



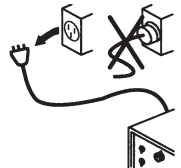
# ***HyPerformance™ HD3070®***

## ***Torch Upgrade***

**Field Service Bulletin**

***805390 – Revision 2 – May 2008***

***Hypertherm®***

		<p><b>WARNING</b> <b>ELECTRIC SHOCK CAN KILL</b></p>
	<p><b>Disconnect electrical power before performing any maintenance. All work requiring removal of the power supply cover must be performed by a qualified technician. See <i>Section 1</i> of the Instruction Manual for more safety precautions.</b></p>	

## Introduction

### Purpose

This document describes the necessary steps to upgrade the HD3070 torch to the HyPerformance (HPR) torch.

### Kit 228132 contents

Part number	Description	Qty
228133	HPR machine torch assembly: HD3070 upgrade	1
128812	Kit: Pressure test gauges	1
024429	Hose assembly: 3/16", gray, right hand, 4'	1
024430	Hose assembly: 1/8", nylon, left hand, 4'	1
024485	Hose assembly: quick-disconnect vent	1
004949	Heatshrink: 3/4" ID x 3.75" long, black	1
027055	Lubricant: silicone 1/4-oz tube	2
104119	Tool: HPR consumables	1
110600	Decal: "H35/F5"	3
110601	Decal: HyPerformance	1

### Installation

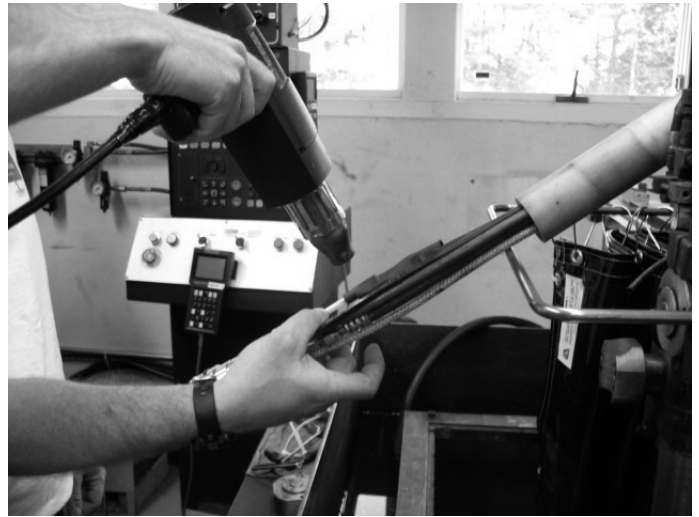
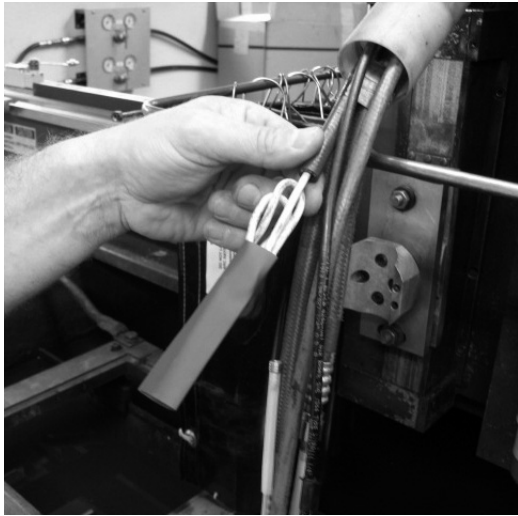
1. Remove the existing torch, quick-disconnect (if necessary), and sleeve assembly from the lifter.
2. Unscrew the mounting sleeve and slide it up to expose the hose fittings.
3. Disconnect all the hoses and the pilot arc connection from the torch and remove the sleeve.
4. Inspect all hoses and wires for damage. Use the hoses provided in this kit as necessary.
5. Slide the new sleeve over the lead set and connect the gas and coolant leads to the new HPR quick-disconnect.



6. On some systems the blue hose surrounding the pilot arc wire (white) is too long for the new torch. This may make it difficult to connect the pilot arc wire. If necessary, carefully remove a portion of the blue hose (5 to 8 cm/ 2 to 3 inches). **The pilot arc wire must not be cut or damaged.** Use wire cutters to reduce the possibility of damaging the wire. Cut from the end of the hose to the desired position, and then cut around the circumference of the hose. When the hose has been cut to the correct length, slide the heat shrink tubing over the pilot arc wire.



7. Fold the excess pilot arc wire, slide the heat shrink over the folded wire, and apply heat. The loose wire can also be pulled back into the ignition console. Any excess wire in the ignition console must be secured with heat shrink or tape.



8. If a visual inspection shows no leaks around the fittings, slide the sleeve into place and tighten by hand. Consumables must be installed at this time in order to turn on the power supply. See *Install consumables* on page 10 for details.
9. In most cases, the large black o-ring on the quick-disconnect must be removed to allow it to be installed in the torch holder. Reinstall the o-ring when the torch is in the holder.
10. Install the torch on the lifter and verify that the torch is aligned properly.
11. Attach the new F5 labels if the F5 process is being used, and any other labels provided, for the gas console and power supply.

### Inlet-gas pressure settings

Note 1: inlet-gas pressures must be set to 8.3 bar +/- 0.7 bar (120 psi +/- 10 psi), while in the test cutflow mode, with the gas flowing. The inlet-gas pressure can be read on the gauges mounted on the inlet side of a manual gas console or on the LCD display of an auto gas console, but should also be verified with an external gauge.

Note 2: Consumables must be installed in the torch.

### Verification and adjustment of gas flow settings

The following procedure is recommended for all auto gas consoles but can also be applied to manual gas consoles so the torch operates with the optimum gas flows.

Upgrading the torch on a system with an auto gas console that is operated from a remote location will require technical support from the original equipment manufacturer (OEM).

The gas settings used with auto gas consoles may need to be adjusted to compensate for any flow valves that are out of adjustment. Not all consoles or valves will require adjustments to the gas settings.

The new pressure gauges provided in this kit must be installed between the off-valve and the torch before you begin the procedure. The gauge with the clear hose is for the plasma gas and the gauge with the gray hose is for the shield gas.

### Gas pressure adjustments

1. Use the toggle switch on the back of the gas console to change the auto gas console to local operation if it is controlled from a remote location (CNC controller).
2. Adjust the inlet pressures, during cutflow, to 8.3 bar +/- 0.7 bar (120 psi +/- 10 psi). Consumables must be installed.
3. Install the consumables for the desired process and adjust the gas flows according to the cut chart. Some processes have multiple settings for different material thicknesses.
4. With the console set to test preflow, check the new plasma and shield pressure gauges for the correct pressures shown in the chart (pages 5 and 6). Be sure to read the correct pressures if the process has multiple settings. The pressures do not need to be exact, but should be within 0.3 bar (5 psi) for optimum performance.
5. If the pressures during preflow are not correct, adjust the preflow gases using the appropriate knobs on the gas console until the pressure on the plasma gauge is correct. If two gases are used, adjust both gases proportionally when you make the adjustment. During preflow the plasma and shield pressures can not be adjusted independently.
6. Switch to cutflow and check the gauges for the correct readings. If the pressures are not correct adjust them using the appropriate knobs on the gas console until the pressures are within range. If two gases are used, adjust both gases proportionally when you make the adjustment.
7. Record all new settings shown on the gas console display for any flow settings that have changed. If the gas console is operated from a remote location these settings will need to be entered into the controller.
8. Adjust all other cut parameters using the new cut chart and make a test cut to check the performance. Adjust arc voltage as necessary to achieve the correct height.
9. While the torch is cutting, check, that the pressures at the off-valve are close to the values in the chart under "pressures while cutting." It may be necessary to adjust the settings again to optimize the pressures during cutting. During the first cut, the pressures in the hoses must build. Wait until the pressures have stabilized before making any readings. The back pressures at the gas console can also be checked at this time.
10. After the correct pressures are reached, all final settings must be recorded and entered into the controller's cut programs if the gas console is operated from a remote location.

If no adjustments to gas settings are needed, it may be possible to use the flow settings in the cut charts for the remaining processes. If adjustments are needed, all processes that will be used on the system must be adjusted individually to achieve the best results. Some processes have multiple settings and all of them should be checked. For different processes, install the consumables for that process and repeat the test from step 3 in this procedure.

After all the desired processes have been tested and the new values are entered in the CNC, the values should be recorded for future reference. If the performance of the torch changes in the future or if any motor valves in the gas console are repaired or replaced, the same procedure can be used to check the pressures and make adjustments.

## HYPERFORMANCE HD3070 TORCH UPGRADE

### Process pressure charts (continued on next page)

Material type	Current	Material thickness	Test pressures				Pressures while cutting				
			Prewflow pressure (at off-valve)		Cutflow pressure (at off-valve)		Pressure (at off-valve)		Back pressure (at console)		
	Amps	mm (in)	Plasma	Shield	Plasma	Shield	Plasma	Shield	Plasma	Shield	Prewflow
Mild steel	30	1.5 mm (0.06") and smaller	4.0 bar (58 psi)	4.0 bar (58 psi)	5.0 bar (73 psi)	1.2 bar (17 psi)	6.6 bar (95 psi)	1.2 bar (17 psi)	6.6 bar (95 psi)	1.2 bar (17 psi)	4.0 bar (58 psi)
		2 mm (0.075") and larger			5.1 bar (74 psi)	0.6 bar (8 psi)	6.7 bar (97 psi)	0.5 bar (8 psi)		0.6 bar (8 psi)	3.9 bar (57 psi)
	50	All thicknesses	3.0 bar (43 psi)	3.0 bar (43 psi)	3.5 bar (50 psi)	1.2 bar (17 psi)	5.7 bar (83 psi)	1.2 bar (17 psi)	6.1 bar (88 psi)	1.1 bar (16 psi)	3.4 bar (50 psi)
	80	All thicknesses	1.7 bar (24 psi)	1.5 bar (22 psi)	1.9 bar (28 psi)	1.9 bar (28 psi)	5.5 bar (80 psi)	1.7 bar (24 psi)	5.2 bar (75 psi)	2.3 bar (34 psi)	2.5 bar (36 psi)
	100	6 mm (0.25") and smaller	1.2 bar (17 psi)	1.2 bar (17 psi)	2.0 bar (29 psi)	1.8 bar (26 psi)	4.8 bar (69 psi)	1.8 bar (26 psi)	5.2 bar (75 psi)	2.6 bar (38 psi)	2.3 bar (34 psi)
		10 mm (0.375") and larger				1.6 bar (24 psi)		1.6 bar (24 psi)	5.0 bar (73 psi)	2.2 bar (32 psi)	

Material type	Current	Material thickness	Test pressures				Pressures while cutting				
			Prewflow pressure (at off-valve)		Cutflow pressure (at off-valve)		Pressure (at off-valve)		Back pressure (at console)		
	Amps	mm (in)	Plasma	Shield	Plasma	Shield	Plasma	Shield	Plasma	Shield	Prewflow
Stainless steel	45	All thicknesses	2.5 bar (36 psi)	2.4 bar (36 psi)	2.3 bar (34 psi)	3.6 bar (53 psi)	4.3 bar (62 psi)	3.4 bar (49 psi)	4.2 bar (61 psi)	4.5 bar (65 psi)	3.4 bar (49 psi)
	45	4 mm (0.135") and smaller	1.7 bar (24 psi)	1.7 bar (24 psi)	2.1 bar (30 psi)	3.4 bar (49 psi)	4.3 bar (62 psi)	3.4 bar (49 psi)	4.5 bar (65 psi)	4.4 bar (64 psi)	2.5 bar (36 psi)
		6 mm (0.188") and larger				1.2 bar (17 psi)		1.1 bar (17 psi)	4.1 bar (60 psi)	1.5 bar (22 psi)	
	70	10 mm (0.375") and smaller	1.2 bar (17 psi)	1.1 bar (16 psi)	1.9 bar (28 psi)	1.3 bar (19 psi)	5.2 bar (75 psi)	1.3 bar (19 psi)	5.3 bar (77 psi)	1.8 bar (26 psi)	1.8 bar (26 psi)
		12 mm (0.5")			3.2 bar (47 psi)		6.2 bar (90 psi)		6.3 bar (92 psi)		
	80	All thicknesses	2.0 bar (29 psi)	1.9 bar (28 psi)	2.7 bar (39 psi)	3.1 bar (45 psi)	4.5 bar (65 psi)	3.0 bar (44 psi)	4.3 bar (62 psi)	4.0 bar (58 psi)	3.1 bar (45 psi)
100	10 mm (0.375") and smaller	1.3 bar (19 psi)	1.2 bar (17 psi)	3.8 bar (55 psi)	3.1 bar (45 psi)	5.4 bar (78 psi)	3.1 bar (45 psi)	5.5 bar (80 psi)	3.9 bar (57 psi)	2.1 bar (30 psi)	
	12 mm (0.5") and larger			5.9 bar (85 psi)		3.0 bar (44 psi)		6.7 bar (97 psi)	3.0 bar (44 psi)		6.9 bar (100 psi)

