Troubleshooting

For troubleshooting common issues related to your CrossFire™ machine and plasma cutting in general, please refer to the guide below. We also recommend searching through our Forum for additional information regarding your specific issue. If you still are experiencing technical issues, please submit a support request with Langmuir Systems by visiting our Support Page.

CrossFire™ CNC Plasma Machine Troubleshooting

PROBLEM	POTENTIAL CAUSES	SOLUTIONS
Plasma Cutter is not automatically firing or is mis-firing intermittently.	Worn out electrode.	Inspect electrode and replace as necessary.
	Cut height is too high.	If the pilot arc starts but does not transfer to the work piece, it is possible that the cut height is too high. Lower the cut height in 0.020" increments until continuity is achieved. Please consult your plasma cutter manufacturer for published cutting parameters for your model.
	Ground clamp not making electrical continuity with workpiece.	If the pilot arc starts but does not transfer to the work piece, it is possible that the ground clamp is not making continuity to the work piece. Inspect that the ground clamp is properly attached. Also inspect that the plate is not sufficiently rusted or has a coating that will prevent continuity.
	Plasma cutter is damaged.	Inspect that your plasma cutter is still working properly off of the machine. Remove the torch from the torch holder and perform a manual cut off of the machine. If the torch does not fire, it's possible that the plasma cutter or torch has malfunctioned and you will need to contact your plasma cutter manufacturer for resolution.
	Torch wiring not hooked up correctly to Torch ON/OFF port on electronics enclosure	Inspect that the two wires are plugged in correctly to the Torch ON/OFF output jack on the electronics enclosure and that full continuity is made.
	Torch wiring not hooked up correctly to plasma cutter trigger or CNC port.	Inspect that the wires going from the electronics enclosure at the Torch ON/OFF output jack are spliced in correctly to the plasma cutter torch trigger wires. You may need to use a multimeter to preform a continuity test by manually pulling the plasma torch trigger and testing for continuity between the two wires.
	Electrical relay inside CrossFire™ electronics enclosure is malfunctioning.	If all other solutions fail to produce proper automatic torch firing, it is possible that the electrical relay within the electronics enclosure is not working properly. Please contact Langmuir Systems and submit a support request.
Torch height offset is low in some areas of travel and high in others.	Workpiece is warped.	Most plate is not perfectly flat and it may be possible that your workpiece is warped. Use a straight edge to inspect the flatness of your plate. If your plate is slightly warped, we recommend using C-clamps to fasten your workpiece down to the slat bed or the machine frame when cutting.
	Slag accumulation on slat bed.	The table surface is established by the top surface of the slat bed which can become chewed up after repetitive cutting and slag accumulation. We recommend removing the slag accumulation from the slat bed to re-establish the original bed surface. If the slats are too worn, it may be necessary to purchase a new slat pack.
	Gantry tube is not level to slat surface.	If all other solutions fail, it is possible that the gantry tube is not level to the surface created by the slat bed. Please consult the Assembly Manual for the correct procedure for aligning the gantry tube.
Stepper motors are missing steps (stalling) during programmed motion.	Debris on rail tube surfaces.	Both rail tubes should be wiped down clean with a dry cloth before and after cutting to prevent the accumulation of dust and debris which can hinder motion.
	Excessive friction between lead screws and lead nuts.	Inspect the spring mechanism on both lead nuts to ensure that they are moving freely and are not bound up. Apply a light coat of oil or grease to the full length of both lead screws and jog the machine back and forth to evenly coat.
	Damaged carriage roller bearings.	Inspect the roller bearings on both carriages for obvious damage and replace as necessary.
	Machine travel limit reached.	When the machine travel limit is reached, it will cause the motors to stall. Please make sure that your program is not cutting outside the travel limits of the machine.
	Torch carriage colliding with workpiece.	Perform a dry run of your program to inspect a potential collision between your torch and the workpiece.
	Loose stepper motor connection at electronics enclosure.	Inspect the connection between the stepper motors and the electronics enclosure for a loose connection and fasten as necessary.
	Damaged Stepper Motor or Motor Drivers.	If all other solutions fail to fix this issue, please contact Langmuir Systems and submit a support request.
Excessive backlash (play) resulting in irregular cut geometry.	Lead screw couplers are loose.	Inspect that two couplers used on each end of the lead screw to ensure that a tight fit is achieved. Re-tighten as necessary.
	Lead nut is worn or damaged.	Inspect the lead nut to ensure that the threads are not damaged and that the spring tensioning mechanism is functioning properly. Replace lead nuts as necessary.
	Loose fastener between the lead screw coupler and roller bearing.	Inspect the fastener at the end of the lead screw coupler where it clamps to the bearing. Tighten as necessary.
	Lead nut fasteners are loose.	Inspect the fasteners that attach the lead nuts to the lead nut mounts. Tighten as necessary.
Communication lost between CrossFire™ machine and computer controller (Mach3).	USB cable unplugged from electronics enclosure or computer.	Inspect that the USB cable is properly connected to both the electronics control box and your computer.
	Synchronization has timed out between USB breakout board and Mach3 Software.	Sometimes the sync between the USB breakout board and Mach3 can be lost. This can be due to programs running in the background or if your computer goes to sleep while running. To fix this issue, restart Mach3 software to restore the sync.
	Breakout board (BOB) is damaged.	If all other solutions fail, it is possible that the USB breakout board is malfunctioning. Please contact Langmuir Systems and submit a support request.
CrossFire™ machine is not powering on.	The machine is not receiving power.	Inspect all power cords and the power inlet switch for connectivity.
	The power inlet fuse is blown.	Remove the fuse at the power inlet rocker switch and inspect for damage. Replace the fuse if damaged.
	The electronics control box is malfunctioning.	If all other solutions fail, it is possible that the electronics control box is malfunctioning. Please contact Langmuir Systems and submit a support request.

