Plasma cutter pdf

I'm not robot!

A plasma cutter cuts metal by sending air or an inert gas through a plasma torch, sparking an electrical arc, and then forcing plasma through the torch tip to cut metal. The arc of a plasma cutter can reach temperatures of 45,000 degrees F and provide one of the fastest ways to cut metal. Plasma cutters have an on/off switch and an amperage setting that determines how much power to use for cutting. Provided the plasma cutter has enough power to cut through the metal workpiece, plasma is often a very safe, efficient, and clean way to cut metal. While many mention the advantages of plasma over oxy-fuel cutting, a plasma cutter requires a significant up front investment. Though a plasma cutter will certainly pay off in the long run with its speed and low operating costs if you need to cut a lot of metal, it can be daunting to select the right plasma cutter for your business or home workshop needs. The following guide will introduce some major factors to consider when purchasing a plasma cutter as well as some helpful links to the Baker's website where you can learn more about plasma cutters and related products. Match Your Plasma Cutter to Your Work As with purchasing a welder, the kind of plasma cutter you select will be determined by the kind of work you do. Unlike oxy-fuel cutting, a plasma cutter is capable of cutting just about every kind of metal. Therefore, the main consideration when choosing a plasma cutter is the thickness and amount of metal you plan on cutting. Below are some key questions to ask when trying to match a plasma cutter to your work: Are you cutting thick metal? How often will you use your plasma cutter? Do you need a portable unit? Are you willing to adapt your power outlets for your cutter? Do you have a generator you plan to use with your plasma cutter? Will your electrical current fluctuate? As you review your plasma cutter options, these questions will narrow down your choices. While certain units will stand out for your particular needs, it's likely that choosing between brands will come down to what you're used to or what's recommended to you. The main difference between brands is that one manufacturer's standard feature may be an extra on another brand's machine. There also are combination units that include a plasma cutter with a stick and TIG welder. If you just want a plasma cutter for the occasional job, this may be a great option provided you can find a unit that meets your TIG or stick welding needs. If you do decide to look into a portable unit that is light and runs off a generator, look for a unit that can handle the fluctuating power of a generator. Explore Plasma Cutters Choosing a Plasma Cutter's Output Power The output power of a plasma cutter will determine what it can cut. For example, 12 amps of output power from a 120V machine will be able to cut most 1/8 inch metal, while 60 amps of output power from a 230V machine will be able to cut most metals that are 7/8 of an inch thick. There also are inverter-based plasma cutters available that provide high cutting output power, yet weigh much less than regular cutting machines that offer the same cutting capacity. Choosing a Plasma Cutter's Cutting Speed The cutting speed for plasma cutters is typically noted as Inches Per Minute (IPM). Your work flow and priorities will determine what you need, but keep in mind that while two plasma cutters may be able to cut through a 1/2 inch of metal, one may cut through the metal in a minute, while the other could take as long as four or five if it has a slow cutting speed. Choosing a machine with the right cutting speed can make the difference between a sound investment and a dip in your productivity. Choosing a Plasma Cutter's Duty Cycle The duty cycle of a plasma cutter is the amount of time it can operate continuously within a ten minute span before needing to cool off. A five minute duty cycle means a plasma cutter can run for five minutes before needing to cool off for five minutes. If a machine is run at a lower power, the duty cycle may be extended, though excessively hot operating conditions may shorten it. Using a machine beyond its duty cycle will cause it to overheat. A longer duty cycle will be ideal for making long cuts or deep cuts on large pieces of metal, while a shorter duty