

GENERATOR DATA

MAY 14, 2019

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Selected Model

Engine: 3520 Generator Frame: 827 Genset Rating (kW): 2050.0 Line Voltage: 480
 Fuel: Natural Gas Generator Arrangement: 1441828 Genset Rating (kVA): 2562.0 Phase Voltage: 277
 Frequency: 60 Excitation Type: Permanent Magnet Pwr. Factor: 0.8 Rated Current: 3081.6
 Duty: CONTINUOUS Connection: SERIES STAR Application: EPG Status: Current

Version:
41205 /42039 /41036 /10263

Spec Information

| Generator Specification | | Generator Efficiency | | | |
|--------------------------|-------------------------|----------------------|---------------|--------|--------------|
| Frame: 827 | Type: SR4B | No. of Bearings: 2 | Per Unit Load | kW | Efficiency % |
| Winding Type: FORM WOUND | Flywheel: 21.0 | | 0.25 | 512.5 | 92.6 |
| Connection: SERIES STAR | Housing: 00 | | 0.5 | 1025.0 | 95.3 |
| Phases: 3 | No. of Leads: 6 | | 0.75 | 1537.5 | 96.0 |
| Poles: 4 | Wires per Lead: 8 | | 1.0 | 2050.0 | 96.1 |
| Sync Speed: 1800 | Generator Pitch: 0.6667 | | 1.1 | 2255.0 | 96.1 |

| Reactances | Per Unit | Ohms |
|---|----------|--------|
| SUBTRANSIENT - DIRECT AXIS X' _d | 0.1412 | 0.0127 |
| SUBTRANSIENT - QUADRATURE AXIS X'' _q | 0.1324 | 0.0119 |
| TRANSIENT - SATURATED X' _d | 0.2258 | 0.0203 |
| SYNCHRONOUS - DIRECT AXIS X _d | 3.1931 | 0.2871 |
| SYNCHRONOUS - QUADRATURE AXIS X _q | 1.5115 | 0.1359 |
| NEGATIVE SEQUENCE X ₂ | 0.1368 | 0.0123 |
| ZERO SEQUENCE X ₀ | 0.0367 | 0.0033 |
| Time Constants | Seconds | |
| OPEN CIRCUIT TRANSIENT - DIRECT AXIS T' _{d0} | 6.8880 | |
| SHORT CIRCUIT TRANSIENT - DIRECT AXIS T' _d | 0.4864 | |
| OPEN CIRCUIT SUBTRANSIENT - DIRECT AXIS T'' _{d0} | 0.0078 | |
| SHORT CIRCUIT SUBTRANSIENT - DIRECT AXIS T'' _d | 0.0069 | |
| OPEN CIRCUIT SUBTRANSIENT - QUADRATURE AXIS T'' _{q0} | 0.0062 | |
| SHORT CIRCUIT SUBTRANSIENT - QUADRATURE AXIS T'' _q | 0.0056 | |
| EXCITER TIME CONSTANT T _e | 0.2225 | |
| ARMATURE SHORT CIRCUIT T _a | 0.0573 | |

| | | |
|---|---------------------------------|--|
| Short Circuit Ratio: 0.39 | Stator Resistance = 0.0010 Ohms | Field Resistance = 1.17 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: 7.11 Volts 32.13 Volts Volts |
| Waveform deviation line - line, no load: less than 3.0% | Excitation current 1.87 Amps | 6.96 Amps Amps |
| Telephone influence factor: less than | 50 | |

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Generator Mechanical Information

Center of Gravity

| | | |
|-----------------|------------|-------|
| Dimension X | -1051.6 mm | -41.4 |
| 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 = 5289 kg * Rotor WT = 2062 kg * Stator WT = 3227 kg

11,660 LB 4,546 LB 7,114 LB

Rotor Balance = 0.0508 mm deflection PTP

Overspeed Capacity — 150% 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 |
|-----------------------------|------------------|-----------------|-----------------------------|------------------|-----------------|---------------------------|
| 62.0 LB IN. s ² | 56.6 MLB IN./rad | 5.0 IN. | 779.4 LB IN. s ² | 48.7 MLB IN./rad | 3.8 IN. | 3.3 LB IN. s ² |
| 7.0 N m s ² | 6.4 MN m/rad | 127.0 mm | 88.063 N m s ² | 5.5 MN m/rad | 96.5 mm | 0.371 N m s ² |
| Total J | | | | | | |
| 844.7 LB IN. s ² | | | | | | |
| 95.434 N m s ² | | | | | | |