General Plasma Cutting Troubleshooting

PROBLEM	POTENTIAL CAUSES	SOLUTIONS
Excessive cut edge angularity (bevel).	Plasma torch nozzle is worn.	The most common cause for increased edge angularity is a worn nozzle. Remove your plasma torch from the torch mount and inspect the nozzle orifice for wear. Replace as necessary.
	Moisture in the compressed supply air.	Moisture in the supply air can result in decreased cut quality which can produce undesired edge bevel. Make sure that you have a water separator in line with your supply air going to the plasma cutter. Also ensure that this water separator is functioning properly and is not full.
	Torch is not perpendicular to cut surface.	Inspect that your torch is mounted properly in the torch mount and that the torch is aligned perpendicular to the workpiece surface. Re-align the torch carriage as necessary in accordance with the Assembly Manual provided.
	Travel speed is too fast.	An increased travel speed will not allow the plasma jet to cut fully down through the workpiece while moving. This causes the plasma column to lag behind while cutting which can produce excessive edge bevel. Slow your travel speed down in increments of 10IPM until the desired cut quality is achieved.
	Plasma torch nozzle diameter is too large.	Most plasma cutters have a range of nozzles that are rated for amperage. Typically the higher amperage nozzles will have a larger nozzle orifice diameter. This larger orifice can produce more edge angularity because the plasma jet is not as tightly focused when using a smaller nozzle size. We recommend lowering your amperage and selected a smaller fine cut nozzle if possible for your project to produce better edge angularity.
	Incorrect cutting amperage.	Incorrect cutting amperage can product either positive or negative edge bevel. Adjust your arc amperage in 3A increments until the desired cut quality is achieved.
	Workpiece is warped.	A warped workpiece can result in irregular cut angularity due to the fact that the torch is no longer perpendicular to the workpiece. Inspect your workpiece and clamp as necessary. If you are experiencing warpage while cutting on thinner material, we recommending cutting with a water table to eliminate this thermal distortion.
	Improper cut height.	Cut height can have an affect on edge angularity which can produce either a positive or negative edge bevel angle. Adjust the cut height either up or down in 0.030" to reduce edge angularity.
Excessive backside dross (slag).	Slow travel speed.	Backside dross can occur when cutting if the travel speed used is too slow. Try increasing your travel speed by 5 IPM increments until the amount of dross is reduced.
	Cut height is too low.	If the cut height is too low, this can cause more backside dross to form. Try increasing the cut height in 0.030" increments until the back side dross is reduced.
	Cutting amperage is too high.	If the cutting amperage is too high, this can cause an increase in the amount of backside dross. Try reducing the cutting amps in increments of 3A until the amount of dross is reduced.
	Large nozzle orifice diameter.	A larger nozzle orifice can result in an increased presence of backside dross. Consult your plasma cutter manufacturer for the availability of smaller nozzle sizes that are compatible with your cutting torch.
Excessive topside dross (spatter).	Cut height is too high.	Top spatter or top dross can occur when the plasma stream first pierces the work piece and the molten metal adheres to the top surface of the material. It is typically much less common than back side dross and it can be easily removed by chipping away from the work piece. If you are experiencing a high incidence of top dross, it is possible that your chosen cut height is too high and should be reduced.
	Pierce delay is too short.	If the pierce delay is too short, it does not allow the plasma arc enough time to correctly pierce the material completely before motion begins. Try increase the pierce delay in 0.1 second intervals until top dross is eliminated.
	Amperage is too low.	If the amperage is too low, the plasma cutter does not have enough power to quickly pierce the material. Try increasing the cutting amperage in intervals of 3A.
Cut holes are excessively tapered.	Travel speed is too fast.	When cutting holes, the plasma cutter is constantly changing direction which can make it difficult to achieve a full speed cut in smaller holes. If you are experiencing holes that measure larger on the top surface than the bottom, it may be necessary to cut these holes out at a slower travel speed. We recommend programming a second layer in SheetCAM for your part and putting holes in the second layer at half of the desired travel speed.
	Excessive edge angularity on part.	Holes typically have higher edge angularity than straight edges. If you are already experiencing high edge angularity on the rest of your part, this will make holes even worse. Please refer to the above section on edge angularity for more troubleshooting tips.
