

Invertig 160DC Owner's Manual



Manufacturer's Warranty

It is expressly agreed that there are no warranties, expressed or implied, made by either the Salesman, Dealer, or HTP America, Inc. on products or parts furnished hereunder, except the Manufacturer's Warranty against defective materials or workmanship as follows:

HTP America, Inc. warrants each new welding machine to be free from defects in material and workmanship under normal use and service for ty q years after delivery to the original purchaser. HTP America, Inc. will repair and replace, at its factory, any part or parts thereof, products to be returned to HTP America, Inc. with transportation charges prepaid and which its examination shall disclose to its satisfaction to have been thus defective. This warranty being expressly in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on its part and it neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its machines.

This warranty shall not apply to any welding machine which has been repaired or altered by unauthorized service departments in any way so as in the judgment of HTP America, Inc. to affect its stability and reliability, nor which has been subjected to misuse, negligence or accident.

HTP America, Inc. shall not be liable in any event, unless HTP America, Inc. receives notice of alleged breach of warranty within not more than 30 days after the discovery, actual or construction alleged breach of warranty specifying the claimed defect.

HTP America, Inc. has reserved the right to make change in design or add any improvements to its products at any time without incurring any obligation to install same on equipment.

This warranty is void unless warranty card is sent to HTP America, Inc. within 15 days from date of purchase.

Note:

Exclusions to Warranty:

1. The Tig Welding Torch is warranted for a period of ninety (90) Days against defects in material and workmanship.
2. The tungsten, collet, collet body, ceramic nozzles are consumable items, WHICH CARRY NO WARRANTY.

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Safety Suggestions

Electric arc welding produces ultra-violet rays, which are harmful to skin and eyes. Ultra-violet radiation can penetrate lightweight clothing, reflect from light colored surfaces, and burn the skin and eyes. Wear flameproof welding gloves which are not oily or greasy. The oil or grease on the gloves may ignite. Wear a heavy, pocket-less; long sleeve shirt, cuffless trousers, and high-topped work shoes. Wear a full-face welding helmet with a number eight or darker lens and a cap. These precautions will protect eyes, hair, face, and skin from arc rays and hot material.

- To avoid fire, do not weld on wood, plastic tile, or carpeted floors. Concrete or masonry floors are safest.
- Do not weld on drums, barrels, tanks or other containers until they have been cleared as described in AWS Standard A6.01.
- Provide adequate ventilation in the welding area at all times. Do not weld on galvanized zinc, cadmium or lead beryllium materials unless POSITIVE sufficient ventilation is provided. These materials produce toxic fumes.
- Do not weld in areas close to degreasing or spraying operations. Chlorinated hydrocarbon vapors may react with the ultra-violet rays and form highly toxic phosgene gas.
- If you develop momentary eye, nose or throat irritation during welding, stop welding immediately. This is an indication that ventilation is not adequate. Do not continue to weld until ventilation is improved.
- Exposed, electrically hot conductors or other bare metal in the welding circuit, or ungrounded electrically hot equipment can fatally shock a person whose body becomes a conductor. Do not stand, sit, lie, lean on or touch a wet surface when welding.
- Frequently inspect cables for wear, cracks, and damage. Replace those with excessively worn insulation to avoid a possible lethal shock from bared cable.

For more information, refer to the following standards and comply as applicable.

1. ANSI Standard Z49.1 SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 2051 NW 7th St., Miami, FL 33125.
2. ANSI Standard Z87.1 SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018.
3. America Welding Society Standard A6.0 WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable same as item 1.
4. NFPA STANDARD 51. OXYGEN-FUEL GAS SYSTEMS FOR WELDING AND CUTTING, obtainable from the National Fire Protection Assoc., 470 Atlantic Avenue, Boston, MA 02210.
5. NFPA Standard 51B. CUTTING AND WELDING PROCESSES, obtainable same as item 4.
6. CGA PAMPHLET P-1. SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 500 Fifth Avenue, New York, NY 10036.
7. OSHA Standard 29 CFR, Part 1910, Subpart Q WELDING, CUTTING AND BRAZING.