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| Generator Cooling Requirements - Temperature - Insulation Data | |
|---|-----------------------------------|
| Cooling Requirements: | Temperature Data: (Ambient 40 °C) |
| Heat Dissipated: 83.2 kW | Stator Rise: 105.0 °C |
| Air Flow: 168.0 m ³ /min | Rotor Rise: 105.0 °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 | 2360.0 kVA |
| F BR -105/40 | 2844.0 kVA |
| H BR - 125/40 | 3125.0 kVA |
| F PR - 130/40 | 3125.0 kVA |

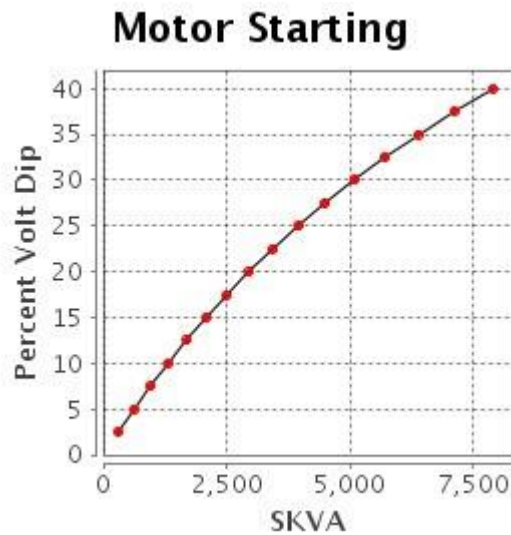
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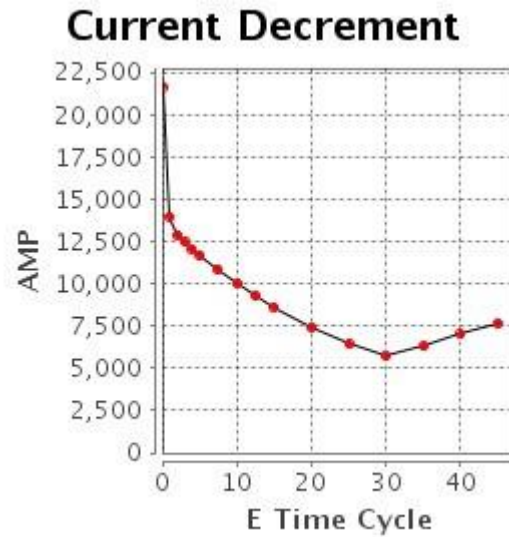
Starting Capability & Current Decrement
Motor Starting Capability (0.4 pf)

| SKVA | Percent Volt Dip |
|-------|------------------|
| 304 | 2.5 |
| 623 | 5.0 |
| 960 | 7.5 |
| 1,315 | 10.0 |
| 1,691 | 12.5 |
| 2,089 | 15.0 |
| 2,511 | 17.5 |
| 2,959 | 20.0 |
| 3,437 | 22.5 |
| 3,946 | 25.0 |
| 4,490 | 27.5 |
| 5,073 | 30.0 |
| 5,699 | 32.5 |
| 6,374 | 35.0 |
| 7,102 | 37.5 |
| 7,891 | 40.0 |



Current Decrement Data

| E Time Cycle | AMP |
|--------------|--------|
| 0.0 | 21,662 |
| 1.0 | 13,978 |
| 2.0 | 12,902 |
| 3.0 | 12,447 |
| 4.0 | 12,059 |
| 5.0 | 11,688 |
| 7.5 | 10,818 |
| 10.0 | 10,018 |
| 12.5 | 9,285 |
| 15.0 | 8,611 |
| 20.0 | 7,425 |
| 25.0 | 6,427 |
| 30.0 | 5,720 |
| 35.0 | 6,291 |
| 40.0 | 7,004 |
| 45.0 | 7,667 |



Instantaneous 3 Phase Fault Current: 21662 Amps Instantaneous Line - Line Fault Current: 19058 Amps
 Instantaneous Line - Neutral Fault Current: 29166 Amps

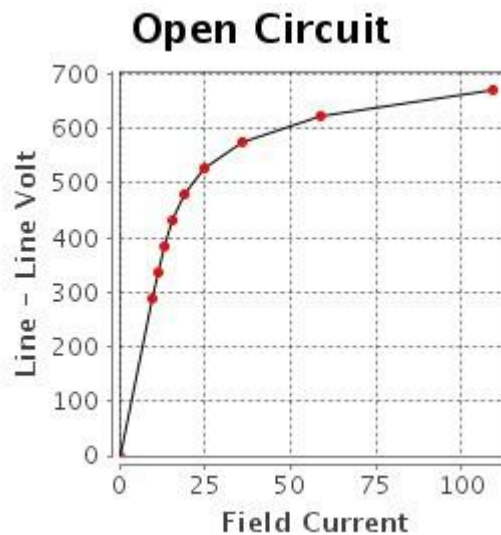
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Generator Output Characteristic Curves
 Open Circuit Curve