cycle is ideal for a home shop where a series of small cuts are made regularly. Choosing the Right Torch for a Plasma Cutter There are two common types of plasma cutting torches. The most common torches are the high-frequency starting systems that create a spark with a high-voltage transformer, capacitors, and spark-gap assembly. High frequency torches have the advantage of not using any moving parts and therefore remain fairly dependable. However, they do require occasional maintenance and may create electric noise that can interfere with computers and other nearby electrical equipment in your office, shop, or home. Another option is the contact start torch that uses a moving electrode or nozzle in order to produce a spark that lights the pilot arc. This kind of torch does not create inference with other electrical items and turns on instantly without a pre-flow cycle. An excellent feature to explore in a torch is a drag shield that attaches to the cup of the torch and holds the tip at the ideal 1/16 to 1/8 of an inch from the metal being cut--this distance is known as the "stand off." The torch can be operated at full capacity with a constant standoff. The standoff distance is based on the thickness of the metal and the amount of amperage used to cut it, with low amperage cutting requiring little to no standoff distance. If you plan on working on thin metal, you will most likely only need a single flow torch that works with limited amperage and does not require an extra flow of shielding gas in order to cool the torch. For larger cutting operations or users who plan on cutting thick metal, a dual flow torch with a shielding gas will make it possible to cut thicker metal at a high amperage. Regardless of the way a torch ignites the plasma arc or utilizes a drag shield, choose a torch design that fits your hand well, especially if you plan on using it for extended periods of time. Choosing Your Consumables for a Plasma Cutter After making the initial purchase of a plasma cutter, the most important ongoing cost will be the cutting tips and electrodes. Therefore, before you pick up a plasma cutter, learn as much as you can about how fast your machine will use these items. A damaged tip from poor technique or a worn out electrode will either slow your cutting speed or reduce the quality of your cuts, and it's often recommended to change the tip and electrode together in order to achieve best cutting performance. David Cook of The Fabricator suggests the following equation for determining the ongoing cost of plasma cutting units: "Consumable cost, or the total consumable cost divided by the consumable life in hours of arc-on time per hour, is the most useful measurement. For example, if the cost of a nozzle is $4, the cost of the electrode is $6, and together a set lasts 2.5 arc hours, then the cost per hour, or CPH, is ($4 + $6)/2.5 = $4." What Else to Consider for a Plasma Cutter As with any large piece of machinery, it's important to test out a plasma cutter or to at least make sure the retailer offers a good return policy if the cutter does not live up to its promises. In addition, a reliable warranty will ensure your investment in a new cutting system will be a sound one for the long term. Hypertherm Powermax 30 XP Plasma System Hypertherm Powermax 45 XP Miller Spectrum 875 Auto-Line XT60 When both speed and cut quality matter, plasma cutters are the answer. Plasma cutters enable clean, dross-free cuts with minimal heat input on both ferrous and non-ferrous materials. At Welders Supply, you'll get free shipping on all plasma cutters and all orders over $300. Consider materials & thickness. When choosing a plasma cutter, your first consideration is the thickness of the material you want it to cut on a regular basis. Thick material requires higher amperage. If you plan on cutting both thick and thin materials, consider a high amperage machine with variable power. See the specifications tab of any plasma cutter on Welders Supply to see its cut capacity. Consider cut speed. Another important consideration: how fast do you want your plasma cutter to cut? Welders Supply carries a wide range of high-speed plasma cutters with capacities from as small as 1/8” up to 1”. The Hypertherm Powermax 30 XP, for instance, cuts through ½” mild steel three times faster than