## HYPERFORMANCE HD3070 TORCH UPGRADE

Material type	Current	Material thickness	Test pressures				Pressures while cutting				
			Prewlow pressure (at off-valve)		Cutflow pressure (at off-valve)		Pressure (at off-valve)		Back pressure (at console)		
Mild steel	Amps	mm (in)	Plasma	Shield	Plasma	Shield	Plasma	Shield	Plasma	Shield	Prewlow
Aluminum	45	All thicknesses	1.5 bar (22 psi)	1.5 bar (22 psi)	1.9 bar (28 psi)	1.9 bar (28 psi)	4.3 bar (62 psi)	1.9 bar (28 psi)	4.1 bar (60 psi)	2.5 bar (36 psi)	2.1 bar (30 psi)
	70		1.2 bar (17 psi)	1.1 bar (16 psi)	1.9 bar (28 psi)	1.3 bar (19 psi)	5.2 bar (75 psi)	1.3 bar (19 psi)	5.3 bar (77 psi)	1.8 bar (26 psi)	1.8 bar (26 psi)
	100		1.3 bar (19 psi)	1.2 bar (17 psi)	3.8 bar (55 psi)	3.1 bar (45 psi)	5.4 bar (78 psi)	3.1 bar (45 psi)	5.5 bar (80 psi)	3.8 bar (55 psi)	2.0 bar (29 psi)

**Estimated kerf width compensation**

The widths in the chart below are for reference. Differences between installations and material composition may cause actual results to vary from those shown in the tables.

**Metric**

Process	Thickness (mm)						
	1.5	3	6	10	12	15	20
<b>Mild steel</b>							
100A O <sub>2</sub> /O <sub>2</sub> and N <sub>2</sub>		1.318	1.743	1.976	2.168	2.419	2.753
80A O <sub>2</sub> /O <sub>2</sub> and N <sub>2</sub>		1.390	1.442	1.863			
50A O <sub>2</sub> /O <sub>2</sub>	1.516	1.740	1.854				
30A O <sub>2</sub> /O <sub>2</sub>	1.447	1.527					
<b>Stainless Steel</b>							
100A H35 and N <sub>2</sub> /N <sub>2</sub>			1.758	1.967	2.015	2.437	
80A F5/N <sub>2</sub>		0.841	0.998	0.870			
70A air/air and CH <sub>4</sub>		1.393	1.601	2.122			
45A F5/N <sub>2</sub>	0.611	0.511					
45A N <sub>2</sub> /N <sub>2</sub>	0.485	0.305					
<b>Aluminum</b>							
100A H35 and N <sub>2</sub> /N <sub>2</sub>			1.674	1.740	1.900		
70A air/air and CH <sub>4</sub>		2.101	1.971	2.004	2.100		
45A air/air	1.477	1.257	1.216				

**English**


Process	Thickness (in)						
	0.060	0.135	1/4	3/8	1/2	5/8	3/4
<b>Mild steel</b>							
100A O <sub>2</sub> /O <sub>2</sub> and N <sub>2</sub>		0.051	0.071	0.076	0.088	0.098	0.106
80A O <sub>2</sub> /O <sub>2</sub> and N <sub>2</sub>		0.057	0.072	0.081			
50A O <sub>2</sub> /O <sub>2</sub>	0.060	0.073	0.073				
30A O <sub>2</sub> /O <sub>2</sub>	0.057	0.061					
<b>Stainless Steel</b>							
100A H35 and N <sub>2</sub> /N <sub>2</sub>			0.070	0.077	0.080	0.102	
80A F5/N <sub>2</sub>		0.034	0.040	0.035			
70A air/air and CH <sub>4</sub>		0.056	0.064	0.081			
45A F5/N <sub>2</sub>	0.024	0.016					
45A N <sub>2</sub> /N <sub>2</sub>	0.019	0.010					
<b>Aluminum</b>							
100A H35 and N <sub>2</sub> /N <sub>2</sub>			0.066	0.067	0.077		
70A air/air and CH <sub>4</sub>		0.082	0.077	0.078	0.084		
45A air/air	0.058	0.047	0.048				



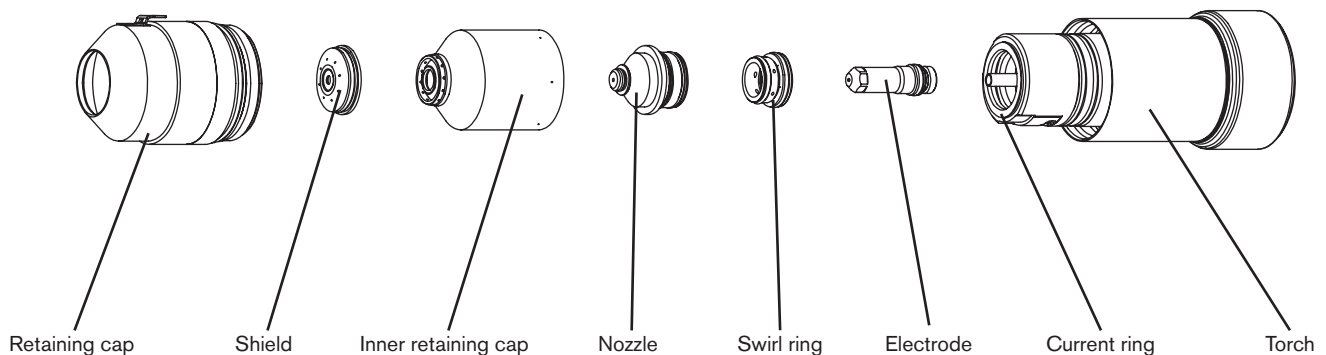
## Daily start-up

Prior to start-up, ensure that your cutting environment and that your clothing meet the safety requirements outlined in the *Safety* section of the system's instruction manual.

## Check torch

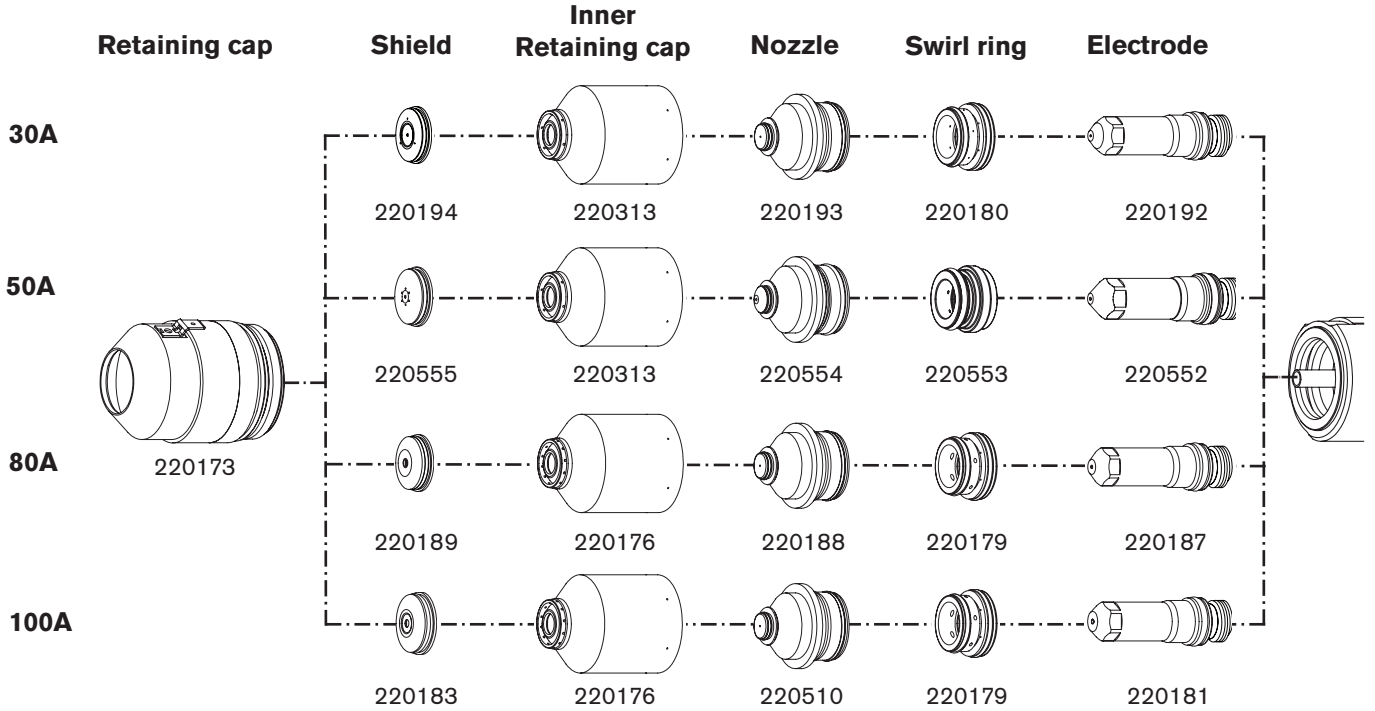
	<b>WARNING</b>
<b>Before operating this system, you must read the <i>Safety</i> section thoroughly! Turn OFF the power supply's main disconnect switch before proceeding with the following steps.</b>	

1. Turn OFF the main disconnect switch to the power supply.
2. Remove the consumables from the torch and check for worn or damaged parts. **Always place the consumables on a clean, dry, oil-free surface after removing. Dirty consumables can cause the torch to malfunction.**
  - Refer to *Changing consumable parts* later in this section for details and for parts inspection tables.
  - Refer to the *Cut charts* to choose the correct consumables for your cutting needs.
3. Replace consumable parts. Refer to *Changing consumable parts* later in this section for details.
4. Ensure that the torch is perpendicular to the workpiece.

