

# How to select a generator for fire and rescue:

## Guide to power sources and vehicle applications

# Cummins Onan



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Fire and rescue professionals use specialized vehicles to respond to a variety of emergencies. However, whether it's an airport emergency or a brush fire, a three-alarm apartment building fire or a car crash, one requirement remains constant: There must be reliable auxiliary power to support equipment at the scene.

Each vehicle is equipped differently and vehicle space is always limited. Generators powered by power takeoff (PTO), diesel fuel, gasoline and hydraulics must perform under the most rigorous conditions. In an emergency, strategic planning and reliable equipment help to save property and lives.

This guide first covers basic issues in choosing a generator. Then it provides specific recommendations for various fire and rescue vehicles.

## Basic considerations

### 1. Determining power requirements

To determine the amount of power you need from a generator on your fire or emergency vehicle, tabulate the power requirements in watts (volts x amps = watts) for all auxiliary electrical equipment. Remember that starting an electric motor typically requires up to three times the specified running power. Determine the total

wattage of all equipment that may need to run simultaneously; this is the power requirement for your generator. Then consult the Cummins® Onan® fire and emergency Web site ([www.cumminsonan.com/fire](http://www.cumminsonan.com/fire)) to find the generators that provide what you need.

Here are the wattage requirements typical for various equipment:

Item	Watts
Quartz lights	500-1500 (each)
Extraction equipment	1500-2500
Rooftop AC (12,000 BTU)	1500-1700 (each)
Ventilator fans	1000-2500
Computers	250-300 (each)
Service tools	100-2000 (depends on tool)
Battery charging (inverter)	1000-3000
TV / monitors	100 (each)
Microwave amplifier	200-2000
Rack communications equipment	500 (per rack)
Exterior lighting	200-1000 (each)

## 2. Choosing the right power source

In addition to determining the amount of power you need, you must decide on the power source for your generator. The following table shows advantages and disadvantages of the most common generator power sources:

### Power source comparison

Power source	Advantages	Disadvantages
<b>Gasoline-powered engine</b>	<ul style="list-style-type: none"><li>• Fuel available everywhere</li><li>• Completely separate from vehicle, so it can run whether vehicle is running or not</li><li>• More compact than diesel</li></ul>	<ul style="list-style-type: none"><li>• Fuel is volatile</li><li>• Requires more maintenance than PTO or hydraulic</li><li>• Higher level of CO emissions</li></ul>
<b>Diesel-powered engine</b>	<ul style="list-style-type: none"><li>• Fuel less volatile</li><li>• Completely separate from vehicle, so it can run whether vehicle is running or not</li></ul>	<ul style="list-style-type: none"><li>• Power range only up to 12 kW <sup>1</sup></li><li>• More maintenance required <sup>2</sup></li><li>• Higher level of particulate emissions</li></ul>
<b>Power takeoff (PTO)</b>	<ul style="list-style-type: none"><li>• Large power range: 15-40 kW</li><li>• Less expensive than comparably powered hydraulic</li><li>• Compact size</li><li>• No emissions</li></ul>	<ul style="list-style-type: none"><li>• Can only be used with vehicle stopped and engine at constant high idle</li><li>• Not portable</li></ul>
<b>Hydraulic (attached to PTO)</b>	<ul style="list-style-type: none"><li>• Can be used at any vehicle engine speed and while vehicle is in motion</li><li>• Smaller and lighter than other types</li><li>• High reliability / low maintenance</li><li>• 6-25 kW available</li><li>• No emissions</li></ul>	<ul style="list-style-type: none"><li>• Not portable</li><li>• More expensive than PTO</li><li>• Vehicle engine must be running</li></ul>

<sup>1</sup> Power range currently available from Cummins Onan.

<sup>2</sup> Separate engine requires more maintenance than PTO or hydraulic.

## 3. Factoring in maintenance

Remember that regular service and maintenance are needed to keep a generator in good working order. A reasonable schedule is that each generator should be cleaned, tested and operated at 50-percent load for a minimum of 1.5 hours each month. Performing this weekly provides a greater assurance of safety and trouble-free operation.

## Recommendations for vehicle types

### > Rescue vehicles

The best choice for rescue vehicles is often a power takeoff generator because PTO units offer the higher power needed—up to 40 kW—for the auxiliary equipment needed on a rescue vehicle. This power capability allows PTO generators to efficiently

operate bottle-filling compressors and large light towers. Furthermore, PTO-powered generators are usually mounted under the chassis, so they leave compartment space available for other equipment.

The most reasonable alternative to PTO power in a rescue vehicle is a hydraulic generator. Hydraulic and PTO generators have some similarities: Both get power from the vehicle's PTO and both are highly reliable. And while hydraulic generators offer a lower power range (6-25 kW) than PTOs (15-40 kW), hydraulics also have some big advantages: They have no engines, fuel or emissions. Furthermore, a hydraulic generator can also be operated at any vehicle engine speed and can be used either on the go or while the vehicle is parked. By comparison, a PTO generator requires a constant, high engine idle speed and can only be used while the vehicle is stationary.

### > **Pumper trucks**

For the on-board power you need on a pumper, you can choose a hydraulic or diesel generator. You may also need to equip the pumper with portable generators to power lighting equipment, vent fans or small extraction pumps. Most portables are gasoline-powered, but gasoline-powered generators are heavy and hard to move, require more maintenance than other types and can be noisy. Hydraulic generators are lighter, more compact and need less maintenance than gasoline-powered units. And because hydraulic generators use no fuel, they are safer and more convenient. If mounted inside the vehicle, hydraulic generators take up a minimum of compartment space; but they also may be mounted in other locations including under and on top of the vehicle.