Electrical Connection

Your Invertig 160DC can operate on either 110-volt or single-phase 230-volt power. The machine comes from the factory set up for 230-volt operation and is not shipped with a plug. The input power cord has 3 wires. The yellow-green wire is ground, and the blue and brown wires are the hot leads.

To change the machine from 230-volt operation to 110-volt operation, follow the following steps:

- 1) Be sure the machine is un-plugged from the power supply and the power switch is in the “0” position. The power switch must remain in the “0” position until the procedure has been completed.
- 2) Remove the phillips head screw which holds the on-off knob on and remove the knob. (See Fig. 1)
- 3) You will see a plastic disc with 2 elongated slots in it. The disc should be in the 230-volt position. (See Fig. 2)
- 4) Flip the disk over so it is in the 110-volt position. (See Fig. 3)
- 5) Replace the knob. Be sure the machine has the correct plug installed and it is set for the voltage which you will be using. Attempting to operate the machine on the wrong voltage will cause damage to the machine and is not covered under warranty.
- 6) Check to make sure the switch rotates to the correct voltage before plugging your Invertig 160DC into the power supply.

All electrical connections should be performed by a qualified electrician in accordance with the National Electrical Code and local codes and ordinances.

When set to operate the machine on 110-volts, do not exceed 130 amps when TIG welding and 90 amps when arc welding.