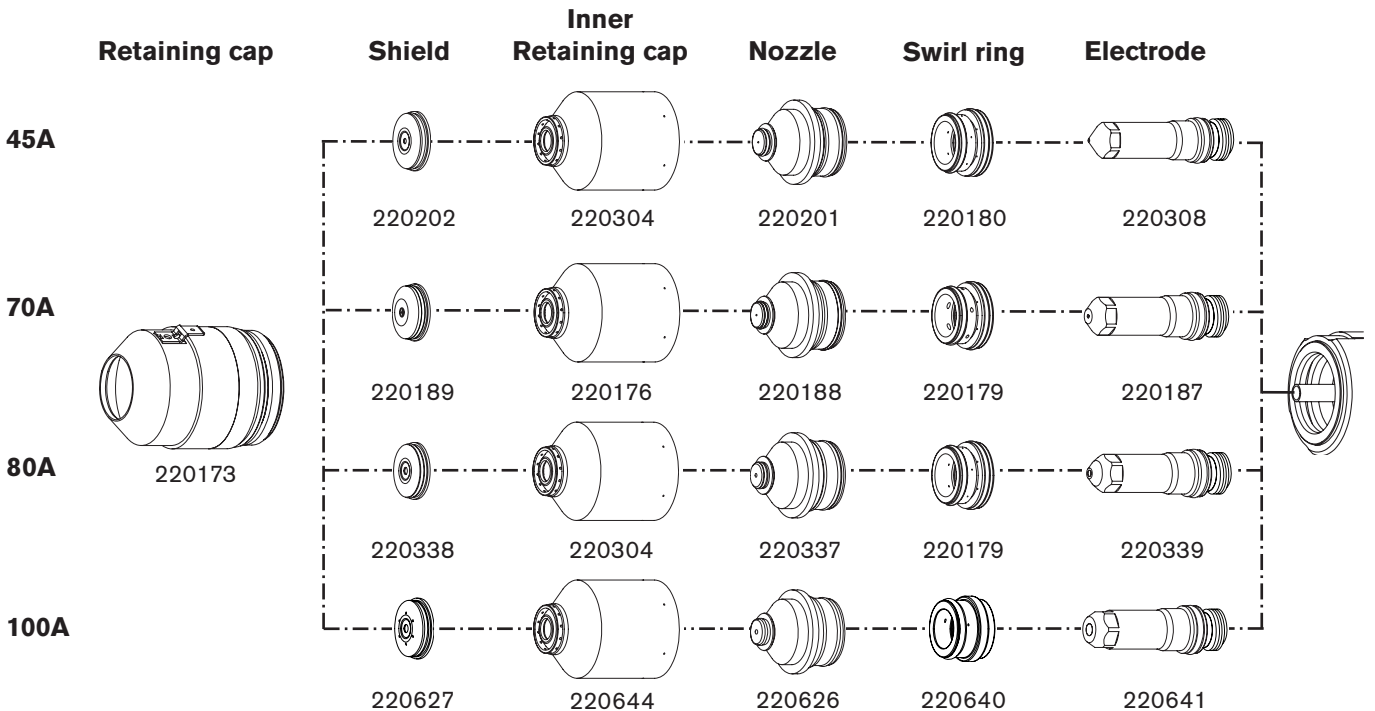


Consumable selection

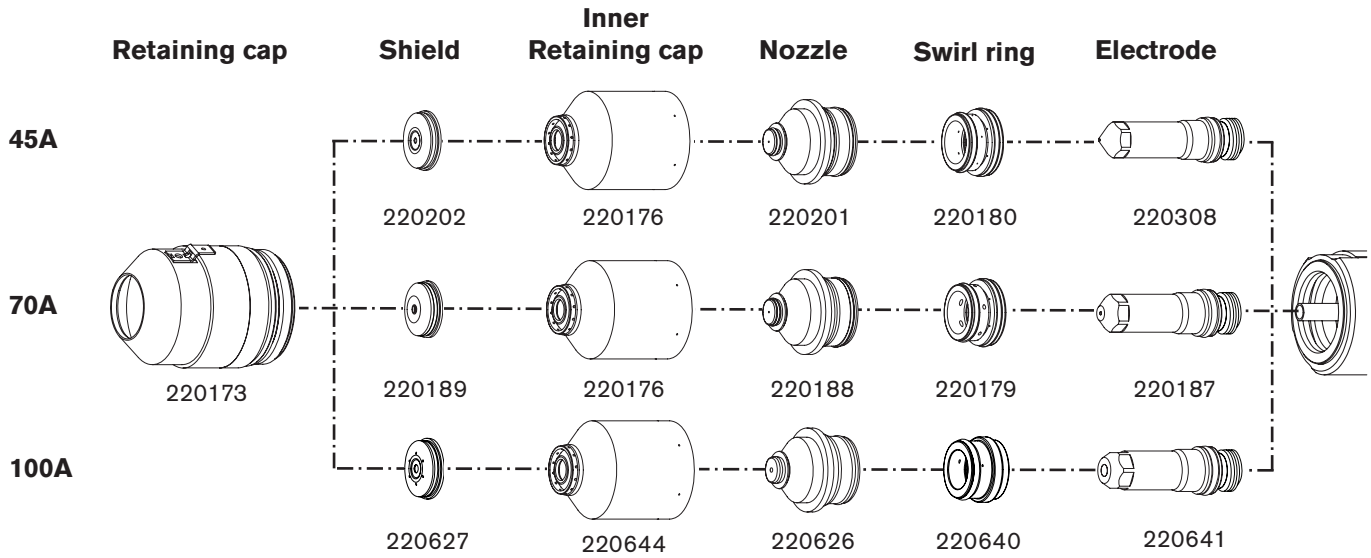
Mild steel



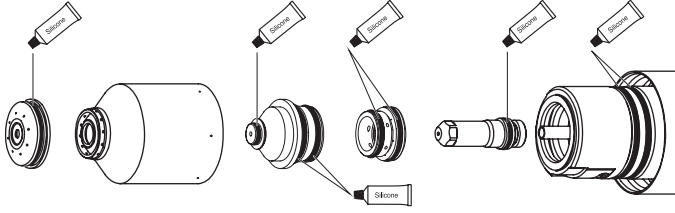
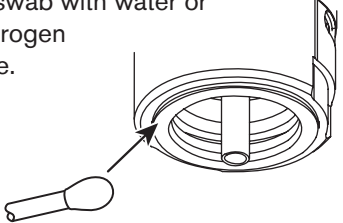
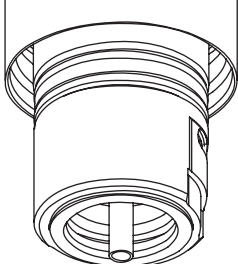
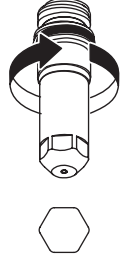
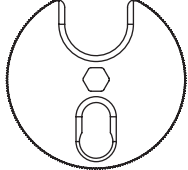

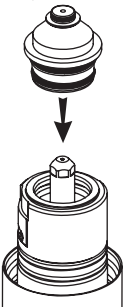
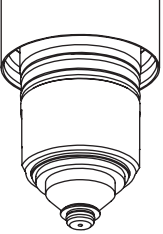
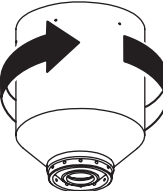

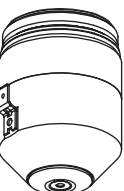
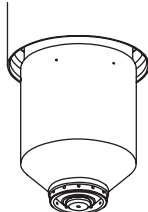
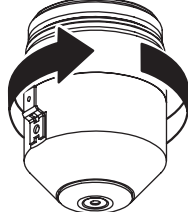
Stainless steel



**Aluminum**



**Install consumables**

<p><b>1</b> Apply a thin film of silicone lubricant on each o-ring.</p> 		<p><b>2</b> Clean current ring using a cotton swab with water or 3% hydrogen peroxide.</p> 	
<p><b>⚠ Do not overtighten parts! Only tighten until mating parts are seated.</b></p>			
<p><b>3</b> Install the electrode</p>    <p>Tool part number 104119</p>		<p><b>4</b> Install the swirl ring</p> 	
		<p><b>5</b> Install the nozzle and swirl ring</p> 	
<p><b>6</b> Install the inner retaining cap</p>  		<p><b>7</b> Install the shield</p>  	
		<p><b>8</b> Install the retaining cap</p>  	

### Arc voltage

The arc voltage settings (v) shown in the cut charts may need to be adjusted to produce the correct cutting height. Physically measuring the height after stopping the torch is preferred, but visual inspection during a cut is acceptable. Over the life of a consumable set it will also be necessary to periodically adjust the arc voltage (v) up 1 to 2 volts at a time to maintain the proper torch height and to achieve the maximum life from the consumables.

### Cut charts

The following *Cut charts* show the consumable parts, cutting speed and the gas and current settings required for each process.

The numbers shown in the *Cut charts* are recommended to provide high-quality cuts with minimal dross. Because of differences between installations and material composition, adjustments may be required to obtain desired results.

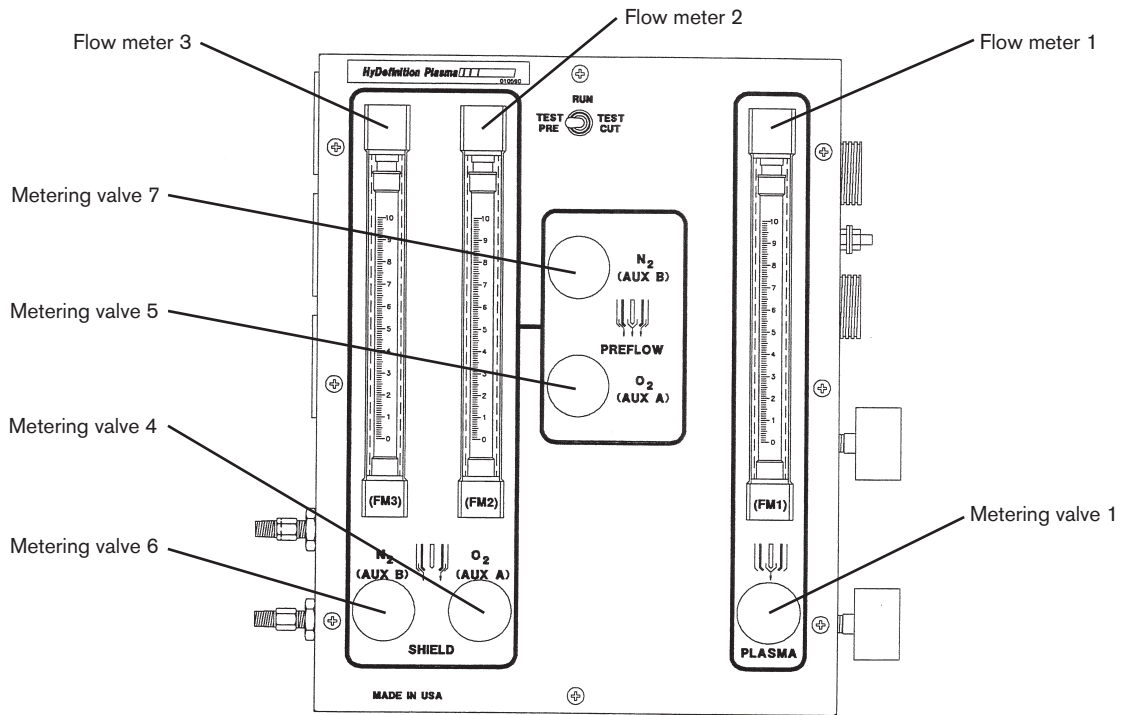
There are 3 cut chart sections.

- Manual gas consoles with 5 or 6 knobs
- Automatic gas console with 5 knobs
- Automatic gas console with 6 knobs

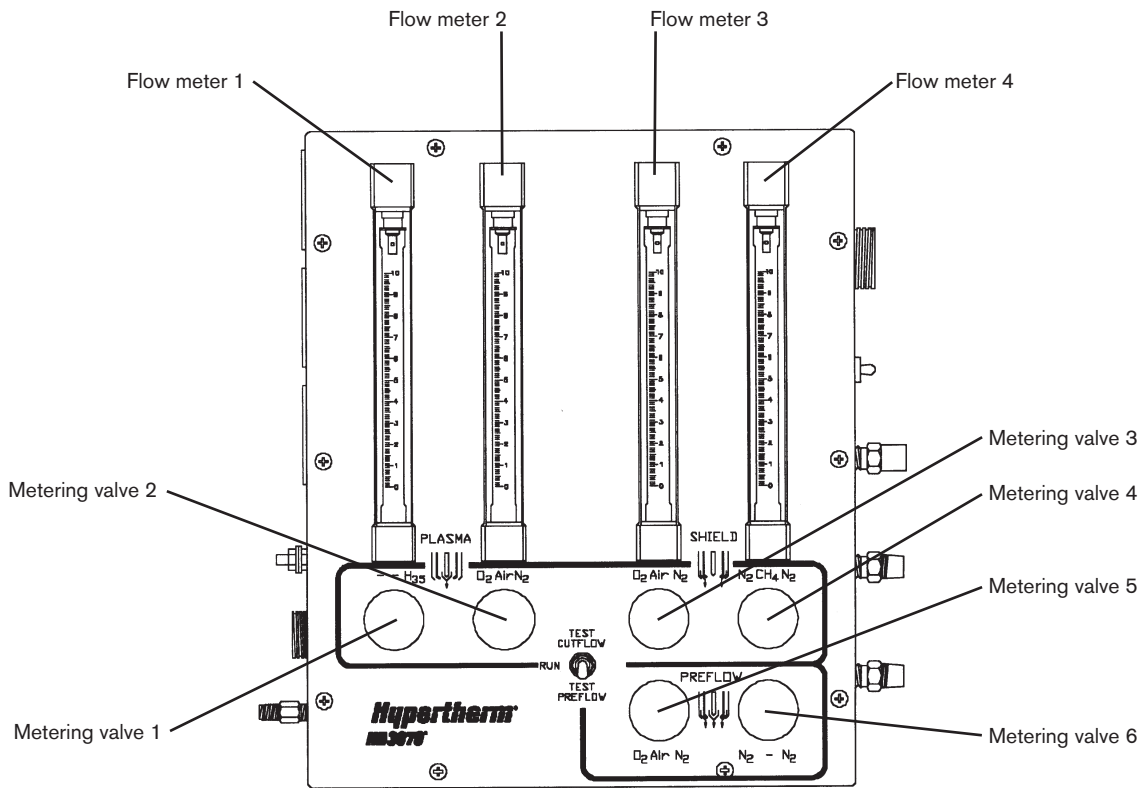
They are in different sections because the layout of the cut charts corresponds to the positions of the knobs on the consoles.

