Engine-Driven Welders:

CHOOSING THE RIGHT ENGINE DRIVEN WELDER

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No matter the task at hand, it's always important to have the right tool for the job. The same principle applies to engine-driven welders. However, with so much equipment available on the market, the process of choosing the proper engine-driven welder for your application can be overwhelming. Without the appropriate knowledge, it's easy to choose the incorrect machine for a given application. It could be undersized and unable to meet the needs of the job, or it could be too large, which means you probably overspent. People make these judgment errors every day when buying or renting engine-driven welding equipment, and the errors take time, effort and money to correct.

Fortunately, you can avoid these pitfalls when you buy or rent your next engine- driven welder by keeping five considerations in mind:

- Fuel Type
- Welding Output / Duty Cycle
- Auxiliary Power Output
- Engine Manufacturer
- Additional Functionality

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FUEL

The first issue to consider is fuel type. The three primary fuel options are gasoline, diesel, and LPG.

Gasoline

Gasoline-powered engine-driven welders are generally smaller in size and have more limited output capabilities. The typical gas welder will produce 300A or less of welding output. These are generally available at a lower up-front cost than a diesel machine, but they use more fuel and are prohibited on some jobsites due to the low flashpoint of gasoline. Further, the higher RPM gas engines require more frequent service.

Diesel

Diesel welders are typically in the 300A class and above. They have a higher up-front cost than gas engines, but they are jobsite workhorses with more welding and auxiliary output than their gas counterparts. Diesel engines are also up to 35% more fuel-efficient and typically have a longer life than gas engines. Lastly, some jobsites require diesel engines for safety reasons.

LPG

LPG engines are very similar to gasoline engines, but they burn clean fuel, which makes them more suitable for use in poorly ventilated environments. The LPG engine-driven welder is an ideal choice for environments where gasoline and diesel emissions are not acceptable.

WELDING OUTPUT / DUTY CYCLE

After determining the best fuel option, it's important to choose a welder/generator that's appropriately sized to your application. The most important thing to determine is how much output you need to run your welding process.

Too often, customers ask for a 400A welder without knowing what that means or what they actually need. Consider the following when determining your needed output:

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Stick

When stick welding with electrodes up to 5/32, a 200A machine is usually sufficient. Larger electrodes require higher amperage, and a higher amperage will require a larger machine.

TIG

Like stick, TIG is a constant current (CC) process. Most TIG application do not require more than 200 to 300 amps.

Flux-Cored Wire

When welding outdoors, wind tends to blow shielding gas away from the weld, so a flux- cored wire is needed to shield the weld puddle. The wires used in this process require a constant voltage (CV) power source that's typically 300A or larger. It's important to consult your welding procedures to find out how much current you'll need prior to choosing a welder.

Arc Gouging

Arc gouging is a process that melts metal and blows it away, removing it from the base material. This process requires a great deal of energy and puts heavy stress on smaller machines. If you plan to arc gouge, a larger machine is recommended to remove material faster. For a ¼-inch carbon, the recommended output is 300 amps, while the recommendation for a 3/8-inch carbon is 450 amps.

Single- or Dual-Output

While most machines include one set of output studs, some offer two – like the Dual Maverick 200/200X from Lincoln Electric. A machine with multiple sets of output studs can be beneficial on crowded jobsites. One less machine means more fuel savings, reduced emissions, and less noise.

Once you understand your process, consider the welding output, duty cycle, and horsepower of a machine to ensure that it's appropriate for your application.

The first thing to understand is the real output of the machine. This is determined by the duty cycle. The industrial standard for welder duty cycles is the IEC rating. The IEC rating uses a formula to calculate the amount of time you can run a welder at a specific amperage and voltage. The breakdown is as follows:

AMPERAGE CLASS	IEC DUTY CYCLE RATING
200	200A/28V/100%
300	300A/32V/100%
400	400A/36V/100%
500	500A/40V/100%

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2 Common Pitfalls

1 - Comparing Welding Machines Based Solely on Their Model Names

Some manufacturers sidestep the IEC formula and give a name to their equipment based on an unrealistic amperage. This can steer customers into making misguided decision, which will negatively affect their ability to perform the job. When shopping for a welder, what really matters is the true welding output and horsepower. Make sure to look beyond the product name and compare the specifications of competing machines that can be found in product literature or owner's manuals.

It's best to compare the IEC rating of each machine. Sometimes the current ratings of two machines will match, but the voltage or duty cycles will differ. Higher voltages, duty cycles, and horsepower mean more output.

Lincoln Electric eliminates this confusion by naming its machines according to the IEC amperage class and horsepower. This gives the customer a clearer sense of what they're getting, and ensures that they're getting what he or she's paying for. Further, Lincoln Electric's Vantage engine-driven welder includes a nameplate that lists the duty cycle of the machine to help prevent confusion.