Figure 1



Figure 2



Figure 3

Front Panel Controls

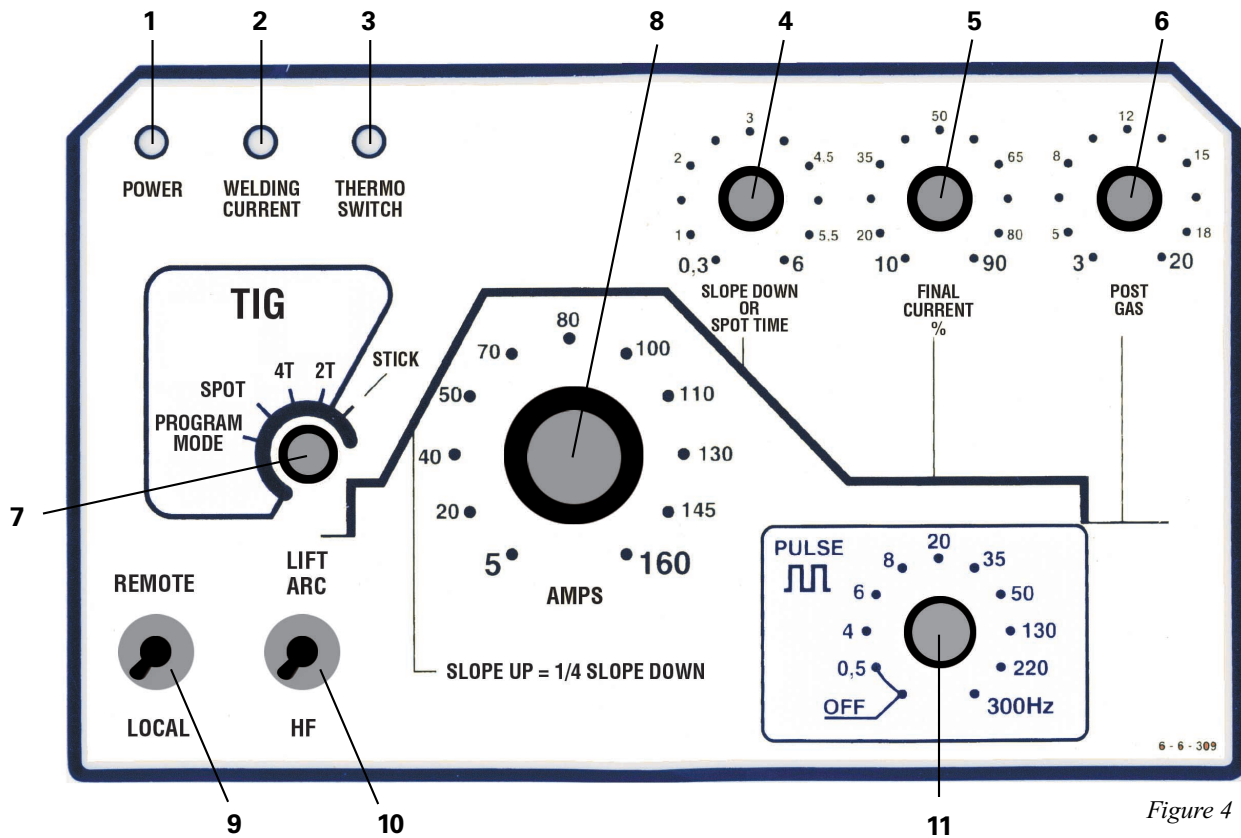


Figure 4

1) Power Indicator Lamp

This lamp is illuminated when the On-Off switch on the back of your Invertig 160DC is turned to either the "220" position, for operation on 220-volt power or the "110" position for operation on 110-volt power.

2) Welding Current Indicator Lamp

When either the foot pedal or the trigger switch on the TIG torch is depressed, welding current will be applied to the welding torch and the Welding Current Indicator Lamp will be illuminated.

If your Invertig 160DC is in the stick-welding mode, the welding current indicator lamp will be illuminated all the time.

3) Thermoswitch Indicator Lamp

The thermoswitch indicator lamp will light up when the duty cycle of your Invertig 160DC has been exceeded. When this lamp is illuminated, the machine will no longer weld because the machine has overheated. Leave the machine plugged in and turned on so the cooling fan can cool the unit down. Allow the machine to cool for 15 to 30 minutes, the thermoswitch should reset automatically and your Invertig will be ready to weld.

4) SLOPE DOWN or SPOT TIME

When the Welding mode is in the TIG 2T Mode, TIG 4T Mode, or the PROGRAM Mode, this knob allows you to adjust the slope down time from 0.3 sec to 6 sec. This is the amount of time it will take for the welding amperage to go from the welding amperage to the final current.

NOTE: If you are using a torch mounted remote amperage control or a foot pedal, it is advisable to set the slope down time to 0.1 sec, as you are controlling the slope down manually with your remote amperage control or foot pedal.

When the welding mode is in the TIG SPOT Mode this button adjusts the spot welding time from 0.3 sec to 6 sec.

5) FINAL CURRENT

Rotating this knob allows you to adjust the Final Current. This is only applicable when your Invertig 160DC is set in the TIG 4T mode or the PROGRAM mode. The final current is adjustable from 10% to 90% of the base current that is set by the amperage adjustment knob (#8). For example, if the amperage adjustment knob is set to 100 amps, and the final current is set to 15%, the final current will be 15 amps.

6) Post Gas

The post gas flow is adjustable from .3 sec to 20 sec. Post gas flow is necessary because after the arc is extinguished; if the gas stopped flowing immediately, there is a possibility the molten weld puddle would come in contact with the atmosphere, causing weld defects. Additionally it prevents the tungsten from becoming contaminated by the atmosphere. The gas flow should run long enough to allow the orange color of the tungsten to disappear. It is important to remember not to remove the TIG torch from the weld until the post gas cycle has been completed. A good starting point for the post gas flow is 5.0 sec. If you are welding at higher amperages or on more critical alloys it may be necessary to increase the post gas flow to a higher value.

7) Welding Mode Switch

The welding mode switch allows you to select the welding mode of your Invertig 160DC.

- A) *Stick Welding* – this mode is used when stick electrode welding. The electrode will always be hot and the gas solenoid will not operate. The green “Welding Current” lamp will be illuminated indicating the welding current is on.
- B) *TIG 2T Mode* – With the torch trigger or foot pedal depressed, your Invertig 160DC will start the arc. When the trigger is released, the unit will stop. Select this welding mode for operation with the foot pedal or the torch mounted amperage control. This will generally be the most common mode of operation.
- C) *TIG 4T Mode* – This is like a lock on trigger on a drill or grinder. This mode is generally used with a TIG torch which has a trigger to start and stop the arc. It is generally not used with a foot pedal or a torch mounted amperage control.