**Note: The 5-knob consoles can NOT be used for processes that require F5 or H35.**

Manual gas consoles



5-knob gas console

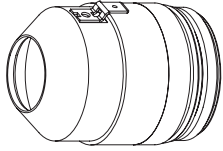


6-knob gas console

## Manual gas console cut chart

Mild steel  
O<sub>2</sub> Plasma / O<sub>2</sub> Shield  
30 A Cutting

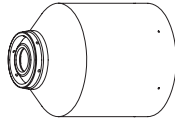
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	4 / 8	32 / 68
Cutflow	27 / 58	0/0



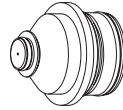
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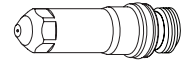
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### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay			
Preflow		Plasma		Shield						mm	volts		mm	mm	factor %
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	-	mm	volts	mm	mm/m	mm	factor %	seconds			
4	85	-	38	21	-	0.5	109	1.25	5355	2.25	180	0.1			
						0.8	110		4225			0.2			
						1.0	111		3615			0.3			
						1.2	112		2865						
						1.5	114		2210						
				10		-	38	-	2.0	118		1.50	1490	2.75	0.4
									2.5	119			1325		0.5
									3.0	121			1160		
									4.0	126			905		
									6.0	126			665		1.0

### English

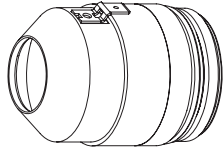
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay			
Preflow		Plasma		Shield		gauge	inch				inch	ipm		inch	factor %	seconds
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	-	gauge	inch	volts	inch	ipm	inch	factor %	seconds			
4	85	-	38	21	-	26	0.018	109	0.05	215	0.09	180	0.1			
						24	0.024	109		200			0.2			
						22	0.030	110		170						
						20	0.036	111		155						
						18	0.048	112		110						
				10		-	38	-	16	0.060	114		0.06	85	0.11	0.3
									14	0.075	118			60		0.4
									12	0.105	119			50		
									10	0.135	121			40		
									-	3/16	126			30		0.5
-	1/4	126	25	1.0												

# Manual gas console cut chart

## Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> Shield  
50 A Cutting

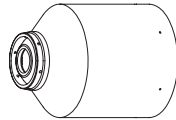
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	5 / 11	26 / 54
Cutflow	25 / 52	0/0



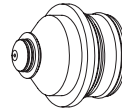
220173



220555



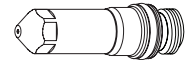
220313



220554



220553



220552

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Plasma		Shield						mm	volts		mm
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	-	mm	volts	mm	mm/m	mm	Factor %	seconds	
5	75	-	48	17	-	0.8	110	1	6500	2	200	0	
						1.0	111		5000				
						1.2	112		4150				
						1.5	114	1.3	3200	2.6			
						2.0	115		2700				
						2.5	117		2200				
						3.0	119	1.5	1800	3			0.1
						4.0	121		1400				
						5.0	122		1200				
						6.0	126		950				
7.0	128	2	780	4	0.2								
8.0	130		630										

### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Plasma		Shield		gauge	inch				inch	ipm		inch
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	-	gauge	inch	inch	ipm	inch	Factor %	seconds		
5	75	-	48	17	-	22	0.030	110	0.04	270	0.08	200	0	
						20	0.036	110		210				
						18	0.048	112		160				
						16	0.060	114	0.05	125	0.10			
						14	0.075	115		110				
						12	0.105	118		80				
						10	0.135	120	0.06	60	0.12			0.1
						-	3/16	121		50				
						-	1/4	125	0.08	35	0.16			0.2
						-	5/16	130		25				

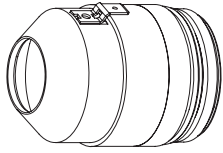


## Manual gas console cut chart

### Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> and N<sub>2</sub> Shield  
80 A Cutting

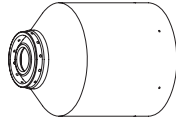
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	11 / 24	38 / 80
Cutflow	39 / 63	28 / 59



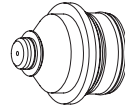
220173



220189



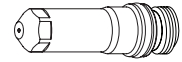
220176



220188



220179



220187

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay						
Preflow		Plasma		Shield						mm	volts		mm	mm	Factor %	seconds		
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds						
25	100	-	49	16	75	2.0	118	2.5	9810	3.8	150	0.1						
						2.5	119		7980									
						3.0	120		6145									
						25	100	-	49	16	75	4.0	120	2.0	4300	4.0	200	0.2
												6.0	121		3045			0.3
												10.0	122		1810			0.5
												12.0	126		1410			0.7

### English

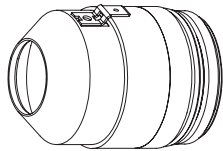
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay						
Preflow		Plasma		Shield		gauge	inch				inch	ipm		inch	Factor %	seconds			
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds						
25	100	-	49	16	75	14	0.075	118	0.1	400	0.15	150	0.1						
						12	0.105	119		290									
						10	0.135	120		180									
						25	100	-	49	16	75	-	3/16	120	0.08	155	0.16	200	0.2
												-	1/4	121		110			0.3
												-	3/8	122		75			0.5
												-	1/2	126		50			0.7

## Manual gas console cut chart

### Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> and N<sub>2</sub> Shield  
100 A Cutting

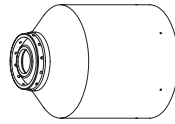
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	7 / 16	38 / 80
Cutflow	30 / 64	31 / 65



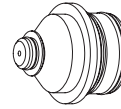
220173



220183



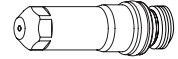
220176



220510



220179



220181

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay				
Preflow		Plasma		Shield						mm	volts		mm	mm/m	mm	Factor %
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds				
15	100	-	59	5	86	3.0	117	2.0	7350	3.0	150	0.0				
						4.0	119		6200							
						6.0	121		3945							
				3	80	-	59	3	80	10.0	126	3.0	2530	4.5	200	0.4
										12.0	129		1970			0.6
										15.0	133	1410	6.0	0.8		
										20.0	139	610	6.5	1.0		
										3.3	610	6.5	200	1.0		

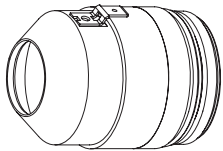
### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay				
Preflow		Plasma		Shield		gauge	inch				inch	ipm		inch	Factor %		
O <sub>2</sub>	N <sub>2</sub>	-	O <sub>2</sub>	O <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds				
15	100	-	59	5	86	10	0.135	117	0.08	270	0.12	150	0.0				
						-	3/16	119		210							
						-	1/4	121		140							
				3	80	-	59	3	80	-	3/8	126	0.12	105	0.18	200	0.4
										-	1/2	129		70			0.6
										-	5/8	133	50	0.24	0.8		
										-	3/4	139	30	0.26	1.0		
										0.13	30	0.26	200	1.0			

# Manual gas console cut chart

**Stainless steel**  
 N<sub>2</sub> Plasma / N<sub>2</sub> Shield  
 45 A Cutting

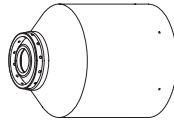
Flow Rates - lpm/scfh	
N <sub>2</sub>	
Preflow	55 / 116
Cutflow	69 / 147



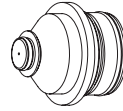
220173



220202



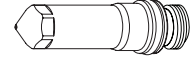
220304



220201



220180



220308

## Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield						mm	volts	
N <sub>2</sub>	N <sub>2</sub>	-	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds
70	70	-	9	80	80	0.8	96	2.5	6380	3.8	150	0.0
						1.0			5880			
						1.2			5380			
						1.5	4630					
						2.0	3935		0.2			
						2.5	3270					
						3.0	2550		0.3			
						4.0	1580					

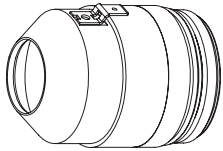
## English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield		gauge	inch				inch	ipm	
N <sub>2</sub>	N <sub>2</sub>	-	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
70	70	-	9	80	80	20	0.035	96	0.1	240	0.15	150	0.0
						18	0.048			210			
						16	0.060	98		180			
						14	0.075			160			
						12	0.105	99		120			0.2
						10	0.135			75			

# Manual gas console cut chart

**Stainless steel**  
 F5 Plasma / N<sub>2</sub> Shield  
 45 A Cutting

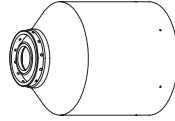
Flow Rates - lpm/scfh		
	F5	N <sub>2</sub>
Preflow	0 / 0	40 / 85
Cutflow	8 / 16	59 / 124



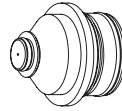
220173



220202



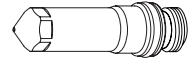
220304



220201



220180



220308

## Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield									
N <sub>2</sub>	N <sub>2</sub>	F5	-	N <sub>2</sub>	N <sub>2</sub>	mm		volts	mm	mm/m	mm	Factor %	seconds
50	50	13	-	75	75	0.8	1.0	98	2.5	6570	3.8	150	0.2
						1.2							
						1.5							
						2.0	102	3175					
						2.5							
						3.0	105	2010					
						4.0							
				6.0	108	2.0	845	3.0	0.4				
				28	28								0.5

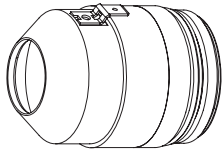
## English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield									
N <sub>2</sub>	N <sub>2</sub>	F5	-	N <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
50	50	13	-	75	75	20	0.036	98	0.10	240	0.15	150	0.2
						18	0.048	100		190			
						16	0.060	102		150			
						14	0.075			130			
						12	0.105	103		90			
						10	0.135	105		65			
						-	3/16	106		45			
				-	1/4	108	30	0.12	0.4				
				28	28			0.08					0.5

# Manual gas console cut chart

**Stainless steel**  
 Air Plasma / Air and CH4 Shield  
 70 A Cutting

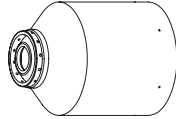
Flow Rates - lpm/scfh		
	Air	CH <sub>4</sub>
Preflow	42 / 89	-
Cutflow	44 / 94	18 / 38



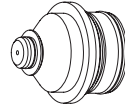
220173



220189



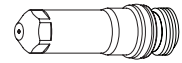
220176



220188



220179



220187

## Metric

Test Preflow Flowrates(%)		Test Cutflow Flowrates(%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield						mm	volts	
Air	-	-	Air	Air	CH <sub>4</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds
100	-	-	53	45	20	3.0	148	3.0	2830	4.5	150	0.2
						4.0	150					
						6.0	152					
						8.0	154					
			10.0	156	3.5	980	0.4					
			77			12.0	170	3.0	810			0.6

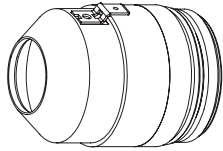
## English

Test Preflow Flowrates(%)		Test Cutflow Flowrates(%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield		gauge	inch				mm	mm/m	
Air	-	-	Air	Air	CH <sub>4</sub>	gauge	inch	volts	mm	mm/m	mm	Factor %	seconds
100	-	-	53	45	20	10	0.135	148	0.12	105	0.18	150	0.2
						-	3/16	150					
						-	1/4	152					
						-	3/8	156					
						77			-	1/2	170	0.12	30

# Manual gas console cut chart

**Stainless steel**  
 F5 Plasma / N<sub>2</sub> Shield  
 80 A Cutting

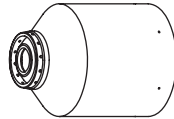
Flow Rates - lpm/scfh		
	F5	N <sub>2</sub>
Preflow	0 / 0	65 / 137
Cutflow	32 / 67	54 / 115



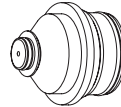
220173



220338



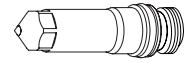
220304



220337



220179



220339

## Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield						mm	volts	
N <sub>2</sub>	N <sub>2</sub>	F5	–	N <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds
80	80	70	–	70	70	4.0	110	3.0	2180	4.5	150	0.2
						6.0	113	2.5	1225	3.8		0.3
						10.0	121	3.0	560	4.5		0.5

