

Understanding Generator Ratings and Safety Labeling

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Article 445 National Electrical Code

445.11 Marking. Each generator shall be provided with a nameplate giving the manufacturer's name, the rated frequency, the number of phases if ac, the rating in kilowatts or kilovolt-amperes, the power factor, the normal volts and amperes corresponding to the rating, the rated ambient temperature, and the rated temperature rise.

Regardless of size



Article 445 National Electrical Code

Nameplates or manufacturer's instructions shall provide the following information for all stationary generators and portable generators rated more than 15 kW:

1. Subtransient, transient, synchronous, and zero sequence reactances
2. Power rating category
3. Insulation system class
4. Indication if the generator is protected against overload by inherent design, an overcurrent protective relay, circuit breaker, or fuse
5. Maximum short-circuit current for inverter-based generators, in lieu of the synchronous, subtransient, and transient reactances



MULTIQUIP

DIESEL POWERED AC GENERATOR

MODEL **DCA-45SSIU4**

SERIAL NO. **7205670**

AC GENERATOR

MODEL **DH-04801**

ARMATURE CONNECTION

Star with Neutral

Zigzag

PHASE

3

Single

FREQUENCY

60 Hz

60 Hz

RATED OUTPUT

45KVA (35KW)

26KW (26KVA)

RATED VOLTAGE

240v

480v

240v

120v

RATED CURRENT

108A

54.1A

108A

POWER FACTOR

0.8

1.0

Class H Insulation System

ENGINE

MODEL **ISUZU 4JJ1T**

TYPE **4 CYL. 4 CYCLE**

RATED SPEED

1800 RPM

DISPLACEMENT

2.999 L

FUEL TANK CAP.

26.4 GAL

Manufactured for MULTQUIP INC. by Denyo Manufacturing Corp.
Made in USA



MULTIQUIP INC.
CARSON, CALIFORNIA

M11030110B

445.11 Marking (Generator)

- A new manufacturer's marking provision was added requiring indication whether or not the **generator neutral is bonded to the generator frame**.
- This new **neutral bonding provision** requires additional marking to indicate whether the generator neutral is bonded to the generator frame whenever the bonding of a generator is **modified in the field**.
- In order to determine if a generator is a separately derived system or not, installers, enforcers, and users of the *Code* must be able to determine if the neutral conductor of the generator is bonded to the generator frame.
- Power factor, subtransient, and transient impedances, insulation system class, and time rating markings are now only required for stationary and portable generators rated **more than 15 kW**.



CENTURION
by Generac Power Systems, Inc.

- ✓ 6.6 Gallon Fuel Tank
 - Up to 10 hour run time @ 1/2 load
- ✓ Low Oil Level Shutdown
 - Protects engine from damage
- ✓ Never-Flat Tires
 - Dependable transport
- ✓ Locking Fold-Down Handles
 - Smaller footprint for convenient storage

Circuit Breaker Protected Outlets
1 x 120/240V 30A Testlock • 2 x 120V 20A Duplex Outlets

