Generator Data July 02,2026

For Help Desk Phone Numbers Click here

Spec Info Mechanical Data Cooling Data Motor Starting Curve Open Circuit Curve
Zero Power Factor Curve Reactive Capability Chart General Information

Selected Model

Engine: 3406 **Generator Frame:** 450 **Genset Rating (kW):** 400.0 **Line Voltage:** 480
Fuel: Diesel **Generator Arrangement:** 1415530 **Genset Rating (kVA):** 500.0 **Phase Voltage:** 277
Frequency: 60 **Excitation Type:** Self Excited **Pwr. Factor:** 0.8 **Rated Current:** 601.4
Duty: STANDBY **Connection:** SERIES STAR **Application:** EPG **Status:** Current
Version: 39094 /38433 /38261 /11204

Spec Information

Generator Specification

Frame: 450 **Type:** SR4 **No. of Bearings:** 1
Winding Type: RANDOM WOUND **Flywheel:** 14
Connection: SERIESSTAR **Housing:** 1
Phases: 3 **No. of Leads:** 12
Poles: 4 **Wires per Lead:** 2
Sync Speed: 1800 **Generator Pitch:** 0.75

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	100	92.5
0.5	200	94.9
0.75	300	95
1	400	94.4

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.1658	0.0764
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1992	0.0918
TRANSIENT - SATURATED X'_d	0.3030	0.1396
SYNCHRONOUS - DIRECT AXIS X_d	3.3309	1.5349
SYNCHRONOUS - QUADRATURE AXIS X_q	1.9727	0.9090
NEGATIVE SEQUENCE X_2	0.1827	0.0842
ZERO SEQUENCE X_0	0.0658	0.0303

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	2.1410
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.1948
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_{d0}	0.0045
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_d	0.0039
OPEN CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_{q0}	0.0050
SHORT CIRCUIT SUBSTRANSIENT - QUADRATURE AXIS T''_q	0.0044
EXCITER TIME CONSTANT T_e	0.1144
ARMATURE SHORT CIRCUIT T_a	0.0316

Short Circuit Ratio: 0.33	Stator Resistance = 0.0148Ohms	Field Resistance = 1.3678 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:	7.5 Volts	40.4 Volts	Volts
Excitation current	1.7 Amps	7.4 Amps	Amps

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Generator Mechanical Information

Center of Gravity

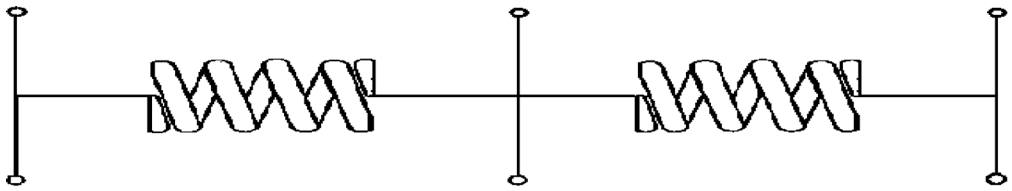
Dimension X	-668 mm	-26.3 IN.
Dimension Y	0 mm	0.0 IN.
Dimension Z	0 mm	0.0 IN.

- "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 = 1125 kg * Rotor WT = 423 kg * Stator WT = 723 kg
2,480 LB 933 LB 1,594 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	32.4 MLB IN./rad	3.8 IN.	33.7 LB IN. s^2	14.1 MLB IN./rad	2.5 IN.	0.4 LB IN. s^2
0.206 N m s^2	3.66 MN m/rad	96.5 mm	3.805 N m s^2	1.59 MN m/rad	63.5 mm	0.043 N m s^2

Total J
35.9 LB IN. s^2
4.054 N m s^2

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Generator Cooling Requirements -
Temperature - Insulation Data

Cooling Requirements:		**Temperature Data: (Ambient 40 ^{0}C)**	
Heat Dissipated: 23.7 kW		**Stator Rise:**	130 ^{0}C
Air Flow:	64.2 m^3/min	**Rotor Rise:**	130 ^{0}C

Insulation Class: H

Insulation Reg. as shipped: 100MΩ minimum at 40 ^{0}C

Thermal Limits of Generator

Frequency:	60 Hz
Line to Line Voltage:	480 Volts
B BR 80/40	379 kVA
F BR -105/40	456 kVA
H BR - 125/40	500 kVA
F PR - 130/40	500 kVA