## English

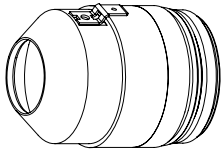
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield		gauge	inch				volts	inch	
N <sub>2</sub>	N <sub>2</sub>	F5	–	N <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
80	80	70	–	70	70	10	0.135	110	0.12	105	0.18	150	0.2
						–	3/16	113	0.11	60	0.17		0.3
						–	1/4	115	0.10	45	0.15		0.3
						–	3/8	121	0.12	25	0.18		0.5

## Manual gas console cut chart

### Stainless steel

H35 and N<sub>2</sub> Plasma / N<sub>2</sub> Shield  
100 A Cutting

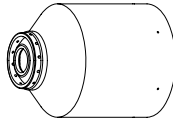
Flow Rates - lpm/scfh		
	H35	N <sub>2</sub>
Preflow	0 / 0	37 / 79
Cutflow	13 / 28	70 / 148



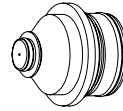
220173



220627



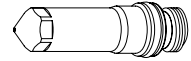
220644



220626



220640



220641

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield						mm	volts	
N <sub>2</sub>	N <sub>2</sub>	H35	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds
45	45	30	30	60	60	6.0	131	3.0	1945	4	130	0.2
						10.0	137	3.8	1445	5		0.4
		40	50			12.0	161	6.3	1125	8		0.6
						15.0	165		740			0.8

### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield		gauge	inch				inch	ipm	
N <sub>2</sub>	N <sub>2</sub>	H35	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
45	45	30	30	60	60	-	1/4	131	0.12	75	0.16	130	0.2
						-	3/8	137	0.15	60	0.20		0.4
		40	50			-	1/2	161	0.25	40	0.32		0.6
						-	5/8	165		25			0.8

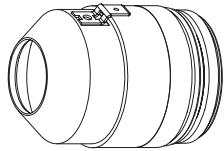
# Manual gas console cut chart

## Aluminum

Air Plasma / Air Shield

45 A Cutting

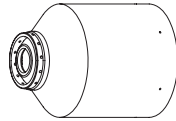
Flow Rates - lpm/scfh	
	Air
Preflow	38 / 80
Cutflow	42 / 90



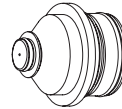
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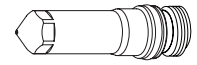
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### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Plasma		Shield						mm	volts		mm
Air	–	–	Air	Air	–	mm	volts	mm	mm/m	mm	Factor %	seconds	
100	–	–	7	100	–	1.2	98	2.5	5670	3.8	150	0.2	
						1.5	100		4420				
						2.0	101		4000				
						2.5	102		3665				
						3.0	98	3225	2.7				
						4.0	106	1.8	2575	4.5			0.3
						6.0	111	3.0	1690	4.5			0.4
												0.6	

### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Plasma		Shield		gauge	inch				inch	ipm		inch
Air	–	–	Air	Air	–	gauge	inch	volts	inch	ipm	inch	Factor %	seconds	
100	–	–	7	100	–	18	0.047	98	0.10	220	0.15	150	0.2	
						16	0.059	100		170				
						14	0.075	101		160				
						12	0.105	102		140				
						10	0.135	98	0.07	110	0.11			0.3
						–	3/16	106	0.12	90	0.18			0.4
						–	1/4	111		60				0.6

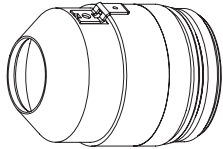


# Manual gas console cut chart

## Aluminum

Air Plasma / Air and CH<sub>4</sub> Shield  
70 A Cutting

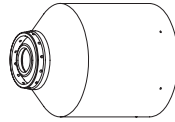
Flow Rates - lpm/scfh		
	Air	CH <sub>4</sub>
Preflow	42 / 89	-
Cutflow	44 / 93	18 / 38



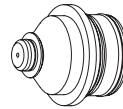
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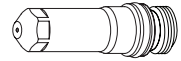
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### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Plasma		Shield						mm	volts		mm
Air	-	-	Air	Air	CH <sub>4</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds	
100	-	-	53	45	20	1.5	154	3	3080	4.5	150	0.1	
						2.0	160		2930				0.2
						2.5	161		2710				
						3.0	162		2490				
						4.0	157		2210				
						6.0	158		1630				
						8.0	159		1260				
						10.0	161		960				
						12.0	167	720			0.4		

### English

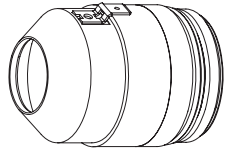
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Plasma		Shield		gauge	inch				inch	ipm		inch
Air	-	-	Air	Air	CH <sub>4</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds	
100	-	-	53	45	20	14	0.064	154	0.12	120	0.18	150	0.1	
						12	0.081	160		110				0.2
						10	0.102	161		105				
						-	1/8	162		95				
						-	3/16	152		80				
						-	1/4	158		60				
						-	3/8	161		40				
						-	1/2	167		25				

## Manual gas console cut chart

### Aluminum

H35 and N<sub>2</sub> Plasma / N<sub>2</sub> Shield  
100 A Cutting

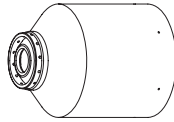
Flow Rates - lpm/scfh		
	H35	N <sub>2</sub>
Preflow	0 / 0	36 / 77
Cutflow	10 / 22	63 / 133



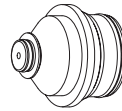
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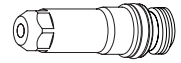
220644



220626



220640



220641

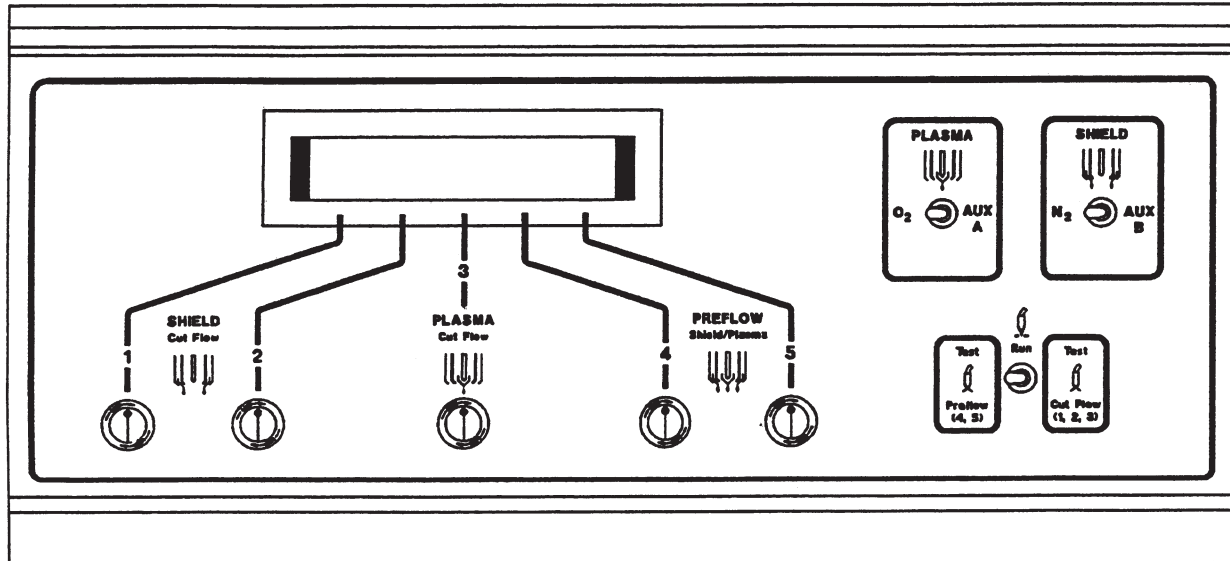
### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield						mm	volts	
N <sub>2</sub>	N <sub>2</sub>	H35	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds
45	45	30	30	60	60	6.0	137	4	2620	6	150	0.1
						10.0	139		1660			0.3
						12.0	146		1180			0.5

### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Plasma		Shield		gauge	inch				inch	ipm	
N <sub>2</sub>	N <sub>2</sub>	H35	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
45	45	30	30	60	60	-	1/4	137	0.16	100	0.24	150	0.1
						-	3/8	139		70			0.3
						-	1/2	146		40			0.5

## 5-Knob automatic gas console



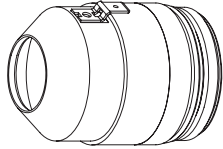
## 5-Knob automatic gas console cut chart

**Mild steel**

O<sub>2</sub> Plasma / O<sub>2</sub> Shield

30 A Cutting

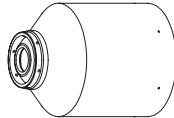
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	4 / 8	32 / 68
Cutflow	27 / 58	0/0



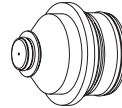
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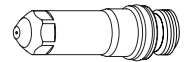
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### Metric

Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow						mm	volts	
O <sub>2</sub> (#1)	(#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)	mm	volts	mm	mm/m	mm	factor %	seconds
21	-	38	4	85	0.5	109	1.25	5355	2.25	180	0.1
					0.8	110		4225			0.2
					1.0	111		3615			0.3
					1.2	112		2865			
					1.5	114		2210			
10	-	38	4	85	2.0	118	1.50	1490	2.75	180	0.4
					2.5	119		1325			0.5
					3.0	121		1160			
					4.0	126		905			
					6.0	126		665			1.0

### English

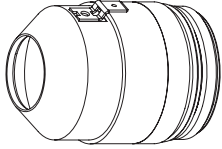
Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow		gauge	inch				inch	ipm	
O <sub>2</sub> (#1)	(#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)	gauge	inch	volts	inch	ipm	inch	factor %	seconds
21	-	38	4	85	26	0.018	109	0.05	215	0.09	180	0.1
					24	0.024	109		200			
					22	0.030	110		170			0.2
					20	0.036	111		155			
					18	0.048	112		110			
					10	-	38		4			85
14	0.075	118	60									
12	0.105	119	50	0.4								
10	0.135	121	40									
-	3/16	126	30					0.5				
-	1/4	126	25	0.7								
												1.0

## 5-Knob automatic gas console cut chart

Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> Shield  
50 A Cutting

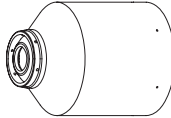
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	5 / 11	26 / 54
Cutflow	25 / 52	0/0



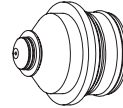
220173



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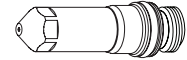
220313



220554



220553



220552

### Metric

Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay				
Shield		Plasma	Preflow						mm	volts		mm	mm/m	mm	Factor %
O <sub>2</sub> (#1)	(#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)											
17	-	48	5	75	0.8	110	1	6500	2	200	0				
					1.0	111		5000							
					1.2	112		4150							
					1.5	114	1.3	3200	2.6						
					2.0	115		2700							
					2.5	117		2200							
					3.0	119	1.5	1800	3			0.1			
					4.0	121		1400				0.2			
					5.0	122		1200				0.3			
					6.0	126	2	950	4			0.4			
					7.0	128		780							
8.0	130	630													

### English

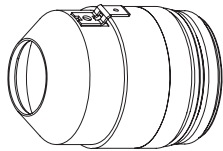
Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay			
Shield		Plasma	Preflow		gauge	inch				volts	inch		ipm	inch	Factor %
O <sub>2</sub> (#1)	(#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)											
17	-	48	5	75	22	0.030	110	0.04	270	0.08	200	0			
					20	0.036	110		210						
					18	0.048	112		160						
					16	0.060	114	0.05	125	0.10					
					14	0.075	115		110						
					12	0.105	118		80						
					10	0.135	120	0.06	60	0.12			0.1		
					-	3/16	121		50				0.2		
					-	1/4	125		35				0.3		
					-	5/16	130	0.08	25	0.16			0.5		

## 5-Knob automatic gas console cut chart

### Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> and N<sub>2</sub> Shield  
80 A Cutting

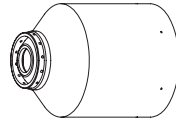
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	11 / 24	38 / 80
Cutflow	39 / 63	28 / 59



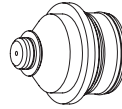
220173



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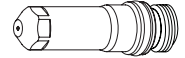
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220188



