

8. TORCH OPERATION

Torch Parts Selection

The application will determine which torch parts must be used. Refer to the cut charts for the proper torch parts to install for a selected application.



CAUTION

Do not interchange parts. Make sure all torch parts correspond with the plasma and shield gases in use for the application.

Pre-Setting Power Supply Controls

Set the Power Supply controls prior to operating the system as described in the power supply Operating Manual. Refer to the cutting charts for the proper cutting parameters for the application.

Recommended Cutting Speeds

Cutting speed depends on material and thickness. The following factors may affect system performance:

- Torch parts wear; gas quality and mass flow / pressure; operator experience; torch standoff height; proper work cable connection; alloy content of material; cutting table capabilities & accuracy.

NOTE

This information represents realistic expectations using recommended practices and well-maintained systems. Actual speeds may vary from those shown in the charts depending on the alloy content of the selected material. Voltage ratings may vary depending on the CNC, cutting table, or height controller.

For complete cutting speed chart data refer to the following pages.

Consumables Notes

Always assemble the consumable parts properly. Improper assembly may damage the parts or the torch head. Ensure that parts are seated together correctly.

Always check the shield gas distributor for charring when changing parts. Do not use the distributor if it is charred. Replace the shield gas distributor regularly to ensure proper performance.

Operational Notes

Always purge the torch after changing consumables or if the power supply has been shut off. The power supply's built-in purge function may not be enough to properly purge the torch. Manually flow gas with the 'Test Cut Flow' and 'Test Pre-Flow' functions to help remove any remaining coolant from the lines.

Slightly increasing the preflow pressure may increase piercing ability on thicker materials. However, increasing the preflow pressure too much may affect plasma starting reliability (misfiring).

Decreasing preflow pressure may improve piloting. Preflow pressure can be reduced without affecting cut performance as long as the pilot arc still transfers to the plate well. Decreasing preflow pressure too much will affect the ability to transfer the arc to the plate and cause damage to the tip.

Notes on Chart Measurements

Pressure measurements in the charts are in psi(g), not psi(a). 0 psi(g) = 14.7 psi(a) (1 atmosphere).

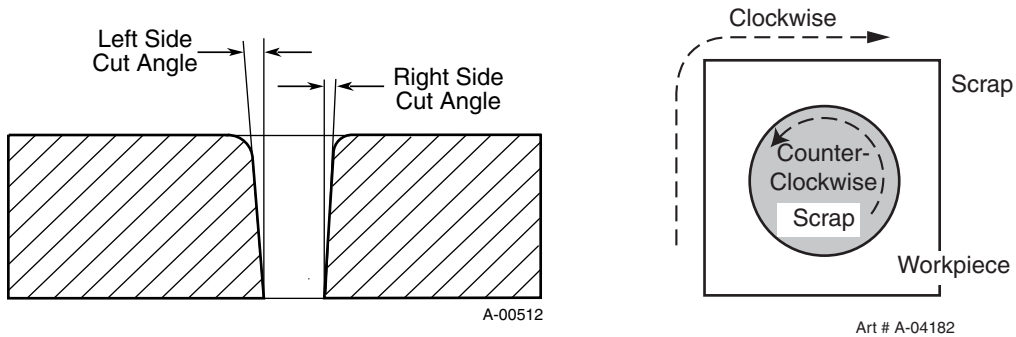
Ball settings are at the center of the gauge ball.

Ohmic Sensing

Ohmic sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.

Direction of Cut

The plasma gas stream swirls as it leaves the torch to maintain a stable arc column. This swirl effect results in one side of a cut being more square than the other. Viewed along the direction of travel, the right side of the cut is more square than the left.



Side Characteristics Of Cut

To make a square - edged cut along an inside diameter of a circle, move the torch counterclockwise around the circle. To keep the square edge along an outside diameter cut, move the torch in a clockwise direction.

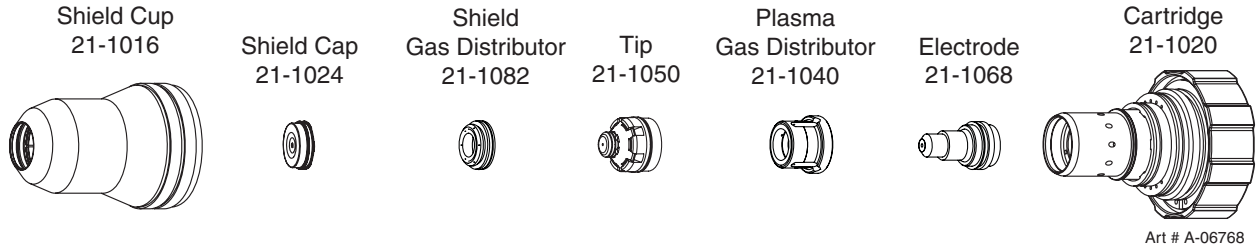
Underwater Cutting

Cutting on a water table either underwater or with the water touching the plate or with a water muffler system is not recommended. If a water table is used the water level must be a minimum of 4 inches / 100 mm from the bottom of the plate. Failure to follow this recommendation could result in poor cut quality and short consumable parts life.

Mild Steel

30A

O₂ Plasma / O₂ Shield



30A Mild Steel (O ₂ /O ₂)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (O ₂)		Shield (O ₂)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
20		0.036	60	22	120	21	120	128	0.050	130	0.120	0.2	0.058
16		0.060	60	22	120	21	120	143	0.050	60	0.120	0.3	0.070
14		0.075	60	22	120	21	120	145	0.070	45	0.120	0.3	0.072
12		0.105	60	22	120	21	120	148	0.110	40	0.150	0.3	0.074
10		0.135	80	22	120	21	120	154	0.130	30	0.150	0.3	0.085
	3/16	0.188	80	22	120	21	120	154	0.120	25	0.150	0.4	0.075

Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (O ₂)		Shield (O ₂)							
(mm)		(Bar)	Ball	(Bar)	Ball	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
1		4.1	22	8.3	21	8.3	130	1.3	3050	3.0	0.2	1.5
2		4.1	22	8.3	21	8.3	145	1.9	1130	3.1	0.3	1.8
3		4.1	22	8.3	21	8.3	150	3.0	910	3.8	0.3	2.0
4		5.5	22	8.3	21	8.3	154	3.2	710	3.8	0.3	2.1
5		5.5	22	8.3	21	8.3	155	3.0	640	3.8	0.4	1.9

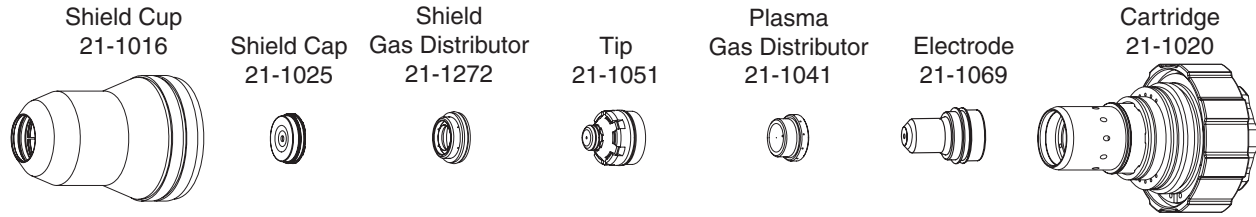
Marking (with 30A Mild Steel Parts)

15A Arc Current	Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Marking Quality Degrades as Thickness Decreases.
		Plasma Pressure (N ₂)		Shield Pressure (N ₂)							
		Ball	Press	Ball	Press						
Burn-through may occur on thicknesses < 1/16" (0.063") / 1.6 mm	20psi 1.4 bar	20	40 psi 2.8 bar	70	80 psi 5.5 bar	145	In ±0.005 / mm ±0.1 0.1 2.5	ipm / mm/min 300 7600	In ±0.005 / mm ±0.1 0.1 2.5	(sec) 0	

Mild Steel

50A

O₂ Plasma / Air Shield



Art # A-06085

50A Mild Steel (O ₂ /Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (O ₂)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
14		0.075	70	28	120	20	120	130	0.060	320	0.100	0.0	0.040
12		0.105	70	28	120	20	120	130	0.060	270	0.100	0.0	0.052
10		0.135	70	28	120	20	120	126	0.040	160	0.100	0.4	0.044
	3/16	0.188	70	28	120	40	120	130	0.060	100	0.110	0.4	0.054
	1/4	0.250	70	28	120	40	120	132	0.060	90	0.110	0.4	0.062

50A Mild Steel (O ₂ /Air)												
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (O ₂)		Shield (Air)							
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
2		4.8	28	8.3	20	8.3	130	1.5	7970	2.5	0.0	1.1
3		4.8	28	8.3	20	8.3	128	1.3	5640	2.5	0.2	1.2
4		4.8	28	8.3	20	8.3	128	1.2	3420	2.7	0.4	1.2
5		4.8	28	8.3	40	8.3	130	1.5	2500	2.8	0.4	1.4
6		4.8	28	8.3	40	8.3	132	1.5	2340	2.8	0.4	1.5

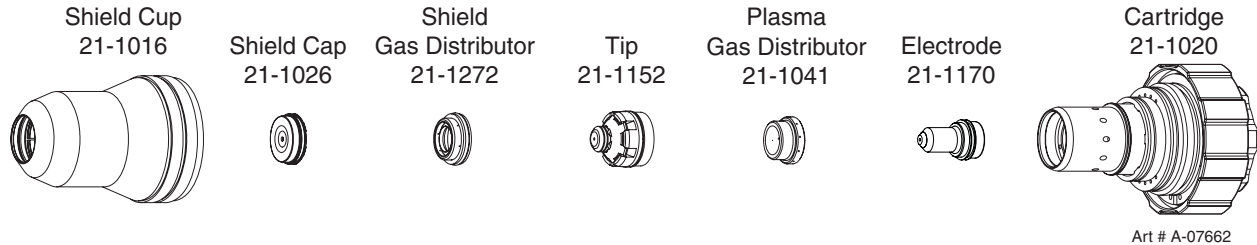
Marking (with 50A Mild Steel Parts)

18A Arc Current	Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Marking quality degrades as thickness decreases.
		Plasma Pressure (N ₂)		Shield Pressure (N ₂)							
		Ball	Press	Ball	Press						
Burn-through may happen for thicknesses < 1/16" (0.063") / 1.6 mm	20 psi 1.4 bar	40	40 psi 2.8 bar	75	80 psi 5.5 bar	160	in ±0.005 / mm ±0.1 0.12 3	ipm / mm/min 300 7600	in ±0.005 / mm ±0.1 0.12 3	sec 0	

Mild Steel

70A

O₂ Plasma / Air Shield With XTL Torch Valve Assembly*



Art # A-07662

70A Mild Steel XTL (O ₂ /Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (O ₂)		Shield (Air)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
16		0.060	46	35	120	41	120	138	0.070	300	0.100	0.1	0.073
14		0.075	46	35	120	41	120	138	0.070	300	0.100	0.1	0.072
12		0.105	46	55	120	60	120	142	0.080	270	0.120	0.2	0.078
10		0.135	46	55	120	60	120	142	0.080	180	0.150	0.2	0.071
	3/16	0.188	46	55	120	60	120	148	0.100	130	0.200	0.4	0.077
	1/4	0.250	46	55	120	60	120	148	0.100	100	0.200	0.5	0.083

70A Mild Steel XTL (O ₂ /Air)												
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (O ₂)		Shield (Air)							
(mm)	(mm)	(Bar)	Ball	(Bar)	Ball	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
1.5		3.2	35	8.3	41	8.3	138	1.8	7620	2.5	0.1	1.9
2		3.2	35	8.3	41	8.3	138	1.8	7530	2.6	0.1	1.9
3		3.2	55	8.3	60	8.3	142	2.0	5860	3.4	0.2	1.9
4		3.2	55	8.3	60	8.3	145	2.3	4030	4.4	0.3	1.9
5		3.2	55	8.3	60	8.3	148	2.5	3190	5.1	0.4	2.0
6		3.2	55	8.3	60	8.3	148	2.5	2710	5.1	0.5	2.1

Marking (with 70A Mild Steel Parts)

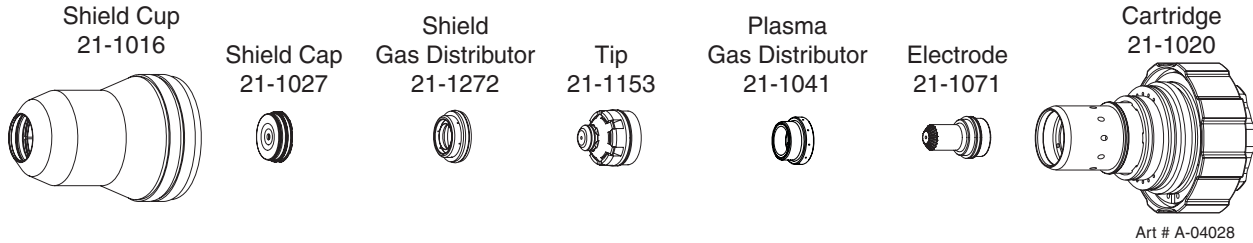
16A Arc Current	Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Marking quality degrades as thickness decreases.
		Plasma Pressure (N ₂)		Shield Pressure (N ₂)							
		Ball	Press	Ball	Press						
Burn-through may occur on thicknesses < 1/16" (0.063") / 1.6 mm.	20 psi 1.4 bar	50	40 psi 2.8 bar	80	80 psi 5.5 bar	155	0.12 3	300 7600	0.12 3	0	

*XTL (eXTreme Life) Torch Valve Assembly increases the life of consumables over the original Torch Valve Assembly. Requires Firmware version 3.2 or higher and XTL consumables.