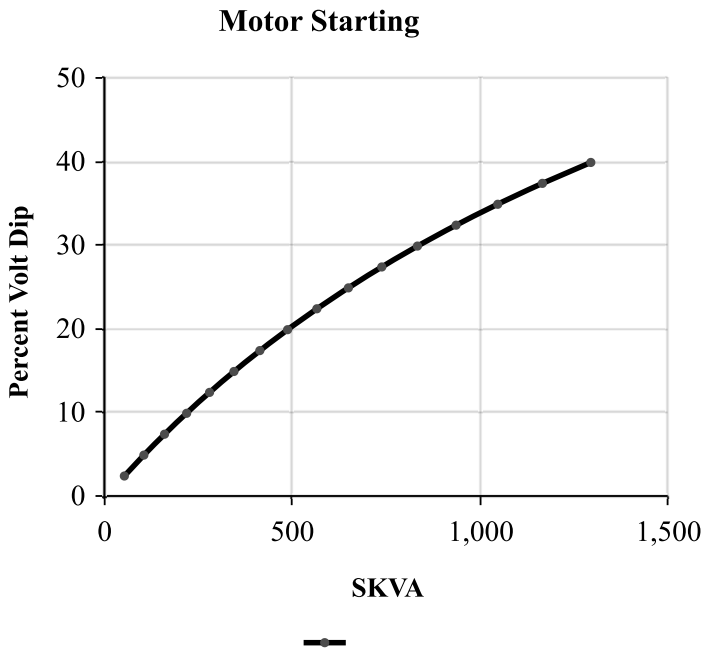
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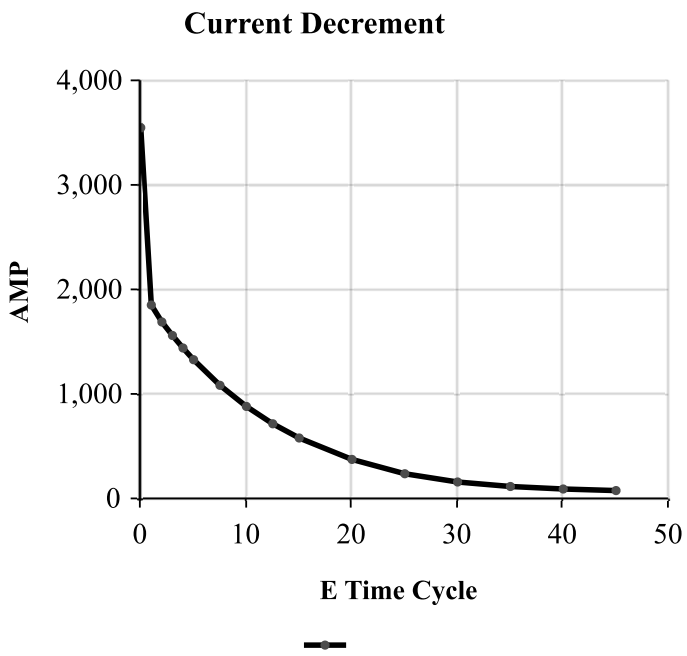
Starting Capability & Current Decrement
Motor Starting Capability (0.4 pf)

SKVA	Percent Volt Dip
50	2.5
102	5.0
157	7.5
216	10.0
277	12.5
342	15.0
411	17.5
485	20.0
563	22.5
647	25.0
736	27.5
831	30.0
934	32.5
1,045	35.0
1,164	37.5
1,293	40.0



Current Decrement Data

E Time Cycle	AMP
0.0	3,556
1.0	1,859
2.0	1,697
3.0	1,568
4.0	1,448
5.0	1,336
7.5	1,091
10.0	889
12.5	723
15.0	587
20.0	382
25.0	245
30.0	166
35.0	123
40.0	99
45.0	84



Instantaneous 3 Phase Fault Current: 3556 Amps **Instantaneous Line - Line Fault Current:** 2931 Amps
Instantaneous Line - Neutral Fault Current: 4271 Amps