Workpiece experiences a large amount of distortion when cutting.	Thermal gradients established in workpiece during cutting.	The plasma cutting processes uses a high temperature plasma arc to melt and cut through the workpiece. As a result, the workpiece will heat up locally which can establish a thermal gradient in the part. This gradient can lead to distortion which will effectively warp you workpiece. Typically with material that is 3/16" and thicker, distortion is not as much of an issue because the plate is strong enough to resist this warping. On thinner plate and sheet metal, distortion can be an issue which can make detailed cutting impossible without distorting the workpiece. Fortunately, some cooling methods can be used that completely eliminates this distortion when cutting. A water table is simply a tray filled with water that surrounds the slat bed of a gantry-style CNC plasma machine. The tray is filled with water to below the top surface of the slat bed so that the action of plasma cutting causes water in the tray to splash back up onto the backside of the part being cut. This allows for part cooling, reduces cutting noise, decreases part warpage, reduces arc flash, and reduces smoke and cutting dust. A water table can be purchased for the CrossFire™ machine from Langmuir Systems or it can be made by following our guide in the Projects page. If you are not able to purchase a water table, we have had an equal amount of success by using a standard spray water bottle and continuously spraying the plasma arc with the water bottle during cutting to cool the part.
Cut does not penetrate completely through workpiece.	Amperage is too low.	If the plasma cutter amperage is too low, it will not have enough power to completely penetrate the material. Try increasing the amperage in 3A intervals until a clean and complete cut edge is achieved. Consult your plasma cutter manufacturer for proper amperage settings for your machine.
	Travel speed is too fast.	If the travel speed is too fast, the plasma arc will lag behind and will not be able to complete several the material. We recommend slowing down the travel speed in 10 IPM increments until a satisfactory cut edge is achieved.
	Supply air pressure too low.	If the supply air is too low, it will not have enough power to completely sever the material and will result in a poor cut edge. Consult your manufacture for the correct supply air pressure settings and make sure that your air compressor has enough capacity to keep up when cutting.
	Cut height is too high.	If the cut height is too high, the plasma arc may not penetrate completely through the material. Try lowering the cut high in 0.030" increments until a complete severance cut is achieved.
Consumables are wearing out more quickly than expected.	Nozzle orifice is clogged or dirty.	The daily buildup of dirt and grime on the nozzle can clog the orifice which greatly affects the swirling of the plasma arc. This can lead to decreased lifetime for both the nozzle and electrode. Make sure that the plasma nozzle remains clean before each use.
	Supply air pressure is incorrect.	If air pressure is too high, this can greatly reduce the lifetime of the electrode. Conversely, if air pressure is too low the nozzle orifice will wear which can affect cut quality. Consult your plasma cutter manufacturer for ideal air pressure settings for your specific plasma cutter model.
	Cut height is not set correctly.	When the plasma cutter initiates the arc, it can take several moments to completely pierce the material depending on the thickness of the material. During this pierce, molten metal is ejected from the topside of the material which can be blown back onto the nozzle orifice. As a result, it is important to use a cut height that is not too low to avoid this blow back of material which can damage the nozzle orifice over time. Conversely, if the cut height is too high the arc will not transfer which will degrade the lifetime of the electrode. Consult your plasma cutter manufacturer for the correct cutting height parameters for your given project.
	Supply air is not dry.	The plasma cutting arc is especially sensitive to moisture. Air compressors take humidified air from the atmosphere which always contains some amount of water. Make sure that you either have a water separator on your plasma cutter or that you have a water separator in line with your air compressor before the air is delivered to your plasma cutter. Moisturized air can greatly decrease the lifetime of your consumables and can negatively affect cut quality.
	Incorrect cutting parameters.	Every plasma cutter is different. We encourage you to contact your plasma cutter manufacturer to get a complete list of proper cutting parameters to use with your machine to optimize the lifetime of your consumables.
	The workpiece is warped.	If a workpiece is warped, it can cause a unidirectional edge bevel because the plasma arc is not perpendicular to the material surface. Inspect the material for flatness and use clamping