Mild Steel

85A

Air Plasma / Air Shield



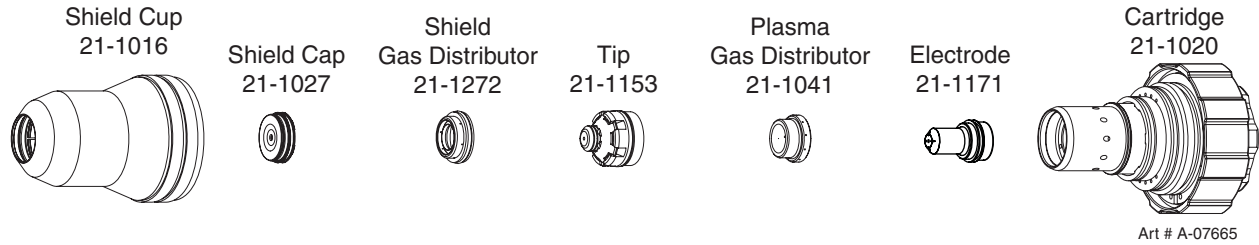
85A Mild Steel Air/Air													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
10		0.135	74	55	120	80	120	160	0.070	240	0.200	0.0	0.062
	3/16	0.188	74	55	120	80	120	161	0.090	174	0.200	0.1	0.065
	1/4	0.250	74	55	120	80	120	164	0.090	140	0.200	0.2	0.065
	3/8	0.375	74	55	120	80	120	175	0.170	75	0.250	0.3	0.085
	1/2	0.500	74	55	120	80	120	169	0.120	64	0.300	0.3	0.081
	5/8	0.625	74	55	120	80	120	178	0.140	30	0.350	0.8	0.095
	3/4	0.750	74	55	120	80	120	186	0.150	25	NR	NR	0.098

85A Mild Steel Air/Air													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(mm)			(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
4			5.1	55	8.3	80	8.3	160	2.0	5310	5.1	0.0	1.6
5			5.1	55	8.3	80	8.3	162	2.3	4240	5.1	0.1	1.7
6			5.1	55	8.3	80	8.3	163	2.3	3730	5.1	0.2	0.2
8			5.1	55	8.3	80	8.3	170	3.3	2700	5.7	0.3	1.9
10			5.1	55	8.3	80	8.3	174	4.1	1860	6.5	0.3	2.2
12			5.1	55	8.3	80	8.3	170	3.3	1690	7.3	0.3	2.1
15			5.1	55	8.3	80	8.3	176	3.4	1000	8.5	0.7	2.3
20			5.1	55	8.3	80	8.3	188	3.9	600	NR	NR	2.5

Mild Steel

100A

O₂ Plasma / Air Shield With XTL Torch Valve Assembly*



100A Mild Steel XTL O ₂ /Air													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (O ₂)		Shield (Air)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
10		0.135	40	55	120	80	120	138	0.070	280	0.200	0.2	0.065
	3/16	0.188	40	55	120	80	120	140	0.090	190	0.200	0.2	0.070
	1/4	0.250	40	55	120	80	120	141	0.100	150	0.200	0.3	0.078
	3/8	0.375	40	55	120	80	120	143	0.110	95	0.250	0.4	0.085
	1/2	0.500	40	55	120	80	120	147	0.120	64	0.300	0.6	0.097
	5/8	0.625	40	55	120	80	120	148	0.120	50	0.350	0.8	0.100
	3/4	0.750	40	55	120	80	120	157	0.150	25	Edge start Only		0.125

100A Mild Steel XTL O ₂ /Air													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (O ₂)		Shield (Air)							
(mm)			(Bar)	Ball	(Bar)	Ball	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
4			2.8	55	8.3	80	8.3	139	2.0	6120	5.1	0.2	1.7
5			2.8	55	8.3	80	8.3	140	2.3	4670	5.1	0.2	1.8
6			2.8	55	8.3	80	8.3	141	2.5	4030	5.1	0.3	1.9
8			2.8	55	8.3	80	8.3	142	2.7	3080	5.7	0.4	2.1
10			2.8	55	8.3	80	8.3	144	2.8	2300	6.5	0.4	2.2
12			2.8	55	8.3	80	8.3	146	3.0	1800	7.3	0.6	2.4
15			2.8	55	8.3	80	8.3	148	3.1	1370	8.5	0.7	2.5
20			2.8	55	8.3	80	8.3	157	3.8	640	Edge Start Only		3.2

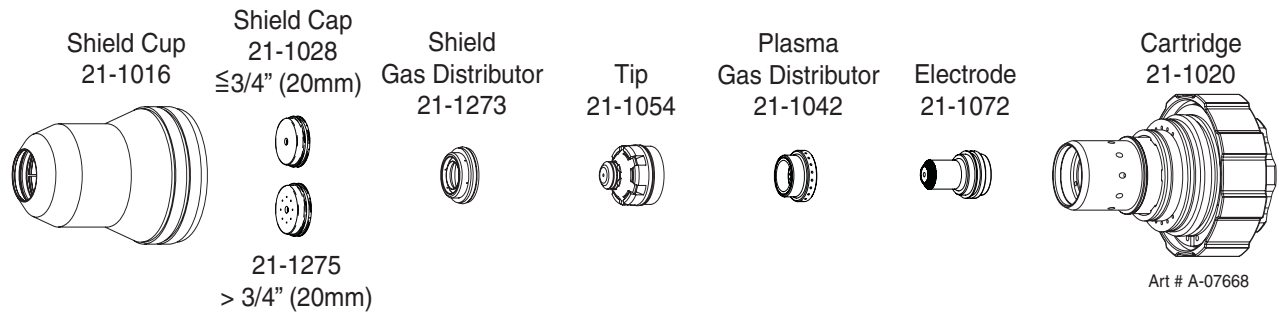
Marking (with 100A Mild Steel Parts)													
15A Arc Current	Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Marking quality degrades as thickness decreases		
		Plasma Pressure (N ₂)		Shield Pressure (N ₂)									
		Ball	Press	Ball	Press	Volts	in ±0.005 / mm ±0.1	ipm / mm/min	in ±0.005 / mm ±0.1	(sec)			
Burn-through may occur for thicknesses < 1/16" (0.063") / 1.6 mm.	20 psi 1.4 bar	50	40 psi 2.8 bar	100	80 psi 5.5 bar	190	0.12 3	300 7600	0.12 3	0			

*XTL (eXTreme Life) Torch Valve Assembly increases the life of consumables over the original Torch Valve Assembly. Requires Firmware version 3.2 or higher and XTL consumables.

Mild Steel

150A

O₂ Plasma / Air Shield With XTL Torch Valve Assembly*



150A Mild Steel XTL (O ₂ /Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (O ₂)		Shield (Air)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	3/8	0.375	80	62	120	45	120	147	0.120	120	0.300	0.4	0.115
	1/2	0.500	80	62	120	45	120	150	0.120	100	0.300	0.6	0.110
	5/8	0.625	80	62	120	45	120	155	0.130	75	0.350	0.6	0.116
	3/4	0.750	80	62	120	45	120	162	0.140	50	0.350	0.8	0.141
	7/8	0.875	80	62	120	62	120	165	0.140	30	0.350	0.8	0.182
	1	1.000	80	62	120	62	120	172	0.160	25	0.350	1.0	0.180
	1 1/4	1.250	80	62	120	62	120	172	0.160	25	Edge Start		0.170
	1 1/2	1.500	80	62	120	62	120	175	0.160	15	Edge Start		0.190
	2	2.000	80	62	120	62	120	184	0.160	9	Edge Start		0.195

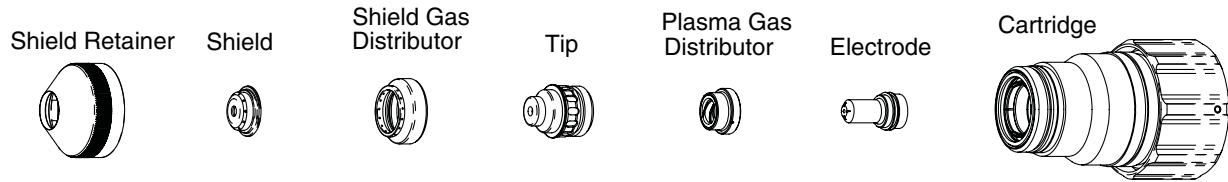
150A Mild Steel XTL (O ₂ /Air)												
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (O ₂)		Shield (Air)							
(mm)	(mm)	(Bar)	Ball	(Bar)	Ball	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
10	10	5.5	62	8.3	45	8.3	147	3.1	2970	7.6	0.4	2.9
12	12	5.5	62	8.3	45	8.3	149	3.1	2650	7.6	0.6	2.8
15	15	5.5	62	8.3	45	8.3	154	3.2	2080	8.5	0.6	2.9
20	20	5.5	62	8.3	62	8.3	163	3.6	1120	8.9	0.8	3.9
22	22	5.5	62	8.3	62	8.3	165	3.6	800	8.9	0.8	4.5
25	25	5.5	62	8.3	62	8.3	171	4.0	650	8.9	1.0	4.6
32	32	5.5	62	8.3	62	8.3	172	4.1	630	Edge Start		4.3
38	38	5.5	62	8.3	62	8.3	175	4.1	390	Edge Start		4.8
50	50	5.5	62	8.3	62	8.3	183	4.1	240	Edge Start		5.0

Marking (with 150A MS parts)												
20A Arc Current	Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Marking quality degrades as thickness decreases	
		Plasma Pressure (N ₂)		Shield Pressure (N ₂)								
		Ball	Press	Ball	Press							
Burn-through may occur on thicknesses < 1/16" (0.063") / 1.6 mm	20 psi 1.4 bar	60	60 psi 4.1 bar	120	80 psi 5.5 bar	145	in ±0.005 / mm ±0.1 3	ipm / mm/min 300 7600	in ±0.005 / mm ±0.1 3	0		

Mild Steel

200A

O₂ Plasma / Air Shield



This Art Is For Reference ONLY

Art # A-07917_AB

Shield Retainer	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge
21-1014	21-1030	21-1285	21-1055	21-1042	21-1093	21-1022

Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
(ga)	(in)	inch		Plasma (O ₂)		Shield (Air)							
			(PSI)	(Ball)	(PSI)	(Ball)	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	3/16	0.188	15	100	100	NA	100	151	0.130	250	0.300	0.2	0.142
	1/4	0.250	15	100	100	NA	100	151	0.130	200	0.300	0.2	0.148
	3/8	0.375	15	100	100	NA	100	154	0.150	140	0.350	0.3	0.162
	1/2	0.500	15	100	100	NA	100	159	0.170	115	0.350	0.5	0.167
	5/8	0.625	15	100	100	NA	100	161	0.200	80	0.350	0.6	0.186
	3/4	0.750	15	100	100	NA	100	163	0.200	65	0.400	0.8	0.186
	7/8	0.875	15	100	100	NA	100	166	0.200	57	0.400	1.0	0.185
	1	1.000	15	100	100	NA	100	167	0.200	48	0.400	1.2	0.193
	1 1/4	1.250	15	100	100	NA	100	170	0.200	30	0.425	2.0	0.196
	1 1/2	1.500	15	100	100	NA	100	185	0.200	20	0.450	4.0	0.201
	2	2.000	15	100	100	NA	100	192	0.200	10	Edge Start		0.204

Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
(mm)	(Bar)		Plasma (O ₂)		Shield (Air)							
	(Bar)	(Ball)	(Bar)	(Ball)	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
5	1.0	100	6.9	NA	6.9	151	3.3	6170	7.6	0.2	3.6	
6	1.0	100	6.9	NA	6.9	151	3.3	5360	7.6	0.2	3.7	
8	1.0	100	6.9	NA	6.9	153	3.6	4290	8.3	0.3	3.9	
10	1.0	100	6.9	NA	6.9	155	3.9	3460	8.9	0.3	4.1	
12	1.0	100	6.9	NA	6.9	158	4.2	3060	8.9	0.5	4.2	
15	1.0	100	6.9	NA	6.9	160	4.0	2280	8.9	0.6	4.6	
20	1.0	100	6.9	NA	6.9	164	5.1	1590	10.2	0.9	4.7	
25	1.0	100	6.9	NA	6.9	167	5.1	1250	10.2	1.2	4.9	
32	1.0	100	6.9	NA	6.9	171	5.1	750	10.8	2.1	5.0	
38	1.0	100	6.9	NA	6.9	185	5.1	510	11.4	4.0	5.1	
44	1.0	100	6.9	NA	6.9	188	5.1	390	Edge Start		5.1	
50	1.0	100	6.9	NA	6.9	192	5.1	270	Edge Start		5.2	

BOLD TYPE indicates maximum piercing parameters. **BOLD ITALIC** indicates edge starts only.

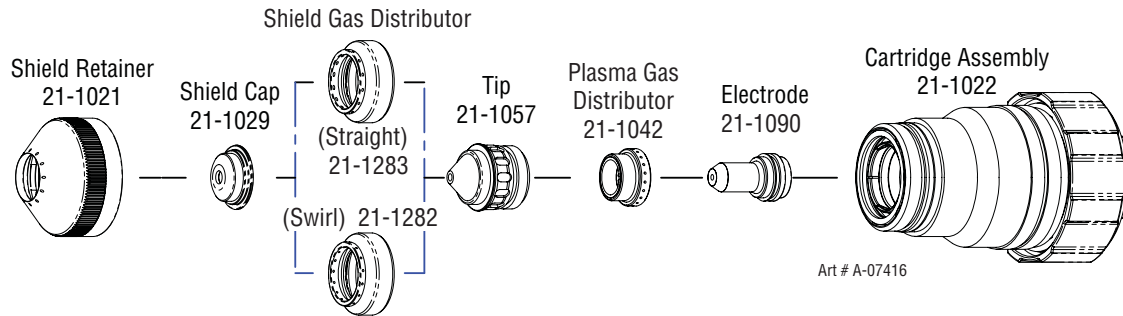
Requires CCM version 3.4 or later. Requires GCM version 3.2 or later

NOTE: Lock pierce height between 0.5" to 1" to avoid torch hitting the pierce metal puddle.