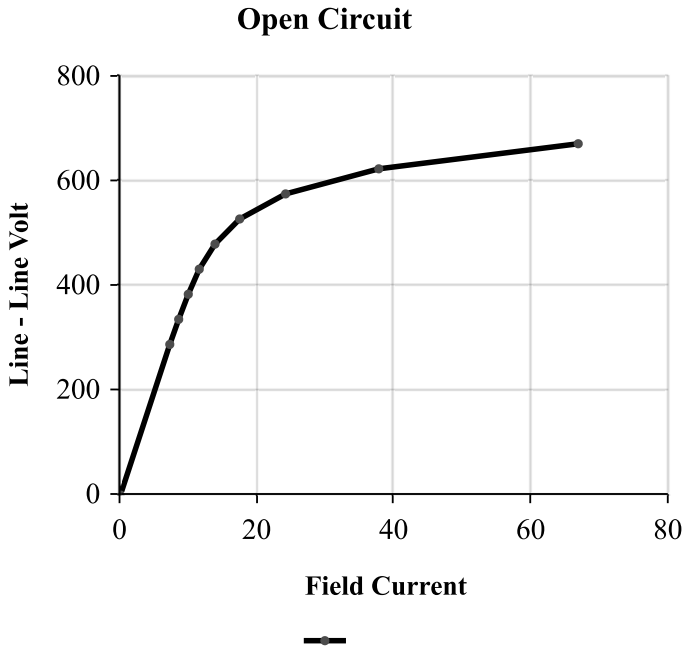
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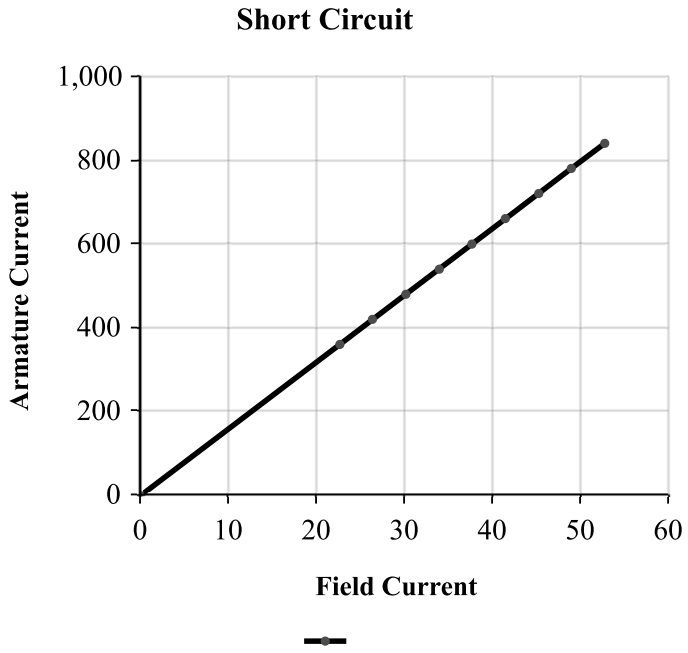
Generator Output Characteristic Curves
Open Circuit Curve

Field Current	Line - Line Volt
0.0	0
7.2	288
8.5	336
9.9	384
11.5	432
13.8	480
17.4	528
24.1	576
37.7	624
66.8	672



Short Circuit Curve

Field Current	Armature Current
0.0	0
22.6	361
26.3	421
30.1	481
33.9	541
37.6	601
41.4	662
45.2	722
48.9	782
52.7	842



