

Standby Generator Systems

Residential Emergency Power

Updated November 2026

Tonight's Topics

- Overview
- The WA3UOO Installation
- System Detailed Views
- Load Distribution
- System Maintenance & Testing
- System Failure Experience
- Purchase Considerations

Overview

What is a Standby Generator?

- A standby generator serves as a back up electrical system that supports the electrical load during a power outage
- When an outage occurs, the system controls will detect the loss of power, start the engine, operate the transfer switch and connect to the load

Fuel Options






- Many generators can be operated from natural gas (NG) or propane with NG being the norm
- Propane use may require a gas conversion kit
- Generally, OEM power output ratings are based on propane gas unless specified otherwise
- NG is commonly used for residential installations due to wide availability in metro areas
  - Nameplate ratings are derated for NG
  - A nameplated 20Kw gen set using NG will be derated 10% (18kW)
- NG provides fewer BTU's per unit than propane

The WA3UOO Installation

Generator Unit Installed Fall 2012

- Generac Standby Generator Unit
  - 1000cc air cooled, purpose-built V-twin natural gas engine (propane optional)
  - 20Kw generator unit – direct shaft drive derated for NG – 18Kw
  - Main output circuit breaker
  - Gas pressure regulator
  - Microprocessor transfer switch controller/monitor/alarm logging
  - 12 volt automotive-type cranking battery and AC based charging system
  - No alternator system for charging

System Transfer Switch & Load Shedding Relays

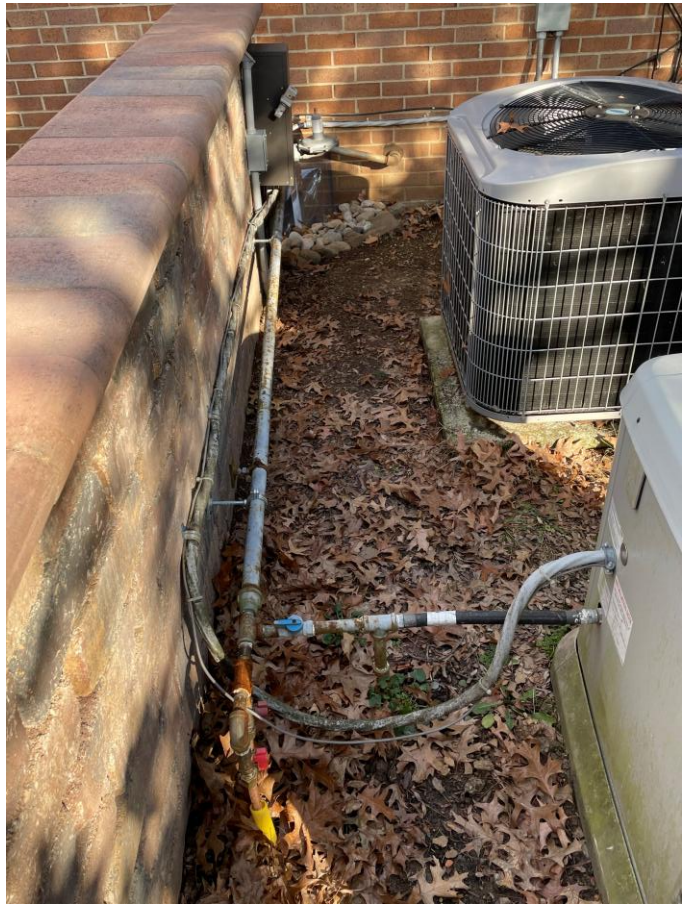
- Transfer Switch / Load Shed Controller
  - Automatically operates the switch from utility side of the line line to generator side based on system setup
    - Open transition on utility loss – 15-20 second delay
    - Closed transition on utility return – no delay
  - Switch is service rated for 200 amps, 240 VAC single phase, with neutral and ground (4 wire)
- Load Shedding Relays (4)
  - Rated 240 VAC, pole, 50 amps with 120 VAC control voltage
  - Controls specific distribution circuits
  - Controls non-essential loads as essential loads change

