PAC180 to PAC182

Torch Upgrade Information

802190 - Revision 0

HYPERTHERM®

PAC180 to PAC182
TORCH UPGRADE INFORMATION

IM-219
(P/N 802190)

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Hypertherm, Inc.
P.O. Box 5010
Hanover, New Hampshire 03755-5010
Tel.: (603) 643-3441
Fax: (603) 643-5352

Hypertherm Offices Worldwide:

Hypertherm, Inc.
Etna Road, P.O. Box 5010
Hanover, NH 03755 USA
Tel.: (603) 643-3441 (Main Office)
Fax: (603) 643-5352 (All Departments)
Tel.: (800) 643-9878 (Technical Service – toll-free in USA and Canada)
Tel.: (800) 737-2978 (Customer Service – toll-free in USA and Canada)
email: info@hypertherm.com (General Information)
email: service@hypertherm.com (Technical/Customer Services)

Hypertherm Plasmatechnik GmbH
Technologiepark Hanau
Rodenbacher Chaussee 6
D–63457 Hanau-Wolfgang, Germany
Tel.: 49 6181 58 2100
Fax: 49 6181 58 2134

Hypertherm (S) Pte Ltd
No. 19 Kaki Bukit Road 2
K.B. Warehouse Complex
Singapore 417847
Tel.: 65 841 2489
Fax: 65 841 2490

Hypertherm UK Ltd
9 Berkeley Court, Manor Park
Runcorn, Cheshire, England WA7 1TQ
Tel.: 44 1928 579 074
Fax: 44 1928 579 604

France
15 Impasse des Rosiers
95610 Eragny, France
Tel.: 33 1 30 37 15 28
Fax: 33 1 30 37 15 79

Hypertherm S.r.L.
Via Torino 2
20123 Milan, Italy
Tel.: 39 02 725 46 312 (Customer Service)
Tel.: 39 02 725 46 314 (Technical Service)
Fax: 39 02 725 46 400 (All Departments)

Hypertherm B.V.
Burg, Haverkampstraat 13
7091 CN Dinxperlo, The Netherlands
Tel.: 31 315 655 866 (Customer Service)
Fax: 31 315 655 886

European Technical Support Organization (ETSO)
Edisonstraat 12
3281 NC Numansdorp, The Netherlands
Tel.: 00 800 4973 7843 (00 800 Hypertherm) – (toll-free Technical Service)
Tel.: 31 186 659494
Fax: 31 186 659495

Japan
Shinjuku Park Tower
30th Floor
3-7-1 Nishi-Shinjuku
Shinjuku-ku, Tokyo
163-1030, Japan
Tel.: 81 03 5326 3142
Fax: 81 03 5326 3001

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SECTION I

PAC182 PRODUCT SUMMARY

Up until January 23, 1994, the standard torch shipped with all HD-1070 HyDefinition systems was the PAC180. The new PAC182 torch is functionally equivalent to the PAC180 torch, but represents an important improvement in industrial robustness.

All plasma cutting torches require good electrical contact between the torch body and electrode to prevent damaging arcing within the torch. Workplace contaminants, such as oil and dirt, can accumulate and weaken or compromise this contact. Because the HyDefinition process utilizes relatively small consumables with reduced contact surfaces and requires precise parts alignment, precautions against the introduction of these contaminants to the HyDefinition torch are particularly essential.

A PAC180 torch properly cleaned and maintained against accumulated workplace contaminants will provide consistently reliable performance. The new PAC182 torch, however, employs an improved design that adds an extra degree of protection against weakened or compromised electrical contact. A gold-plated high-current electrical contact is placed inside the cathode block, largely protected from external contact, forming a high-quality contact with the stem of the HyDefinition electrodes newly redesigned for use with the PAC182 torch.

All HD-1070 electrodes have been modified with an extended non-threaded stem to take advantage of the improved contact feature in the PAC182 torch. These electrodes have new part numbers (all old-style electrodes have been replaced). All other consumables remained unchanged. Refer to the revised HD-1070 Operating Data (Cut) Charts in Section IV for the correct electrode part number/s for your application/s. A summary cross-reference table for old and new-style electrodes is provided below:

Cutting Application	Obsoleted Part Number	New Part Number
15A Mild Steel	020659	120111
30A Mild Steel	020638	
50A Mild Steel	020640	120112
70A Mild Steel/Stainless/Aluminum		
30A Stainless Steel	020936	120113
50A Stainless Steel	020946	

After the PAC182 torch has been installed, carefully review all cutting parameters contained in the revised Operating Data (Cut) Charts to ensure optimum cutting performance. The "Test Preflow Flowrates" have been adjusted for both PAC180 and PAC182 operation and are critical to minimizing torch misfiring on starting.

Finally, although the PAC182 torch offers improved resistance to workplace contaminants, proper torch maintenance and consumable/torch assembly remain critical to long-term torch reliability and performance. Carefully read and follow the recommended procedures in Section III.

SECTION II

PAC180 TORCH REMOVAL/PAC182 TORCH INSTALLATION

Introducton

This procedure provides the user with the necessary information to remove the existing PAC180 torch and install the PAC182 torch.

PAC180 Torch Removal

1. **Shut off power at power supply. Shut down input power at the disconnect switch box and tag and lockout.**

2. Remove the torch and off-valve assembly together from the torch mounting bracket.

   Note: Before any leads and hoses are removed below, read these instructions carefully. Identify and tag all leads and hoses and their origins and destinations.

3. Disconnect the plasma bypass vent (**1**), plasma gas (**2**) and shield gas (**3**) 17-inch hoses from the off-valve assembly. Refer to illustration.

4. Loosen the set screw to remove the off-valve assembly from the torch mounting sleeve. Slide the off-valve assembly out of the way.