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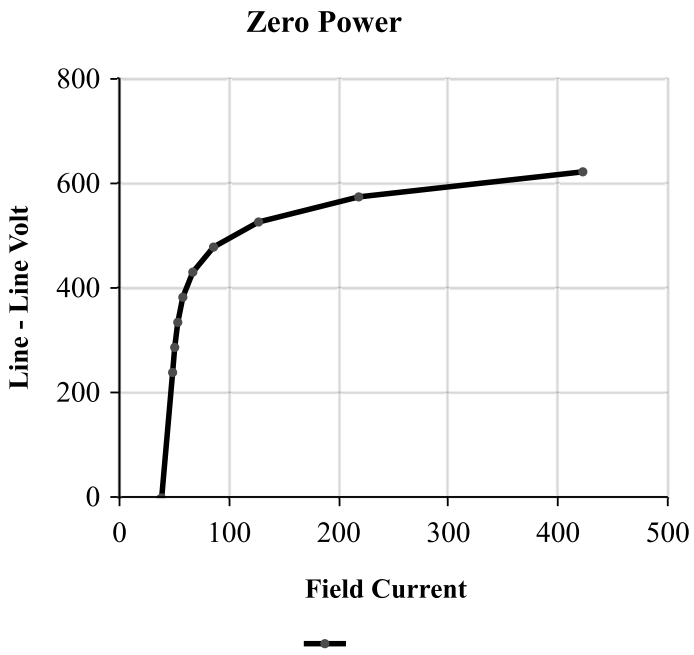
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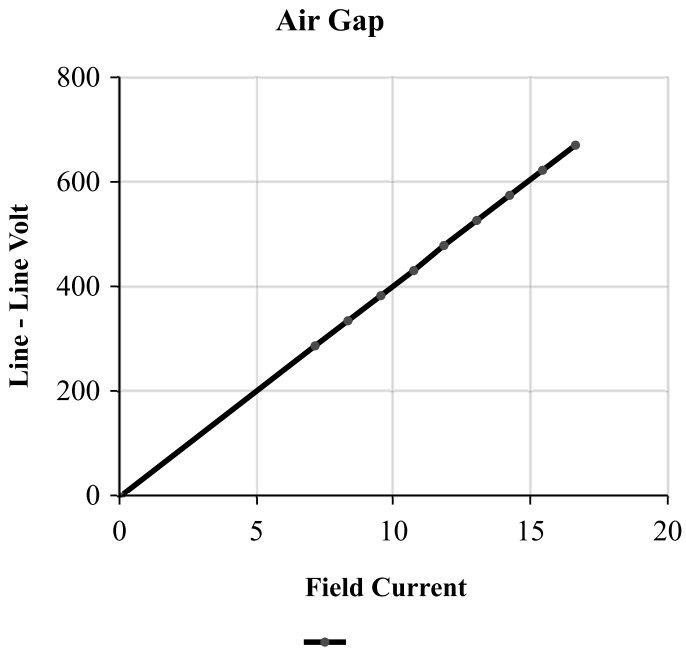
Zero Power Factor Curve

Field Current	Line - Line Volt
37.6	0
47.6	240
49.5	288
52.3	336
56.9	384
66.0	432
84.9	480
126.0	528
217.3	576
421.7	624



Air Gap Curve

Field Current	Line - Line Volt
0.0	0
7.1	288
8.3	336
9.5	384
10.7	432
11.8	480
13.0	528
14.2	576
15.4	624
16.6	672