System Detailed Views



20 kW on NG = 18kW

Gas Supply, Output Breaker, Utility Outlet



GAS LINE & GENERATOR
AC OUTPUT



OUTPUT CB, 110 V
UTILITY RECEPTACLE
STATUS LED's (lower-left)

V-Twin Engine and User Control Panel



ENGINE-GENERATOR
COMPARTMENT



MICRO-CONTROLLER
AND PANEL CONTROLS

Transfer Switch and Load Shedding Relays

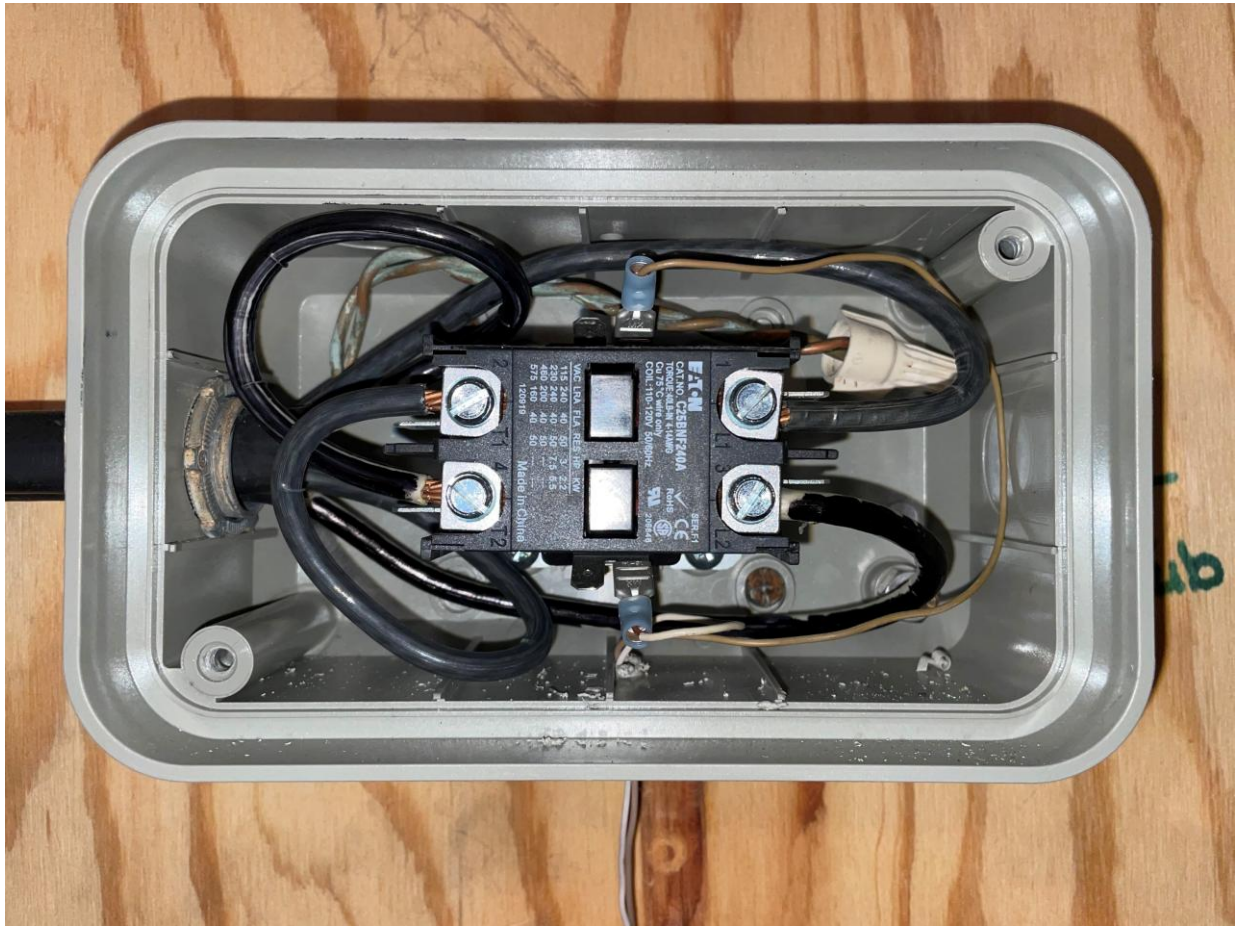


AUTO-TRANSFER SWITCH



2 OF 4 LOAD SHEDDING RELAYS

Load Shedding Relay Closeup



240 VAC 50 AMP TWO-POLE “LOAD SHEDDING” RELAY
120 VAC COIL. Generac calls them “digital load modules”

Load Distribution Considerations

Essential vs. Non-Essential Loads

- Final decision for *my* installation. Yours may be different
- Essential Loads
  - Central air
  - Furnace
  - All lighting and receptacle circuits throughout the home
- Non-Essential Loads – load shedding relays
  - Hot tub – now decommissioned and removed
  - Oven & microwave (gas cooktop is plan B when needed)
  - Washer/dryer

True Whole-House vs. Partial House

- My system is 20 Kw /18 Kw with a load shedding system
- Based on National Electrical Code (NEC) calculations, a *true* whole-house generator without load shedding circuits requires a **35Kw** generator system



18 Kw



35 Kw

System Maintenance & Testing

Brands by Market Rank

- Generac #1
- Kohler #2
- Briggs & Stratton #3
- Cummins #4
- Rest of the market - Champion Power Equipment, Atlas Copco, Honda
- Coming in 2027 – Harbor Freight 28Kw $5,000 w/ATS
  - https://youtube.com/shorts/C1vbVAL7FrY?si=hQkkFYM6iENBzwFc
  - First and only product entry into residential generator market

General Maintenance Recommendations - Generac

- Every Two Years – generally performed by a service company
  - Oil change
  - Air filter change
  - Spark plugs change
  - Gas control and regulator checks
  - Check control system operation
  - Review alarm log
  - Battery check – suggest replacement every 4 years regardless of condition
- Weekly
  - One exercise session for 12 minutes without load
  - Unloaded exercise operation does not harm these gas fueled generators

Maintenance Costs

- Generally, about $300 per service as described