OHV Engine

5000
RUNNING WATTS
6250 STARTING WATTS

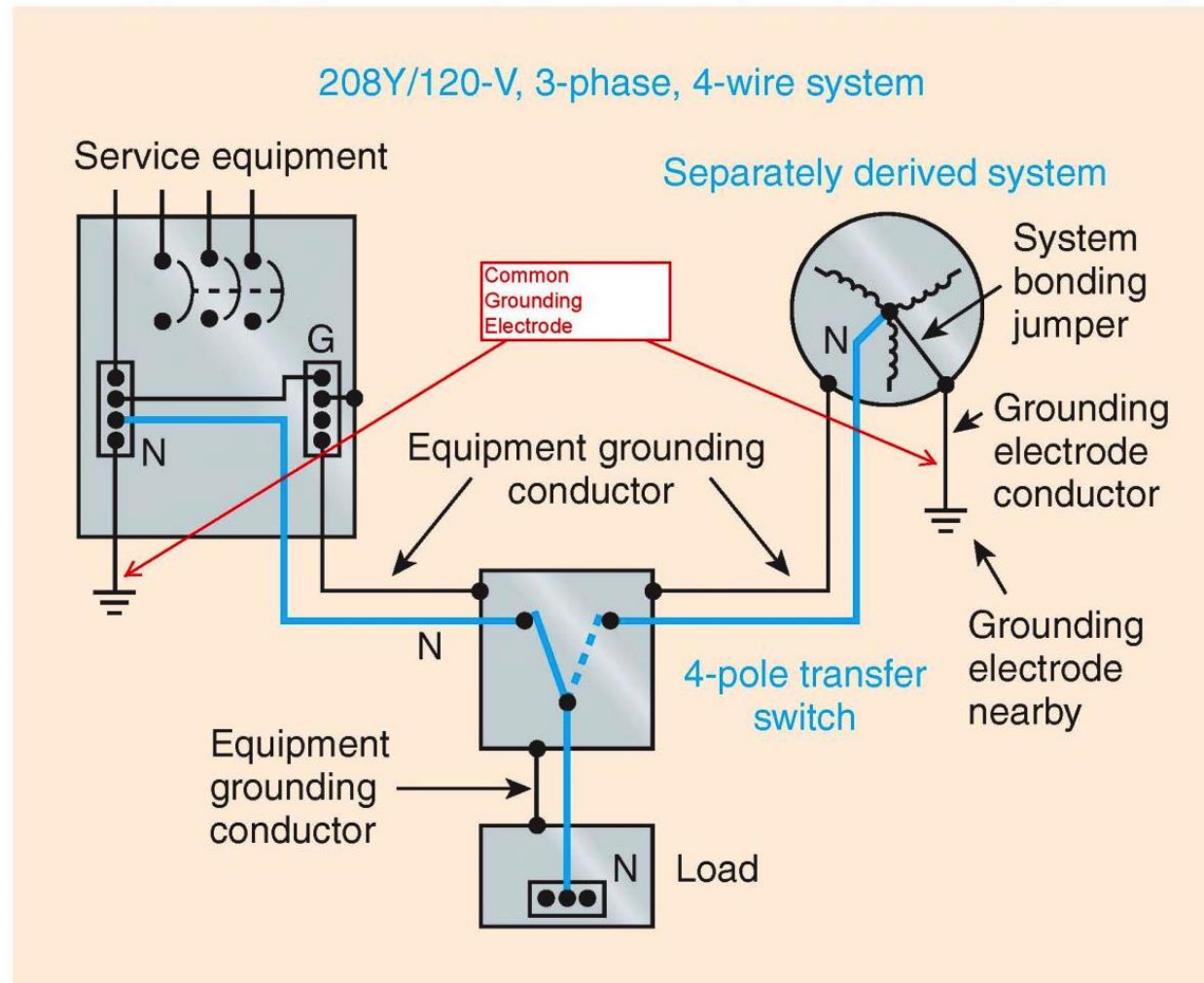
0VAC

120VAC