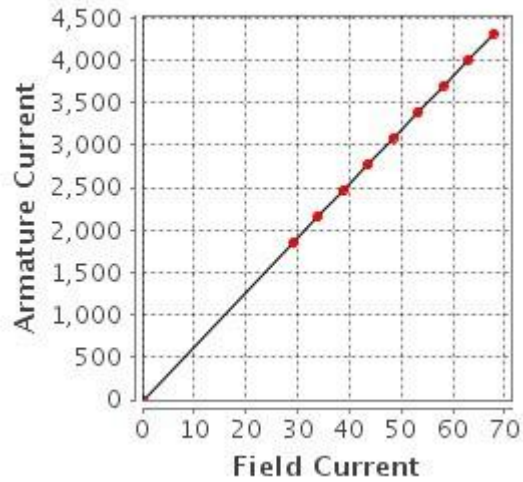
| Field Current | Line - Line Volt |
|---------------|------------------|
| 0.0 | 0 |
| 9.6 | 288 |
| 11.4 | 336 |
| 13.3 | 384 |
| 15.7 | 432 |
| 19.1 | 480 |
| 24.9 | 528 |
| 35.9 | 576 |
| 58.9 | 624 |
| 109.3 | 672 |



Short Circuit Curve

Short Circuit

| Field Current | Armature Current |
|---------------|------------------|
| 0.0 | 0 |
| 29.1 | 1,849 |
| 33.9 | 2,158 |
| 38.7 | 2,466 |
| 43.6 | 2,774 |
| 48.4 | 3,082 |
| 53.3 | 3,390 |
| 58.1 | 3,699 |
| 63.0 | 4,007 |
| 67.8 | 4,315 |



Selected Model

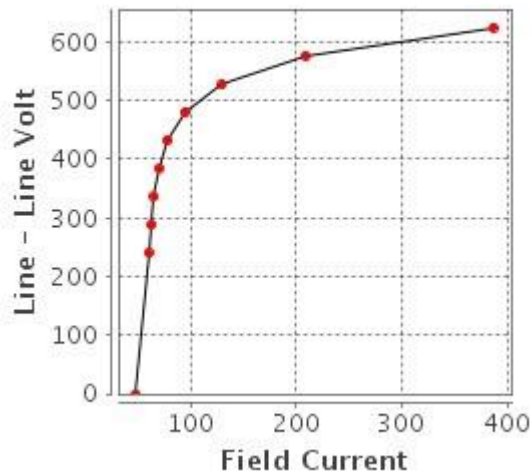
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Generator Output Characteristic Curves
Zero Power Factor Curve

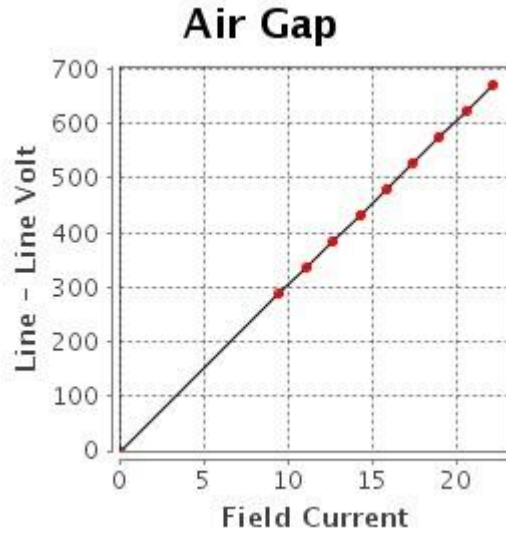
Zero Power

| Field Current | Line - Line Volt |
|---------------|------------------|
| 48.4 | 0 |
| 60.3 | 240 |
| 62.5 | 288 |
| 65.4 | 336 |
| 69.9 | 384 |
| 78.1 | 432 |
| 94.6 | 480 |
| 130.2 | 528 |
| 209.2 | 576 |
| 386.8 | 624 |