When you depress the trigger on the torch, your Invertig 160DC provides pre-gas flow for as long as the trigger is depressed. When the trigger is released, it will slope up to the welding amperage that has been selected. When the trigger is depressed again, the welding current will slope down to the final current. As long as the trigger is depressed, your Invertig 160DC will continue to weld at the final current which has been selected. When the trigger is released, the arc will extinguish, and the post flow will start.

We do not recommend using the 4t mode with either the foot pedal or the torch mounted amperage control.

D) *TIG SPOT* – the spot welding mode allows you to weld for between 0.3 and 6 seconds and then the unit will automatically stop. This would be a good selection if you were performing a series of repetitive tack welds.

E) *Program Mode* – using a TIG torch which has a trigger switch, the program mode allows you to switch between 2 programmed welding amperages.

For example, let's say you have your welding current set at 150 amps, and your “FINAL CURRENT” set at 50% or 75 amps. Depress the trigger and you have pre-gas flow for as long as you keep the trigger depressed. Release the trigger and your TIG 160DC will begin to weld at 150 amps. Depress and release the trigger and you will go to your final current of 75 amps. Depress and release the trigger again and you will go back to 150 amps. To stop welding, depress the trigger for 5 seconds or longer. When the trigger is released the arc is extinguished and the machine will go into post gas flow.

8) Amperage Adjustment Knob

This knob determines the welding amperage. The amperage on your Invertig 160DC can be adjusted from 5 to 160 amps.

When using a remote amperage control, the amperage adjustment knob is used to select the maximum amperage for your particular welding application. For example, when welding .060" mild steel, I adjusted the amperage knob to 80 amps. This is about 20% more power than I need for welding the .060" steel. I made sure the local/remote switch (#9) was set to remote. If I were to depress the foot pedal completely, the maximum amperage would now be 80 amps.

Setting the machine so the maximum amperage is 80 amps vs. the maximum output of the machine of 160 amps, the pedal becomes less sensitive. More of a movement in the pedal results in a smaller variance of the amperage, making it easier to control the heat and therefore easier to control your puddle.

9) Remote/Local Switch

When the remote/local switch is set to remote, the amperage is infinitely adjustable by either the foot pedal or the torch mounted amperage control.

It is possible to limit the maximum amperage of your Invertig 160DC. To limit the maximum amperage of the machine to 100 amps, for example, with the foot pedal plugged in or torch mounted amperage control plugged into the 5-pin connection, simply set the amperage adjustment

knob (#8) to 100 amps. Now, when you fully depress the foot pedal, the maximum amperage will be 100 amps. This makes the foot pedal less sensitive and makes it easier to control your puddle.

When the remote/local switch is set to local, the amperage will be adjusted by the amperage adjustment knob (#8) on the front of the welder.

10) Lift Arc/HF Switch

When the lift arc/HF switch is in the HF position, the arc is initiated by a high frequency pilot arc which allows the arc to start without bringing the tungsten in contact with the work. When the foot pedal is depressed, a high frequency arc will jump from the tungsten to the ground, initiating the arc. This makes it very easy to start the arc.

When the lift arc/HF switch is in the "Lift Arc" position, the arc is initiated by touching the tungsten to the work and then lifting it off the work. The lift arc mode allows you to initiate the welding arc without high frequency. This is important in any environment where the high frequency arc will cause interference with sensitive electrical components or computers. A good example of this would be stainless steel repair in hospitals.

To TIG Weld using the Lift Arc Mode, simply touch the tungsten to the workpiece, activate the torch trigger or depress the foot pedal and lift off. When the tungsten breaks contact with the work, the arc will start. You can also use this method for Stick welding with the added benefit of being able to vary your amperage with the foot pedal.

11) Pulse

Turning the "PULSE" knob from the off position to any setting will allow you to do "pulsed TIG welding". The machine will pulse from whatever amperage you are welding at to the what ever the final current is set to.