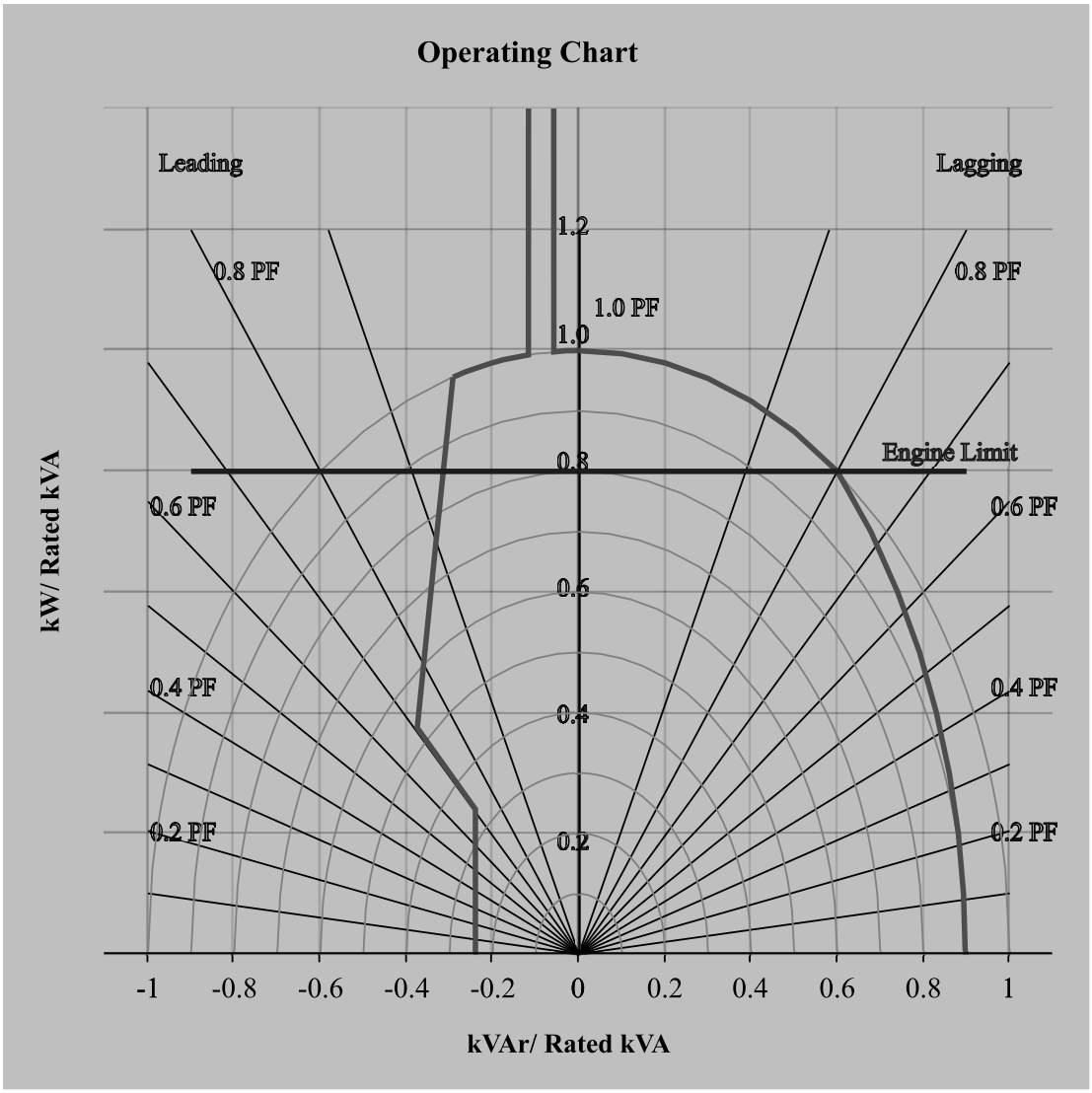


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Reactive Capability Curve



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General Information

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DM7802
GENERATOR GENERAL INFORMATION

