



# Powermax SYNC machine-side reference

For mechanized applications with Powermax65/85/105 SYNC™



This machine-side reference guide is intended for those cutting on a CNC table to help maximize the performance of your Powermax SYNC system. Always refer to your operator manual for detailed safety and operating instructions.

Unlike other air plasma systems, the Powermax SYNC series uses a unique single-piece cartridge consumable and advanced communication capabilities to eliminate much of the system set up required by other plasma systems, allowing you to concentrate on improving your cuts.

## Choose the appropriate Hypertherm cartridge

- Once you have determined the material and thickness you intend to cut, choose the optimal cartridge that is also appropriate for your system (that is, if you choose, for example, a 105 amp cartridge for a Powermax65 SYNC, it will be limited to 65 amps).
- The power supply will set gas pressure, amperage, and cutting mode based on the installed cartridge.

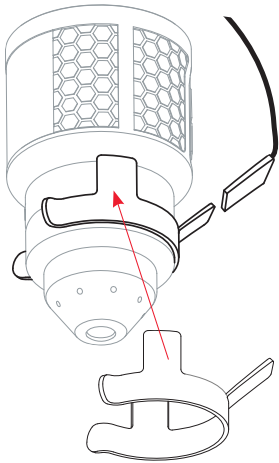
## Choose the right process

	Thickness (inch)										
	0.02	0.06	1/8	1/4	3/8	1/2	5/8	3/4	1	1-1/4	1-1/2
FineCut®	●	●	○								
45 A	●	○	○	○							
65 A		○	○	○	○	○	○	●	●		
85 A			○	○	○	○	○	○	●	●	●
105 A				○	○	○	○	○	●	●	●

- Optimized cut quality
- Near to optimal cut quality
- Decreased cut quality or speed

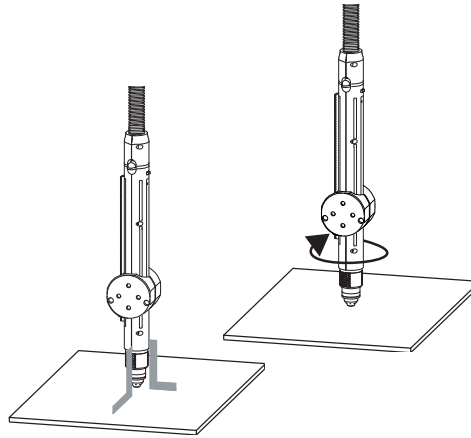
## Consult your cut charts for speed, cut height, and pierce height

- Book specs are intended as a starting point for optimizing your cut. Your results may vary based on the condition of your table, your CNC, and your method of height control. Proper pierce and cut height are especially important for the plasma cutting process. An incorrect pierce or cut height can lead to a number of problems, such as an arc that pilots but does not transfer.
- It is important to remember that the length of the plasma arc changes as the consumable wears and the distance from the work piece to the hafnium in the electrode increases, causing the arc voltage to increase. Height may need to be adjusted to account for this if you are not using a torch height control that senses arc voltage and adjusts automatically.
- See the complete cut charts in Powermax65/85/105 SYNC™ Cut Charts Guide (810500MU) that shipped with your system and can be found on Hypertherm's website.
- If using ohmic contact to measure arc voltage, ensure that the ohmic ring is correctly installed. The tabs on the ring should touch the shoulder of the cartridge as shown below.



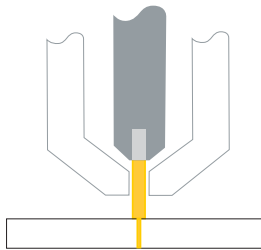
## Verify the torch is square and heights are correct

- Ensure the straightest possible cut by ensuring that the torch is square and the torch-to-work distance is correct.



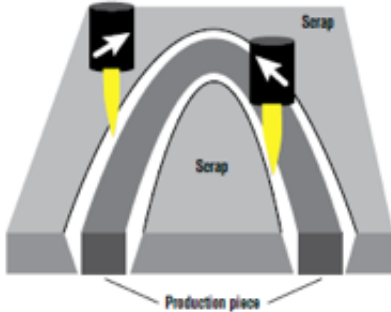
## Maximize consumable life

- Ensure you have clean, dry air. Oil, water, vapor, and other contaminants degrade cut quality and reduce cartridge life.
- Verify your cutting parameters, including torch height and pierce delay.
- Fire the torch only when necessary. Excess firing reduces cartridge life.
- In general, life is shorter on thicker workpieces. Refer to the recommended thicknesses for your power supply.
- Cutting expanded metal reduces life because the pilot arc remains on continuously.