Mild Steel

300A

O₂ Plasma / Air Shield



300A Mild Steel (O ₂ /Air)														
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	Shield Gas Distributor
				Plasma (O ₂)		Shield (Air)								
(ga)	(in)	inch	psi	Ball	psi	Ball	psi	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)	
	1/2	0.500	30	104	90	N/A*	40	147	0.130	150	0.400	0.4	0.190	-1282
	5/8	0.625	30	104	90		50	152	0.130	115	0.400	0.5	0.190	-1282
	3/4	0.750	30	104	100		60	154	0.140	100	0.450	0.7	0.190	-1282
	7/8	0.875	30	104	100		60	155	0.140	85	0.450	0.8	0.190	-1282
	1	1.000	30	104	100		60	160	0.150	70	0.450	0.9	0.195	-1282
	1 1/4	1.250	30	104	100		60	169	0.220	50	0.450	1.0	0.230	-1283
	1 1/2	1.500	30	104	100		80	176	0.230	35	0.450	1.7	0.245	-1283
	1 3/4	1.750	30	104	100		90	182	0.230	25	0.450	3.0	0.275	-1283
	2	2.000	30	104	100		90	187	0.230	18	Edge Start		0.280	-1283
	2 1/2	2.500	30	104	100		90	208	0.230	10	Edge Start		NA	-1283
	3	3.000	30	104	100		90	219	0.230	7	Edge Start		NA	-1283

300A Mild Steel (O ₂ /Air)														
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	Shield Gas Distributor
				Plasma (O ₂)		Shield (Air)								
(mm)			bar	Ball	bar	Ball	bar	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
12			2.1	104	6.2	N/A*	2.8	146	3.3	3810	10.2	0.4	4.8	-1282
15			2.1	104	6.2		3.5	151	3.3	2920	10.2	0.5	4.8	-1282
20			2.1	104	6.9		4.1	155	3.6	2540	12.7	0.7	4.8	-1282
25			2.1	104	6.9		4.1	160	3.8	1780	12.7	0.9	5.0	-1282
30			2.1	104	6.9		4.1	168	5.6	1270	12.7	1.0	5.8	-1283
35			2.1	104	6.9		5.5	175	5.8	900	12.7	1.7	6.2	-1283
40			2.1	104	6.9		6.2	180	5.8	660	12.7	3.0	6.6	-1283
50			2.1	104	6.9		6.2	187	5.8	460	Edge Start		7.1	-1283
60			2.1	104	6.9		6.2	201	7.6	325	Edge Start		7.1	-1283
70			2.1	104	6.9		6.2	212	7.6	285	Edge Start		7.1	-1283

* Set Shield Flow to Pressure only.

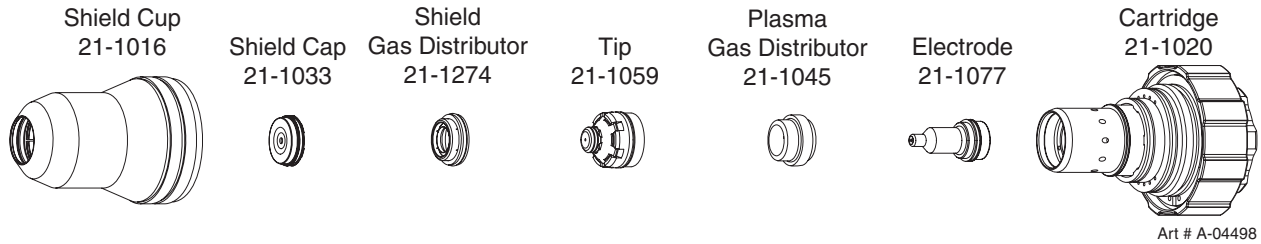
BOLD TYPE indicates maximum piercing parameters.

BOLD ITALIC indicates edge starts only.

Stainless Steel

30A

Air Plasma / Air Shield



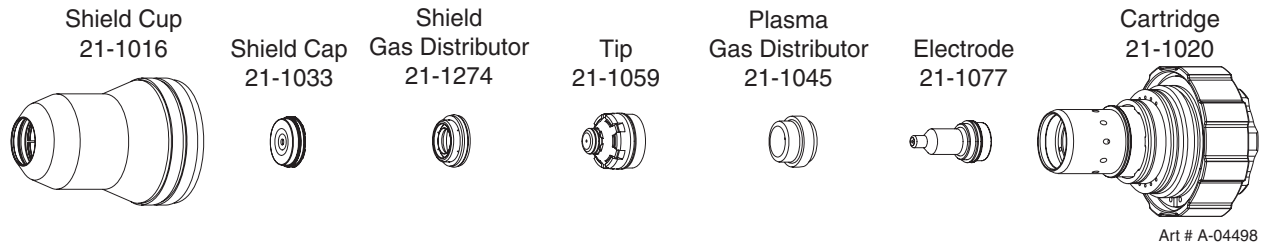
30A Stainless Steel (Air/Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
26		0.019	60	64	120	20	120	87	0.020	350	0.040	0.0	0.029
24		0.025	60	64	120	20	120	85	0.020	320	0.040	0.0	0.028
22		0.031	60	64	120	20	120	80	0.020	310	0.040	0.0	0.034
20		0.038	60	64	120	20	120	75	0.020	300	0.060	0.1	0.025
18		0.050	60	64	120	20	120	78	0.020	150	0.080	0.2	0.032
16		0.063	60	64	120	20	120	76	0.020	110	0.080	0.2	0.030

Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (Air)		Shield (Air)							
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
0.6		4.1	64	8.3	20	8.3	85	0.5	13580	1.0	0.0	0.7
0.8		4.1	64	8.3	20	8.3	80	0.5	11580	1.1	0.0	0.9
1		4.1	64	8.3	20	8.3	75	0.5	9780	1.6	0.1	0.7
1.5		4.1	64	8.3	20	8.3	77	0.5	5970	2.0	0.2	0.8
2		4.1	64	8.3	20	8.3	74	0.5	4050	2.0	0.2	0.7

Stainless Steel

30A

N₂ Plasma / H₂O Shield



30A Stainless Steel N ₂ /H ₂ O													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				** Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(ga)	(in)	(in)	(psi)	Ball	(psi)	Ball	(psi)	(volts)	(in) ±0.005	(ipm)	(in)	(sec)	(in)
26		0.019	90	75	120	4	55	91	0.020	600	0.040	0.0	0.047
24		0.025	90	64	120	4	55	97	0.020	440	0.040	0.0	0.045
22		0.031	90	50	120	4	55	95	0.020	420	0.040	0.0	0.045
20		0.038	90	60	120	5	55	105	0.020	300	0.050	0.1	0.044
18		0.050	90	60	120	5	55	78	0.030	250	0.050	0.1	0.035
16		0.063	90	60	120	5	55	85	0.050	205	0.060	0.2	0.044

30A Stainless Steel N ₂ /H ₂ O													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				** Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(mm)		(mm)	(bar)	Ball	(bar)	Ball	(bar)	(volts)	(mm)	(mm/min)	(mm)	(sec)	(mm)
0.6		0.024	6.2	75	8.3	4	3.8	96	0.5	12110	1.0	0.0	1.2
0.8		0.031	6.2	64	8.3	4	3.8	96	0.5	10450	1.0	0.0	1.1
1.0		0.039	6.2	50	8.3	4	3.8	102	0.5	7470	1.3	0.1	1.1
1.5		0.059	6.2	60	8.3	5	3.8	83	1.0	5550	1.4	0.2	1.0
2.0		0.079	6.2	60	8.3	5	3.8	93	2.0	3820	1.8	0.3	1.4

Pressure of the water supply line should be regulated by customer-supplied pressure regulator.

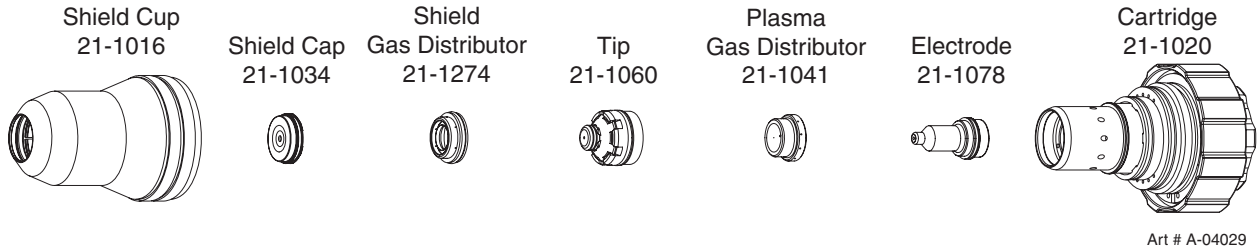
NOTE 1: Ohmic height sensing is not recommended with water shield.
Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Stainless Steel

50A

Air Plasma / Air Shield



Art # A-04029

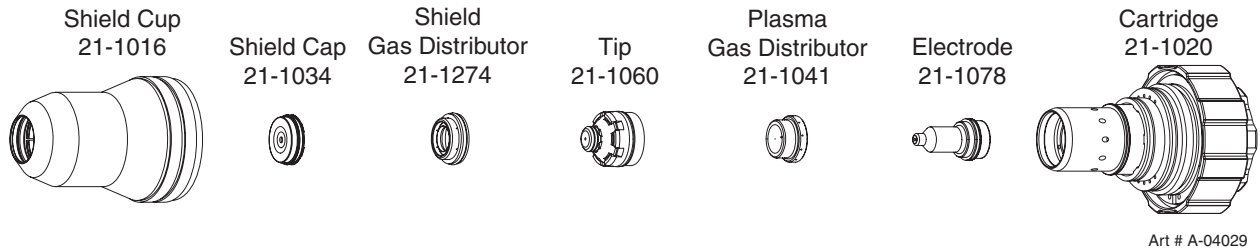
50A Stainless Steel (Air/Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
14		0.078	100	62	120	75	120	109	0.060	180	0.120	0.0	0.044
12		0.109	100	62	120	75	120	114	0.060	130	0.150	0.0	0.049
10		0.141	100	62	120	75	120	118	0.060	120	0.180	0.1	0.050
	3/16	0.188	100	62	120	75	120	124	0.080	70	0.200	0.3	0.059

50A Stainless Steel (Air/Air)													
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
			Plasma (Air)		Shield (Air)								
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
1.5		6.9	62	8.3	75	8.3	106	1.5	5350	2.6	0.0	1.0	
2		6.9	62	8.3	75	8.3	109	1.5	4540	3.1	0.0	1.1	
3		6.9	62	8.3	75	8.3	115	1.5	3230	4.0	0.0	1.3	
4		6.9	62	8.3	75	8.3	120	1.7	2600	4.8	0.2	1.4	
5		6.9	62	8.3	75	8.3	125	2.1	1520	5.2	0.3	1.5	

Stainless Steel

50A

N₂ Plasma / H₂O Shield



50A Stainless Steel (N ₂ /H ₂ O)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
14		0.078	100	62	120	4	55	117	0.110	170	0.200	0.2	0.043
12		0.109	100	62	120	4	55	119	0.110	150	0.200	0.2	0.047

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(mm)		(bar) *	Ball	(bar) *	Ball	(bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
2		6.9	62	8.3	4	3.8	117	2.8	4310	5.1	0.2	1.1
3		6.9	62	8.3	4	3.8	120	2.8	3660	5.1	0.2	1.2

* Pressure of the water supply line should be regulated by customer supplied pressure regulator

NOTE: Ohmic height sensing is not recommended with water shield.

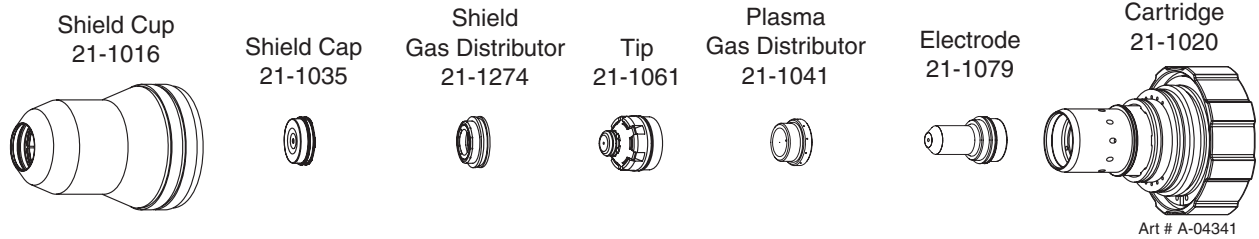
Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Stainless Steel

70A

Air Plasma / Air Shield



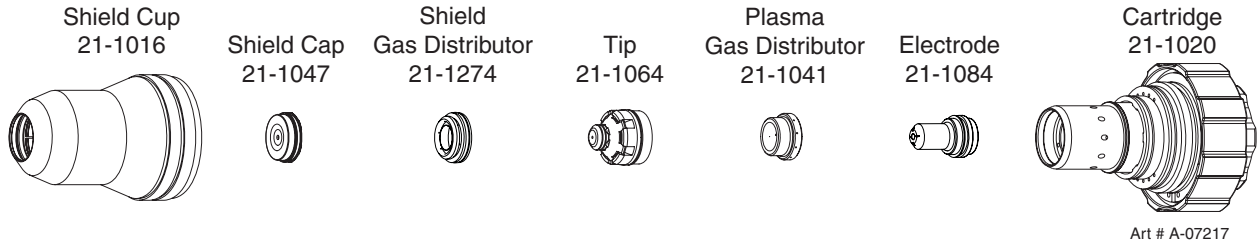
70A Stainless Steel (Air/Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
10		0.141	84	41	120	94	120	138	0.080	120	0.140	0.3	0.075
	3/16	0.188	84	41	120	87	120	144	0.080	100	0.140	0.4	0.082
	1/4	0.250	84	41	120	72	120	148	0.130	55	0.180	0.5	0.085
	3/8	0.375	84	41	120	72	120	152	0.140	40	0.200	0.6	0.083
	1/2	0.500	84	53	120	60	120	160	0.140	25	0.280	0.8	0.080