Air Gap Curve

| Field Current | Line - Line Volt |
|---------------|------------------|
| 0.0 | 0 |
| 9.5 | 288 |
| 11.1 | 336 |
| 12.7 | 384 |
| 14.3 | 432 |
| 15.9 | 480 |
| 17.4 | 528 |
| 19.0 | 576 |
| 20.6 | 624 |
| 22.2 | 672 |



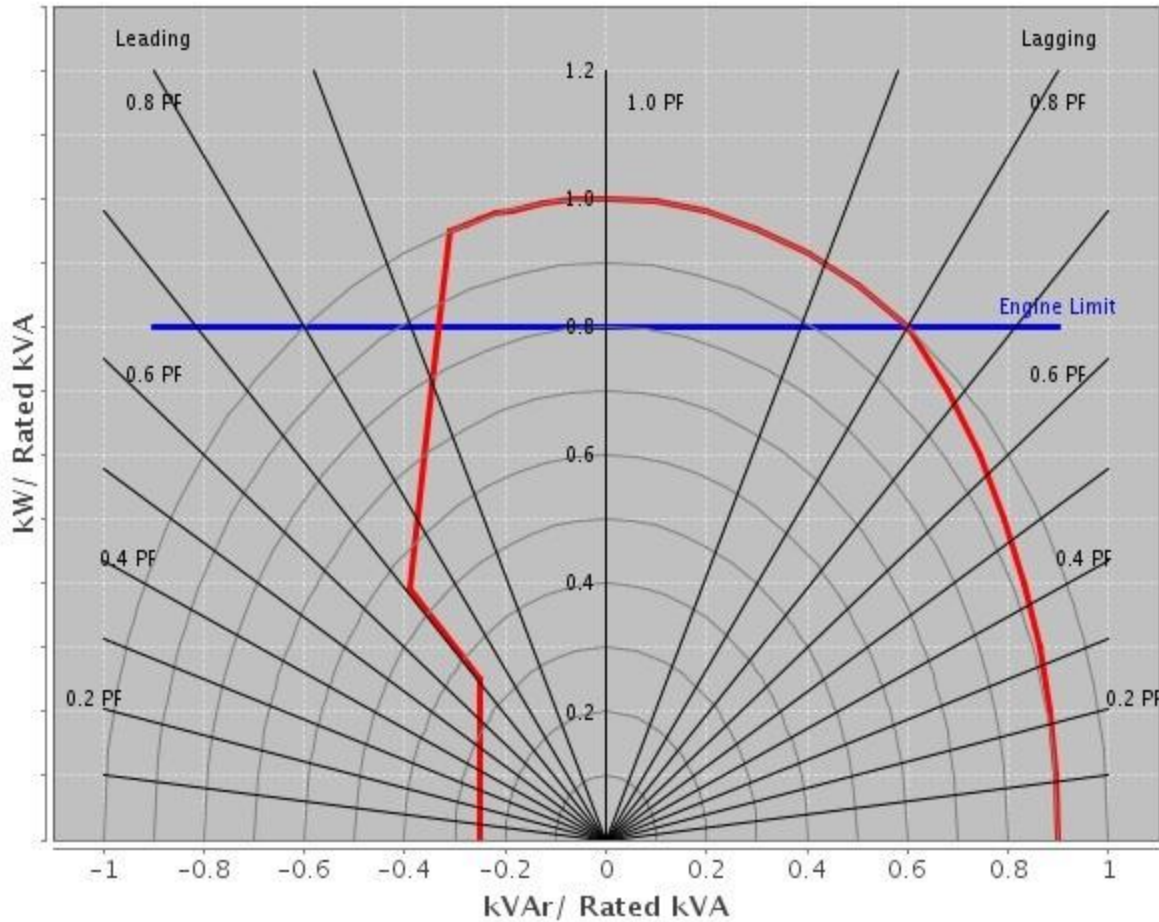
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Reactive Capability Curve

Operating Chart



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| | | | |
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General Information

DM7824 Caterpillar SR4B Generators (50 Hz, 60 Hz)
Data for 360s, 440s, 450s, 490, 590, 660, 690, 820 and 860 frames.
Caterpillar SR4B generators built by Leroy Somer-USA(& 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.

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Internal Information

| | | |
|----------------------|-------------------------|-----------------------|
| Max Block Load : 0.0 | Max Motor Load : 0.0 | Max Single Step : 0.0 |
| Block Kg : 0.065 | Motor Kg : 0.084 | KVA Derate : 2844.0 |
| Derate Code : BR | Temperature Rise: 105.0 | Target ekW: 2050.0 |