## Plan your cut

- Due to the swirling action of the plasma gas, one side of the cut always has more bevel angle. The best part of the cut (the “good” side) is always on the right as the torch travels away from you. Keep that in mind as you set up to cut your part.



## Check your status screen or CNC for faults

- What you see on your status screen will vary depending on the cartridge installed and the Powermax SYNC™ features being used. Refer to your operator manual for a full list of fault codes and corrections.



## Perform regular maintenance on your table

- Unsteady drive system and rail movement can make torch motion unsteady, causing irregular cut patterns. Make sure that you do routine service and maintenance to the drive system and rails.

## Ensure an adequate supply of clean, dry air

- Check and replace the air filter element regularly.
- A three-stage coalescing filtering system, in addition to the built-in air filter, is recommended.
- Add an air dryer in humid environments. Keeping the gas supply line clean and dry is the simplest way to improve cut quality and consumable life.
- For optimum system performance, make sure that the inlet gas pressure stays between 110 psi–120 psi while gas is flowing.

## Questions to ask when troubleshooting

- Is the mechanized cutting system correctly grounded?
- Are cables routed and coiled in a figure 8 shape (if necessary) to avoid EMI interference?
- If you are using torch height control, is the ohmic contact ring installed correctly on the cartridge?
- Does the work lead have good metal-to-metal contact?
- Are the gas supply and filtration systems functioning properly?
- Check your CNC settings against the cut chart specifications that came with your system. Book settings are only a starting point, but your settings should be close.
- Is the Hypertherm cartridge worn or damaged? Check the center hole for roundness and remove any debris.
- Is the status screen showing any fault codes or icons? Refer to the Operator Manual.
- If the arc does not transfer, is the torch-to-work distance too great?

## Investigating common cut quality issues

### To eliminate low speed dross:

- Increase the cut speed in 5 ipm increments.
- Increase the standoff in 1/16 increments or 5 volt increments.
- Decrease the amperage in 10 amp increments.
- If none of these measures improve the cut, consider a smaller nozzle size (lower amp cartridge).

### To eliminate high speed dross:

- Check the cartridge orifice for roundness.
- Decrease the cutting speed in 5 ipm increments.
- Decrease the standoff in 1/16 increments or 5 volts increments.
- Increase the amperage (but do not exceed 95% of the cartridge rating).

For more information, visit:  
[www.hypertherm.com](http://www.hypertherm.com)

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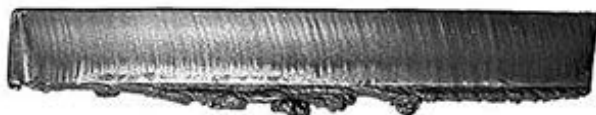
### 1. Cutting speed is just right



### 2. Cutting speed is too fast



### 3. Cutting speed is too slow



## Kerf width

Kerf is the space that remains when the plasma arc cuts through the metal. A more constricted plasma arc produces a narrower kerf. A wider arc produces a wider kerf.

- A kerf that is too wide can be caused by a worn cartridge, high torch standoff (arc voltage), excessive amperage, inadequate gas flow, or low speed.
- Conversely, a kerf that is too narrow can be caused by low torch standoff (arc voltage), inadequate amperage, excessive gas flow, or high speed.

Powermax SYNC™ cut charts provide an approximate kerf width for each amperage and thickness at best quality settings as a guideline.

## Bevel angle

A cut with 0° bevel is a straight cut, perpendicular to the plane of the material. Most plasma torches use a clockwise swirling flow of plasma gas, which produces a straighter cut on the right hand side of the kerf with respect to forward torch motion.

- Positive bevel angle indicates that the top of the cut is smaller than the bottom. Excessive positive bevel can be caused by This problem may be caused by a worn cartridge, high torch standoff (arc voltage), inadequate amperage, or excessive speed.
- Negative bevel, where the bottom of the part is smaller than the top, can be caused by low torch standoff (arc voltage), excessive amperage, or low speed.
- Irregular bevel generally indicates that the torch is out of square or the cartridge is near end of life.

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