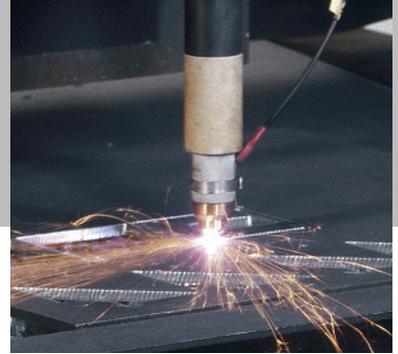


Powermax® machine-side reference guide



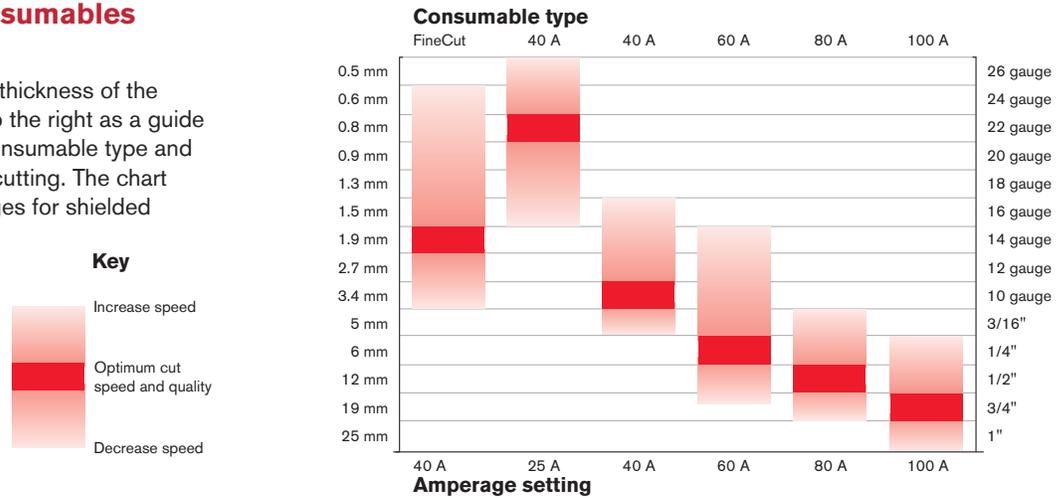
For mechanized applications with Powermax1000, Powermax1250 and Powermax1650

This Powermax machine-side reference guide is a supplement to your Operator Manual and includes examples of edge cut quality and consumable wear. Always refer to your Operator Manual for detailed safety and operating instructions.

Step 1

Select appropriate consumables and amperage

- Once you have determined the thickness of the metal to be cut, use the chart to the right as a guide to determine the appropriate consumable type and amperage setting for optimum cutting. The chart provides general thickness ranges for shielded cutting of mild steel. Refer to your Operator Manual for more accurate speed and thickness measurements.



Step 2

Install appropriate consumables

- Once you have chosen an appropriate amperage setting from the chart in **Step 1**, use the pictures to the right as a guide to help you choose the correct Powermax consumable parts and properly assemble your torch. (Refer to Operator Manual for full selection of consumables.)