220179



220187

### Metric

Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay					
Shield		Plasma	Preflow						mm	volts		mm	mm	Factor %	seconds	
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)	mm	volts	mm	mm/m	mm	Factor %	seconds					
16	75	49	25	100	2.0	118	2.5	9810	3.8	150	0.1					
					2.5	119										
					3.0	120										
					16	75	49	25	100	4.0	120	2.0	4300	4.0	200	0.2
										6.0	121		3045			0.3
										10.0	122		1810			0.5
										12.0	126		1410			5.0

### English

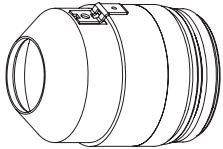
Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay					
Shield		Plasma	Preflow		gauge	inch				inch	ipm		inch	Factor %	seconds		
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds					
16	75	49	25	100	14	0.075	118	0.10	400	0.15	150	0.1					
					12	0.105	119										
					10	0.135	120										
					16	75	49	25	100	-	3/16	120	0.08	180	0.16	200	0.2
										-	1/4	121		110			0.3
										-	3/8	122		75			0.5
										-	1/2	126		50			0.20

## 5-Knob automatic gas console cut chart

Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> and N<sub>2</sub> Shield  
100 A Cutting

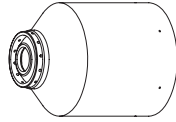
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	7 / 16	38 / 80
Cutflow	30 / 64	31 / 65



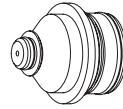
220173



220183



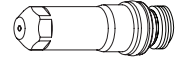
220176



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### Metric

Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow						mm	volts	
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)	mm	volts	mm	mm/m	mm	Factor %	seconds
5	86	59	15	100	3.0	117	2.0	7350	3.0	150	0.0
					4.0	119		6200			0.2
					6.0	121		3945			0.4
3	80				10.0	126	3.0	2530	4.5		0.6
					12.0	129		1970	0.8		
					15.0	133	1410	6.0			
		20.0	139	3.3	610	6.5	200	1.0			

### English

Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow		gauge	inch				inch	ipm	
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	O <sub>2</sub> (#4)	N <sub>2</sub> (#5)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
5	86	59	15	100	10	0.135	117	0.08	270	0.12	150	0.0
					-	3/16	119		210			0.2
					-	1/4	121		140			0.4
3	80				-	3/8	126	0.12	105	0.18		0.6
					-	1/2	129		70	0.8		
					-	5/8	133	50	0.24			
		-	3/4	139	0.13	30	0.26	200	1.0			

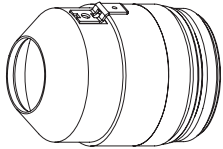
## 5-Knob automatic gas console cut chart

### Stainless steel

N<sub>2</sub> Plasma / N<sub>2</sub> Shield

45 A Cutting

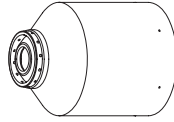
Flow Rates - lpm/scfh	
N <sub>2</sub>	
Preflow	55 / 116
Cutflow	69 / 147



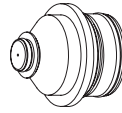
220173



220202



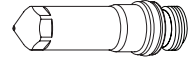
220304



220201



220180



220308

### Metric

Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow						mm	volts	
N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	mm	volts	mm	mm/m	mm	Factor %	seconds
80	80	9	70	70	0.8	96	2.5	6380	3.8	150	0.0
					1.0			5880			
					1.2			5380			
					1.5	97		4630			0.2
					2.0	98		3935			
					2.5	99		3270			
					3.0	100		2550			0.3
					4.0			1580			

### English

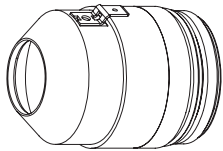
Test Cutflow Flowrates (%)			Test Preflow Flowrates (%)		Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow		gauge	inch				inch	ipm	
N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	N <sub>2</sub>	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
80	80	9	70	70	20	0.035	96	0.1	240	0.15	150	0.0
					18	0.048	97		210			
					16	0.060	98		180			0.2
					14	0.075	98		160			
					12	0.105	99		120			
					10	0.135	100		75			0.3



## 5-Knob automatic gas console cut chart

**Stainless steel**  
Air Plasma / Air and CH<sub>4</sub> Shield  
70 A Cutting

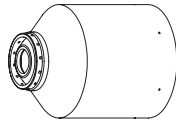
Flow Rates - lpm/scfh		
	Air	CH <sub>4</sub>
Preflow	42 / 89	-
Cutflow	44 / 94	18 / 38



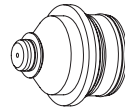
220173



220189



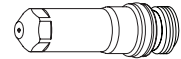
220176



220188



220179



220187

### Metric

Test Cutflow Flowrates (%)		Test Preflow Flowrates (%)			Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma							mm	volts	
Air (#1)	CH <sub>4</sub> (#2)	Air (#3)	Air (#4)	(#5)	mm	volts	mm	mm/m	mm	Factor %	seconds
45	20	53	100	-	3.0	148	3.0	2830	4.5	150	0.2
					4.0	150		2450			
					6.0	152		1960			
					8.0	154		1440			
		10.0			156	3.5	980	0.4			
		12.0			170	3.0	810	0.6			
		77									

### English

Test Cutflow Flowrates (%)		Test Preflow Flowrates (%)			Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Shield		Plasma			gauge	inch				inch	ipm		inch
Air (#1)	CH <sub>4</sub> (#2)	Air (#3)	Air (#4)	(#5)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds	
45	20	53	100	-	10	0.135	148	0.12	105	150	0.18	0.2	
					-	3/16	150		85				
					-	1/4	152		75				
					-	3/8	156		0.14				40
		-			1/2	170	0.12	30	0.18				0.4
						77							

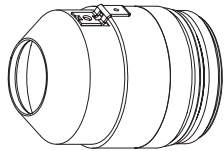
## 5-Knob automatic gas console cut chart

### Aluminum

Air Plasma / Air Shield

45 A Cutting

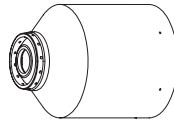
Flow Rates - lpm/scfh	
Air	
Preflow	38 / 80
Cutflow	42 / 90



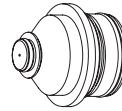
220173



220202



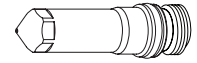
220176



220201



220180



220308

### Metric

Test Cutflow Flowrates (%)		Test Preflow Flowrates (%)			Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow						mm	volts	
Air (#1)	(#2)	Air (#3)	Air (#4)	(#5)	mm	volts	mm	mm/m	mm	Factor %	seconds
100	-	7	100	-	1.2	98	2.5	5670	3.8	150	0.2
					1.5	100		4420			
					2.0	101		4000			
					2.5	102		3665			
					3.0	98	3225	2.7	0.3		
					4.0	106	1.8	2575	4.5	0.4	
					6.0	111	3.0	1690	4.5	0.6	

### English

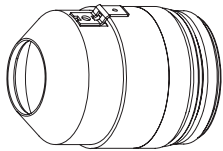
Test Cutflow Flowrates (%)		Test Preflow Flowrates (%)			Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Shield		Plasma	Preflow		gauge	inch				inch	ipm	
Air (#1)	(#2)	Air (#3)	Air (#4)	(#5)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
100	-	7	100	-	18	0.047	98	0.10	220	0.15	150	0.2
					16	0.059	100		170			
					14	0.075	101		160			
					12	0.105	102		140			
					10	0.135	98	0.07	110	0.11	0.3	
					-	3/16	106	0.12	90	0.18	0.4	
					-	1/4	111		60		0.6	

## 5-Knob automatic gas console cut chart

### Aluminum

Air Plasma / Air and CH<sub>4</sub> Shield  
70 A Cutting

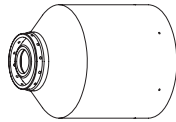
Flow Rates - lpm/scfh		
	Air	CH <sub>4</sub>
Preflow	42 / 89	-
Cutflow	44 / 93	18 / 38



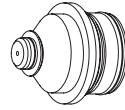
220173



220189



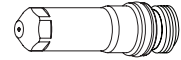
220176



220188



220179



220187

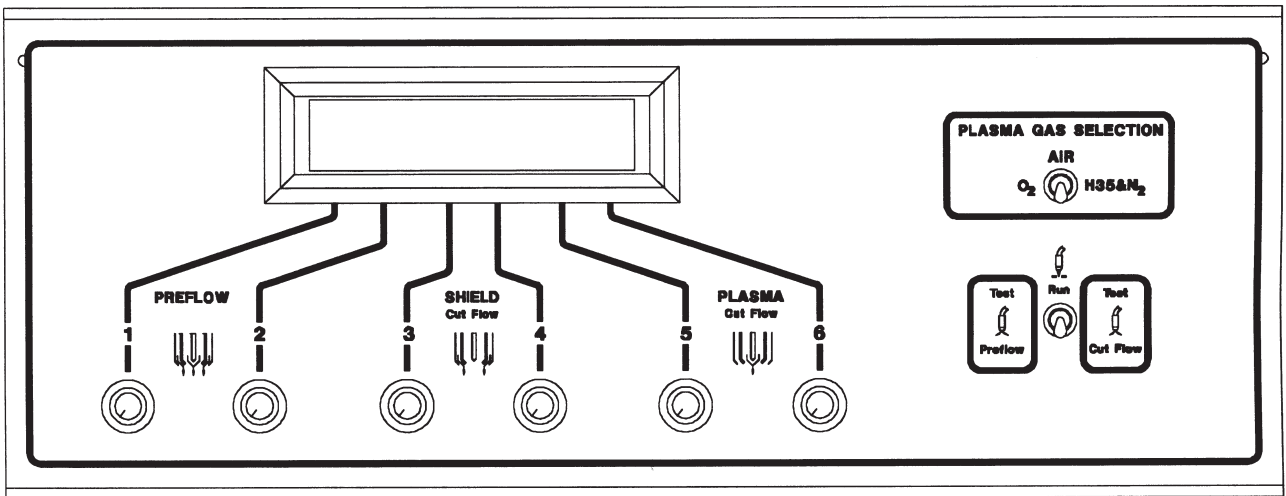
### Metric

Test Cutflow Flowrates (%)		Test Preflow Flowrates (%)			Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay		
Shield		Plasma	Preflow						mm	volts		mm	mm/m
Air(#1)	CH <sub>4</sub> (#2)	Air(#3)	Air(#4)	(#5)	mm	volts	mm	mm/m	mm	Factor %	seconds		
45	20	53	100	-	1.5	154	3.0	3080	4.5	150	-	0.1	
					2.0	160						2930	0.2
					2.5	161						2710	0.3
					3.0	162						2490	
					4.0	157						2210	
					6.0	158						1630	
					8.0	159						1260	
					9.5	161						960	
12.0	167	720	0.4										

### English

Test Cutflow Flowrates (%)		Test Preflow Flowrates (%)			Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay		
Shield		Plasma	Preflow		gauge	inch				inch	ipm		inch	Factor %
Air(#1)	CH <sub>4</sub> (#2)	Air(#3)	Air(#4)	(#5)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds		
45	20	53	100	-	14	0.064	154	0.10	120	0.18	150	-	0.1	
					12	0.081	160						110	0.2
					10	0.102	161						105	0.3
					-	1/8	162						95	
					-	3/16	152						80	
					-	1/4	158						60	
					-	3/8	161						40	
					-	1/2	167						25	

## 6-Knob automatic gas console

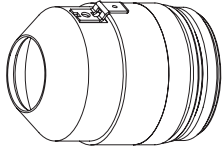


## 6-Knob automatic gas console cut chart

Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> Shield  
30 A Cutting

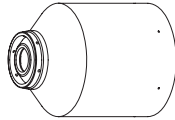
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	4 / 8	32 / 68
Cutflow	27 / 58	0/0



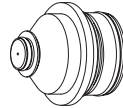
220173



220194



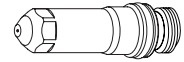
220313



220193



220180



220192

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Shield		Plasma						mm	volts		mm
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	(#4)	O <sub>2</sub> (#5)	(#6)	mm	volts	mm	mm/m	mm	factor %	seconds	
4	85	21	-	38	-	0.5	109	1.25	5355	2.25	180	-	0.1
						0.8	110						0.2
						1.0	111						0.3
						1.2	112						0.3
						1.5	114						0.3
		2.0				118	1.50	1490	2.75	0.4			
		2.5				119				0.5			
		3.0				121				0.7			
		4.0				126				1.0			
		6.0				126				1.0			