70A Stainless Steel (Air/Air)												
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (Air)		Shield (Air)							
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
3		5.8	41	8.3	94	8.3	135	2.0	3300	3.6	0.3	1.8
4		5.8	41	8.3	94	8.3	140	2.0	2870	3.6	0.3	2.0
5		5.8	41	8.3	87	8.3	145	2.2	2380	3.7	0.4	2.1
6		5.8	41	8.3	72	8.3	148	2.3	1440	4.5	0.5	2.1
8		5.8	41	8.3	72	8.3	150	2.4	1200	4.8	0.6	2.1
10		5.8	41	8.3	72	8.3	153	3.6	960	5.4	0.6	2.1
12		5.8	53	8.3	60	8.3	158	3.6	720	6.7	0.8	2.1

Stainless Steel

70A

N₂ Plasma / H₂O Shield



70A Stainless Steel (N ₂ /H ₂ O)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI) *	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
10		0.141	45	55	90	5	55	146	0.100	120	0.250	0.3	0.075
	3/16	0.188	45	55	90	5	55	150	0.100	90	0.250	0.4	0.086
	1/4	0.250	45	55	90	5	55	159	0.150	50	0.250	0.5	0.095
	3/8	0.375	45	55	90	5	55	168	0.150	35	0.250	0.7	0.103

Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(mm)		(mm)	(Bar)	Ball	(Bar)	Ball	(Bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
3		3	3.1	55	6.2	5	3.8	142	2.5	3040	6.3	0.3	1.8
4		4	3.1	55	6.2	5	3.8	143	2.5	2780	6.3	0.3	2.0
5		5	3.1	55	6.2	5	3.8	151	2.5	2140	6.3	0.4	2.2
6		6	3.1	55	6.2	5	3.8	157	3.8	1495	6.3	0.5	2.3
8		8	3.1	55	6.2	5	3.8	164	3.8	1070	6.3	0.6	2.5
10		10	3.1	55	6.2	5	3.8	170	3.8	980	6.3	0.7	2.6

* Pressure of the water supply line should be regulated by customer supplied pressure regulator

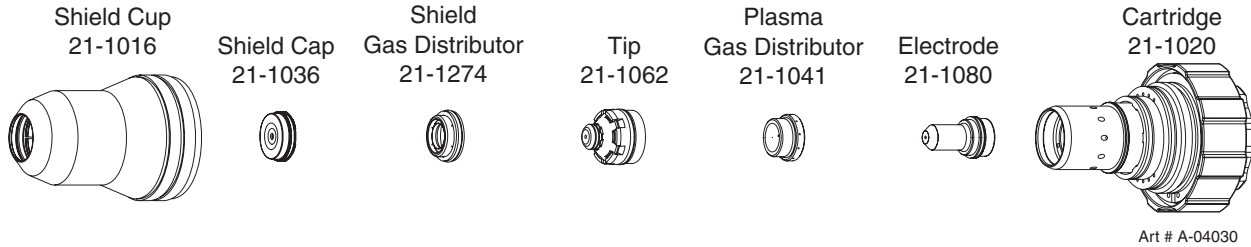
NOTE 1: Ohmic height sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Stainless Steel

100A

H35 Plasma / N₂ Shield



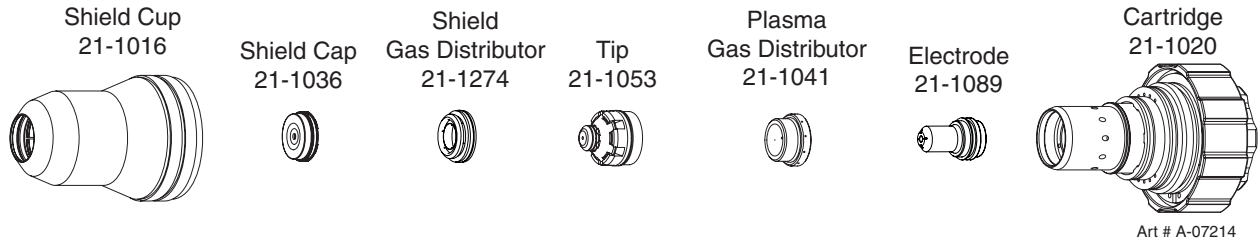
100A Stainless Steel (H35/N ₂)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (H35)		Shield (N ₂)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	1/4	0.250	80	50	120	97	120	148	0.145	72	0.250	0.3	0.093
	3/8	0.375	80	55	120	97	120	152	0.130	55	0.300	0.3	0.090
	1/2	0.500	80	55	120	97	120	155	0.130	42	0.350	0.5	0.095
	5/8	0.625	80	62	120	97	120	157	0.130	25	0.350	0.6	0.100

100A Stainless Steel (H35/N ₂)													
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
			Plasma (H35)		Shield (N ₂)								
(mm)		(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
6		5.5	50	8.3	97	8.3	148	3.7	1880	6.2	0.3	2.0	
8		5.5	55	8.3	97	8.3	150	3.5	1600	7.0	0.3	2.0	
10		5.5	55	8.3	97	8.3	152	3.3	1350	7.8	0.3	1.9	
12		5.5	62	8.3	97	8.3	154	3.3	1140	8.6	0.5	1.9	
15		5.5	62	8.3	97	8.3	156	3.3	750	8.9	0.7	1.9	

Stainless Steel

100A

N₂ Plasma / H₂O Shield



100A Stainless Steel (N ₂ /H ₂ O)												
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI) *	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
3/16	0.188	45	60	90	7	55	148	0.100	140	0.300	0.1	0.091
1/4	0.250	45	60	90	7	55	158	0.100	95	0.300	0.1	0.091
3/8	0.375	45	60	90	7	55	168	0.150	65	0.350	0.2	0.100
1/2	0.500	45	60	90	7	55	168	0.150	50	0.350	0.4	0.102

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(mm)	(mm)	(Bar)	Ball	(Bar)	Ball	(Bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
5	5	3.1	60	6.2	7	3.8	149	2.5	3390	7.6	0.1	2.3
6	6	3.1	60	6.2	7	3.8	156	2.5	2665	7.6	0.1	2.3
8	8	3.1	60	6.2	7	3.8	163	3.8	2015	8.9	0.2	2.5
10	10	3.1	60	6.2	7	3.8	168	3.8	1595	8.9	0.3	2.6
12	12	3.1	60	6.2	7	3.8	168	3.8	1355	8.9	0.4	2.6

* Pressure of the water supply line should be regulated by customer supplied pressure regulator

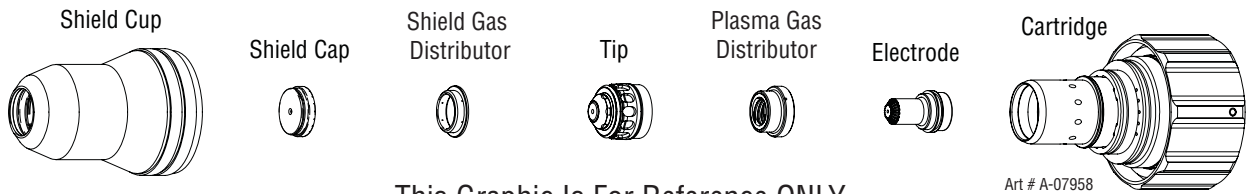
NOTE 1: Ohmic height sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Stainless Steel

150A

H35 Plasma / N2 Shield



This Graphic Is For Reference ONLY

Shield Cup	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge
21-1016	21-1037	21-1278	21-1063	21-1041	21-1081	21-1020

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
			Plasma (H35)		Shield (N ₂)								
(ga)	(in)	inch	psi	Ball	psi	Ball	psi	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	1/2	0.500	84	57	120	85	120	153	0.300	50	0.350	0.2	0.110
	5/8	0.625	84	57	120	85	120	155	0.200	40	0.350	0.4	0.118
	3/4	0.750	84	57	120	85	120	157	0.225	30	0.400	0.6	0.128
	1	1.000	84	57	120	85	120	165	0.250	20	0.450	1.8	0.133

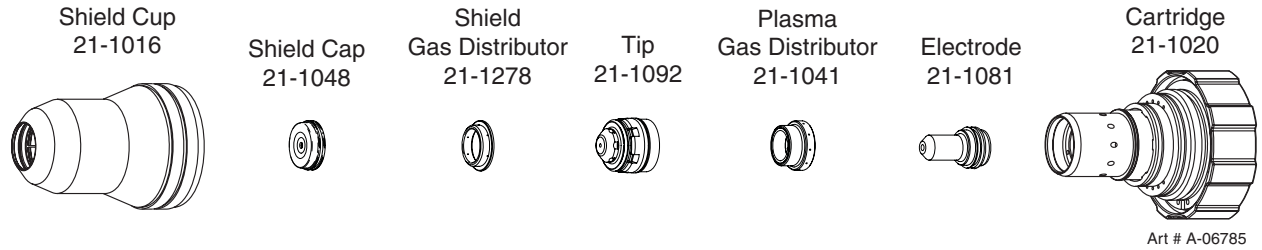
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (H35)		Shield (N ₂)							
(mm)		bar	Ball	bar	Ball	bar	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
12		5.8	57	8.3	85	8.3	153	7.6	1330	8.9	0.2	2.8
15		5.8	57	8.3	85	8.3	155	5.1	1090	8.9	0.4	3.0
20		5.8	57	8.3	85	8.3	157	5.7	720	10.2	0.6	3.3
25		5.8	57	8.3	85	8.3	165	6.4	520	11.4	1.8	3.4

BOLD TYPE indicates maximum piercing parameters.

Stainless Steel

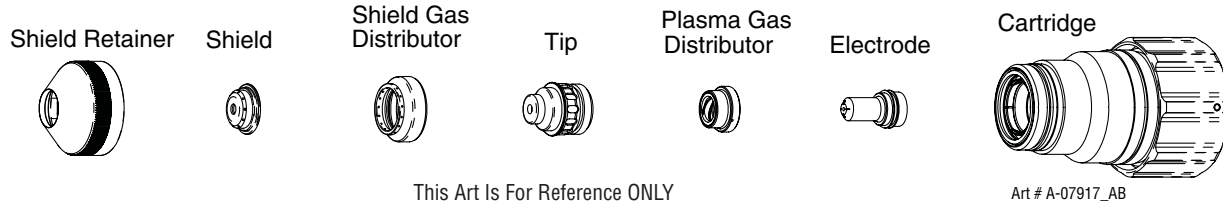
150A

N₂ Plasma / H₂O Shield



150A Stainless Steel (N ₂ /H ₂ O)												
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI) *	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
1/4	0.250	70	60	90	8	55	135	0.100	110	0.250	0.3	0.104
3/8	0.375	70	60	90	8	55	139	0.100	70	0.350	0.3	0.107
1/2	0.500	70	60	90	8	55	149	0.150	60	0.350	0.5	0.111
5/8	0.625	70	60	90	8	55	159	0.180	45	0.350	0.5	0.128
3/4	0.750	70	60	90	4	55	159	0.180	40	0.350	0.9	0.130
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
(mm)		(Bar)	Ball	(Bar)	Ball	(Bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
8		4.8	60	6.2	8	3.8	137	2.5	2265	6.4	0.3	2.7
10		4.8	60	6.2	8	3.8	140	2.5	1740	8.9	0.3	2.7
12		4.8	60	6.2	8	3.8	147	3.8	1580	8.9	0.5	2.8
15		4.8	60	6.2	8	3.8	156	4.6	1248	8.9	0.5	3.2
20		4.8	60	6.2	4	3.8	162	4.6	1010	8.9	0.9	3.3
* Pressure of the water supply line should be regulated by customer supplied pressure regulator												
NOTE 1: Ohmic height sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.												
NOTE 2: Water source used for H ₂ O Water Shield must be demineralized.												

Stainless Steel 200A N₂ Plasma / H₂O Shield



Shield Retainer	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge
21-1015	21-1049	21-1284	21-1067	21-1043	21-1089	21-1022

Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)*							
(ga)	(in)	inch	(PSI)	(Ball)	(PSI)	(Ball)	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	3/8	0.375	20	80	90	5	55	155	0.160	95	0.300	0.0	0.110
	1/2	0.500	20	80	90	5	55	156	0.160	85	0.300	0.4	0.115
	5/8	0.625	20	80	90	5	55	158	0.180	65	0.300	0.5	0.122
	3/4	0.750	20	80	90	5	55	163	0.200	50	0.300	0.7	0.133
	7/8	0.875	20	80	90	5	55	177	0.250	40	0.400	0.9	0.149
	1	1.000	20	80	90	5	55	183	0.300	35	0.450	1.0	0.148
	<i>1 1/4</i>	<i>1.250</i>	<i>20</i>	<i>80</i>	<i>90</i>	<i>5</i>	<i>55</i>	<i>185</i>	<i>0.300</i>	<i>20</i>	<i>Edge Start</i>		<i>0.176</i>
	<i>1 1/2</i>	<i>1.500</i>	<i>20</i>	<i>80</i>	<i>90</i>	<i>5</i>	<i>55</i>	<i>200</i>	<i>0.350</i>	<i>10</i>	<i>Edge Start</i>		<i>0.211</i>
	<i>1 3/4</i>	<i>1.750</i>	<i>20</i>	<i>80</i>	<i>90</i>	<i>5</i>	<i>55</i>	<i>207</i>	<i>0.350</i>	<i>8</i>	<i>Edge Start</i>		<i>0.216</i>

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)*							
(mm)		(Bar)	(Ball)	(Bar)	(Ball)	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
10		1.4	80	6.3	5	3.8	155	4.1	2400	7.6	0.0	2.8
12		1.4	80	6.3	5	3.8	156	4.1	2000	7.6	0.4	2.9
15		1.4	80	6.3	5	3.8	157	4.4	1550	7.6	0.5	3.1
20		1.4	80	6.3	5	3.8	165	5.1	1100	7.6	0.7	3.4
25		1.4	80	6.3	5	3.8	183	7.6	900	11.4	0.9	3.7
32		1.4	80	6.3	5	3.8	185	7.6	500	Edge Start		4.5
38		1.4	80	6.3	5	3.8	200	8.9	250	Edge Start		5.4
44		1.4	80	6.3	5	3.8	206	8.9	200	Edge Start		5.5

BOLD TYPE indicates maximum piercing parameters. **BOLD ITALIC** indicates edge starts only.