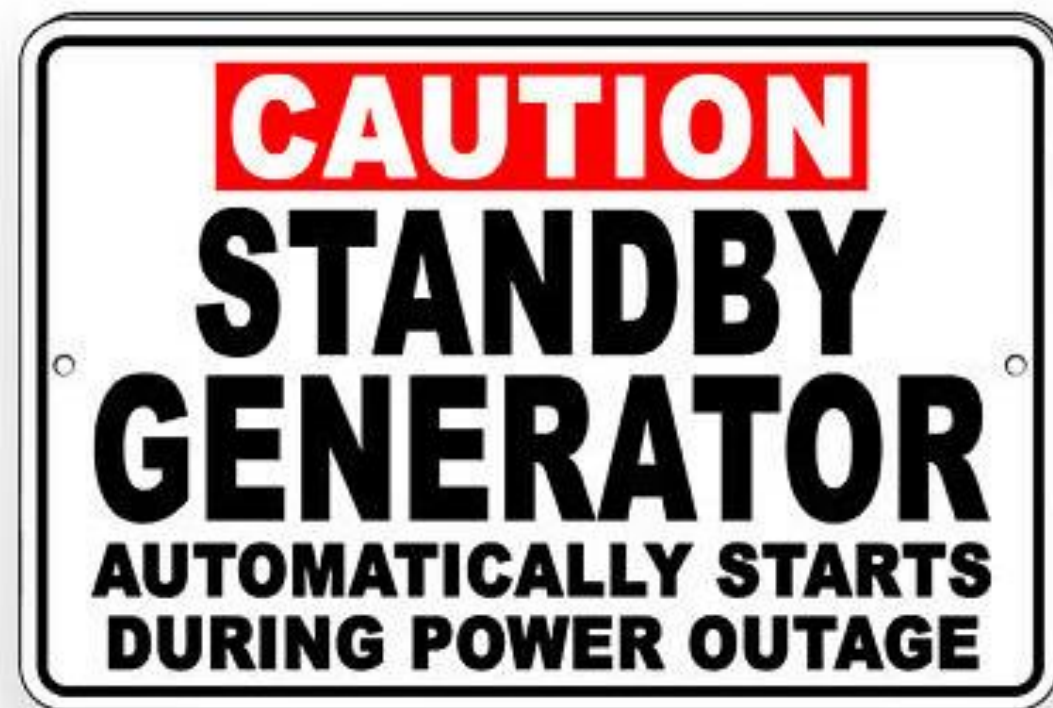
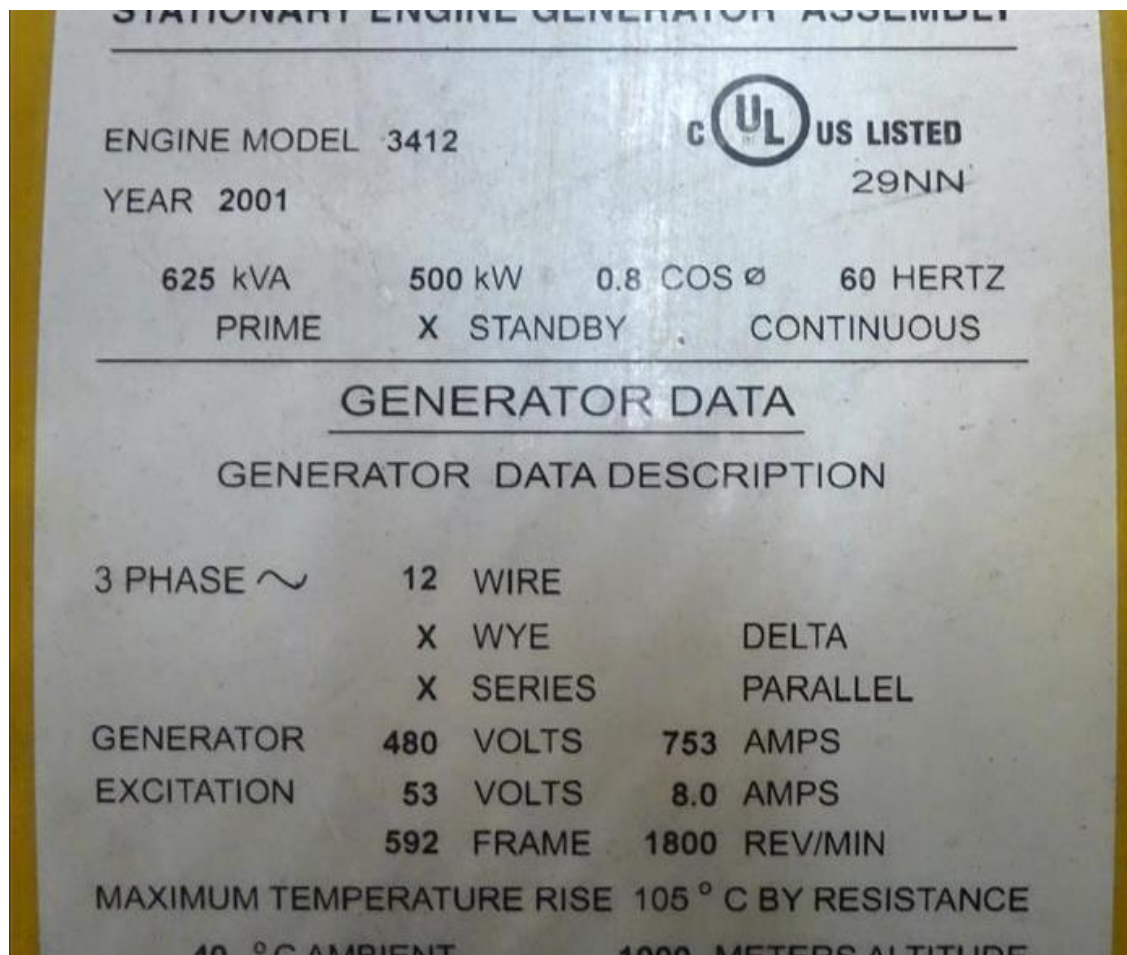
NEUTRAL BONDED
TO FRAME



