7	240
80.9	288
85.2	336
92.4	384
106.3	432
135.8	480
202.4	528
356.0	576
714.8	624



### Air Gap Curve

## Air Gap

Field Current	Line - Line Volt
0.0	0
13.5	288
15.7	336
17.9	384
20.2	432
22.4	480
24.7	528
26.9	576
29.2	624
31.4	672



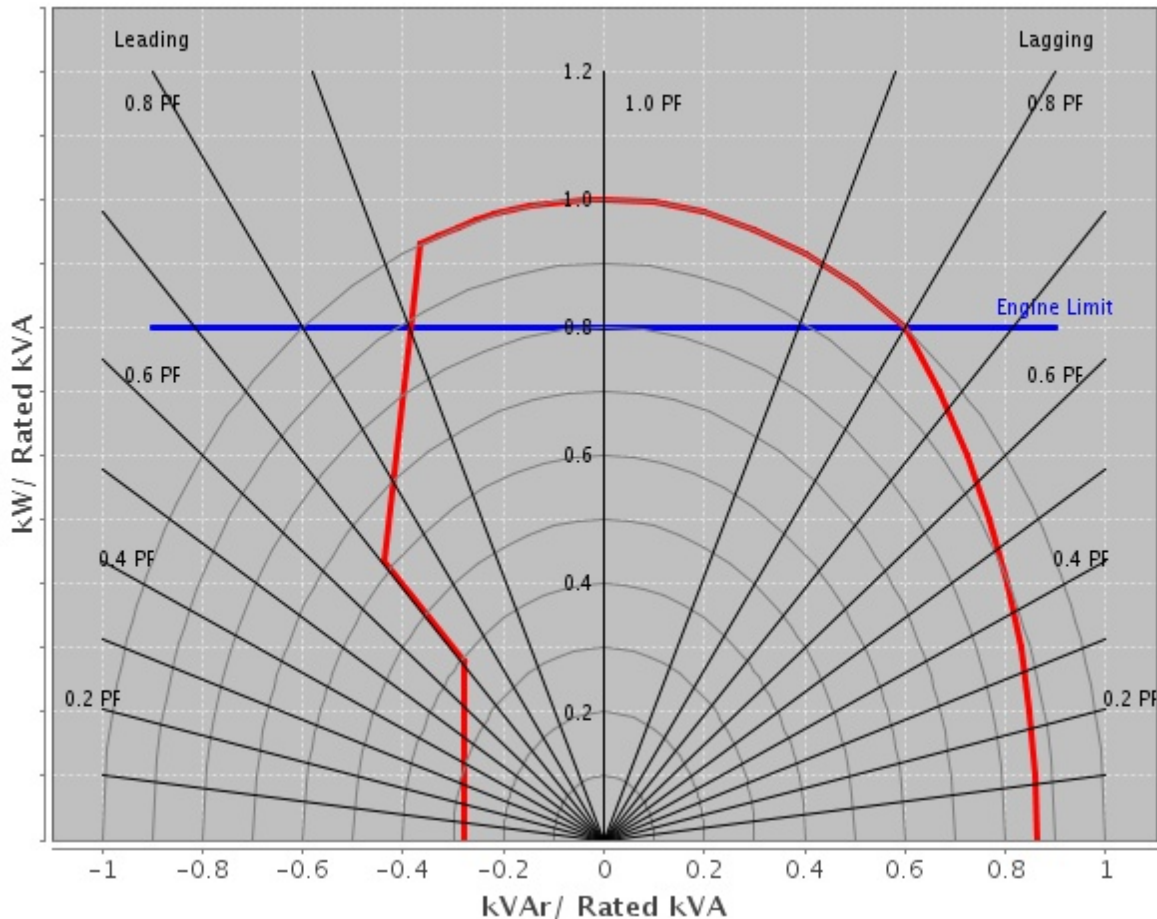
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### Reactive Capability Curve

## Operating Chart



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### General Information

DM7825 Caterpillar SR5 Generators (50 Hz, 60 Hz)  
Data for 1400, 1600, 1700, 1800 and 1900 frames Caterpillar SR5  
generators built by Leroy Somer - USA and Leroy Somer - France.

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.

Refer to DM7829 for low and medium voltage protective setting values a  
nd limits.

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