5. Unscrew the torch mounting sleeve from the torch and slide out of the way.

6. Disconnect the pilot arc lead (**4**), coolant supplyhose/power lead (**5**) and coolant return hose (**6**) from the torch. Also disconnect the plasma bypass vent (**1**), plasma gas (**2**) and shield gas (**3**) 17-inch hoses from the off-valve assembly. Refer to illustration.

PAC182 Torch Installation

Note: Ensure that the leads and hoses are connected straight and are not twisted. If the leads and hoses become twisted, the torch sleeve will not be able to be slid into position for threading on to the torch.

Make the following connections at torch.

1. Connect the pilot arc lead (**4**) to the pilot pin fitting.

2. Connect the coolant supplyhose/power lead (**5**) (green band) to the water inlet fitting (RH) at the center of the torch.

3. Connect the cooling return hose (**6**) (red band) to the water outlet fitting (RH).

SECTION III

PAC182 TORCH MAINTENANCE GUIDELINES

Introduction

The following operating recommendations and troubleshooting guidelines will aid the user in cutting with the redesigned consumables. Refer to the latest HD-1070 Operating Data (Cut) Charts in Section IV. Note that some of the recommended settings have been changed to optimize the new consumables.

Operating Recommendations

As a guideline, when applying silicone grease to any of the consumable O-rings, you should be able to feel the grease on your fingers, but not see it. **Do not use an excessive amount of grease.** The swirl ring ports and other consumable ports and holes can easily be plugged by grease, causing improper gas flow during operation.

1. Prior to replacing the electrode, apply a light coating of silicone grease to the O-ring. Then apply a light coating of silicone grease to both O-rings on the swirl ring.

2. Insert the electrode into the the small diameter end of the swirl ring, then insert the swirl ring (large diameter end) into the nozzle or nozzle/shield. Prior to replacing the nozzle or nozzle/ shield with swirl ring and electrode, apply a light coat of silicone grease to the O-rings, then insert into the torch and push it into place.

3. Prior to replacing the inside cap and shield cap, inspect the threads on the torch body, and clean the threads if necessary. Apply a light coat of silicone grease to the O-rings on the torch body.

4. Replace the inside retaining cap by screwing it on to the torch head. **Hand tighten the inside cap snugly to ensure good electrical contact. Do not overtighten.**

5. Prior to replacing the shield cap, ensure that the shield is in place. If the shield is not in place, apply a light coating of silicone grease to the O-ring and insert the shield into the shield cap and push into place.

6. Replace the shield cap by screwing it on to the torch head. **The shield cap should be hand tightened only. Failure to tighten the shield cap snugly could result in poor electrical contact and water and gas leaks which will impair cut quality.**

Troubleshooting Guidelines

1. If the consumable life is short or if the torch misfires, check the swirl ring holes for silicone lubrication. Plugged swirl holes will cause improper gas flow during operation.

2. If the torch starts to misfire after approximately 200 starts, remove the consumables and check the base of the electrode for burn marks. If burn marks exist, clean the torch interior with demineralized water and a cotton swab and replace the electrode.

3. If the electrode looks good, take a piece of scotch bright and gently rub the tip of the electrode to remove the oxide layer. Reinstall the consumables being careful not to get dirt or excess silicone lubricant on the consumables.

4. If the torch still misfires, remove the THC wire from the shield cap. If the torch fires, checkout the lifter station.

For assistance, contact Hypertherm Technical Service at 1-800-643-9878.

SECTION IV

HD-1070 OPERATING DATA (CUT) CHARTS

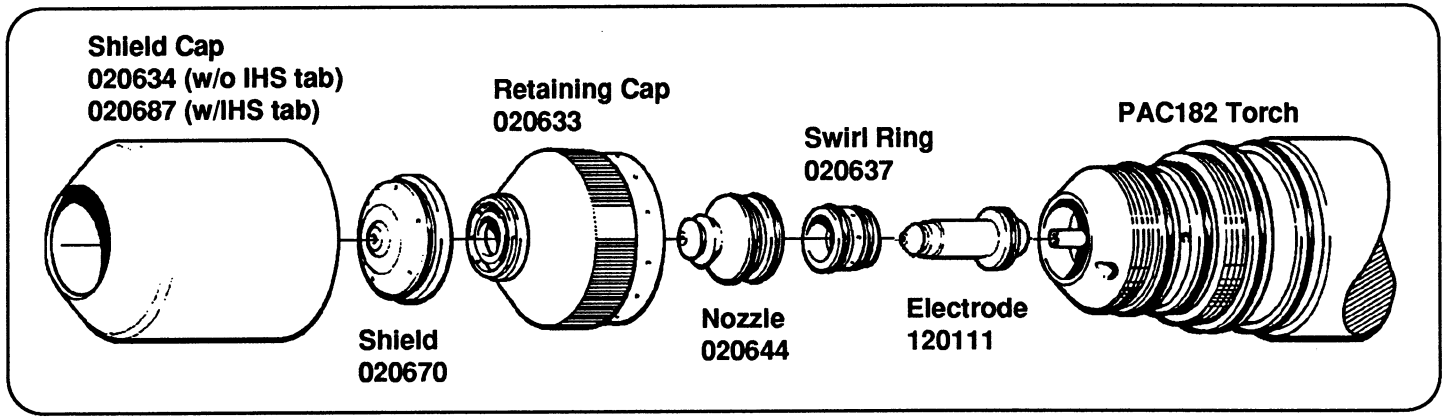
Introduction

The *Cut Charts* on the following pages are optimized to provide the best cut angle, least dross and best cut surface finish. Keep in mind that the charts provide a good starting point and that optimum cutting must be tuned to the application and materials on site. Increasing cut speed, lowering the torch standoff, higher current consumables on thinner metals or increasing the oxygen ratio in the shield mix, for example, all present certain tradeoffs. Depending on the cutting application, it is up to the operator to determine if the tradeoffs are acceptable.

The cut charts also provide part numbers and illustrations of the consumables required to cut at specific amperages.