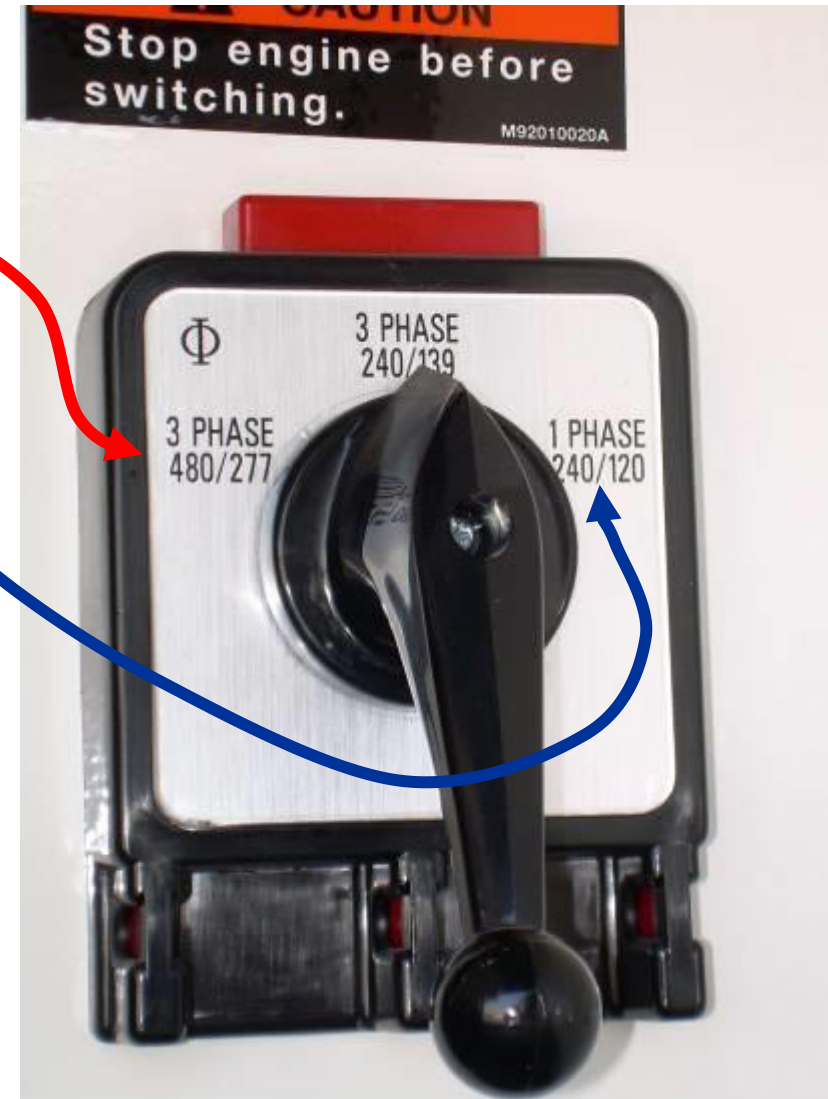