Requires CCM version 3.4 or later. Requires GCM version 3.2 or later.

* Pressure of the water supply line should be regulated by customer pressure regulator.

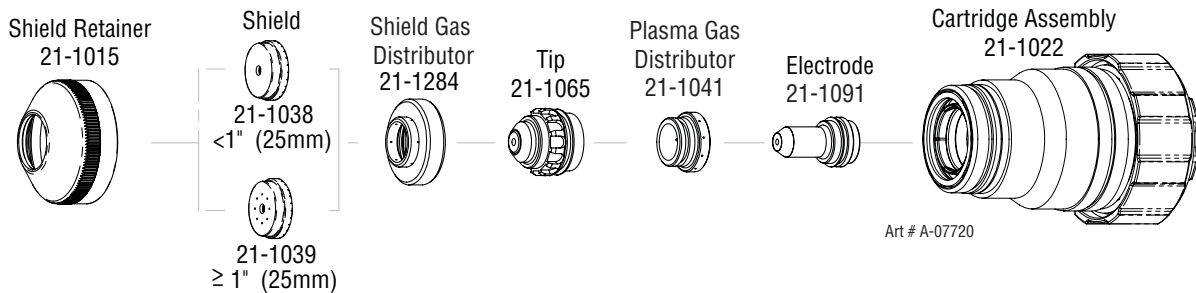
Note1: Ohmic height sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.

Note2: Water source used for shield must be demineralized.

Stainless Steel

300A

H35 Plasma / N₂ Shield



300A Stainless Steel (H35/N ₂)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height*	Pierce Delay	Kerf Width @ Min/Max
				Plasma (H35)		Shield (N ₂)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	3/8	0.375	20	120	100	N/A**	120	160	0.350	85	0.350	0.2	0.175
	1/2	0.500	20	120	100		120	168	0.350	75	0.350	0.4	0.193
	5/8	0.625	20	120	100		90	163	0.350	65	0.375	0.5	0.197
	3/4	0.750	20	120	100		90	168	0.350	55	0.375	0.6	0.195
	7/8	0.875	20	120	100		90	170	0.350	45	0.375	0.7	0.210
	1	1.000	20	120	100		120	173	0.350	35	0.500	0.9	0.226
	1 1/4	1.250	20	120	100		120	180	0.400	30	0.500	1.0	0.203
	1 1/2	1.500	20	120	100		120	180	0.400	25	Edge Start		0.220
	2	2.000	20	120	100		120	186	0.400	17	Edge Start		0.237

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height*	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (H35)		Shield (N ₂)							
(mm)	(mm)	(Bar)	Ball	(Bar)	Ball	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
10		1.4	120	6.9	N/A**	8.3	161	8.9	2120	8.9	0.2	4.5
12		1.4	120	6.9		8.3	166	8.9	1960	8.9	0.4	4.8
15		1.4	120	6.9		6.2	164	8.9	1720	9.4	0.5	5.0
20		1.4	120	6.9		6.2	169	8.9	1320	9.5	0.6	5.1
25		1.4	120	6.9		6.2	173	8.9	920	12.3	0.9	5.7
32		1.4	120	6.9		8.3	180	10.2	760	12.2	1.0	5.2
38		1.4	120	6.9		8.3	180	10.2	640	Edge Start		5.6
44		1.4	120	6.9		8.3	183	10.2	540	Edge Start		5.8
50		1.4	120	6.9		8.3	186	10.2	450	Edge Start		6.0

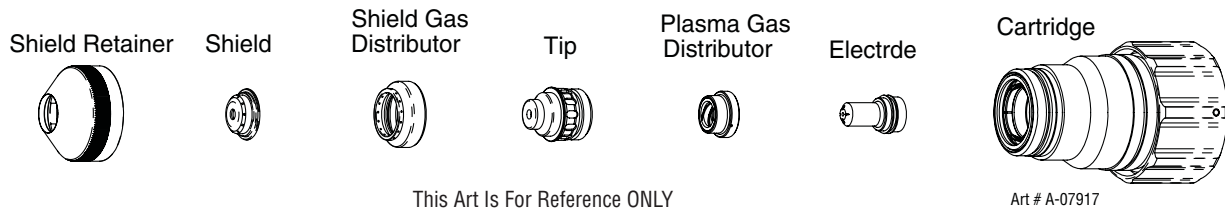
* Lock pierce height for first 0.5" to 1" of cutting to avoid torch hitting the pierce metal puddle.

** Set Shield Flow to "Pressure" only

Stainless Steel

300A

N₂ Plasma / H₂O Shield



This Art Is For Reference ONLY

Shield Retainer	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge							
21-1015	21-1046	21-1284	21-1066	21-1043	21-1089	21-1022							
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates /				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
(ga)	(in)	inch	psi	Plasma (N ₂)		Shield (H ₂ O)		Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	3/8	0.375	20	120	100	8	55	150	0.150	140	0.350	0.3	0.144
	1/2	0.500	20	120	100	8	55	159	0.150	100	0.350	0.5	0.154
	5/8	0.625	20	120	100	8	55	158	0.150	75	0.350	0.1	0.153
	3/4	0.750	20	120	100	8	55	166	0.200	55	0.500	0.7	0.173
	7/8	0.875	20	120	100	8	55	180	0.300	45	0.500	1.1	0.210
	1	1.000	20	120	100	8	55	182	0.300	40	0.500	1.3	0.210
	1 1/4	1.250	20	120	100	8	55	196	0.350	30	0.500	2..0	0.230
	1 1/2	1.500	20	120	100	8	55	198	0.350	25	Edge Start		0.232
	1 3/4	1.750	20	120	100	8	55	198	0.350	18	Edge Start		0.237
	2	2.000	20	120	100	8	55	205	0.350	12	Edge Start		0.253

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates /				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
(mm)	bar	bar	Plasma (N ₂)		Shield (H ₂ O)		Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
10	1.4	120	6.9	8	3.8	151	3.8	3400	8.9	0.3	3.7	
12	1.4	120	6.9	8	3.8	157	3.8	2760	8.9	0.5	3.9	
15	1.4	120	6.9	8	3.8	158	3.8	2080	9.4	0.6	3.9	
20	1.4	120	6.9	8	3.8	170	5.8	1320	12.7	0.8	4.7	
25	1.4	120	6.9	8	3.8	182	7.6	1030	12.7	1.3	5.3	
32	1.4	120	6.9	8	3.8	196	8.9	760	12.7	2.0	5.8	
38	1.4	120	6.9	8	3.8	198	8.9	640	Edge Start		5.9	
44	1.4	120	6.9	8	3.8	198	8.9	470	Edge Start		6.0	
50	1.4	120	6.9	8	3.8	204	8.9	320	Edge Start		6.4	

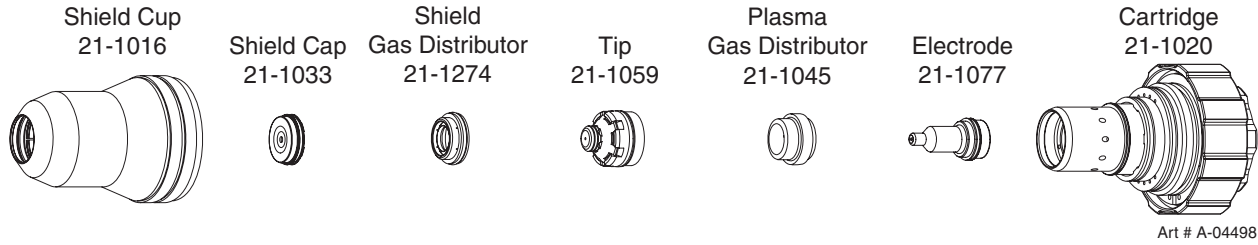
BOLD TYPE indicates maximum piercing parameters.

BOLD ITALIC indicates edge starts only.

Aluminum

30A

Air Plasma / Air Shield



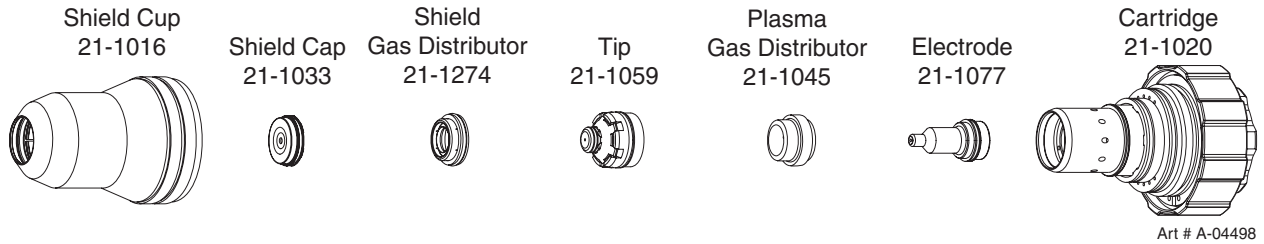
30A Aluminum (Air/Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
25		0.025	60	60	120	15	120	86	0.020	500	0.040	0.0	0.029
21		0.037	60	60	120	15	120	86	0.020	240	0.060	0.1	0.046
18		0.052	60	60	120	15	120	84	0.020	230	0.100	0.2	0.034
16		0.064	60	60	120	15	120	80	0.020	220	0.100	0.2	0.036

Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (Air)		Shield (Air)							
(mm)		(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
1		4.1	60	8.3	15	8.3	86	0.5	6060	1.7	0.1	0.9
2		4.1	60	8.3	15	8.3	75	0.5	5280	2.5	0.2	0.9

Aluminum

30A

N₂ Plasma / H₂O Shield



30A Aluminum (N ₂ /H ₂ O)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(ga)	(in)	inch	psi	Ball	psi	Ball	psi*	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
25		0.025	96	55	120	4	55	103	0.030	230	0.080	0.0	0.034
21		0.037	96	55	120	4	55	103	0.030	220	0.080	0.1	0.045
18		0.052	96	55	120	4	55	103	0.030	150	0.080	0.2	0.031
16		0.064	96	55	120	4	55	103	0.030	110	0.080	0.2	0.036

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(mm)		bar	Ball	bar	Ball	bar*	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
1		6.6	55	8.3	4	3.8	103	0.8	5310	2.0	0.1	1.1
2		6.6	55	8.3	4	3.8	103	0.8	1550	2.0	0.2	1.0

Bold type indicates maximum piercing parameters.

* Pressure of the water supply line should be regulated by customer supplied pressure regulator.

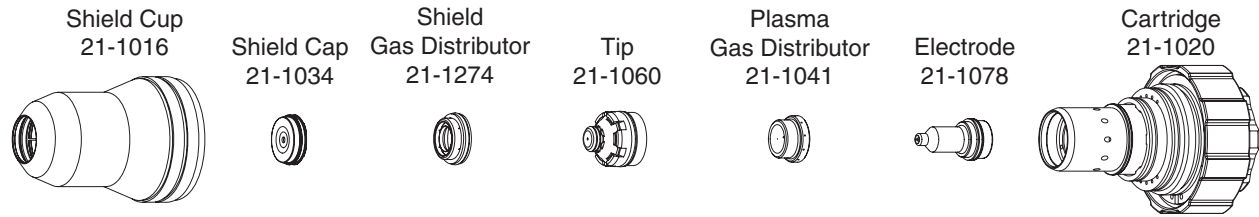
NOTE 1: Ohmic height sensing is not recommended with water shield.
Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Aluminum

50A

Air Plasma / Air Shield



Art # A-04029

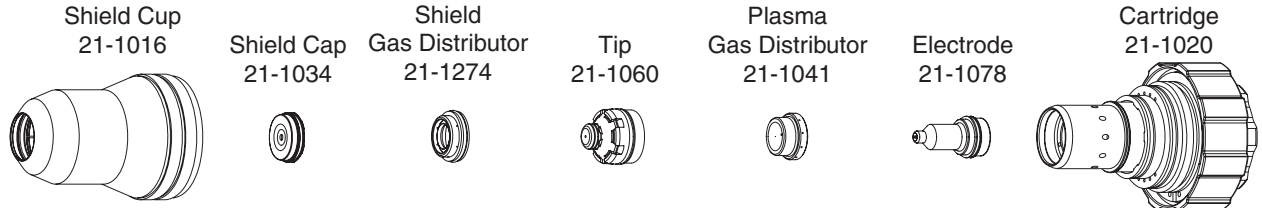
50A Aluminum (Air/Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
16		0.064	100	60	120	75	120	124	0.100	140	0.200	0.0	0.06
12		0.097	100	60	120	75	120	125	0.105	90	0.200	0.0	0.067
11		0.120	100	60	120	75	120	129	0.110	60	0.200	0.0	0.068
	3/16	0.188	100	60	120	75	120	133	0.120	40	0.200	0.2	0.074

50A Aluminum (Air/Air)													
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
			Plasma (Air)		Shield (Air)								
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
2		6.9	60	8.3	75	8.3	124	2.6	2990	5.1	0.0	1.6	
3		6.9	60	8.3	75	8.3	129	2.8	1520	5.1	0.0	1.7	
4		6.9	60	8.3	75	8.3	131	2.9	1240	5.1	0.1	1.8	
5		6.9	60	8.3	75	8.3	134	3.1	950	5.1	0.2	1.9	

Aluminum

50A

N₂ Plasma / H₂O Shield



Art # A-04029

50A Aluminum (N ₂ /H ₂ O)													
Material Thickness			Pre Flow (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
16		0.064	100	60	120	4	55	120	0.11	140	0.200	0.2	0.045
12		0.097	100	60	120	4	55	120	0.11	90	0.200	0.2	0.046
11		0.120	100	60	120	4	55	123	0.11	60	0.200	0.2	0.050
	3/16	0.188	100	60	120	4	55	125	0.12	40	0.200	0.2	0.051

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(mm)		(bar) *	Ball	(bar) *	Ball	(bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
2		6.9	60	8.3	4	3.8	120	2.8	2990	5.1	0.2	1.2
3		6.9	60	8.3	4	3.8	123	2.8	1520	5.1	0.2	1.3
4		6.9	60	8.3	4	3.8	124	2.9	1240	5.1	0.2	1.3
5		6.9	60	8.3	4	3.8	125	3.1	950	5.1	0.2	1.3

* Pressure of the water supply line should be regulated by customer supplied pressure regulator.