For example, if the local/remote switch is set to local, and the amperage adjustment knob (#8) is set to 100 amps, and the final current knob #5 is set to 50%, then the machine will pulse between 100 and 50 amps. By adjusting the pulse frequency from .5 Hz to 300 Hz determines how often this happens. If it is set to 1hz, then the unit pulses once every second. If it is set to 300 Hz, then it will pulse between 100 and 50 amps 300 times a second.

To turn off the pulse mode, simply rotate the pulse knob until the knob clicks into the off position.

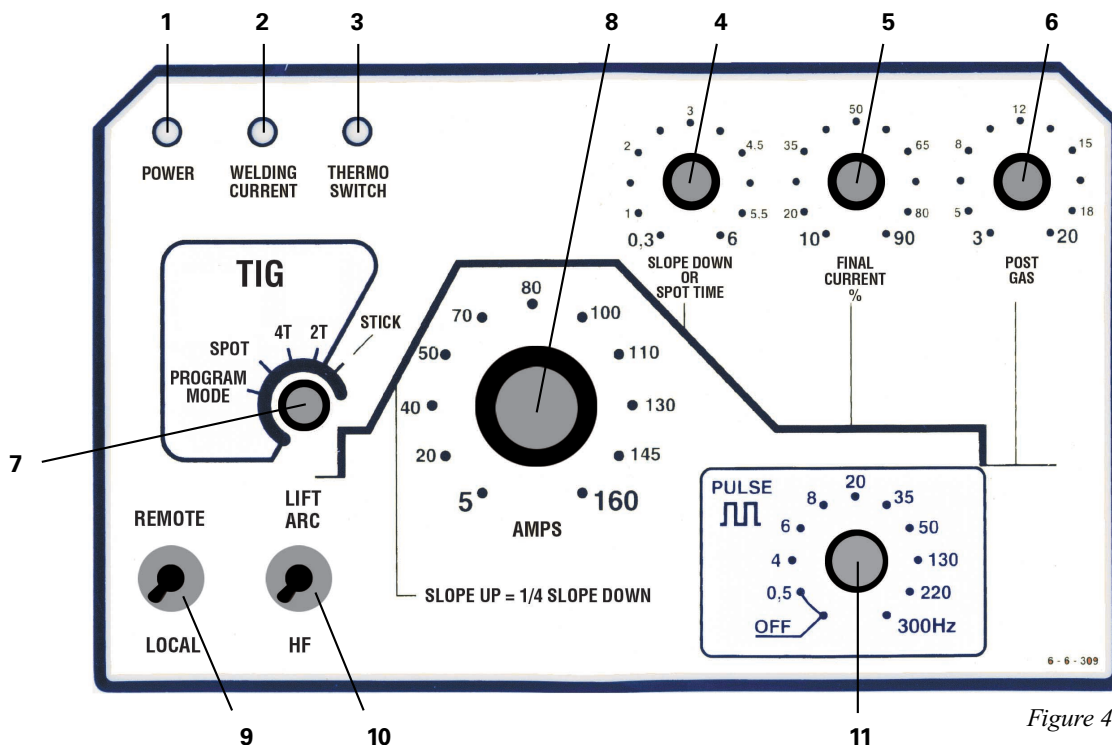


Figure 4

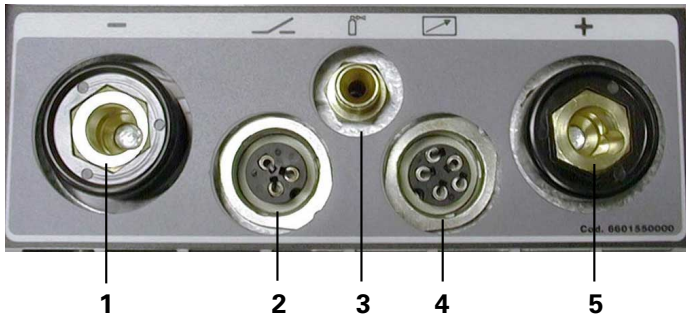
Front Panel Connections

1) Negative Output Receptacle

When TIG welding, this is where the TIG Torch connects to your Invertig 160DC Welder. That's right, we said the TIG Torch. This is called straight polarity, with the torch negative and the work positive. When using your Invertig Welder to TIG weld, all work will be done in straight polarity.