### > **Aerial vehicles**

On an aerial vehicle, for scene lighting and electric tools, 6-8 kW is probably enough power. But today, more and more companies need aerials to provide multiple services and become involved in more types of emergencies, driving generator size requirements to 10-15 kW. Be sure to consider the additional services that your aerial vehicle may need to provide before deciding how large a generator to choose. Again, depending on the available compartment space and the required power range, your best choices are probably diesel and hydraulic generators.



### > **Brush trucks**

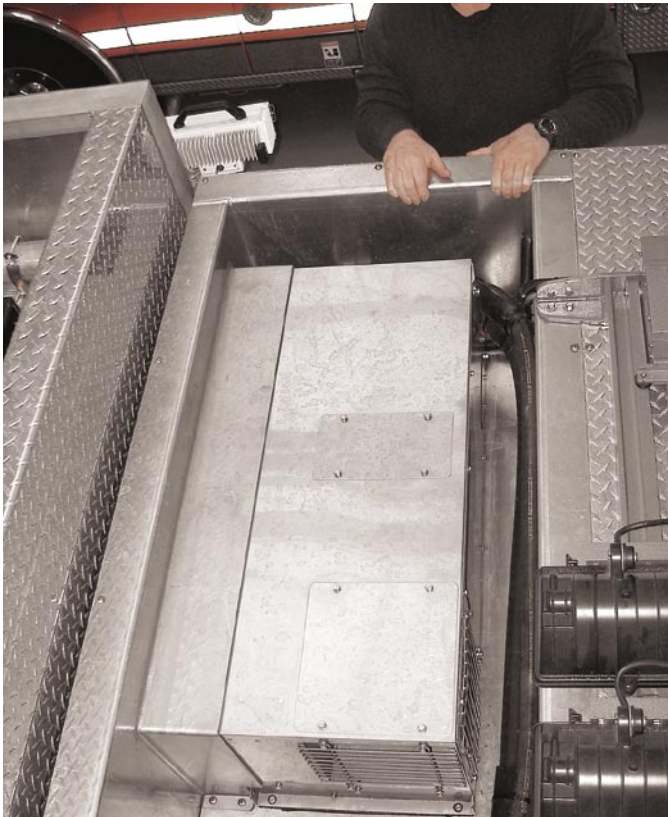
Brush trucks are increasingly popular because they offer a cost-effective way to respond to off-road fires and a variety of other emergencies. They are also common in urban environments to fight fires in underground parking garages and other places with low clearance. For lighting and power tools, a 5-8 kW range is probably sufficient. A portable generator offers the flexibility you need to bring power to the scene. However, many departments choose small diesel generators because their fuel is less volatile. Others choose hydraulic generators because they are lighter, burn no fuel and are permanently installed on the truck.

### > **ARFF vehicles**

For many years, fire and emergency professionals have considered diesel generators standard equipment on ARFF (Aircraft Rescue and Firefighting) vehicles. For scene lighting equipment, a 10 kW generator is probably sufficient. However, many people are now specifying hydraulic generators on ARFF vehicles because they need less maintenance, can be installed less expensively, take up less space and weigh about half as much as diesel generators.

### > **Command center vehicles**

Command center vehicles often have complex power requirements including large rooftop air conditioning units, light towers, communications equipment, interior lighting, and "plug-in" loads. Power needs range from 20-24 kW and are typically supplied by 2-12 kW diesel generators. This also provides for easy load splitting, backup redundancy and quieter operation.



## > **Ambulances**

Most ambulances are equipped with battery banks and an inverter to provide the small amount of auxiliary power—typically 2-3 kW—needed for interior lighting and medical instruments. The battery-inverter system provides the power needed by many medical instruments. While the overall power requirement may be relatively low, space limitations keep generators out of most ambulances. This is especially an issue with diesel-powered ambulances since diesel generators tend to be larger. However, some manufacturers offer small, housed diesel generators, which are a good choice for a diesel-fueled vehicle, especially for high-risk situations such as neo-natal care. Other ambulances use gasoline generators to save weight and size on an otherwise diesel-fueled vehicle—especially where high-powered air conditioning is needed.

## > **HazMat—quick rescue vehicles**

HazMat and quick rescue vehicles are often customized to respond to a specific range of situations, including chemical spills and leaks, major road accidents, and classic fire support. Therefore, their power requirements vary. For example, a HazMat vehicle customized to handle spills and emergencies at refineries and chemical plants will typically need 15-30 kW for water heaters, pumps, washing units and air compressors. A PTO or diesel generator can supply that level of power.

# Reliability and service: the big Cummins Onan advantages

Reliability and service are major reasons to choose Cummins Onan Generators. We have been designing and manufacturing generators for more than 75 years. That's why we can offer the best warranty in the industry. But perhaps the best reason to choose Cummins Onan products is our people.

We have the most experience and the largest service organization of any generator manufacturer in the U.S., making reliability and service our standard. Cummins Onan generators from 2-40 kW offer reliability and performance, and include hydraulic, PTO, diesel, LP and gasoline fuel-powered models.

For more information about Cummins Onan Generators for your fire and rescue applications, visit [www.cumminsonan.com/fire](http://www.cumminsonan.com/fire)

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F-1736 CON-215 (3/07)

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