Cut Chart Index

HD-1070 Operating Data (Cut) Charts
Mild Steel - 15 Amp Cutting
O_2 Plasma/O_2 & N_2 Shield



Material Thickness (GA)	(In)	(mm)	Test Cut Flowrates (%) PLASMA O_2 (MV1/FM1)	SHIELD O_2 (MV4/FM2)	SHIELD N_2 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW O_2 (MV5/FM2)	PREFLOW N_2 (MV7/FM3)	Arc Voltage ** (V)	Torch Standoff *,** (in)	(mm)	Travel Speed (ipm)	(m/min)	Initial Height (In)	(mm)	Pierce Delay (Dial Setting)
20	0.036	0.9	40	30	10	5	75	120	0.020	0.5	100	2.54	0.040	1.0	0
18	0.048	1.3	40	30	10	5	75	121	0.020	0.5	85	2.16	0.040	1.0	.5
16	0.060	1.5	40	30	10	5	75	124	0.030	0.8	65	1.65	0.040	1.0	1
14	0.075	1.9	40	30	10	5	75	130	0.040	1.0	45	1.14	0.060	1.5	1.5
12	0.105	2.7	40	30	10	5	75	132	0.040	1.0	35	0.90	0.060	1.5	2
10	0.135	3.4	40	30	10	5	75	134	0.040	1.0	25	0.64	0.060	1.5	2.5

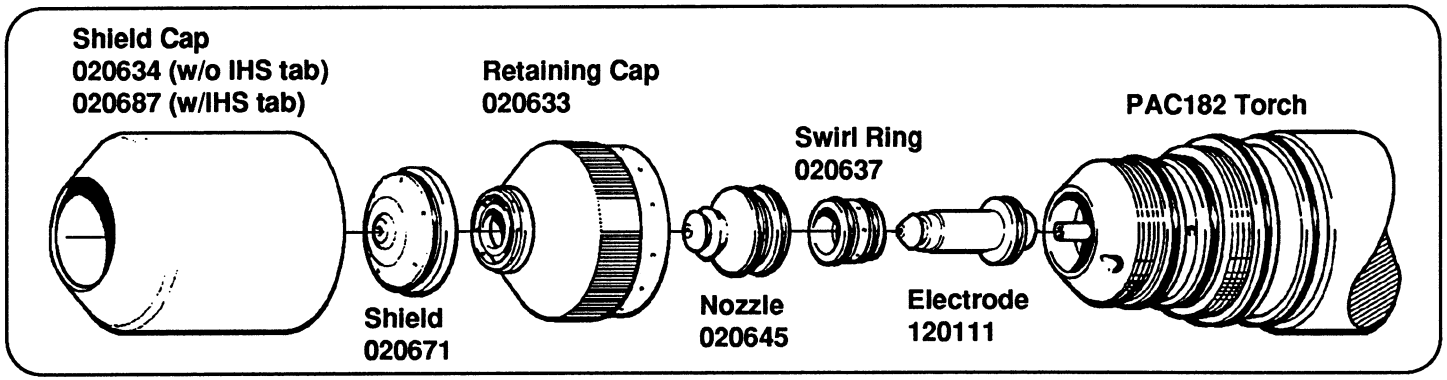
O_2 and N_2 gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.

* The torch standoff tolerances are ± 0.005 inch /± 0.125 mm. When using a THC, the tolerances are ± 1 volt.

** To maintain the 0.5 mm (0.020 inch) torch standoff as the electrode wears, the arc voltage may have to be increased to avoid having the torch dive into the plate.

If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

HD-1070 Operating Data (Cut) Charts
Mild Steel - 30 Amp Cutting
O_2 Plasma/O_2 & N_2 Shield



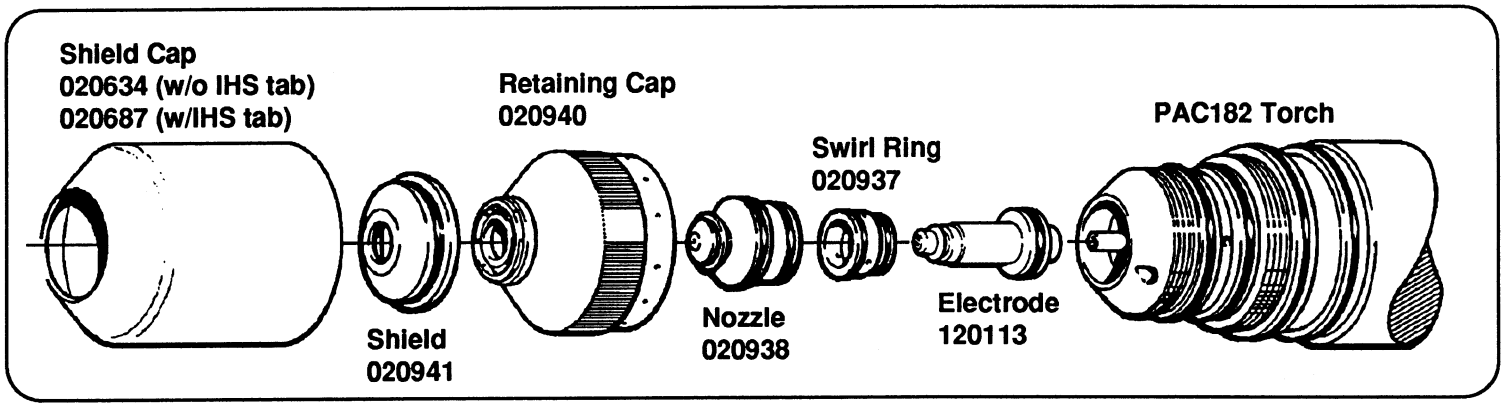
Material Thickness (GA)	(In)	(mm)	Test Cut Flowrates (%) PLASMA O_2 (MV1/FM1)	SHIELD O_2 (MV4/FM2)	SHIELD N_2 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW O_2 (MV5/FM2)	PREFLOW N_2 (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (In)	(mm)	Travel Speed (Ipm)	(m/min)	Initial Height (In)	(mm)	Pierce Delay (Dial Setting)
24	0.024	0.6	46	15	5	5	75	103	0.030	0.8	200	5.08	0.040	1.0	0
22	0.030	0.8	46	15	5	5	75	108	0.030	0.8	170	4.32	0.040	1.0	0
20	0.036	0.9	46	15	5	5	75	110	0.040	1.0	140	3.56	0.060	1.5	0
18	0.048	1.3	46	15	5	5	75	112	0.040	1.0	110	2.80	0.060	1.5	0
16	0.060	1.5	46	15	5	5	75	115	0.040	1.0	80	2.00	0.060	1.5	0
14	0.075	1.9	46	15	5	5	75	118	0.040	1.0	60	1.52	0.060	1.5	.5
12	0.105	2.7	46	15	5	5	75	121	0.060	1.5	50	1.27	0.080	2.0	1
10	0.135	3.4	46	15	5	5	75	124	0.060	1.5	35	0.90	0.080	2.0	1.5
	3/16	4.8	46	15	5	5	75	125	0.060	1.5	32	0.81	0.080	2.0	2
	1/4	6.4	46	30	10	5	75	124	0.040	1.0	25	0.64	0.080	2.0	2.5