2 - Not Comparing Auxiliary Power Correctly

Peak, continuous, three phase, single phase, with so many different types and ways to rate the auxiliary (AC) output of your machine, it can get very confusing. Here are a few things to remember that will help you get the amount of power you need.

PEAK POWER VS. CONTINUOUS POWER

The peak power will always be higher than continuous power, but can only be sustained for a short time (about 30 seconds or less). Peak power is needed for certain applications, such as starting pumps or other inductive loads, which can require a large in-rush current to get running After that initial surge, it settles into the lower, continuous power rating. Continuous power is the power available at a 100% duty cycle.

Always be sure you are comparing peak ratings to peak ratings and continuous rating to continuous ratings.

SINGLE-PHASE VS. THREE-PHASE

Single- and three-phase auxiliary power are fundamentally different due to the design of the AC circuit. As a result, these two types of output cannot be directly compared. More importantly, jobsite tools may require one over the other. For example, most hand-held tools are single-phase, while

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many pumps, welders and plasma cutters require three-phase power. Furthermore, the available three-phase power will be higher than the available single-phase power.

Once again, be certain to compare available three-phase with three-phase, and single-phase with single-phase.

SIMULTANEOUS WELDING AND AUXILIARY POWER

Just like the weld output ratings, the auxiliary power ratings are the maximum output the machine can give you. These machines are designed to provide both auxiliary and weld output at the same time, but there is some give and take. The following table is an example of this.

WELD AMPS		1 PHASE			3 PHASE			BOTH 1 AND 3 PHASE	
		WATTS	AMPS		WATTS	AMPS		WATTS	AMPS
0		12,000	50		20,000	50		–	50
100		12,000	50		17,800	43		–	50
200	PLUS	12,000	50	OR	14,000	34	OR	–	50
250		12,000	50		12,000	29		12,000	–
300		10,000	42		10,000	24		10,000	–
400		5,600	23		5,600	13		5,600	–
UP TO 600		0	0		0	0		0	0

AUXILIARY OUTPUT

It's also important to consider your auxiliary power needs. Engine welders also generate auxiliary (AC) power that can be used to run lights, pumps, power tools and other devices. As with welding output, it's important to review machine specifications closely to ensure a true comparison. The two ratings often used for auxiliary power are peak power and continuous power.

As you can see, when you increase the weld output the available auxiliary power decreases, and vice versa. It is important to understand the needs of your jobsite and application before you buy or rent.

Finally, depending on the machine's available auxiliary output, it is possible to run a second operator by plugging in an inverter-style welder to provide two arcs simultaneously. For example, a diesel-driven Frontier™ 400X can power a Flextec 350X PowerConnect inverter welder.

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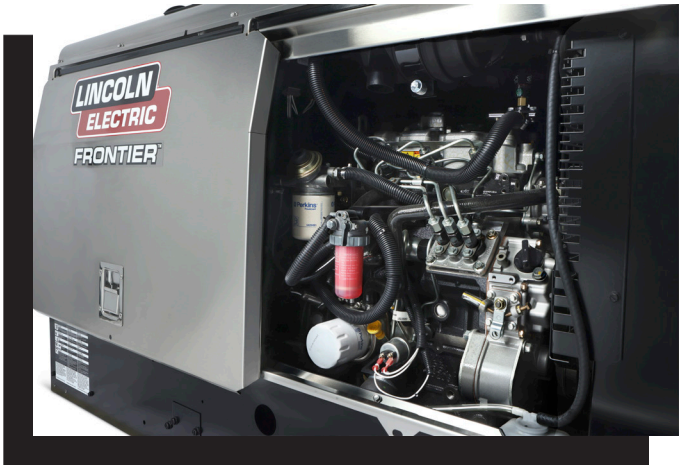

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ENGINE MANUFACTURER

There are multiple engines available in the same amperage class. This is another important consideration in the buying process. Engine service networks can vary by location, so for maintenance reasons, you'll want to consider an engine manufacturer that has a presence in your area.

Also, you can streamline your maintenance operations by having the same engine manufacturer throughout your fleet: welders, lifts, tow motors, etc.

ADDITIONAL FUNCTIONALITY

While all machines offer welding and auxiliary output, some machines offer additional functionality to maximize their versatility on the job site. Lincoln Electric offers engine-driven welders with integrated air compressors, hydraulic pumps and battery jump-start terminals. This can save space on your truck or job site, by combining multiple functions into one piece of equipment. Another great benefit is that you will not have to run cranes or tools off your truck engine, saving fuel and reducing wear and tear on the truck engine. It is especially useful in areas where vehicle engine idling is restricted.

Conclusion

With so many engine-driven welders available on the market, it's easy to get overwhelmed. Remember to keep the process simple by focusing on the five primary considerations outlined above: fuel type, welding output/duty cycle, auxiliary power output, the engine manufacturer and additional functionality. Don't be confused by product names that can sometimes be intentionally misleading. All the information you need can be found on the product specification sheet or owner's manual. Just look over the documentation and buy what you need.