I. GENERATOR MOTOR STARTING CAPABILITY CURVES
A. THE MOTOR STARTING CURVES ARE REPRESENTATIVE OF THE DATA
OBTAINED BY THE FOLLOWING PROCEDURE:
1. THE CATERPILLAR GENERATOR IS DRIVEN BY A SYNCHRONOUS
DRIVER.
2. VARIOUS SIZE THREE PHASE INDUCTION MOTORS (NEMA
CODE F) ARE STARTED ACROSS THE LINE LEADS OF THE
UNLOADED GENERATOR.
3. THE RESULTING VOLTAGE DIPS ARE RECORDED WITH AN
OSCILLOSCOPE.
4. MOTOR HORSEPOWER HAS BEEN CONVERTED TO STARTING
KILOVOLT AMPERES (SKVA).
5. RECORDED VOLTAGE DIPS HAVE BEEN EXPRESSED AS A
OF GENERATOR RATED VOLTAGE.
```

II. USE OF THE MOTOR STARTING CAPABILITY CURVES.
A. CALCULATE THE SKVA REQUIRED BY THE MOTOR FOR FULL VOLTAGE STARTING ACROSS THE LINE IF THE VALUE IS NOT LISTED ON THE MOTOR DATA PLATE.
1. MOTORS CONFORMING TO NEMA STANDARDS
MULTIPLY THE MOTOR HORSEPOWER BY THE NEMA SKVA/HP FIGURE. FOR NEMA CODE F,USE 5.3 SKVA/HP; FOR NEMA CODE G, USE 6.0 SKVA/HP.
2. ALL OTHER MOTORS:
MULTIPLY THE RATED VOLTAGE BY THE LOCKED ROTOR AMPERE AND BY 0.001732. (IF THE LOCKED ROTOR AMPERES ARE NOT LISTED, MULTIPLY THE FULL LOAD (RUNNING) AMPERES BY
B. USE THE ABOVE SKVA WITH THE MOTOR STARTING TABLE.
1. ACROSS LINE STARTING:
READ ACROSS THE ROW OF "ACROSS THE LINE STARTING SKVA IF THE DESIRED VALUE OF SKVA IS NOT GIVEN, CALCULATE THE DIP BY FINDING THE PROPER SKVA INTERVAL AND INTERPOLATING AS FOLLOWS:
SKVA1 IS THE SKVA TABLE ENTRY JUST SMALLER THAN THE DESIRED SKVA, DIP1 IS THE DIP FOR SKVA2, AND SKVA2 IS THE SKVA TABLE ENTRY JUST GREATER THAN THE DESIRED SKVA. THE DIP (IN PERCENT) AT THE DESIRED SKVA IS:
DIP = DIP1 + (SKVA - SKVA1) * 2.5 / (SKVA2 - SKVA1)
NOTE:VOLTAGE DIPS GREATER THAN 35% MAY CAUSE MAGNETIC CONTACTORS TO DROP OUT.

2. REDUCED VOLTAGE STARTING:
REFER TO THE FOLLOWING TABLE. MULTIPLY THE CALCULATE ACROSS LINE SKVA BY THE MULTIPLIER LISTED FOR THE SPECIFIC STARTING METHOD. APPLY THE RESULT TO THE STARTING TABLE AS IN II A, TO CALCULATE THE EXPECTED VOLTAGE DIP:

TYPE OF REDUCED VOLTAGE STARTING	MULTIPLY LINE SKVA BY
80% TAP	.80
65% TAP	.65
50% TAP	.50
45% TAP	.45
Wye start,delta run	.33
AUTOTRANSFORMER	
80% TAP	.68
65% TAP	.46
50% TAP	.29

NOTE: REDUCE VOLTAGE STARTING LOWERS THE MAXIMUM REQUIRED MOTOR skVA.
3. Part winding starting:
Most common is half-winding start, full-winding run. Multiply the full motor, accross line starting skVA by 0.6. Apply the result to the selected curve as in ii. A above. Read the expected voltage dip, for the required skVA.

III.DEFINITION:
A. GENERATOR TERMS
MODEL: Engine Sales model
ENG TYPE: DI = Direct Injection, NA = Naturally aspirated, etc
HZ: Running frequency, hertz
RATING TYPE: PP, SB (prime power or standby)
KW: Base rating electrical kilowatts (ekW)
VOLTS: Rating terminal, line to line
GEN ARR: Cat generator arrangement part number
GEN FRAME: Generator frame size designation
CONN: Generator output connection

(star, wye, delta, ect.)
POLES: Number of pole pieces on rotor.
(eg. A 4 pole generator run at 1800)
RPM will produce 60 Hz alternating current. A 6 pole
generator run at 1200 RPM will produce 60 Hz alternating
current.)
B. GENERATOR TEMPERATURE RISE:
The indicated temperature rise indicated the NEMA limits
for standby or prime power applications. These rises are
used for calculating the losses and efficiencies and are
not necessarily indicative of the actual temperature rise
of a given machine.

C. CENTER OF GRAVITY
The specified center of gravity is for the generator only.
For single bearing, and two bearing close coupled generators, the cent
er of gravity is measured from the generator/engine flywheel housing i
nterface and from the centerline of the rotor shaft.

For two bearing, standalone generators, the center of gravity is measu
red from the end of the rotor shaft and from the centerline of the rot
or shaft.

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D. GENERATOR DECREMENT CURRENT CURVES

The generator decrement current curve gives the
symmetrical current supplied by the generator for a three
phase bolted fault at the generator terminals. Generators
equipped with the series boost attachment or generators
with PM excitation system will supply 300% of rated current
for at least 10 seconds.

E. GENERATOR EFFICIENCY CURVES
The efficiency curve is representative of the overall
generator efficiency over the normal range of the
electrical load and at the specified parameters. This is
not the overall engine generator set efficiency curve.

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