When Stick Welding Direct Current Electrode Negative (DCEN), the optional electrode holder will be plugged into the negative output receptacle. When Stick Welding Direct Current Electrode Positive (DCEP), the ground cable will be plugged into the negative output receptacle.

To install a cable into the negative output receptacle, insert the male end of the cable into the negative output receptacle and twist clockwise until snug.



2) 3 Pin Trigger Connection

This connection is used with TIG torches, which have on/off triggers on the torch. Your Invertig 160DC comes standard with a footpedal which has the on/off function built into the pedal, so an on/off trigger on the TIG torch is not necessary. Therefore, this connection is not used.

3) Gas Output Connection

This is where you connect the gas fitting from the TIG Torch. The gas output is controlled by the solenoid valve, which is mounted inside the welder. The gas fitting on your Invertig 160DC is a 1/4 BSP male connection.

4) 5 Pin Footpedal Connection

This is where the footpedal or the torch mounted hand amperage control connects to the Invertig 160DC. Insert the connection into the machine and twist the lock ring to lock into place.

5) Positive Output Receptacle

When TIG welding, this is where the ground cable connects to the front of the TIG Adapter. That's right, we said the ground cable. This is called straight polarity, with the torch negative and the work positive.

When Stick Welding Direct Current Electrode Negative (DCEN), the ground cable will be plugged into the positive output receptacle. When Stick Welding Direct Current Electrode Positive (DCEP), the electrode holder will be plugged into the positive output receptacle.

To install a cable into the positive output receptacle, insert the male end of the cable into the positive output receptacle and twist clockwise until snug.

Rear Panel Controls

1) On-Off Switch

This switch controls the input power to your Invertig 160DC Welder. 0 is off. If the switch is set up to operate on 220-volt power, then rotating the switch to the right will turn the machine on to operate on 220 volt power. If the switch is set up to operate on 110-volt power, then rotating to the left will turn the machine on to operate on 110-volt power. The switch can only be turned one way at a time. (See electrical connection)

When you turn the machine on, the power indicator lamp (#1) will be illuminated green on the front panel of the welder. This is an indication your Invertig 160DC is on and ready for use.

Shield Gas

TIG welding requires a shield gas of 100% Argon. A shield gas is used to keep the surrounding atmosphere from coming in contact with the molten weld puddle. The correct flow rate is enough gas to shield the molten weld puddle and protect the tungsten electrode. Any greater flow rate is a waste of shield gas. Usually, the flow rate will be set anywhere between 15 and 30 cubic feet per hour (cfh).

Use a gas flowmeter such as HTP Part #12020-F which is compatible with Argon cylinders and has a barbed fitting for the delivery hose. Connect a gas hose to the gas fitting at the rear of the machine and to the barbed fitting on the regulator.



HTP Flowmeter #12020-F

Your Invertig welder comes with a gas hose that connects the TIG welder to the 12020-F gas regulator. The input gas fitting is located in the back of the welder.

It is possible to weld thick aluminum castings with your Invertig 160DC for cylinder head repair. To do this, an ultra high purity helium must be used, and exceptional care must be used to make sure the area to be welded is clean.