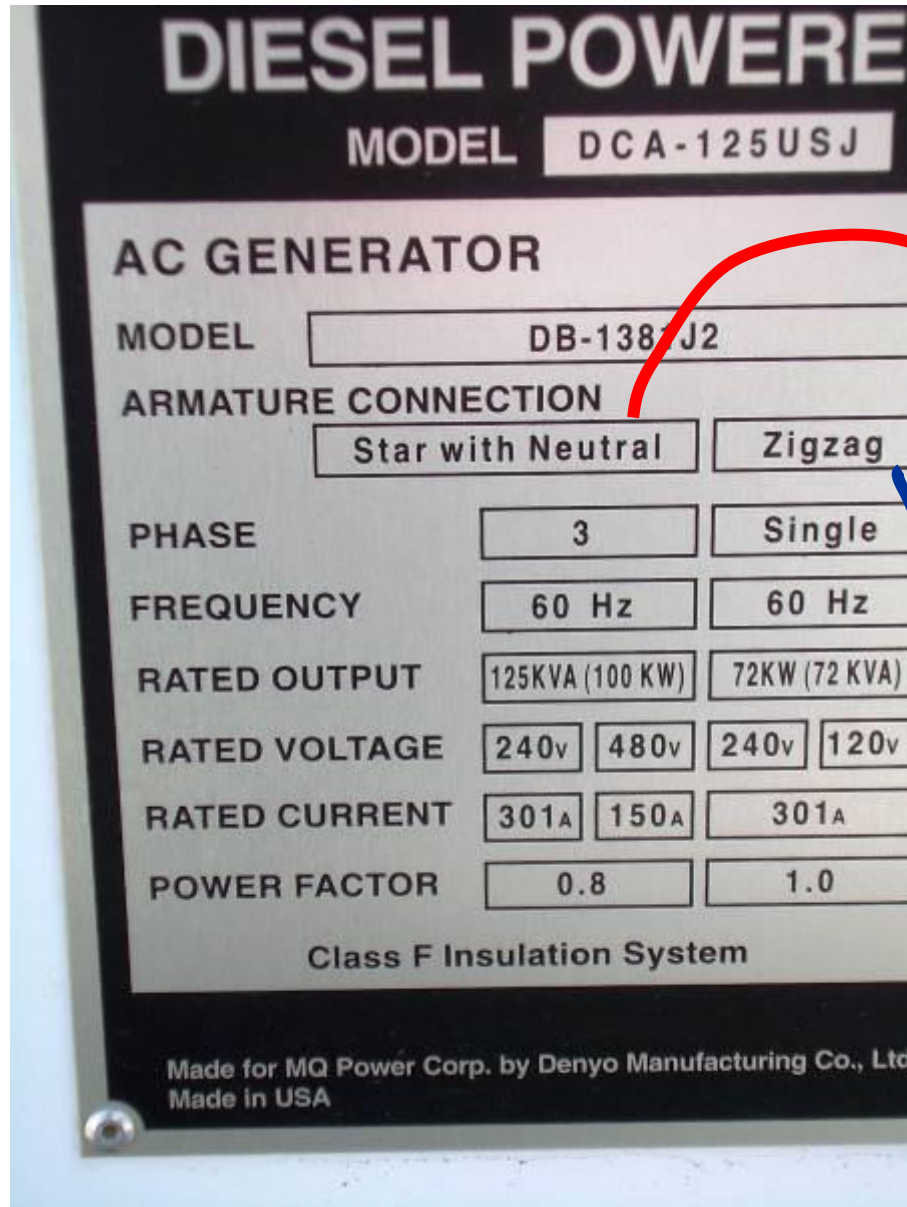
Separately Derived System