O_2 and N_2 gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.

* The torch standoff tolerances are ± 0.005 inch /± 0.125mm. When using a THC, the tolerances are ± 1 volt.

If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

HD-1070 Operating Data (Cut) Charts
Stainless Steel# - 30 Amp Cutting
Air Plasma/Air Shield



Material Thickness (GA)	(in)	(mm)	Test Cut Flowrates (%) PLASMA Air (MV1/FM1)	SHIELD Air (MV4/FM2)	SHIELD AUX B (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW Air (MV5/FM2)	PREFLOW AUX B (MV7/FM3)	Arc Voltage ** (V)	Torch Standoff *,** (in)	(mm)	Travel Speed (ipm)	(m/min)	Initial Height (in)	(mm)	Pierce Delay (Dial Setting)
27	0.016	0.4	60	30	—	72	—	70-75	0.020	0.5	250	6.35	0.040	1.0	0
24	0.024	0.6	60	30	—	72	—	70-75	0.020	0.5	220	5.59	0.040	1.0	0
22	0.030	0.8	60	30	—	72	—	70-75	0.020	0.5	200	5.08	0.040	1.0	0
20	0.036	0.9	60	30	—	72	—	70-75	0.020	0.5	180	4.57	0.040	1.0	0
18	0.048	1.2	60	30	—	72	—	73-78	0.020	0.5	150	3.81	0.060	1.5	.5
16	0.060	1.5	60	30	—	72	—	73-78	0.020	0.5	120	3.05	0.060	1.5	.5

Air (AUX A) inlet pressure remains at one setting of 120 psi (8.2 bar) for all material thickness.

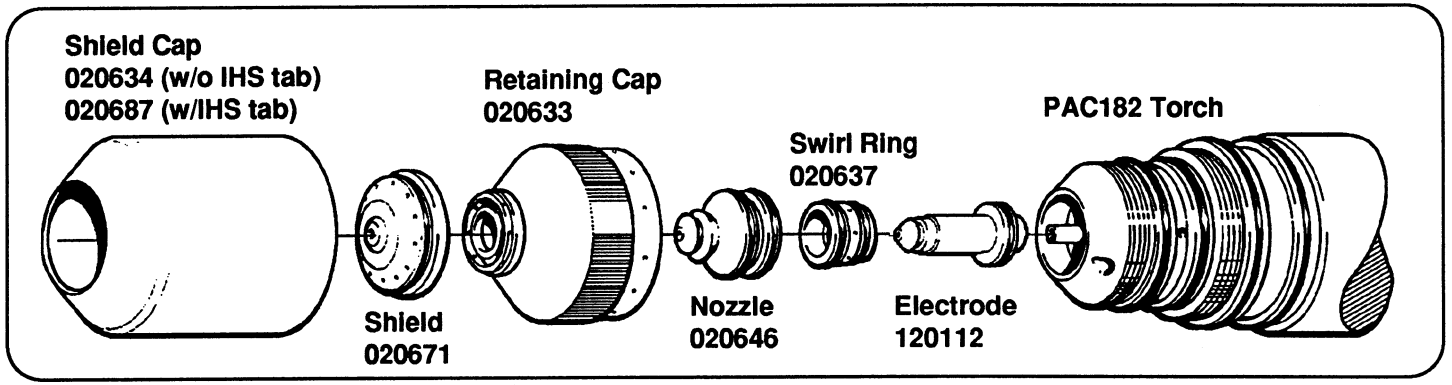
* The torch standoff tolerances are ± 0.005 inch /± 0.125mm. When using a THC, the tolerances are ± 1 volt.

** To maintain the .020 inch (0.5 mm) torch standoff as the electrode wears, the arc voltage may have to be increased to avoid having the torch dive into the plate.

Stainless steel plate sometimes comes with a protective plastic film. This film must be removed prior to cutting.