Ohmic sensing retaining caps



40 A – 80 A 100 A

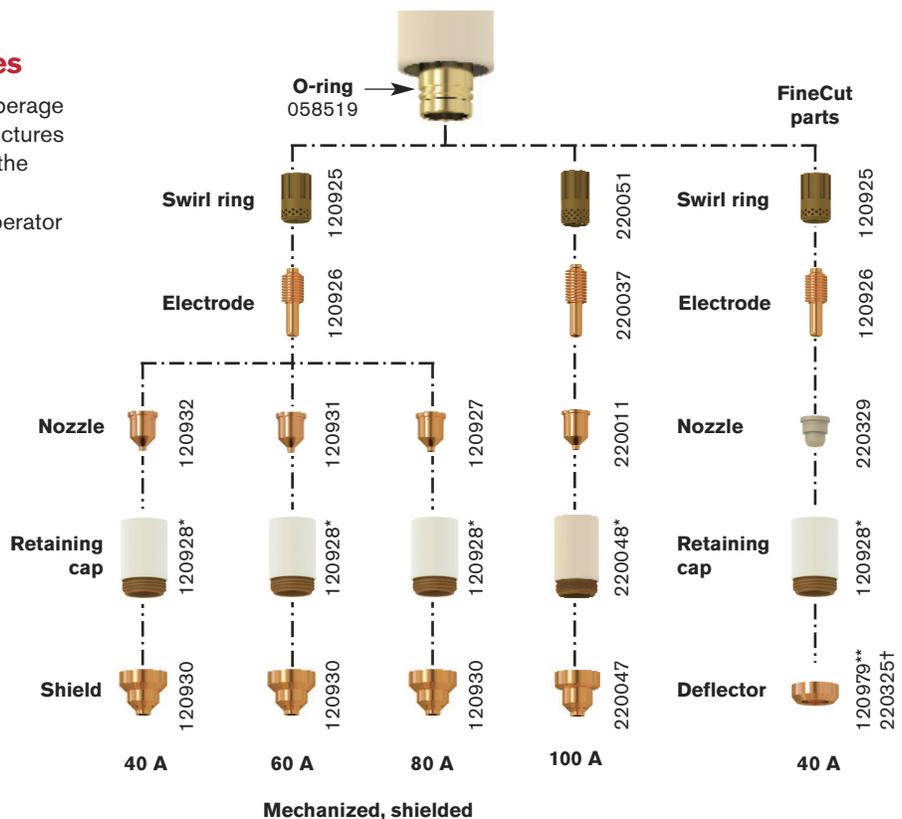
FineCut Ohmic shield



* Use an ohmic sensing cap when a torch height control is installed.

** Use an ohmic shield when using FineCut consumables and a torch height control is installed.

† For use in countries that require CE, CCC or GOST marks.



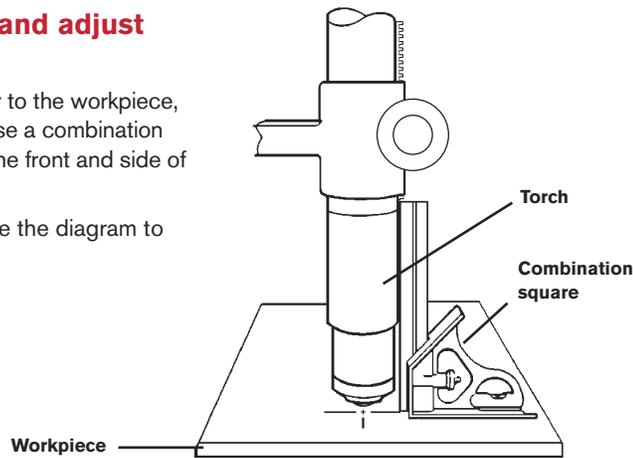
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Step 3

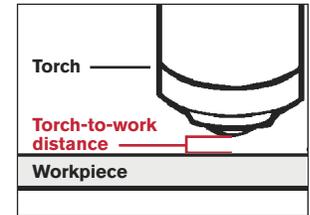
Verify that the torch is square and adjust torch-to-work distance

- Set up your torch so that it is perpendicular to the workpiece, in order to achieve a square, vertical cut. Use a combination square to ensure the torch is square from the front and side of the torch.
- Set the proper torch-to-work distance. Use the diagram to the right as a reference.



Torch-to-work distance

Amperage	Distance (using shielded consumables)
60A	1/16" (1.5 mm)
80A	1/16" (1.5 mm)
100A	1/8" (3 mm)



Step 4

Set the mode switch

- Ensure the **Mode switch** is set to the center position for plate/sheet metal cutting, or to the correct setting if you are cutting expanded metal or gouging.

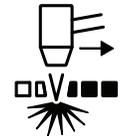


Expanded/punched metal



Mode switch up

Mode switch

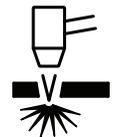


Plate/sheet metal*



Keep mode switch level

Mode switch



Gouging**



Mode switch down

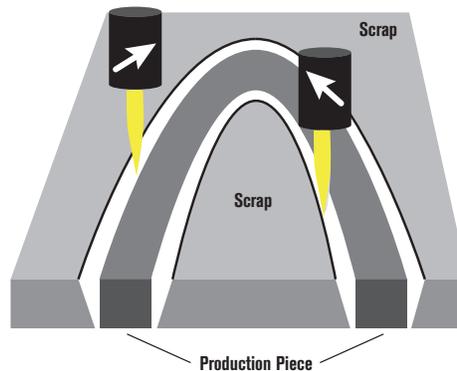
Mode switch



**Refer to your Operator Manual for gouging consumables

*Verify correct torch direction when cutting plate/sheet metal

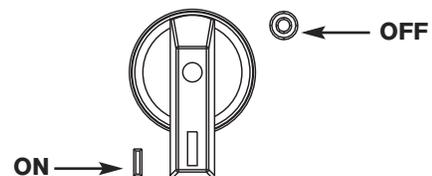
Due to the swirling action of the plasma gas, one side of the cut will always have more bevel angle. This is called the "scrap side" of the cut. The "good side" is on the right as the torch is traveling away from you. Refer to the picture to the right.