Nameplate & Label



Zigzag Stator Connection



Nameplate

SYNCHRONOUS AC GENERATOR							
SERIAL NUMBER		CODE		MODEL NUMBER		WEIGHT	
00000-00		4P4-2100		AA00000000		24,500 lb	
IMPORTANT: WHEN ORDERING PARTS INCLUDE SERIAL NUMBER AND MODEL NUMBER							
ALTERNATOR						EXCITER	
KW		PHASE		WIRE		HERTZ	
500		3		6		60	
KVA		P.F.		RPM		FIELD AMPS	
625		0.8		1800		2.2	
VOLTAGE		AMPERES		WARNING: EXPLOSION HAZARD- SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CL. 1, DIV. 2. ROTOR WEIGHT = 7,755 lb			
277/480		752					
TEMP RISE		INSUL. CL.					
80 °C		H		157-00103-04			
AMBIENT		SEQUENCE					
50 °C		T1,T2,T3					
ENCLOSURE		MFR. YEAR		ROTOR WEIGHT = 7,755 lb			
IP23		2013					
DUTY		ROTATION					
CONT.		CCWFDE		FOR ACCESSORIES ELECTRICAL RATING SEE CONNECTION DIAGRAM 888-00000-XX			
X'd SAT.		X'd SAT.					
15.6%		13.2%					
CSA 1881034;							
CLASS 1, DIV. 2, GROUPS B, C, & D, T3:							
FOR ACCESSORIES ELECTRICAL RATING SEE CONNECTION DIAGRAM 888-00000-XX							

Labels



Figure 5 – Caution Tags

Automatic Start – This can be placed at entrances to spaces or enclosures informing of automatic start without warning or consent.

Maintenance Required – This label is used to determine maintenance requirements and next inspection requirements. As each requirement is completed the labeled is changed.

Emergency Generator – This would be located on the outside of an enclosure or door to a generator room.

Dual Supply – This is an informational label that would be placed in close proximity of a warning label. Isolation information is supplied.

Labels



Figure 6 –Warning/Danger Labels

2nd Power Source danger label will appear at panels that have dual power source. A label listing the locations to secure the source can be included in the general area.

Arc Flash/Shock warnings can be placed at the generator connection panel. This indicate voltage and the distance the flash can extend.

High Voltage – Placed on all access points in the power generation system where high power connections exist.

Carbon Monoxide – This can be placed on exhaust point at installed generators. Always on residential portable generators. Operating generator without proper exhaust can kill.

Surface – Located on structures designed for operator protection but not designed to stand on.

Emission Control Information

- By January 1, 2007, manufacturers will have to certify that the diesel engines built for stationary applications, including electric power generation, meet the new EPA regulations for emissions, most notably oxides of nitrogen (NO_x).

This is a photograph of a white label with black text, titled "CAT CATERPILLAR INC. EMISSION CONTROL INFORMATION". The label provides technical specifications for a 2005 Caterpillar engine. The specifications are listed in two columns: "ENGINE MODEL: 3516", "EPA FAMILY 5CPXL78.1ERK", "DISPLACEMENT: 69.0 L", "MAX. ADV. KW 2148", and "MAX. ADV. HP 2880". The label also includes a serial number "ZAP00150". At the bottom, there are two paragraphs of text regarding engine use in nonroad mobile and stationary applications, and a reference to "40 CFR Part 60 Subpart III Table 1". The label number "159-2455" is printed in the bottom right corner.

2005	
ENGINE MODEL:	3516
EPA FAMILY	5CPXL78.1ERK
DISPLACEMENT:	69.0 L
MAX. ADV. KW	2148
MAX. ADV. HP	2880

ZAP00150

If engine is used in a nonroad mobile application: This engine conforms to the nonroad compression-ignition regulations under the flexibility provisions of U.S. EPA 40 CFR 1039.625, and California 13 CCR 2423 (d). Selling or installing this engine for any purpose other than for the equipment flexibility provision cited may be a violation of applicable law subject to civil penalty.

If engine is used in a stationary application: This engine is excluded from the requirements of U.S. EPA 40 CFR PART 1039 as a "Stationary Engine." Installing or using this engine in any other application may be a violation of federal law subject to civil penalty. This engine is compliant with 40 CFR Part 60 Subpart III Table 1.

159-2455



Thank you!

Q&A Session

**If you want to learn more about Generators,
TPC is here to help!**

**Contact TPC at:
TPC Training (877) 978-7246
live.tpctraining.com**