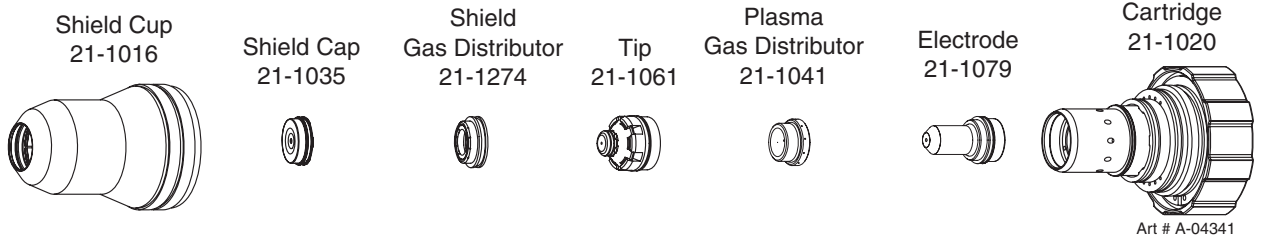
NOTE 1: Ohmic height sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Aluminum

70A

Air Plasma / Air Shield



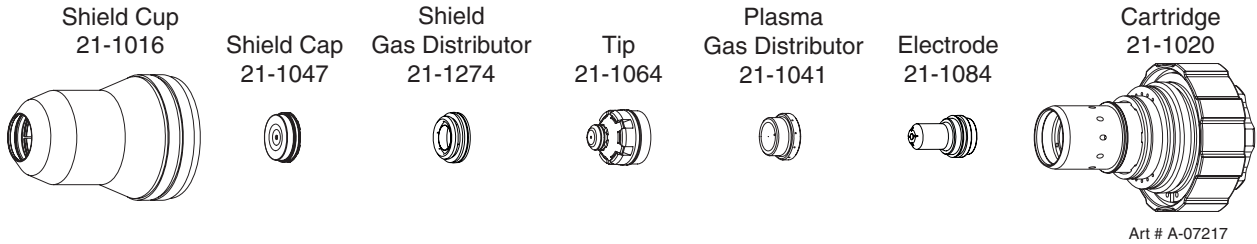
70A Aluminum (Air/Air)													
Material Thickness			Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (Air)		Shield (Air)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
14		0.079	84	42	120	70	120	153	0.060	300	0.140	0.0	0.058
12		0.097	84	42	120	70	120	160	0.080	200	0.140	0.1	0.062
	3/16	0.188	84	42	120	70	120	162	0.120	100	0.140	0.1	0.072
	1/4	0.250	84	42	120	70	120	166	0.140	70	0.180	0.2	0.073
	3/8	0.375	84	42	120	70	120	168	0.140	60	0.180	0.3	0.078

70A Aluminum (Air/Air)													
Material Thickness		Pre Flow Pressure (Air)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
			Plasma (Air)		Shield (Air)								
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
2		5.8	42	8.3	70	8.3	153	1.5	7620	3.6	0.0	1.5	
3		5.8	42	8.3	70	8.3	160	2.3	4490	3.6	0.1	1.6	
4		5.8	42	8.3	70	8.3	161	2.7	3390	3.6	0.1	1.7	
5		5.8	42	8.3	70	8.3	163	3.1	2430	3.7	0.1	1.8	
6		5.8	42	8.3	70	8.3	165	3.4	1950	4.4	0.2	1.9	
8		5.8	42	8.3	70	8.3	167	3.6	1650	4.6	0.3	2.0	
10		5.8	42	8.3	70	8.3	168	3.6	1490	4.6	0.3	2.0	

Aluminum

70A

N₂ Plasma / H₂O Shield



70A Aluminum (N ₂ /H ₂ O)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI) *	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
16		0.064	45	55	90	5	55	155	0.100	300	0.250	0.0	0.057
14		0.079	45	55	90	5	55	148	0.100	240	0.250	0.0	0.068
12		0.097	45	55	90	5	55	150	0.150	200	0.250	0.1	0.095
	3/16	0.188	45	55	90	5	55	150	0.150	120	0.250	0.3	0.095
	1/4	0.250	45	55	90	5	55	158	0.150	70	0.250	0.3	0.097
	3/8	0.375	45	55	90	5	55	162	0.150	35	0.250	0.5	0.100

70A Aluminum (N ₂ /H ₂ O)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)							
(mm)			(Bar)	Ball	(Bar)	Ball	(Bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
2			3.1	55	6.2	5	3.8	148	2.5	6100	6.3	0.0	1.7
3			3.1	55	6.2	5	3.8	150	3.8	4610	6.3	0.2	2.4
4			3.1	55	6.2	5	3.8	150	3.8	3730	6.3	0.3	2.4
5			3.1	55	6.2	5	3.8	151	3.8	2870	6.3	0.3	2.4
6			3.1	55	6.2	5	3.8	156	3.8	2060	6.3	0.3	2.5
8			3.1	55	6.2	5	3.8	160	3.8	1315	6.3	0.4	2.6
10			3.1	55	6.2	5	3.8	163	3.8	880	6.3	0.5	2.7

* Pressure of the water supply line should be regulated by customer supplied pressure regulator

NOTE 1: Ohmic height sensing is not recommended with water shield.

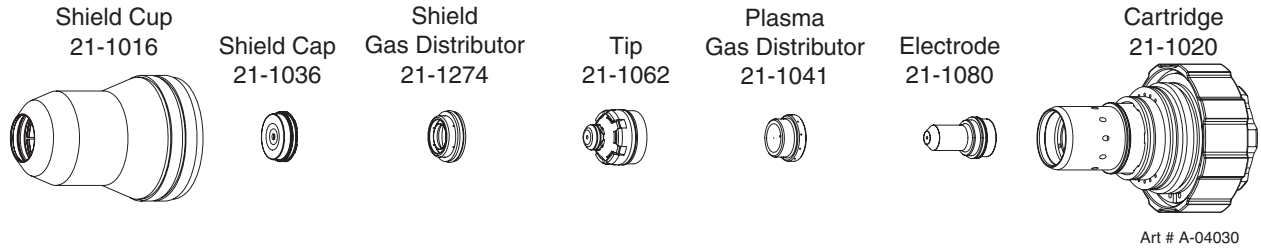
Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Aluminum

100A

H35 Plasma / N₂ Shield



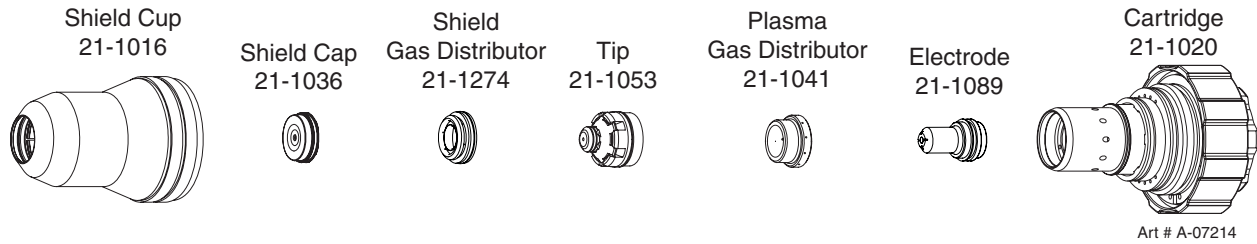
100A Aluminum (H35/N ₂)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (H35)		Shield (N ₂)							
(ga)	(in)	inch	(psi)	Ball	(psi)	Ball	(psi)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	3/8	0.375	80	67	120	62	120	152	0.154	60	0.350	0.2	0.105
	1/2	0.500	80	67	120	62	120	158	0.150	50	0.350	0.2	0.110
	5/8	0.625	80	67	120	62	120	160	0.150	35	0.350	0.5	0.110

100A Aluminum (H35/N ₂)													
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed	
			Plasma (H35)		Shield (N ₂)								
(mm)	(mm)	(bar)	Ball	(bar)	Ball	(bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
10	10	5.5	67	8.3	62	8.3	153	3.9	1490	8.9	0.2	2.7	
12	12	5.5	67	8.3	62	8.3	157	3.8	1330	8.9	0.2	2.8	
15	15	5.5	67	8.3	62	8.3	159	3.8	990	8.9	0.5	2.8	

Aluminum

100A

N₂ Plasma / H₂O Shield



100A Aluminum (N ₂ /H ₂ O)												
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI) *	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
3/16	0.188	45	60	90	7	55	158	0.150	130	0.300	0.1	0.095
1/4	0.250	45	60	90	7	55	160	0.150	90	0.300	0.1	0.100
3/8	0.375	45	60	90	7	55	161	0.150	70	0.300	0.2	0.100
1/2	0.500	45	60	90	7	55	171	0.150	40	0.300	0.4	0.100
5/8	0.625	45	60	90	7	55	175	0.180	35	0.350	0.5	0.105

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(mm)		(Bar)	Ball	(Bar)	Ball	(Bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
5		3.1	60	6.2	7	3.8	158	3.8	3150	7.6	0.1	2.4
6		3.1	60	6.2	7	3.8	160	3.8	2510	7.6	0.1	2.5
8		3.1	60	6.2	7	3.8	161	3.8	2025	7.6	0.2	2.5
10		3.1	60	6.2	7	3.8	162	3.8	1665	7.6	0.3	2.5
12		3.1	60	6.2	7	3.8	169	3.8	1190	7.6	0.4	2.5
15		3.1	60	6.2	7	3.8	174	4.6	925	8.9	0.5	2.7

* Pressure of the water supply line should be regulated by customer supplied pressure regulator

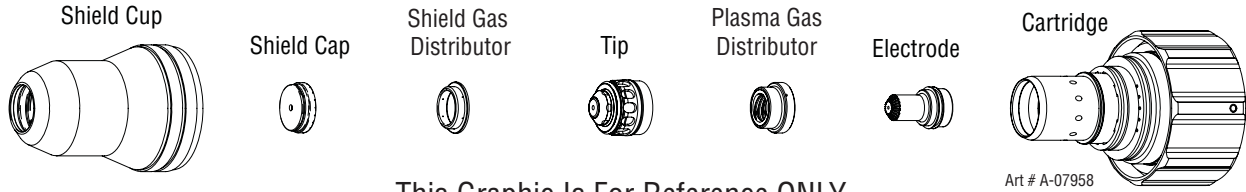
NOTE 1: Ohmic height sensing is not recommended with water shield.
Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Aluminum

150A

H35 Plasma / N2 Shield



This Graphic Is For Reference ONLY

Shield Cup	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge
21-1016	21-1037	21-1278	21-1063	21-1041	21-1081	21-1020

Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (H35)		Shield (N ₂)							
(ga)	(in)	inch	psi	Ball	psi	Ball	psi	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	1/2	0.500	70	80	120	60	120	167	0.400	75	0.450	0.4	0.120
	5/8	0.625	70	80	120	60	120	165	0.300	40	0.350	0.5	0.129
	3/4	0.750	70	80	120	60	120	173	0.300	35	0.400	0.8	0.139
	1	1.000	70	80	120	60	120	175	0.300	25	0.450	1.8	0.137

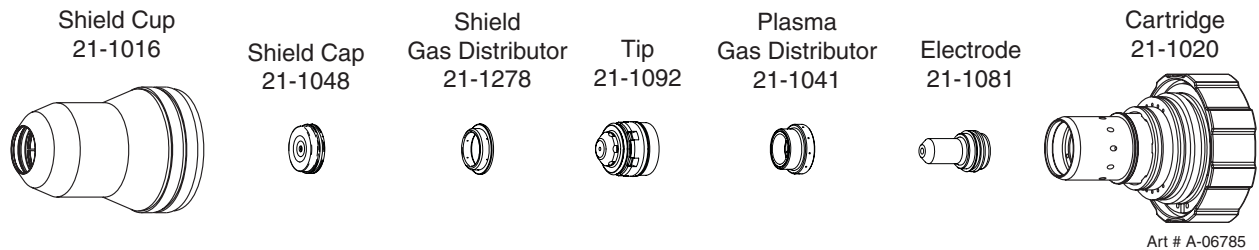
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (H35)		Shield (N ₂)							
(mm)	bar	Ball	bar	Ball	bar	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)	
12	4.8	80	8.3	60	8.3	167	10.2	2100	11.4	0.4	3.0	
15	4.8	80	8.3	60	8.3	165	7.6	1260	8.9	0.5	3.2	
20	4.8	80	8.3	60	8.3	173	7.6	850	10.2	0.8	3.5	
25	4.8	80	8.3	60	8.3	175	7.6	650	11.4	1.8	3.5	

BOLD TYPE indicates maximum piercing parameters.