If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

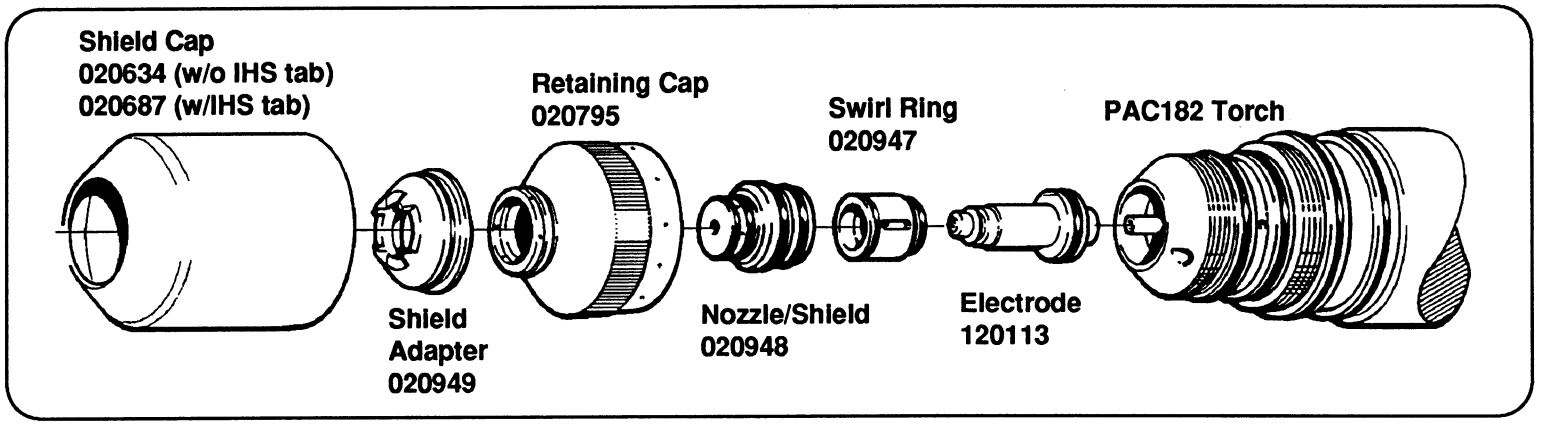
HD-1070 Operating Data (Cut) Charts
Mild Steel - 50 Amp Cutting
O_2 Plasma/O_2 & N_2 Shield



Material Thickness (GA)	(In)	(mm)	Test Cut Flowrates (%) PLASMA O_2 (MV1/FM1)	SHIELD O_2 (MV4/FM2)	SHIELD N_2 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW O_2 (MV5/FM2)	PREFLOW N_2 (MV7/FM3)	Arc Voltage (volts)	Torch Standoff* (In)	(mm)	Travel Speed (Ipm)	(m/min)	Initial Piercing Height (In)	(mm)	Pierce Delay (Dial Setting)
22	0.030	0.8	40	40	–	5	75	103	0.040	1.0	270	6.86	0.060	1.5	0
20	0.036	0.9	40	40	–	5	75	104	0.040	1.0	210	5.33	0.060	1.5	0
18	0.048	1.3	40	40	–	5	75	104	0.040	1.0	160	4.06	0.060	1.5	0
16	0.060	1.5	40	40	–	5	75	109	0.050	1.3	120	3.05	0.080	2.0	0
14	0.075	1.9	40	40	–	5	75	113	0.050	1.3	100	2.54	0.080	2.0	0
12	0.105	2.7	40	40	–	5	75	119	0.050	1.3	75	1.91	0.100	2.5	0
10	0.135	3.4	40	40	–	5	75	122	0.060	1.5	55	1.40	0.100	2.5	1
	3/16	4.8	40	40	–	5	75	124	0.060	1.5	45	1.14	0.100	2.5	1.5
	1/4	6.4	60	40	–	5	75	127	0.080	2.0	35	0.90	0.120	3.0	2

O_2 and N_2 gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.
* Torch standoff tolerances are ± 0.125 mm (± 0.005 inch). When using a THC, tolerances are ± 1 volt.
If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

HD-1070 Operating Data (Cut) Charts
Stainless Steel# - 50 Amp Cutting
Air Plasma/Air Shield



Material Thickness (GA)	(In)	(mm)	Test Cut Flowrates (%) PLASMA Air (MV1/FM1)	SHIELD Air (MV4/FM2)	SHIELD AUX B (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW Air (MV5/FM2)	PREFLOW AUX B (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (In)	(mm)	Travel Speed (Ipm)	(m/min)	Initial Height ** (In)	(mm)	Pierce Delay (Dial Setting)
14	0.075	1.9	40	80	—	60	—	100	0.040	1.0	120	3.05	0.120	3.0	2
12	0.105	2.7	40	80	—	60	—	100	0.040	1.0	80	2.03	0.120	3.0	2.5
10	0.135	3.4	40	60	—	60	—	110	0.060	1.5	55	1.40	0.120	3.0	3
	3/16	4.8	40	50	—	60	—	115	0.080	2.0	40	1.02	0.160	4.0	4

Air (AUX A) inlet pressure remains at one setting of 120 psi (8.2 bar) for all material thickness.

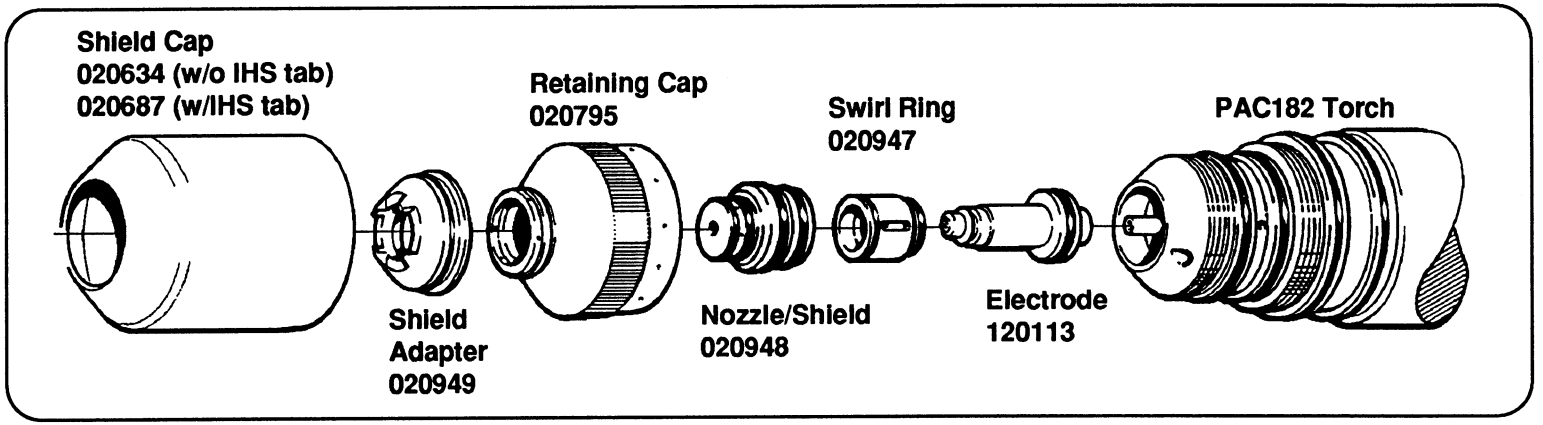
* The torch standoff tolerances are ± 0.005 inch /± 0.125mm. When using a THC, the tolerances are ± 1 volt.