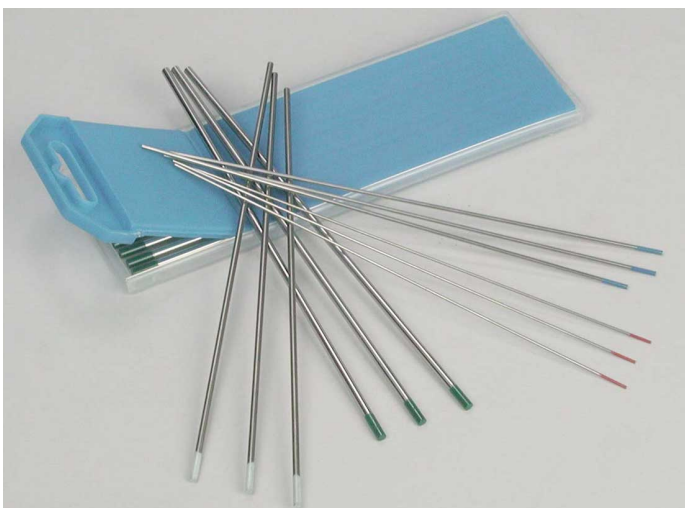
Tungsten Electrodes

HTP recommends the following premium quality tungsten ground to a high quality finish for use with your Invertig 160DC. All tungsten is 7" long and can be purchased individually.

2% Thoriated Tungsten (TT2) – red tip - This tungsten is the most common tungsten currently used. Generally used for DC welding of steel and stainless steel. Draw back is it has a low level radiation hazard. Offers good overall performance.

2% Ceriated Tungsten (TC2) – grey tip – 2% Ceriated is an excellent substitute for 2% thoriated tungsten and works excellent with inverter power sources such as your 160DC. More popular for thinner materials because it requires less amperage to start. Offers a stable arc.

2% Lanthanated Tungsten (TL2) – blue tip – 2% lanthanated is also an excellent substitute for 2% thoriated tungsten. It offers good arc starting characteristics and longer life than 2% thoriated.



Tungsten Electrodes

Tungsten Type	Diameter			
	.040" (1.0mm)	1/16" (1.6mm)	3/32" (2.4mm)	1/8" (3.2mm)
2% Thoriated	TT2-7040	TT2-7116	TT2-7332	TT2-718
2% Ceriated	TC2-7040	TC2-7116	TC2-7332	TC2-718
2% Lanthanated	TL2-7040	TL2-7116	TL2-7332	TL2-718
Amperage	15-50	50-120	80-150	130-250

The electrode should be sharpened to a point with a fine grinding wheel. If the stone used for sharpening the electrode is not clean, contaminants could lodge in the electrode and dislodge when welding. The grinding wheel used for tungsten electrodes should not be used for any other materials. When grinding the electrode to a point, a 15 to 30 degree angle is desired. The grinding marks should run lengthwise with the point, opposed to in the direction of the diameter. To prevent spitting the “point” of the tungsten into the weld, we recommend you slightly flatten the point of the tungsten just enough to remove the sharp point.

The HTP Tungsten Sharpener is an excellent tool for precisely sharpening tungsten electrodes without any fear of contamination.



HTP Tungsten Sharpener

Filler Rod for TIG Welding

HTP offers you high quality filler rods in affordable quantities. All filler rod is packaged in 1lb airtight plastic tubes to keep your filler rod fresh and contaminant free. The tubes are completely re-sealable.

In TIG welding, the filler rod is fed into the molten puddle by hand. The choice of filler rod is extremely important as the rod must correctly match the material and alloy you will be welding. The thickness of the material to be welded determines the diameter of the filler rod.

Here are some good rules of thumb to help you select the correct filler metal:

- 1) ER70S-6 is generally used for mild steel welding.
- 2) ER70S-2 is highly recommended for welding 4130 chrome-moly tubing in many applications.
- 3) ER80S-D2 is recommended for welding 4130 chrome-moly tubing if a higher strength, less ductile weld is required. If your weld will be heat treated to obtain optimum strength, then use a filler metal which matches the chemistry of your tubing, which neither 70S-2 nor 80S-D2 wires do.
- 4) Generally speaking, use a 1/16" diameter filler rod for applications where the material is 1/8" and less. Use a 3/32" diameter rod for 1/8" and thicker.

The following Filler Rod is available from HTP in 1 lb. Tubes which are tightly sealed to prevent oxidation.