Step 5

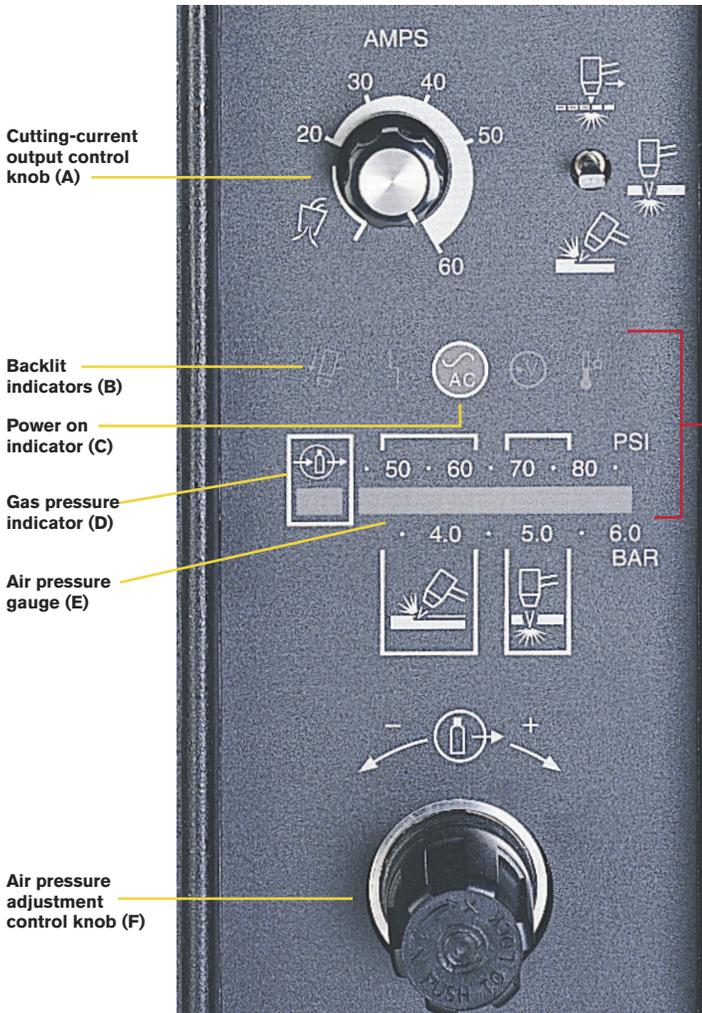
Turn on the power

- Position the power switch to ON as shown.
Note: The cooling fan is automatic and will only operate when needed.
- The power switch is found on the back of the system.



Step 6

Check indicator lights



Indicator light description



Power ON indicator: Green

When illuminated, indicates that power is applied to the system and the power switch is ON (I).



Gas pressure indicator: Illuminated

When illuminated, indicates that there is acceptable gas pressure for torch operation.



Red fault indicator: Not illuminated

If illuminated, indicates that a fault condition exists, which prevents system operation. A troubleshooting indicator should also be illuminated to identify the type of fault.

Troubleshooting indicators



Gas pressure indicator: Flashing

When flashing, indicates that the gas pressure is below 65 psig (4.5 bar) for cutting, or 40 psig (2.8 bar) for gouging.



Temperature indicator

When illuminated, indicates that the power supply temperature has exceeded its operating limit.



Line voltage indicator

When illuminated, indicates that line voltage is below 170 VAC, above 680 VAC, or missing a phase.



Torch cap indicator

When illuminated, indicates that the retaining cap is loose or not installed.

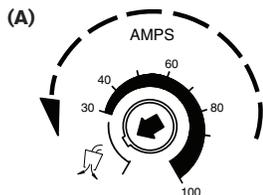
Note: These conditions must be corrected and the power turned OFF and then ON again to clear the troubleshooting indicator.

Step 7

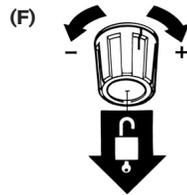
Adjust gas pressure and current setting

Refer to the picture in **Step 6**.