** Measured from tips of shield adapter 020949.

Stainless steel plate sometimes comes with a protective plastic film. This film must be removed prior to cutting.

If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

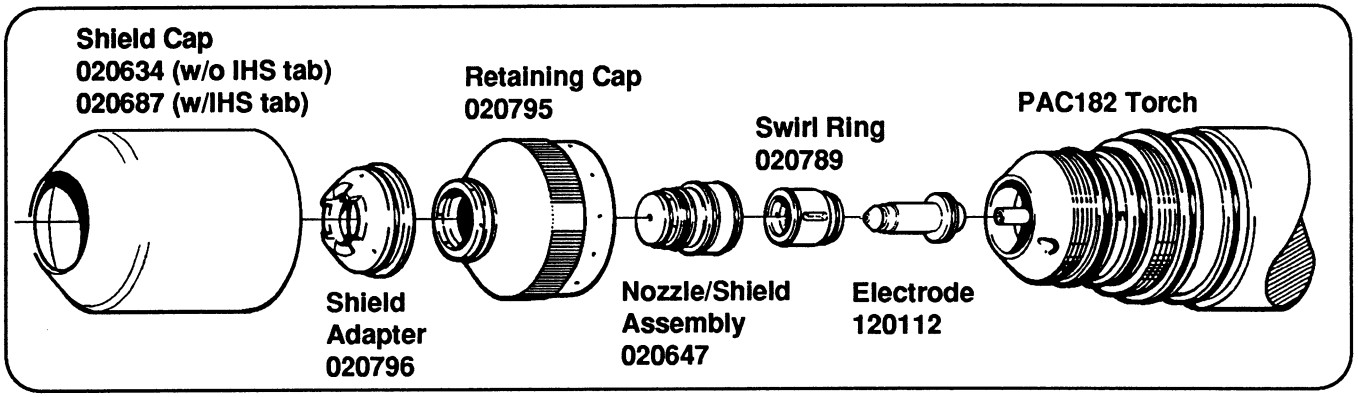
HD-1070 Operating Data (Cut) Charts
Copper# - 50 Amp Cutting
O_2 Plasma/O_2 & N_2 Shield



Material Thickness (GA)	(in)	(mm)	Test Cut Flowrates (%) PLASMA O_2 (MV1/FM1)	SHIELD O_2 (MV4/FM2)	SHIELD N_2 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW O_2 (MV5/FM2)	PREFLOW N_2 (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (in)	(mm)	Travel Speed (ipm)	(m/min)	Initial Height ** (in)	(mm)	Pierce Delay (Dial Setting)	External Pierce Delay *** (Sec)
16	0.060	1.6	40	20	10	35	40	92	0.080	2.0	70	1.8	0.100	2.5	5	1.0
14	0.075	1.9	40	20	10	35	40	92	0.080	2.0	70	1.8	0.100	2.5	5	1.0
12	0.105	2.7	40	20	10	35	40	94	0.080	2.0	65	1.7	0.100	2.5	7	1.5
10	0.135	3.4	40	20	10	35	40	94	0.080	2.0	65	1.7	0.100	2.5	9	2.0

O_2 and N_2 gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.
Ensure retaining cap 020795 is tight for good electrical contact.
* The torch standoff tolerances are ± 0.005 inch /± 0.125mm. When using a THC, the tolerances are ± 1 volt.
** Measured from tips of shield adapter 020949.
*** To initiate the external pierce complete function at the CNC, refer to Section 3, Installation, *Local/External Pierce Delay Function* to disable the pierce delay dial on the power supply. Refer to the external pierce delay settings (in seconds) above.
# Copper plate sometimes comes with a protective plastic film. This film must be removed prior to cutting.
If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

HD-1070 Operating Data (Cut) Charts
Mild Steel - 70 Amp Cutting
O_2 Plasma/O_2 & N_2 Shield



Material Thickness (GA)	(in)	(mm)	Test Cut Flowrates (%) PLASMA O_2 (MV1/FM1)	SHIELD O_2 (MV4/FM2)	SHIELD N_2 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW O_2 (MV5/FM2)	PREFLOW N_2 (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (in)	(mm)	Travel Speed (ipm)	(m/min)	Initial Height ** (in)	(mm)	Pierce Delay (Dial Setting)
16	0.060	1.6	25	—	100	5	75	109	0.060	1.5	280	7.11	0.100	2.5	0.5
14	0.075	1.9	25	—	100	5	75	110	0.060	1.5	230	5.84	0.100	2.5	0.5
12	0.105	2.7	25	—	100	5	75	111	0.080	2.0	185	4.70	0.120	3.0	0.5
10	0.135	3.4	25	—	100	5	75	115	0.080	2.0	150	3.81	0.120	3.0	1
	3/16	4.8	25	—	100	5	75	120	0.080	2.0	120	3.05	0.120	3.0	2
	1/4	6.4	40	—	100	5	75	130	0.080	2.0	100	2.54	0.120	3.0	2.5
	3/8	9.5	40	—	100	5	75	140	0.100	2.5	65	1.65	0.160	4.0	3

O_2 and N_2 gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.