an oxyacetylene torch and has a lower operating cost. Consider the consumables you'll have to use. Plasma cutter consumables are pieces that wear down with use and must be replaced. Typical plasma cutters use a stack of various consumable parts that must be checked periodically for wear and replaced when worn down. The new Hypertherm Powermax SYNC line of plasma cutters makes this process much easier by combining all consumable parts into a single easy-to-swap cartridge, simplifying inventory management and reducing the time it takes to swap consumable parts. With the new SmartSYNC torches, you'll be able to have the right settings applied automatically and know exactly when to change your SmartSYNC consumable cartridges. Consider the duty cycle you need. The duty cycle of a plasma cutter is the percentage of time the machine can operate in a 10 minute time period. For example, a "50% @ 45 A" duty cycle means the plasma cutter can output 45 A of power for 5 minutes out of every 10 minutes the machine runs. Plasma cutters with higher duty cycle ratings are better for professional use in the field where speed of operation really counts. Consider whether you need CNC capabilities. Plasma cutters with a CPC port or serial port are able to integrate with CNC machines for automated plasma cutting. Plasma cutters with a CPC or serial port can be used for any type of plasma cutting, including handheld, machine and robotic plasma cutting. Many Hypertherm plasma cutters have the option to come with a CPC port or be upgraded to use one, including the Powermax45® XP, Powermax65®/85/105/125, and Powermax65/85/105 SYNC™ models. Compare Plasma Cutter Models by Brand The gold standard for plasma cutting, Hypertherm has developed some of the top-performing plasma cutters in the industry. Innovations like the Powermax SYNC line with easily swappable consumable cartridges give Hypertherm an edge over other brands. HypethermPowermaxPlasma Cutter Models Cut Capacity Rated Duty Cycle Price Powermax 30XP, Powermax 30 Air Up to 5/8'' 20% @ 120V35% @ 240V $ Powermax 45XP 1/2'' 50% @ 45 A, 200–240 V, 1-PH60% @ 41 A, 200–240 V, 1-PH100% @ 32 A, 200–240 V, 1-PH50% @ 45 A, 480 V, 3-PH60% @ 41 A, 480 V, 3-PH100% @ 32 A, 480 V, 3-PH $$ Powermax 65 SYNC 5/8'' 50% @ 65 A, 230–600 V, 1/3-PH40% @ 65 A, 200–208 V, 1/3-PH100% @ 46 A, 230–600 V, 1/3-PH $$$ Powermax 85 SYNC 3/4'' 60% @ 85 A, 230–600 V, 3-PH60% @ 85 A, 480 V, 1-PH50% @ 85 A 240 V, 1-PH50% @ 85 A, 200–208 V, 3-PH40% @ 85 A, 200–208 V, 1-PH100% @ 66 A, 230–600 V, 1/3-PH $$$$ Powermax 105 SYNC 7/8'' 70% @ 105 A, 240 V, 3-PH80% @ 105 A, 480–600 V, 3-PH100% @ 94 A, 480–600 V, 3-PH100% @ 88 A, 240 V, 3-PH $$$$$ Powermax 125 1 1/2'' 100% @ 125A $$$$$$ You're probably already familiar with Miller as a manufacturer of some of the top welding machines in the world. Miller brings this expertise to the plasma cutting world with the affordable, dependable Spectrum line of plasma cutting machines. MillerPlasma Cutter Models Cut Capacity Rated Duty Cycle Price Spectrum® 375 X-TREME™ 3/8'' 20% @ 27 A (115 V input)35% @ 27 A (230 V input) $$ Spectrum® 625 X-TREME™ 5/8'' 50% @ 40 A $$$ Spectrum® 875 Auto-Line 7/8'' 50% @ 60 A $$$$ Thermal Dynamics is a world leader setting the standard in flexibility, value and performance for advanced high precision plasma cutting equipment. Its manual systems, automated systems, manual torches, automated torches and full line of accessories cover every plasma cutting application imaginable. Thermal DynamicsPlasma Cutter Models Cut Capacity Rated Duty Cycle Price Cutmaster 40 Up to 1/2'' 40% @ 27 A (110V)40% @ 40 A (200-240V) $ Cutmaster 58 1/2'' 40% @ 60A60% @ 50A100% @ 30A $$ Cutmaster 60i 5/8'' 50% @ 60 A60% @ 50 A100% @ 40 A $$$ Cutmaster 82 3/4'' 40% @ 80A60% @ 65A100% @ 55A $$$ Cutmaster 102 1'' 60% @ 100A80% @ 80A100% @ 70A $$$$ Cutmaster 152 1 1/4'' 60% @ 120A $$$$ Other Brands Hobart plasma cutters Vicor ESAB plasma cutters For the best prices on quality plasma cutting equipment, shop Welders Supply Company online. For questions about welding or plasma cutting equipment, contact us online or call 1-800-236-8825. Related Categories Protect your eyes and skin with welding helmets, welding gloves and all other welding safety supplies available online.

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