### English

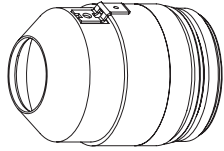
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay		
Preflow		Shield		Plasma		gauge	inch				inch	ipm		inch	factor %
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	(#4)	O <sub>2</sub> (#5)	(#6)	gauge	inch	volts	inch	ipm	inch	factor %	seconds		
4	85	21	-	38	-	26	0.018	109	0.05	215	0.09	180	-	0.1	
						24	0.024							200	0.2
						22	0.03							170	0.3
						20	0.036							155	0.3
						18	0.048							110	0.3
						16	0.06							114	0.3
		14				0.075	118	0.06	60	0.11	0.4				
		12				0.105	119				0.4				
		10				0.135	121				0.5				
		-				3/16	126				0.7				
		-				1/4	126				1.0				
		-				1/4	126				1.0				

## 6-Knob automatic gas console cut chart

### Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> Shield  
50 A Cutting

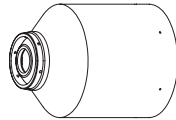
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	5 / 11	26 / 54
Cutflow	25 / 52	0/0



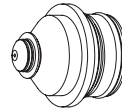
220173



220555



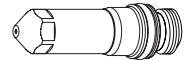
220313



220554



220553



220552

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Shield		Plasma						mm	volts		mm
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	(#4)	O <sub>2</sub> (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds	
5	75	17	-	48	-	0.8	110	1	6500	2	200	0	
						1.0	111		5000				
						1.2	112		4150				
						1.5	114	1.3	3200	2.6			
						2.0	115		2700				
						2.5	117		2200				
						3.0	119	1.5	1800	3			0.1
						4.0	121		1400				
						5.0	122		1200				
						6.0	126		950				
7.0	128	2	780	4	0.2								
8.0	130		630										

### English

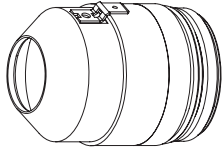
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				inch	ipm	
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	(#4)	O <sub>2</sub> (#5)	(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
5	75	17	-	48	-	22	0.03	110	0.04	270	0.08	200	0
						20	0.036	110		210			
						18	0.048	112		160			
						16	0.06	114	0.05	125	0.10		
						14	0.075	115		110			
						12	0.105	118		80			
						10	0.135	120	0.06	60	0.12		
						-	3/16	121		50			
						-	1/4	125		35			
						-	5/16	130	0.08	25	0.16		

## 6-Knob automatic gas console cut chart

Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> and N<sub>2</sub> Shield  
80 A Cutting

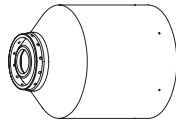
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	11 / 24	38 / 80
Cutflow	39 / 63	28 / 59



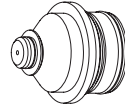
220173



220189



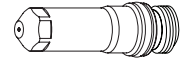
220176



220188



220179



220187

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay						
Preflow		Shield		Plasma						mm	volts		mm	mm	Factor %	seconds		
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	N <sub>2</sub> (#4)	O <sub>2</sub> (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds						
25	100	16	75	49	-	2.0	118	2.5	9810	3.8	150	0.1						
						2.5	119		7980									
						3.0	120		6145									
						25	100	16	75	49	-	4.0	120	2.0	4300	4.0	200	0.2
												6.0	121		3045			0.3
												10.0	122		1810			0.5
												12.0	126		1410			5.0

### English

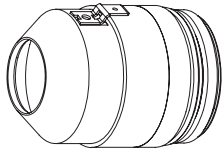
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay						
Preflow		Shield		Plasma		gauge	inch				inch	ipm		inch	Factor %	seconds			
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	N <sub>2</sub> (#4)	O <sub>2</sub> (#5)	(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds						
25	100	16	75	49	-	14	0.075	118	0.10	400	0.15	150	0.1						
						12	0.105	119		290									
						10	0.135	120		180									
						25	100	16	75	49	-	-	3/16	120	0.08	155	0.16	200	0.2
												-	1/4	121		110			0.3
												-	3/8	122		75			0.5
												-	1/2	126		50			0.20

## 6-Knob automatic gas console cut chart

### Mild steel

O<sub>2</sub> Plasma / O<sub>2</sub> and N<sub>2</sub> Shield  
100 A Cutting

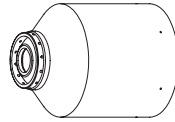
Flow Rates - lpm/scfh		
	O <sub>2</sub>	N <sub>2</sub>
Preflow	7 / 16	38 / 80
Cutflow	30 / 64	31 / 65



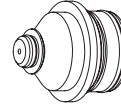
220173



220183



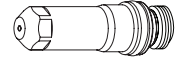
220176



220510



220179



220181

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay		
Preflow		Shield		Plasma						mm	volts		mm	mm/m
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	N <sub>2</sub> (#4)	O <sub>2</sub> (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds		
15	100	5	86	59	-	3.0	117	2.0	7350	3.0	150	0.0		
						4.0	119		6200			0.2		
						6.0	121		3945			0.4		
		3	80			59	-	10.0	126	3.0	2530	4.5	0.6	
								12.0	129		1970		0.8	
								15.0	133	3.3	1410	6.0	200	1.0
								20.0	139		610			6.5

### English

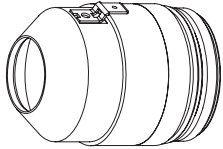
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Shield		Plasma		gauge	inch				inch	ipm		inch
O <sub>2</sub> (#1)	N <sub>2</sub> (#2)	O <sub>2</sub> (#3)	N <sub>2</sub> (#4)	O <sub>2</sub> (#5)	(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds	
15	100	5	86	59	-	10	0.135	117	0.08	270	150	0.12	0.0	
						-	3/16	119		210			0.2	
						-	1/4	121		140			0.4	
		3	80			59	-	3/8	126	0.12	105	0.18	0.6	
								1/2	129		70		0.8	
								5/8	133	0.13	50	0.24	200	1.0
								3/4	139		30			0.26



## 6-Knob automatic gas console cut chart

**Stainless steel**  
 N<sub>2</sub> Plasma / N<sub>2</sub> Shield  
 45 A Cutting

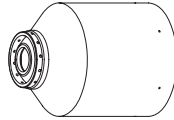
Flow Rates - lpm/scfh	
N <sub>2</sub>	
Preflow	55 / 116
Cutflow	69 / 147



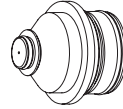
220173



220202



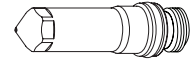
220304



220201



220180



220308

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	N <sub>2</sub> (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
70	70	80	80	9	-	0.8	96	2.5	6380	3.8	150	0
						1.0			5880			
						1.2			5380			
						1.5	4630					
						2.0	97		3935			0.2
						2.5	98		3270			
						3.0	99		2550			
						4.0	100		1580			0.3

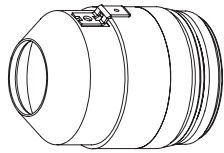
### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				inch	ipm	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	N <sub>2</sub> (#5)	(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
70	70	80	80	9	-	20	0.035	96	0.1	240	0.15	150	0
						18	0.048			210			
						16	0.060	98		180			0.2
						14	0.075	98		160			
						12	0.105	99		120			
						10	0.135	100		75			0.3

## 6-Knob automatic gas console cut chart

**Stainless steel**  
F5 Plasma / N<sub>2</sub> Shield  
45 A Cutting

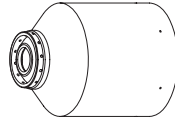
Flow Rates - lpm/scfh		
	F5	N <sub>2</sub>
Preflow	0 / 0	40 / 85
Cutflow	8 / 16	59 / 124



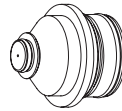
220173



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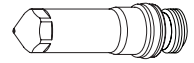
220304



220201



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220308

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	(#5)	F5(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
50	50	75	75	-	13	0.8	98	2.5	6570	3.8	150	0.2
						1.0			5740			
						1.2			4905			
						1.5	100		3890			
						2.0	102		3175			
						2.5	103		2510			
						3.0	105		2010			
		4.0	106	1435	3.0	0.4						
6.0	108	845	0.5									

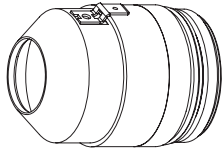
### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Shield		Plasma		gauge	inch				inch	ipm		inch
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	(#5)	F5(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds	
50	50	75	75	-	13	20	0.036	98	0.10	240	0.15	150	0.2	
						18	0.048			100				190
						16	0.060			102				150
						14	0.075	103		130				
						12	0.105	103		90				
						10	0.135	105		65				
						-	3/16	106		45				0.12
		-	1/4	108	30	0.5								

## 6-Knob automatic gas console cut chart

**Stainless steel**  
 Air Plasma / Air and CH<sub>4</sub> Shield  
 70 A Cutting

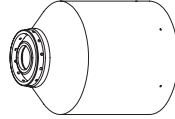
Flow Rates - lpm/scfh		
	Air	CH <sub>4</sub>
Preflow	42 / 89	-
Cutflow	44 / 94	18 / 38



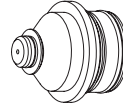
220173



220189



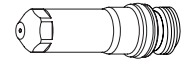
220176



220188



220179



220187

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
Air (#1)	(#2)	Air (#3)	CH <sub>4</sub> (#4)	Air (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
100	-	45	20	53	-	3.0	148	3.0	2830	4.5	150	0.2
						4.0	150		2450			
						6.0	152		1960			
						8.0	154		1440			
						10.0	156	3.5	980			
				77		170	3.0	810			0.6	

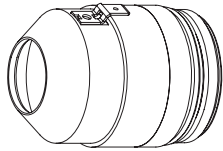
### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay	
Preflow		Shield		Plasma		gauge	inch				inch	ipm		inch
Air(#1)	(#2)	Air(#3)	CH <sub>4</sub> (#4)	Air(#5)	(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds	
100	-	45	20	53	-	10	0.135	148	0.12	105	150	0.18	0.2	
						-	3/16	150		85				
						-	1/4	152		75				
						-	3/8	156		0.14				40
						-	1/2	170	0.12	30				0.18

## 6-Knob automatic gas console cut chart

**Stainless steel**  
 F5 Plasma / N<sub>2</sub> Shield  
 80 A Cutting

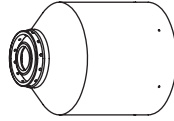
Flow Rates - lpm/scfh		
	F5	N <sub>2</sub>
Preflow	0 / 0	65 / 137
Cutflow	32 / 67	54 / 115



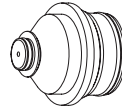
220173



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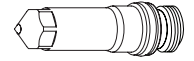
220304



220337



220179



220339

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	(#5)	F5 (#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
80	80	70	70	-	70	4.0	110	3.0	2180	4.5	150	0.2
						6.0	113	2.5	1225	3.8		0.3
						10.0	121	3.0	560	4.5		0.5

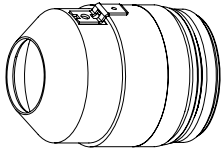
### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				inch	inch	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	(#5)	F5 (#6)	gauge	inch	volts	inch	inch	inch	Factor %	seconds
80	80	70	70	-	70	10	0.135	110	0.12	105	0.18	150	0.2
						-	3/16	113	0.11	60	0.17		0.3
						-	1/4	115	0.10	45	0.15		
						-	3/8	121	0.12	25	0.18		0.5

## 6-Knob automatic gas console cut chart

**Stainless steel**  
 H35 and N<sub>2</sub> Plasma / N<sub>2</sub> Shield  
 100 A Cutting

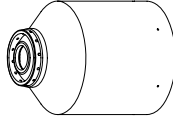
Flow Rates - lpm/scfh		
	H35	N <sub>2</sub>
Preflow	0 / 0	37 / 79
Cutflow	13 / 28	70 / 148



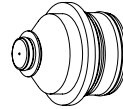
220173



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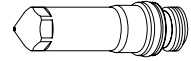
220644



220626



220640



220641

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	N <sub>2</sub> (#5)	H35 (#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
45	45	60	60	30	30	6.0	131	3.0	1945	4	130	0.2
						10.0	137	3.8	1445	5		0.4
				50	40	12.0	161	6.3	1125	8		0.6
						15.0	165		740			0.8

### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				volts	inch	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	N <sub>2</sub> (#5)	H35 (#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
45	45	60	60	30	30	-	1/4	131	0.12	75	0.16	130	0.2
						-	3/8	137	0.15	60	0.20		0.4
				50	40	-	1/2	161	0.25	40	0.32		0.6
						-	5/8	165		25			0.8

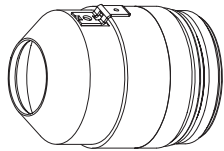
## 6-Knob automatic gas console cut chart

### Aluminum

Air Plasma / Air Shield

45 A Cutting

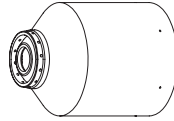
Flow Rates - lpm/scfh	
Air	
Preflow	38 / 80
Cutflow	42 / 90



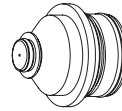
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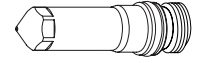
220176



220201



220180



220308

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
Air (#1)	(#2)	Air (#3)	(#4)	Air (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
100	-	100	-	7	-	1.2	98	2.5	5670	3.8	150	0.2
						1.5	100		4420			
						2.0	101		4000			
						2.5	102		3665			
						3.0	98	3225	2.7	0.3		
						4.0	106	1.8	2575	4.5	0.4	
						6.0	111	3.0	1690	4.5	0.6	

### English

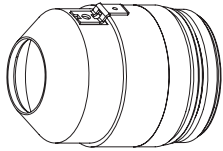
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				inch	ipm	
Air (#1)	(#2)	Air (#3)	(#4)	Air (#5)	(#6)	gauge	inch	inch	ipm	inch	Factor %	seconds	
100	-	100	-	7	-	18	0.047	0.10	98	220	0.15	150	0.2
						16	0.059		100	170			
						14	0.075		101	160			
						12	0.105		102	140			
						10	0.135	98	0.07	110	0.11	0.3	
						-	3/16	106	0.12	90	0.18	0.4	
						-	1/4	111		60		0.6	

## 6-Knob automatic gas console cut chart

### Aluminum

Air Plasma / Air and CH4 Shield  
70 A Cutting

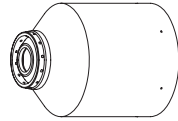
Flow Rates - lpm/scfh		
	Air	CH <sub>4</sub>
Preflow	42 / 89	-
Cutflow	44 / 93	18 / 38



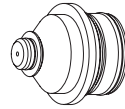
220173



220189



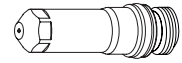
220176



220188



220179



220187

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
Air (#1)	(#2)	Air (#3)	CH <sub>4</sub> (#4)	Air (#5)	(#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
100	-	45	20	53	-	1.5	154	3.0	3080	4.5	150	0.1
						2.0	160		2930			0.2
						2.5	161		2710			0.3
						3.0	162		2490			
						4.0	157		2210			0.4
						6.0	158		1630			
						8.0	159		1260			
						9.5	161		960			
12.0	167	720										

### English

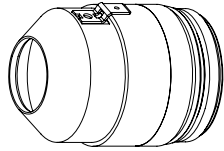
Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				inch	ipm	
Air (#1)	(#2)	Air (#3)	CH <sub>4</sub> (#4)	Air (#5)	(#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
100	-	45	20	53	-	14	0.064	154	0.12	120	0.18	150	0.1
						12	0.081	160		110			0.2
						10	0.102	161		105			0.3
						-	1/8	162		95			
						-	3/16	152		80			0.4
						-	1/4	158		60			
						-	3/8	161		40			
						-	1/2	167		25			

## 6-Knob automatic gas console cut chart

### Aluminum

H35 and N<sub>2</sub> Plasma / N<sub>2</sub> Shield  
100 A Cutting

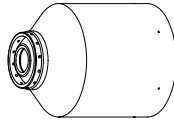
Flow Rates - lpm/scfh		
	H35	N <sub>2</sub>
Preflow	0 / 0	36 / 77
Cutflow	10 / 22	63 / 133



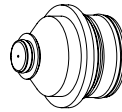
220173



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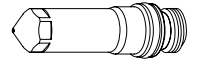
220644



220626



220640



220641

### Metric

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness	Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma						mm	volts	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	N <sub>2</sub> (#5)	H35 (#6)	mm	volts	mm	mm/m	mm	Factor %	seconds
45	45	60	60	30	30	6.0	137	4	2620	6	150	0.1
						10.0	139		1660			0.3
						12.0	146		1180			0.5

### English

Test Preflow Flowrates (%)		Test Cutflow Flowrates (%)				Material Thickness		Arc Voltage	Torch-to-work distance	Travel Speed	Initial Pierce Height		Pierce Delay
Preflow		Shield		Plasma		gauge	inch				inch	ipm	
N <sub>2</sub> (#1)	N <sub>2</sub> (#2)	N <sub>2</sub> (#3)	N <sub>2</sub> (#4)	N <sub>2</sub> (#5)	H35 (#6)	gauge	inch	volts	inch	ipm	inch	Factor %	seconds
45	45	60	60	30	30	-	1/4	137	0.16	100	0.24	150	0.1
						-	3/8	139		70			0.3
						-	1/2	146		40			0.5



## Changing consumable parts

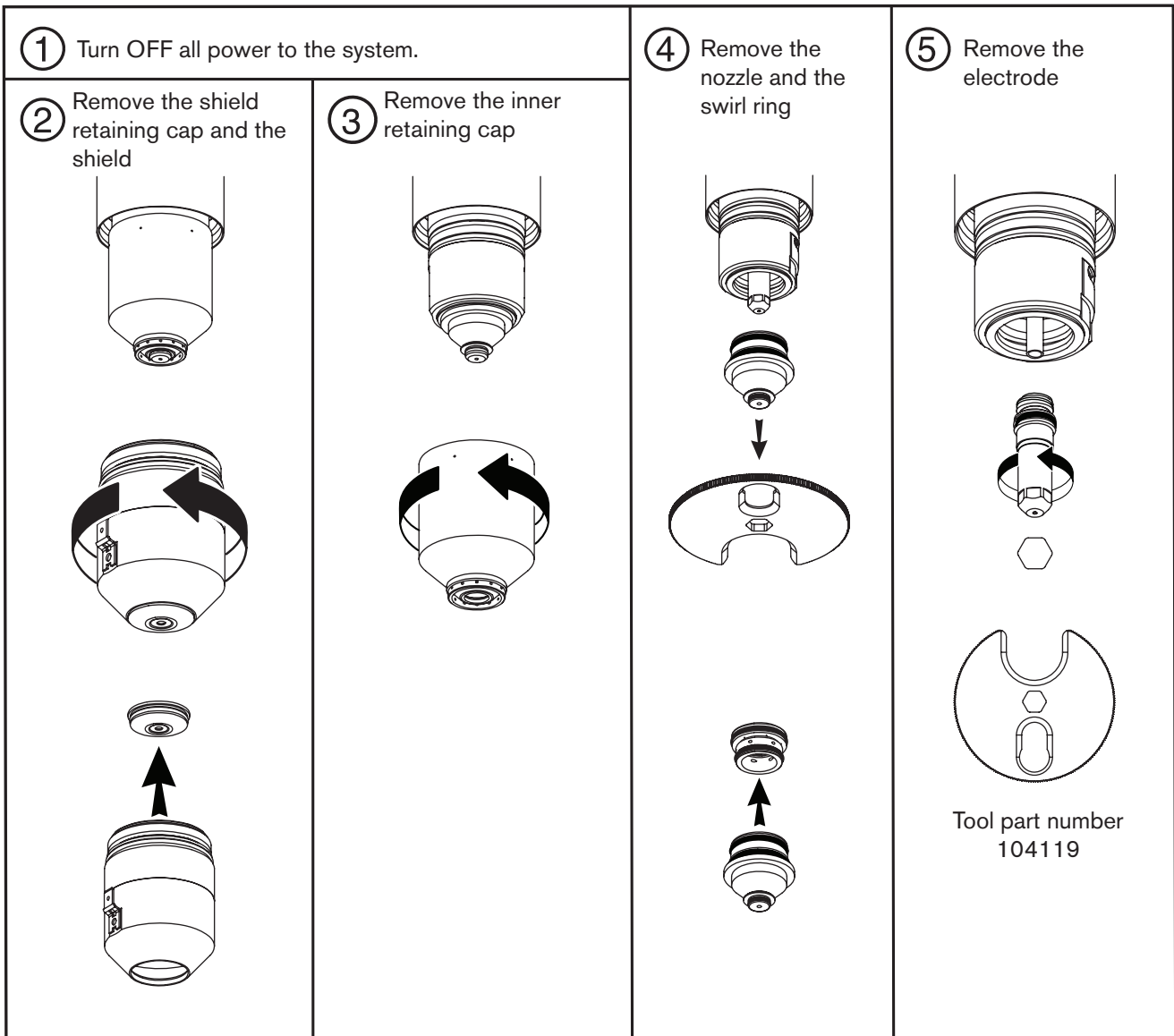


### WARNING

**Always** disconnect power to the power supply before inspecting or changing consumable parts. Use gloves when removing consumables. The torch might be hot.

## Remove consumables

Check the consumable parts daily for wear before cutting. Before removing consumables, bring the torch to the edge of the cutting table, with the torch lifter raised to its highest point to prevent the consumables from dropping into the water of the water table.



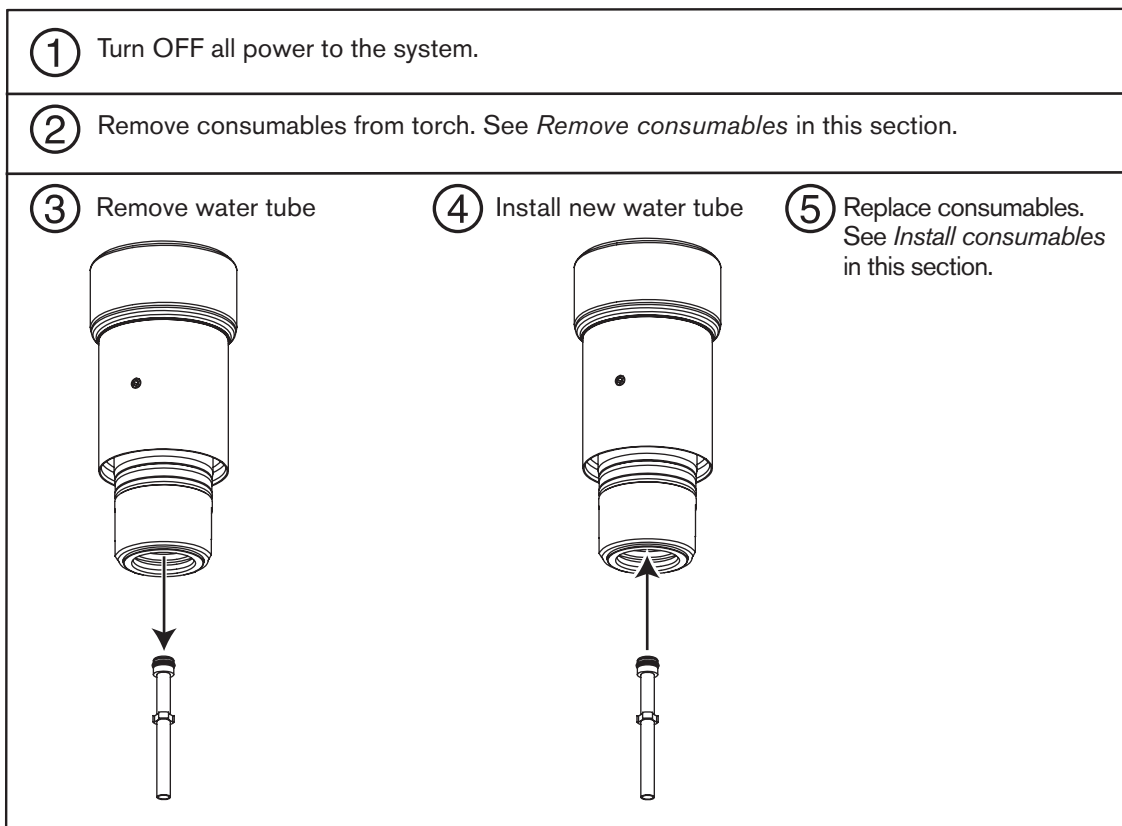
## Replace torch water tube



### WARNING

**Always disconnect power to the power supply before removing consumable parts.**

Note: The water tube may seem loose even though correctly inserted, but any side-to-side looseness will disappear after the electrode is installed.





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