Aluminum

150A

N₂ Plasma / H₂O Shield



150A Aluminum (N ₂ /H ₂ O)												
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
(in)	inch	(PSI)	Ball	(PSI)	Ball	(PSI) *	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
3/16	0.188	70	60	90	8	55	130	0.100	150	0.350	0.2	0.107
1/4	0.250	70	60	90	8	55	133	0.120	120	0.350	0.2	0.108
3/8	0.375	70	60	90	8	55	140	0.120	100	0.350	0.2	0.116
1/2	0.500	70	60	90	8	55	152	0.200	75	0.350	0.3	0.126
5/8	0.625	70	60	90	8	55	155	0.200	50	0.350	0.4	0.142
3/4	0.750	70	60	90	8	55	165	0.250	35	0.350	0.5	0.141
1	1.000	70	60	90	8	55	178	0.300	20	0.350	1.0	0.155

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)							
		(Bar)	Ball	(Bar)	Ball	(Bar) *	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
5		4.8	60	6.2	8	3.8	130	2.5	3700	8.9	0.2	2.7
6		4.8	60	6.2	8	3.8	132	3.0	3220	8.9	0.2	2.7
8		4.8	60	6.2	8	3.8	137	3.0	2785	8.9	0.2	2.8
10		4.8	60	6.2	8	3.8	142	3.0	2445	8.9	0.2	2.9
12		4.8	60	6.2	8	3.8	149	5.1	2050	8.9	0.3	3.2
15		4.8	60	6.2	8	3.8	154	5.1	1445	8.9	0.4	3.4
20		4.8	60	6.2	8	3.8	167	6.4	830	8.9	0.5	3.7
25		4.8	60	6.2	8	3.8	177	7.6	535	8.9	1.0	3.9

* Pressure of the water supply line should be regulated by customer supplied pressure regulator

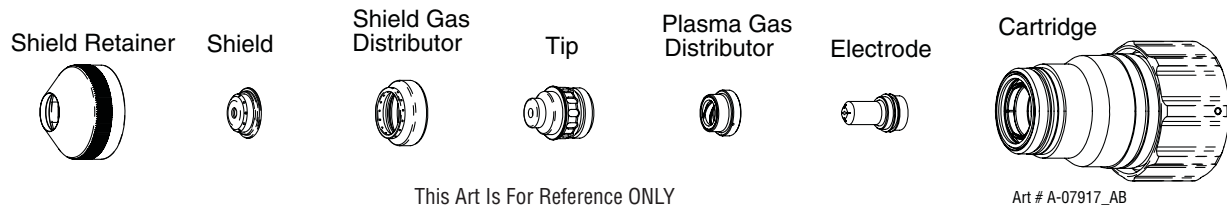
NOTE 1: Ohmic height sensing is not recommended with water shield.

Water on the plate interferes electrically with the ohmic sensing circuit.

NOTE 2: Water source used for H₂O Water Shield must be demineralized.

Aluminum 200A

N₂ Plasma / H₂O Shield



This Art Is For Reference ONLY

Art # A-07917_AB

Shield Retainer	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge
21-1015	21-1049	21-1284	21-1067	21-1043	21-1089	21-1022

Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
				Plasma (N ₂)		Shield (H ₂ O)*							
(ga)	(in)	inch	(PSI)	(Ball)	(PSI)	(Ball)	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	1/2	0.500	20	100	90	5	55	168	0.250	110	0.300	0.3	0.120
	5/8	0.625	20	80	100	5	55	170	0.300	105	0.350	0.5	0.126
	3/4	0.750	20	80	100	5	55	175	0.300	90	0.350	0.6	0.127
	7/8	0.875	20	80	100	5	55	180	0.300	75	0.350	0.8	0.133
	1	1.000	20	80	100	5	55	194	0.350	50	0.400	1.0	0.144
	1.25	1.250	20	80	100	5	55	208	0.400	25	0.450	2.0	0.180
	1 1/2	1.500	20	80	100	5	55	210	0.400	20	0.500	3.0	0.197
	1 3/4	1.750	20	80	100	5	55	212	0.400	18	Edge Start		0.201
	2	2.000	20	80	100	5	55	215	0.400	12	Edge Start		0.204

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (N ₂)		Shield (H ₂ O)*							
(mm)	(mm)	(Bar)	(Ball)	(Bar)	(Ball)	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
	12	1.4	100	6.3	5	3.8	167	6.3	2900	7.6	0.3	3.0
	15	1.4	80	6.9	5	3.8	170	7.5	2700	8.9	0.5	3.2
	20	1.4	80	6.9	5	3.8	176	7.5	2200	8.9	0.6	3.3
	25	1.4	80	6.9	5	3.8	194	8.9	1300	10.2	1.0	3.6
	32	1.4	80	6.9	5	3.8	208	10.2	630	11.4	2.0	4.6
	38	1.4	80	6.9	5	3.8	210	10.2	500	12.7	3.0	5.0
	44	1.4	80	6.9	5	3.8	212	10.2	460	Edge Start		5.1
	50	1.4	80	6.9	5	3.8	215	10.2	300	Edge Start		5.2

BOLD TYPE indicates maximum piercing parameters. **BOLD ITALIC** indicates edge starts only.

Requires CCM version 3.4 or later. Requires GCM version 3.2 or later.

* Pressure of the water supply line should be regulated by customer pressure regulator.

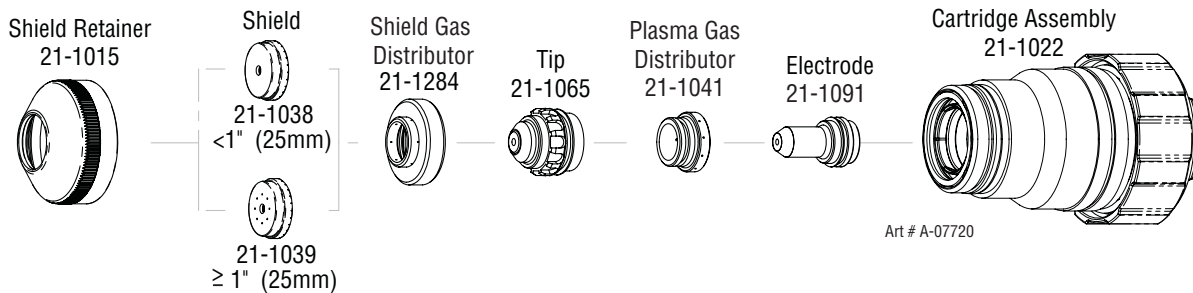
Note1: Ohmic height sensing is not recommended with water shield. Water on the plate interferes electrically with the ohmic sensing circuit.

Note2: Water source used for shield must be demineralized.

Aluminum

300A

H35 Plasma / N₂ Shield



300A Aluminum (H35/N ₂)													
Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height*	Pierce Delay	Kerf Width @ Min/Max
				Plasma (H35)		Shield (N ₂)							
(ga)	(in)	inch	(PSI)	Ball	(PSI)	Ball**	(PSI)	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	1/4	0.250	20	120	100	NA**	120	163	0.400	300	0.400	0.1	0.182
	3/8	0.375	20	120	100		120	163	0.400	275	0.400	0.2	0.186
	1/2	0.500	20	120	100		120	153	0.300	210	0.400	0.3	0.174
	5/8	0.625	20	120	100		90	160	0.300	140	0.350	0.4	0.169
	3/4	0.750	20	120	100		90	159	0.300	110	0.350	0.5	0.172
	7/8	0.875	20	120	100		90	162	0.300	95	0.400	0.6	0.183
	1	1.000	20	120	100		120	165	0.350	85	0.450	0.7	0.190
	1 1/4	1.250	20	120	100		120	168	0.400	60	Edge Start		0.205
	1 1/2	1.500	20	120	100		120	177	0.400	45	Edge Start		0.215
	1 3/4	1.750	20	120	100		120	182	0.400	35	Edge Start		0.226
	2	2.000	20	120	100		120	188	0.400	25	Edge Start		0.228

300A Aluminum (H35/N ₂)												
Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates / Pressures				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height*	Pierce Delay	Kerf Width @ Rec. Speed
			Plasma (H35)		Shield (N ₂)							
(mm)	(mm)	(Bar)	Ball	(Bar)	Ball**	(Bar)	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
6	6	1.4	120	6.9	NA**	8.3	163	10.2	7620	10.2	0.1	4.7
8	8	1.4	120	6.9		8.3	163	10.2	7290	10.2	0.2	4.7
10	10	1.4	120	6.9		8.3	162	9.8	6740	10.2	0.2	4.7
12	12	1.4	120	6.9		8.3	155	8.2	5700	10.2	0.3	4.5
15	15	1.4	120	6.9		6.2	158	7.6	4050	9.2	0.4	4.3
20	20	1.4	120	6.9		6.2	160	7.6	2680	9.3	0.5	4.5
25	25	1.4	120	6.9		8.3	165	8.7	2190	11.3	0.7	4.8
32	32	1.4	120	6.9		8.3	168	10.2	1510	Edge Start		5.2
38	38	1.4	120	6.9		8.3	177	10.2	1150	Edge Start		5.5
44	44	1.4	120	6.9		8.3	182	10.2	910	Edge Start		5.7
50	50	1.4	120	6.9		8.3	185	10.2	670	Edge Start		5.8

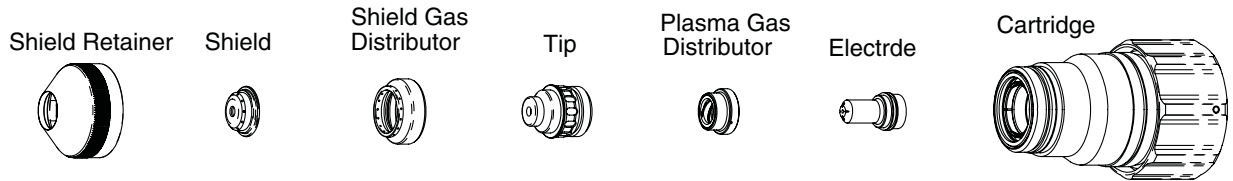
* Lock pierce height for first 0.5" to 1" of cutting to avoid torch hitting the pierce metal puddle.

** Set Shield Flow to "Pressure" only

Aluminium

300A

N₂ Plasma / H₂O Shield



This Art Is For Reference ONLY

Art # A-07917

Shield Retainer	Shield Cap	Shield Gas Distributor	Tip	Plasma Gas Distributor	Electrode	Cartridge
21-1015	21-1046	21-1284	21-1066	21-1043	21-1089	21-1022

Material Thickness			Pre Flow Pressure (N ₂)	Cut Flow Rates /				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
(ga)	(in)	inch		Plasma (N ₂)		Shield (H ₂ O)							
			psi	Ball	psi	Ball	psi	Volts	(in) ±0.005	(ipm)	(in)	(sec)	(in)
	1/2	0.500	20	120	100	8	55	160	0.200	120	0.300	0.3	0.161
	5/8	0.625	20	120	100	8	55	164	0.200	100	0.300	0.4	0.165
	3/4	0.750	20	120	100	8	55	170	0.250	80	0.500	0.5	0.174
	7/8	0.875	20	120	100	8	55	173	0.250	70	0.500	0.6	0.175
	1	1.000	20	120	100	8	55	175	0.250	60	0.500	0.7	0.190
	1.25	1.250	20	120	100	8	55	180	0.250	40	0.500	1.2	0.185
	1 1/2	1.500	20	120	100	8	55	184	0.300	25	Edge Start		0.190
	1 3/4	1.750	20	120	100	8	55	196	0.300	15	Edge Start		0.213
	2	2.000	20	120	100	8	55	200	0.300	10	Edge Start		0.205

Material Thickness		Pre Flow Pressure (N ₂)	Cut Flow Rates /				Arc Voltage	Torch Working Height	Travel Speed	Initial Piercing Height	Pierce Delay	Kerf Width @ Rec. Speed
(mm)	bar		Plasma (N ₂)		Shield (H ₂ O)							
		bar	Ball	bar	Ball	bar	Volts	(mm) ±0.1	(mm/min)	(mm)	(sec)	(mm)
15	1.4	1.4	120	6.9	8	3.8	163	5.1	2680	7.6	0.4	4.2
20	1.4	1.4	120	6.9	8	3.8	171	6.4	1960	12.7	0.5	4.4
25	1.4	1.4	120	6.9	8	3.8	175	6.4	1560	12.2	0.7	4.8
32	1.4	1.4	120	6.9	8	3.8	180	6.4	1000	0.2	1.2	4.7
38	1.4	1.4	120	6.9	8	3.8	184	7.6	640	Edge Start		4.8
44	1.4	1.4	120	6.9	8	3.8	195	7.6	400	Edge Start		5.4
50	1.4	1.4	120	6.9	8	3.8	199	7.6	270	Edge Start		5.2

BOLD TYPE indicates maximum piercing parameters.

BOLD ITALIC indicates edge starts only.

TORCH PARTS LIST

Returns

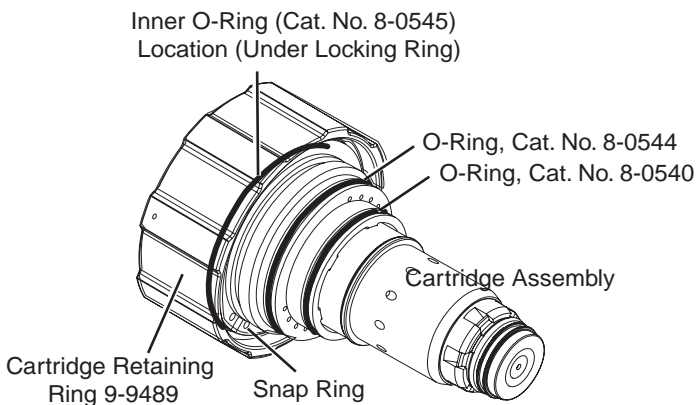
If a product must be returned for service, contact your authorized distributor. Materials returned without proper authorization will not be accepted.