- Look at service plans and reputation of prospective service providers
  - Single year
  - Multi-year
  - Parts inclusive
  - Pre-paid
  - Rapid response needs?
    - Same day, 4 hours, etc.
- Like all mechanical things, a generator will eventually need repair. Know where to get service ***before*** you need it.

System Failure Experience

System Failure August 2026

- 20Kw Generac installed November 2012
- August 11, 2026 – worst storm in Clintonville in years – power outage
- On generator for 2 ½ days – then things went sideways
- Voltage regulation issues resulted in lights flickering significantly
- New-to-generators tech could not troubleshoot the problem
- Second service company - waited 30 days without backup
- Tech found what was *thought* to be the problem in 10 minutes
- Generator section of the unit was toast with replacement required
- Waited 3 weeks for parts

System Failure August 2026

- Two techs arrived October 20 to replace the generator section
- When powered up, still had lights flickering in the house
- After 15 minutes the culprit was found – a bad controller unit that provides regulated excitation voltage to the generator section for proper voltage output and regulation
- Controller replaced with follow up testing
- Proper operation fully restored
- Repair cost was $4,100
- New unit w/o transfer switch $10,000+ installation

Purchase Considerations

Before You Buy

- Research brands, reviews, reliability, serviceability and local service capabilities
- Buy from reputable dealers. Preferably, get your service from the same company that sells the prospective unit you want
- Make sure the gas supply you have will support the generator under full load conditions – consult with the processionals
- NG is good because you may already have it but remember the deration factor for NG is about 10%.
- Rural areas probably won't have NG, so propane will be required
- Point of reference – this 20 Kw system was just under $10K
  - Generator, transfer switch, installation



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Thanks for checking in to the CORC TechNet

73 until next time!