Support

Unequal (uni-directional) edge angularity.		as necessary.
	The torch is not mounted perpendicular to the slat bed surface.	Inspect that your torch is mounted properly in the torch mount and that the torch is aligned perpendicular to the workpiece surface. Re-align the torch carriage as necessary in accordance with the Assembly Manual provided.
	Slag accumulation on slat bed creating an unequal cut surface.	The table surface is established by the top surface of the slat bed which can become chewed up after repetitive cutting and slag accumulation. We recommend removing the slag accumulation from the slat bed to re-establish the original bed surface. If the slats are too worn, it may be necessary to purchase a new slat pack.
	The gantry tube is misaligned.	If all other solutions fail, it is possible that the gantry tube is not level to the surface created by the slat bed. Please consult the Assembly Manual for the correct procedure for aligning the gantry tube.
Irregular cut geometry along one axis.	Incorrect stepper motor settings in Mach3.	If the motor tuning settings are changed accidently in Mach3, it can affect the 'gear ratio' for a given axis. If this happens, you will need to re-load the specific Mach3 configuration file for the CrossFire^{TM} machine. Please consult the Assembly Manual for instructions on how to configure Mach 3 for your machine.
	One lead screw coupler is loose.	Inspect that two couplers used on each end of the lead screw to ensure that a tight fit is achieved. Re-tighten as necessary.
	Lead nut is worn or damaged.	Inspect the lead nut to ensure that the threads are not damaged and that the spring tensioning mechanism is functioning properly. Replace lead nuts as necessary.
	Loose fastener between the lead screw coupler and roller bearing.	Inspect the fastener at the end of the lead screw coupler where it clamps to the bearing. Tighten as necessary.
	Lead nut fasteners are loose.	Inspect the fasteners that attach the lead nuts to the lead nut mounts. Tighten as necessary.
Part dimensions are oversized/undersized compared to design.	Kerf width setting is too large.	If the kerf width setting for your programmed tool in SheetCAM is too large, the dimensions of all outside offset part geometry will be undersized (all inside offset geometry will be oversized). We recommend making a test cut at the known parameters in a straight line and using a tape measure or caliper to measure the actual kerf width.
	Kerf width setting is too small.	If the kerf width setting for your programmed tool in SheetCAM is too small, the dimensions of all outside offset part geometry will be oversized (all inside offset geometry will be undersized). We recommend making a test cut at the known parameters in a straight line and using a tape measure or caliper to measure the actual kerf width.
Divots' created in cut edge at starts/stops.	Missing or under-sized cut lead-in.	Lead-ins are used when CNC plasma cutting in order to make smooth cuts when piercing a material. A lead-in is used at the start of a cut so that the plasma arc can be pierced in an area of the part that is slightly away from the actual geometry of the part. After making the pierce, the plasma torch moves along the lead-in path (usual an arc) and makes a smooth cut around the part geometry. Without a lead-in, a rough cut or 'divot' will result where the plasma torch first made the initial pierce since it pauses here for a given amount of time when piercing.
	Excessive gap between part and slat surface.	Sometime 'divots' in the cut edge can result when a cut is finished and the part starts to drop out before the cut is completely finished. This usually happens when the drop is small enough so that it is unsupported by the slat bed when the cut is complete. To avoid this, make sure that the drop is supported when the cut is complete.

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