Ordering Information

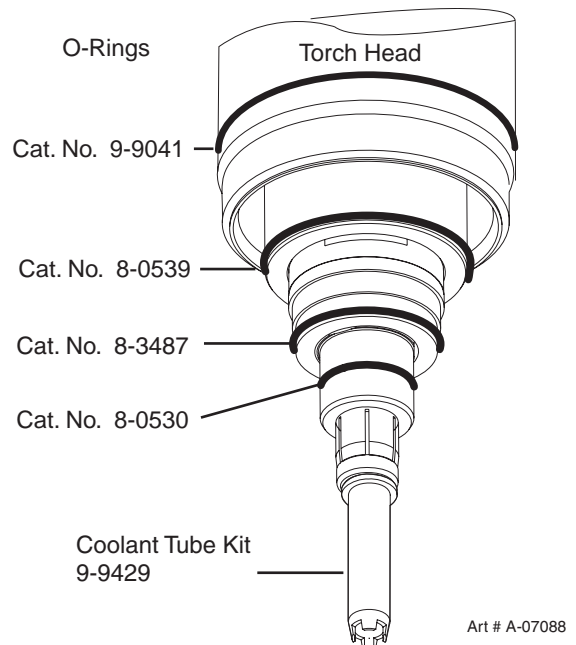
Order replacement parts by catalog number and complete description of the part or assembly. Also include the model and serial number of the machine or torch.

Refer to parts diagrams within the body of the manual for consumable parts and replacement O-Ring catalog numbers.

Description	Catalog Number
O-Ring Lubricant (Christo-Lube MCG-129)	9-4893
Torch Head and Cartridge O-Ring Kit	9-9488
Shield Cup (all applications except 200A & 300A)	21-1016
Shield Cup (200A & 300A only)	21-1017
Torch Cartridge (includes Cartridge Tool) (all applications except 200A & 300A)	21-1020
Torch Cartridge (includes Cartridge Tool) (200A & 300A only)	21-1022
Cartridge Tool	9-9431
Cartridge Retaining Ring	9-9489



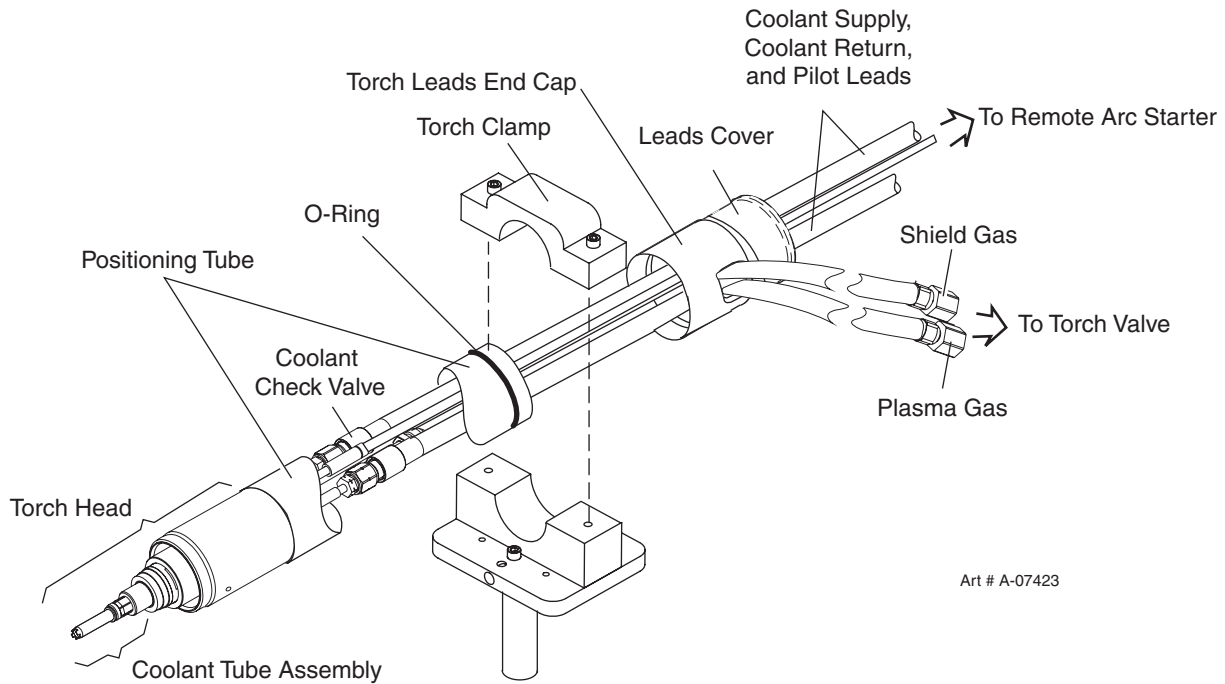
Art # A-07087



Art # A-07088

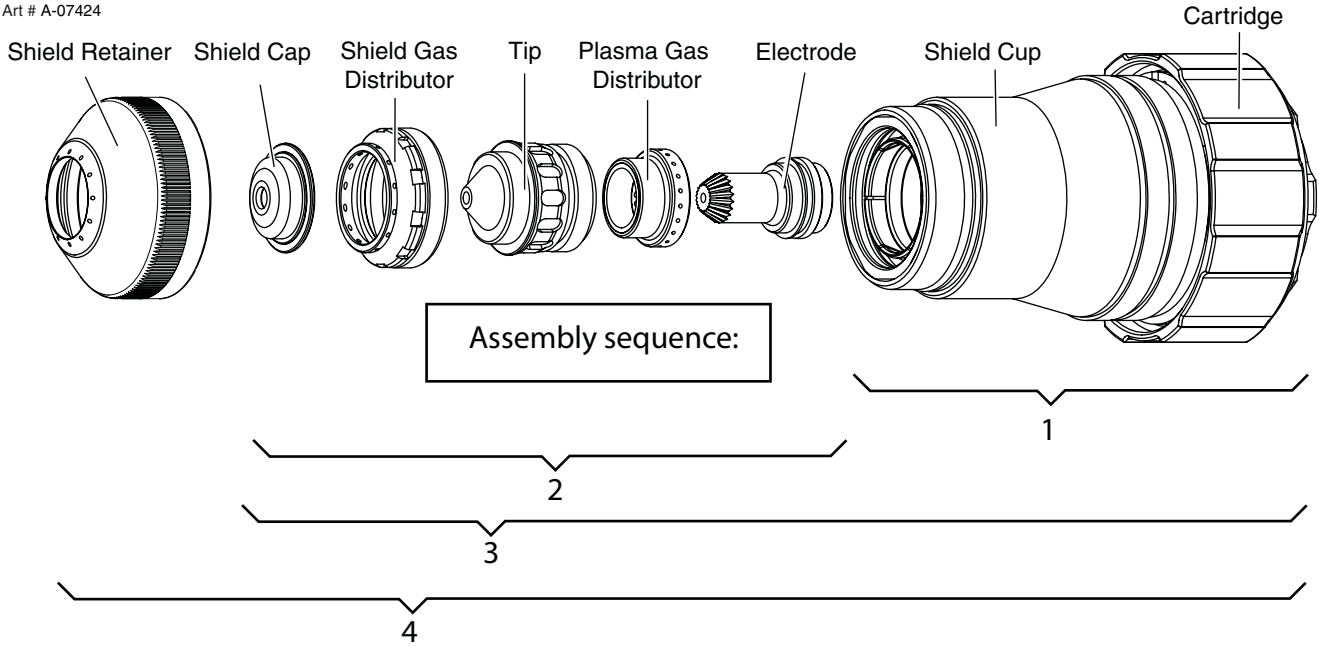
Torch Replacement Parts

Description	Catalog Number
Torch Head Assembly	21-1002
Coolant Check Valve Assembly	9-4846
Torch Clamp Assembly	9-9336
Torch Positioning Tube (includes hardware kit 9-4847)	9-4700
Positioning Tube Hardware Kit (O-Ring & screws)	9-4847
Plasma & Shield Leads Assembly (to Torch Valve)	4-3026
Ohmic Clip (not shown)	9-9414

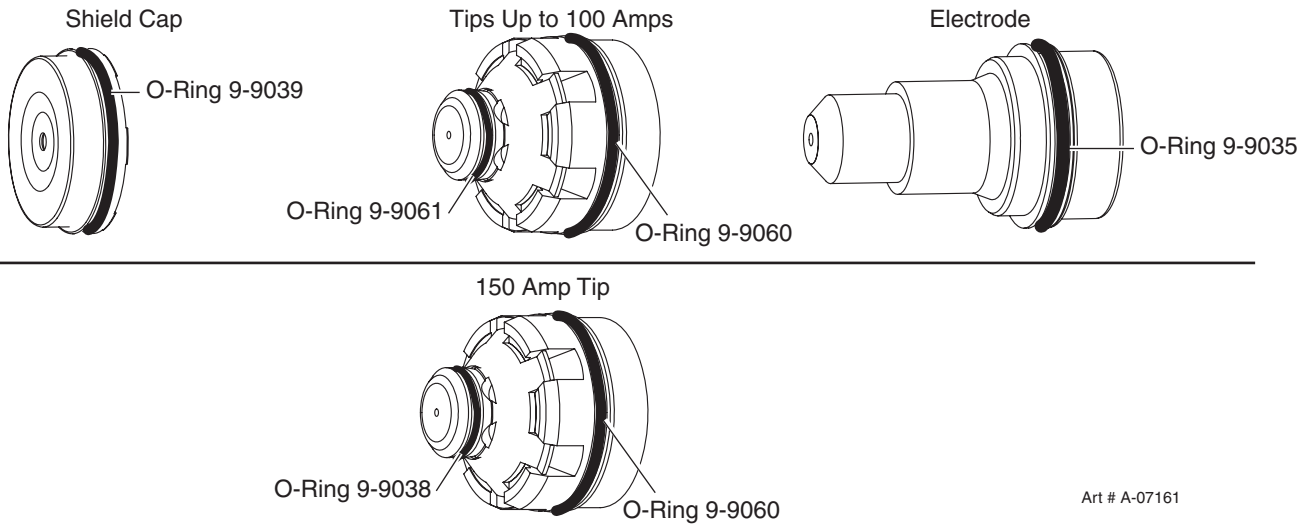


Assembly Sequence, 200/300 Amp Consumables

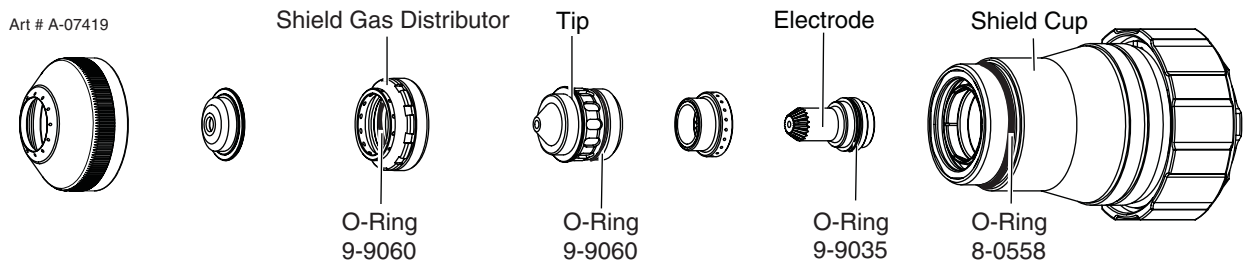
Art # A-07424



Consumables O-Rings (up to 150 Amps)



Consumables O-Rings (300 Amps)



PATENT INFORMATION

XT™-300 Plasma Cutting Torch Patents

The following parts are covered under U.S. and Foreign Patents as follows:

Catalog #	Description	Patent(s)
21-1002	Torch Head	U.S. Pat No(s) 6,946,616; 6,919,526; 6,852,944; 7,071,443 and 7,019,254
21-1014	Shield Retainer	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1015	Shield Retainer	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1021	Shield Retainer	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1016	Shield Cup	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1020	Cartridge	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1024	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1025	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1026	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1027	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1028	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1030	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; Other Pat(s) Pending
21-1033	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1034	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1035	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1036	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1038	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1039	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523042; 7071443 Other Pat(s) Pending
21-1046	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1047	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1048	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523043; 7071443 Other Pat(s) Pending
21-1049	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; Other Pat(s) Pending
21-1275	Shield Cap	US Pat No(s) 6946616; 6919526; 6989505; D523042; 7071443 Other Pat(s) Pending
21-1040	Plasma Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1041	Plasma Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1043	Plasma Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1045	Plasma Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending

XT-300™ Plasma Cutting Torch Patents Continued

The following parts are covered under U.S. and Foreign Patents as follows:

Catalog #	Description	Patent(s)
21-1050	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1051	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1052	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1053	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1054	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1055	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; Other Pat(s) Pending
21-1059	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1060	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1061	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1062	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1065	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; Other Pat(s) Pending
21-1066	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1067	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; Other Pat(s) Pending
21-1152	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1153	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1092	Tip	US Pat No(s) 6946616; 6919526; 6989505; 7005600; D519135; D524,336 Other Pat(s) Pending
21-1068	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517577 Other Pat(s) Pending
21-1069	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566 Other Pat(s) Pending
21-1070	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517576 Other Pat(s) Pending
21-1071	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517576 Other Pat(s) Pending
21-1072	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517576 Other Pat(s) Pending
21-1077	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566 Other Pat(s) Pending
21-1078	Electrode	US Pat No(s) 6946616; 6919526; D505963; 6989505; 6998566 Other Pat(s) Pending
21-1079	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566 Other Pat(s) Pending
21-1080	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517577 Other Pat(s) Pending
21-1091	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517577 Other Pat(s) Pending
21-1093	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; Other Pat(s) Pending
21-1170	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; Other Pat(s) Pending
21-1171	Electrode	US Pat No(s) 6946616; 6919526; 6989505; 6998566; D517577 Other Pat(s) Pending

XT-300™ Plasma Cutting Torch Patents Continued

The following parts are covered under U.S. and Foreign Patents as follows:

Catalog #	Description	Patent(s)
21-1082	Shield Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1272	Shield Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1273	Shield Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1274	Shield Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1284	Shield Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending
21-1285	Shield Gas Distributor	US Pat No(s) 6946616; 6919526; 6989505 Other Pat(s) Pending

The following parts are licensed under U.S. Patent No. 5,120,930 and 5,132,512:

Catalog Number	Description
21-1027	Shield Cap
21-1039	Shield Cap
21-1046	Shield Cap
21-1275	Shield Cap

NOTE

This manual may refer to some or all of the parts listed.