Ensure retaining cap 020795 is tight for good electrical contact.

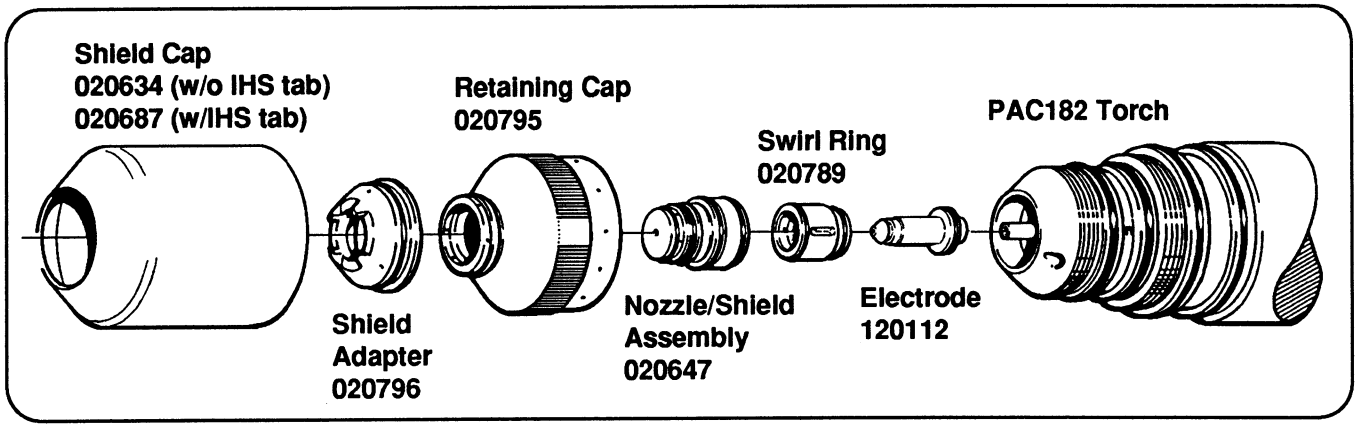
Ensure the seat of electrode 020640 is free of silicone before installing in torch for good electrical contact.

* The torch standoff tolerances are ± 0.005 inch /± 0.125 mm. When using a THC, the tolerances are ± 1 volt.

** Measured from tips of castlation on shield adapter 020796.

If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

HD-1070 Operating Data (Cut) Charts
Stainless Steel# - 70 Amp Cutting
Air Plasma/Air & CH_4 Shield



Material Thickness (GA)	(In)	(mm)	Test Cut Flowrates (%) PLASMA Air (MV1/FM1)	SHIELD Air (MV4/FM2)	SHIELD CH_4 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW Air (MV5/FM2)	PREFLOW AUX B (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (In)	(mm)	Travel Speed (Ipm)	(m/min)	Initial Height ** (In)	(mm)	Pierce Delay (Dial Setting)
10	0.135	3.4	35	100	—	72	—	135	0.060	1.5	100	2.50	0.140	3.5	1.5
	3/16	4.8	35	60	3	72	—	140	0.080	2.0	80	2.00	0.140	3.5	2
	1/4	6.4	35	40	5	72	—	150	0.140	3.5	55	1.40	0.180	4.5	2.5
	3/8	9.5	35	30	10	72	—	165	0.140	3.5	30	0.76	0.180	4.5	3

Air (AUX A) and CH_4 (AUX B) gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.

Ensure retaining cap 020795 is tight for good electrical contact.

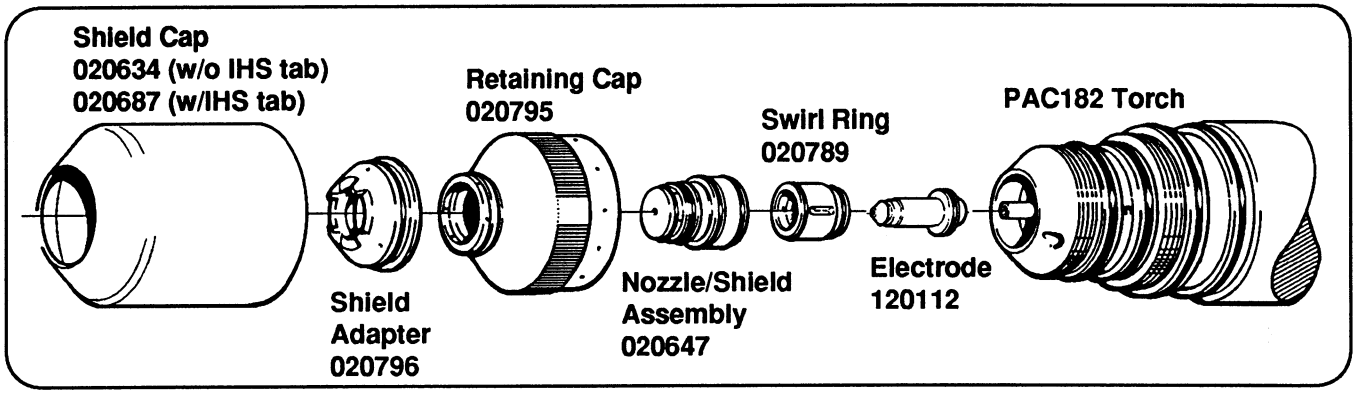
Ensure the seat of electrode 020640 is free of silicone before installing in torch for good electrical contact.

* The torch standoff tolerances are ± 0.005 inch /± 0.125 mm. When using a THC, the tolerances are ± 1 volt.