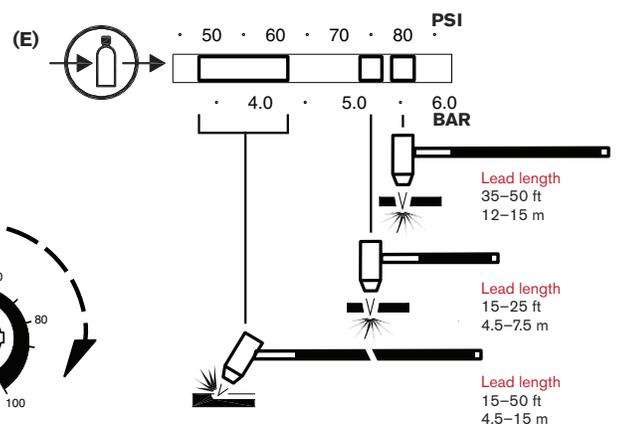
1. Set the **Cutting-current output control knob** to gas test.



2. Pull the **Air pressure adjustment control knob** to unlock it.



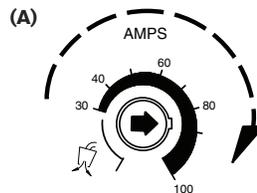
3. Set the **Air pressure gauge** for the torch lead length by adjusting the **Air pressure adjustment control knob (F)**. Gas pressure is dictated by lead length.



4. Push the **Air pressure adjustment control knob** to lock it.



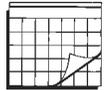
5. Set the **Cutting-current output control knob** to match the current you chose in **Step 1**, *Select appropriate amperage.*



You are now ready to begin cutting...

Maintenance schedule

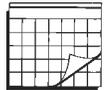
		WARNING ELECTRIC SHOCK CAN KILL
<p>Disconnect electrical power before performing any maintenance. All work requiring removal of the power supply cover must be performed by a qualified technician.</p>		



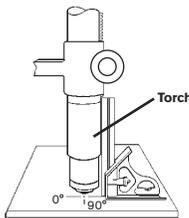
Each week



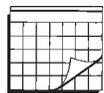
Check the torch cap-on safety switch: be sure that red fault indicator and yellow torch cap indicator illuminate when the cap is loosened.



Each month



See **Step 3**, Verify that the torch is square.



3 months



Replace damaged labels.



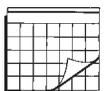
Replace power cord or plug if damaged.



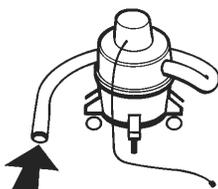
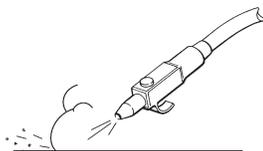
Replace torch lead if damaged.



Check the pressure hose, filter element, and connections for leaks.



6 months



Clean the inside of the power supply with air pressure or vacuum.

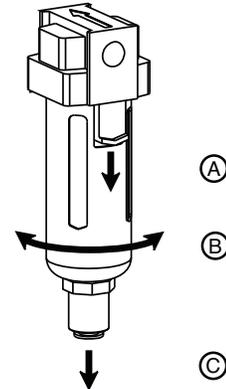
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Filter element replacement

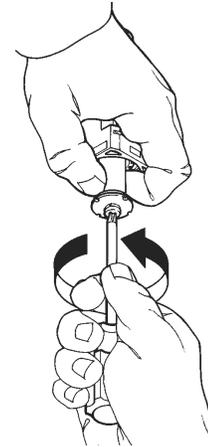
- Disconnect the electrical power and gas supply. Remove the filter bowl.
 - Pull down on the black release tab and hold.
 - Rotate the filter bowl until it is released.
 - Pull the filter bowl down to remove it.

Note: Do not discard the o-ring.

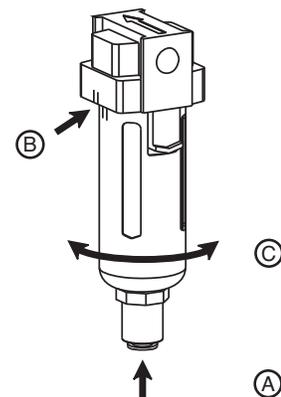


- Remove the filter element from the filter housing.

Note: Do not allow the filter element to turn when loosening the screw.



- Install the filter bowl.
 - Slide the filter bowl over the filter element.
 - Align the marks on filter bowl and filter body.
 - Rotate the filter bowl until it locks in place.



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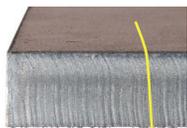
© 3/09 Hypertherm, Inc. Revision 0
893270

Troubleshooting for Powermax[®] mechanized cutting applications

Cut quality

Cut samples generated from a Powermax1650 with a machine torch (T100M). No secondary work was performed on the cut edges shown. Operator Manual specifications were used to create the optimum cut.

Optimum cut



Lagline

Operator Manual specifications

1/2" (12 mm) mild steel sample cut at 100 A.