** Measured from tips of castlation on shield adapter 020796.

If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

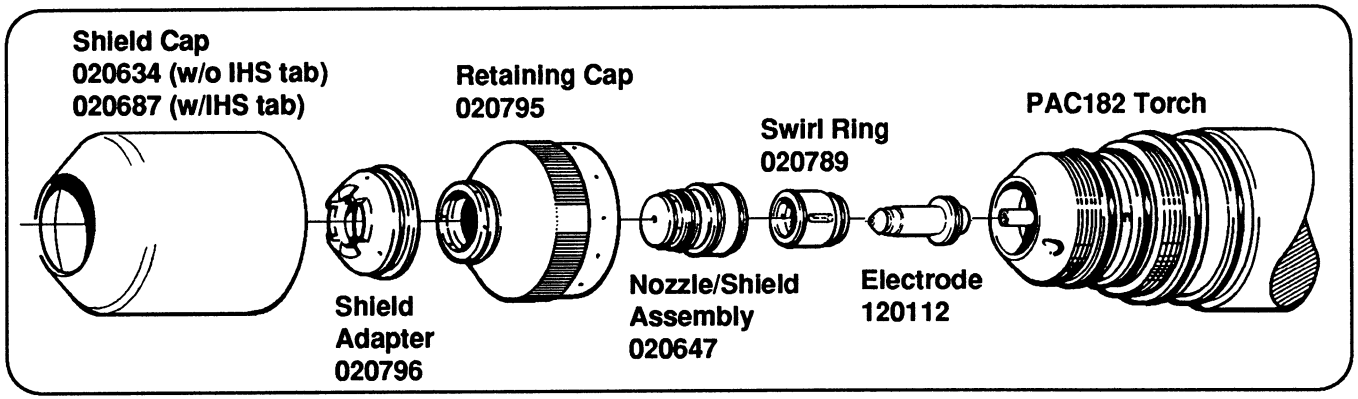
HD-1070 Operating Data (Cut) Charts
Aluminium# - 70 Amp Cutting
Air Plasma/CH_4 Shield



Material Thickness (GA)	(in)	(mm)	Test Cut Flowrates (%) PLASMA Air (MV1/FM1)	SHIELD AUX A (MV4/FM2)	SHIELD CH_4 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW Air (MV5/FM2)	PREFLOW AUX B (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (in)	(mm)	Travel Speed (ipm)	(m/min)	Initial Height ** (in)	(mm)	Pierce Delay (Dial Setting)
18	0.048	1.3	45	—	40	72	—	160	0.100	2.5	150	3.81	0.160	4.0	0.5
16	0.060	1.5	45	—	40	72	—	160	0.100	2.5	125	3.18	0.160	4.0	0.5
14	0.075	1.9	45	—	40	72	—	160	0.100	2.5	100	2.54	0.160	4.0	1
12	0.105	2.7	45	—	40	72	—	160	0.100	2.5	85	2.16	0.160	4.0	1.5
	1/8	3.2	45	—	40	72	—	180	0.180	4.5	70	1.78	0.180	4.5	2
10	0.135	3.4	45	—	40	72	—	180	0.180	4.5	65	1.65	0.180	4.5	2
	1/4	6.4	45	—	40	72	—	180	0.180	4.5	45	1.14	0.180	4.5	2.5
	3/8	9.5	45	—	40	72	—	180	0.180	4.5	30	0.76	0.180	4.5	3

Air (AUX A) and CH_4 (AUX B) gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.
Ensure retaining cap 020795 is tight for good electrical contact.
Ensure the seat of electrode 020640 is free of silicone before installing in torch for good electrical contact.
* The torch standoff tolerances are ± 0.005 inch /± 0.125 mm. When using a THC, the tolerances are ± 1 volt.
** Measured from tips of castlation on shield adapter 020796.
# Aluminum plate sometimes comes with a protective plastic film. This film must be removed prior to cutting.
If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*

HD-1070 Operating Data (Cut) Charts
Copper# - 70 Amp Cutting
O_2 Plasma/O_2 & N_2 Shield



Material Thickness (GA)	(In)	(mm)	Test Cut Flowrates (%) PLASMA O_2 (MV1/FM1)	SHIELD O_2 (MV4/FM2)	SHIELD N_2 (MV6/FM3)	Test Preflow Flowrates (%) PREFLOW O_2 (MV5/FM2)	PREFLOW N_2 (MV7/FM3)	Arc Voltage (V)	Torch Standoff * (in)	(mm)	Travel Speed (ipm)	(m/min)	Initial Height ** (in)	(mm)	Pierce Delay (Dial Setting)	External Pierce Delay *** (Sec)
10	0.134	3.4	50	75	50	—	75	134	0.120	3.0	60	1.52	0.160	4.0	***	2.0
	3/16	4.8	50	75	50	—	75	120	0.120	3.0	55	1.40	0.160	4.0	***	2.5
	1/4	6.4	50	75	50	—	75	125	0.120	3.0	50	1.27	0.160	4.0	***	3.0
	3/8	9.5	50	75	50	—	75	130	0.120	3.0	25	0.64	0.160	4.0	***	5.0

O_2 and N_2 gas inlet pressures remain at one setting of 120 psi (8.2 bar) for all material thickness.
Ensure retaining cap 020795 is tight for good electrical contact.
* The torch standoff tolerances are ± 0.005 inch /± 0.125mm. When using a THC, the tolerances are ± 1 volt.
** Measured from tips of shield adapter 020796.
*** Set external pierce complete function at CNC by using the external pierce delay settings (in seconds) above. To disable the pierce delay dial on the power supply, refer to Section 3, Installation, *Local/External Pierce Delay Function.*
# Copper plate sometimes comes with a protective plastic film. This film must be removed prior to cutting.
If problems occur with the cutting process, and the flowrates are suspect, refer to Section 5, Maintenance, *Gas System Back Pressure Checks.*