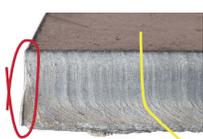
What to look for

1. Well defined lag lines with an angle of 10 – 15 degrees
2. Minimal dross
3. Square edges
4. No top splatter
5. No discoloration

Potential issues

Issue(s)

Excess bevel angle



Result of high speed

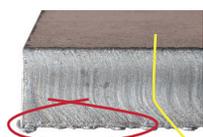
Possible cause(s)

1. Torch not square
2. Torch-to-work distance too high
3. Amperage too low
4. Speed too fast
5. Incorrect torch travel direction
6. Worn nozzle

Solution(s)

1. Square torch to workpiece
2. Lower torch-to-work distance
3. Increase amperage
4. Decrease speed
5. Change direction
6. Replace nozzle

Hardened dross

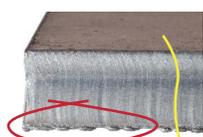


Result of torch-to-work distance too high

1. Speed too fast
2. Amperage too low
3. Torch-to-work distance too high

1. Decrease speed
2. Increase amperage
3. Lower torch-to-work distance

Easily removed dross



Result of slow speed

1. Speed too slow
2. Amperage too high
3. Torch-to-work distance too low

1. Increase speed
2. Decrease amperage
3. Raise torch-to-work distance

Top splatter



Result of slow speed and torch-to-work distance too high

1. Speed too slow
2. Torch-to-work distance too high
3. Worn nozzle

1. Increase speed
2. Lower torch-to-work distance
3. Replace nozzle

Recommendations

Use high-quality consumables

You can not get a good cut without good consumables. Dimensions and tolerances of plasma consumables are critical to performance. Consumables must be precision manufactured from high quality materials. To optimize cut quality, always start with a new set of consumables.

Choose the right consumables for the job

Different amperages require some different consumables. Check your Operator Manual to ensure you use the correct consumables for the job. Good cut quality starts with the right nozzle. For fastest speeds use the highest amperage and biggest nozzle possible for your system. For optimizing cut quality, try a smaller nozzle and lower amperage for a narrower kerf and finer cut.

Assemble the torch correctly

Carefully assemble the torch, making sure the consumables align and fit together. This ensures good electrical contact and correct flow of gas through the torch. When changing consumables keep them on a clean towel to keep dirt and metal dust away. Use the proper amount of o-ring lube – just enough to put a shine on the o-ring.

Set the appropriate amperage

Set the amperage to 95% of the nozzle's amperage rating. Nozzles are sized according to amperage. The higher the amperage, the bigger the nozzle orifice. An amperage setting that is too low for the nozzle causes a "soft arc" and a sloppy cut. An amperage setting that is too high for the nozzle will quickly wear out the nozzle.

Square the torch to the workpiece

A torch that is not perpendicular to the workpiece will cause a bevel angle in the cut. Ensure the torch is square from the front and side of the torch.

Verify the cut direction

The good side of a cut is always the right side of the kerf of forward torch motion. Validate appropriate travel direction with a test cut.

Adjust the torch-to-work distance

On mechanized systems, adjust the torch-to-work distance of the torch tip to the workpiece according to torch-to-work distance guidelines in the Operator Manual.

Adjust the cutting speed

Select an initial speed based on the cut charts in your Operator Manual. Make a test cut and observe the angle of the cutting arc through a welding lens as it exits the workpiece. Adjust the speed to create an arc angle of 10 – 15 degrees.

Troubleshooting for Powermax[®] mechanized cutting applications

Consumable wear

New electrode and nozzle



Top view of electrode

Partially used electrode and nozzle



Top view of electrode

Time to change electrode and nozzle



Top view of electrode

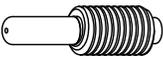
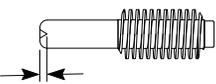
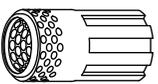
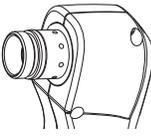
Pit depth of 1/32" (0.8 mm)

Overused electrode and nozzle



Top view of electrode

"Blowout"

Part	Check for	Action
 Nozzle Center hole	Roundness of through hole  Good  Worn	Examine through hole closely. If out of round, replace.
 Electrode Center surface	 Max. 1/32" (0.8 mm) Maximum pit depth 1/32" (0.8 mm)	Replace
 Swirl ring External surfaces Central bore (I.D.) Gas holes	Damage or debris Does electrode slide easily? Blocked holes	Replace If not, replace the swirl ring. Replace
 Torch o-ring External surfaces	Damage or wear Dry surface	Replace Apply a thin film of silicone grease. (Part number 027055)