Part #	Material	
308L-035-1	308L Stainless Steel Wire	.035" x 36"
308L-1/16-1	308L Stainless Steel Wire	1/16" X 36"
70S6-1/16-1	ER70S-6 Steel Wire	1/16" X 36"
70S6-3/32-1	ER70S-6 Steel Wire	3/32" X 36"
70S2-1/16-1	ER70S-2 Steel Wire	1/16" X 36"
80SD2-1/16-1	ER80SD-2 Steel Wire	1/16" X 36"



HTP Filler Rod

General Welding Parameters

Following are some “rule of thumb” welding parameters, tungsten diameters and amperage settings for welding different thicknesses of steel. Keep in mind these are general settings and the specific application may require more or less power to get the job done.

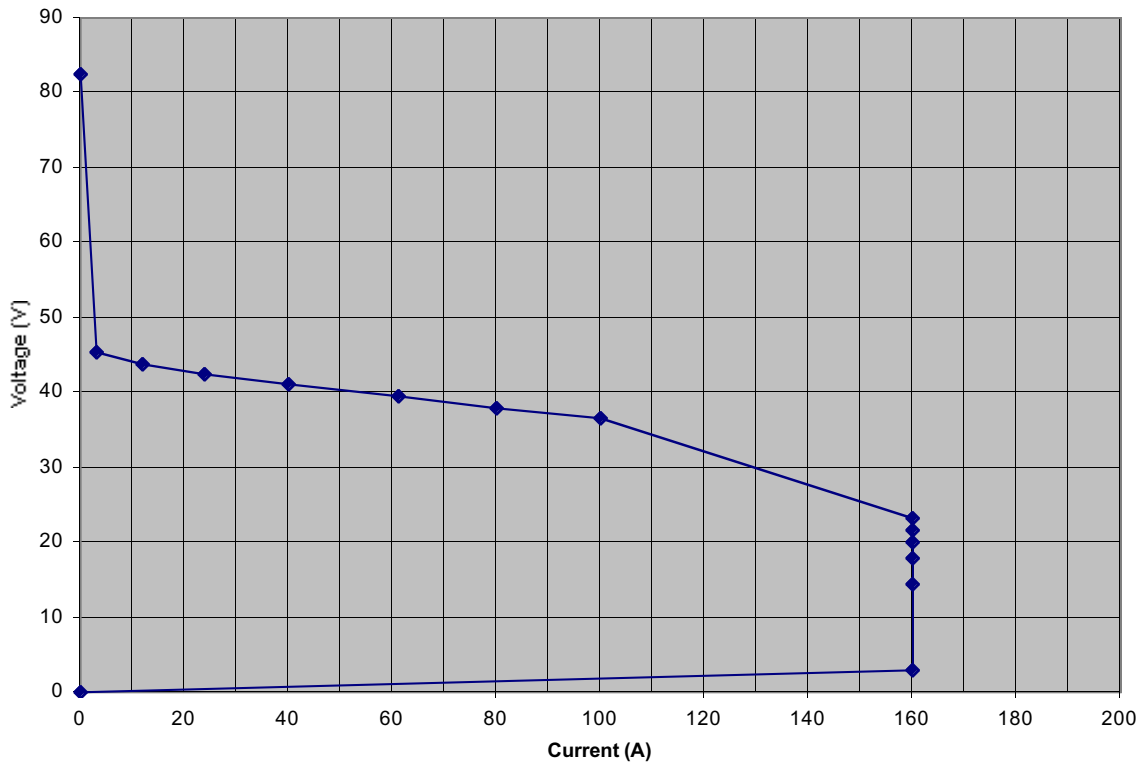
Thickness	Tungsten Diameter	Machine Amperage	Welding Amperage	Filler Diameter
.030"	.040"	50	30-40	.035"
.050"	1/16"	70	45-55	.035"
.062" (1/16")	1/16"	80	55-65	1/16"
.093" (3/32")	1/16"	110	80-90	1/16"
.125" (1/8")	1/16"	130	110-120	1/16"
.187" (3/16")*	1/16"-3/32"	150	130-140	1/16"
.250" (1/4")*	3/32"	160	150-160	3/32"

* May require beveling – depends on joint

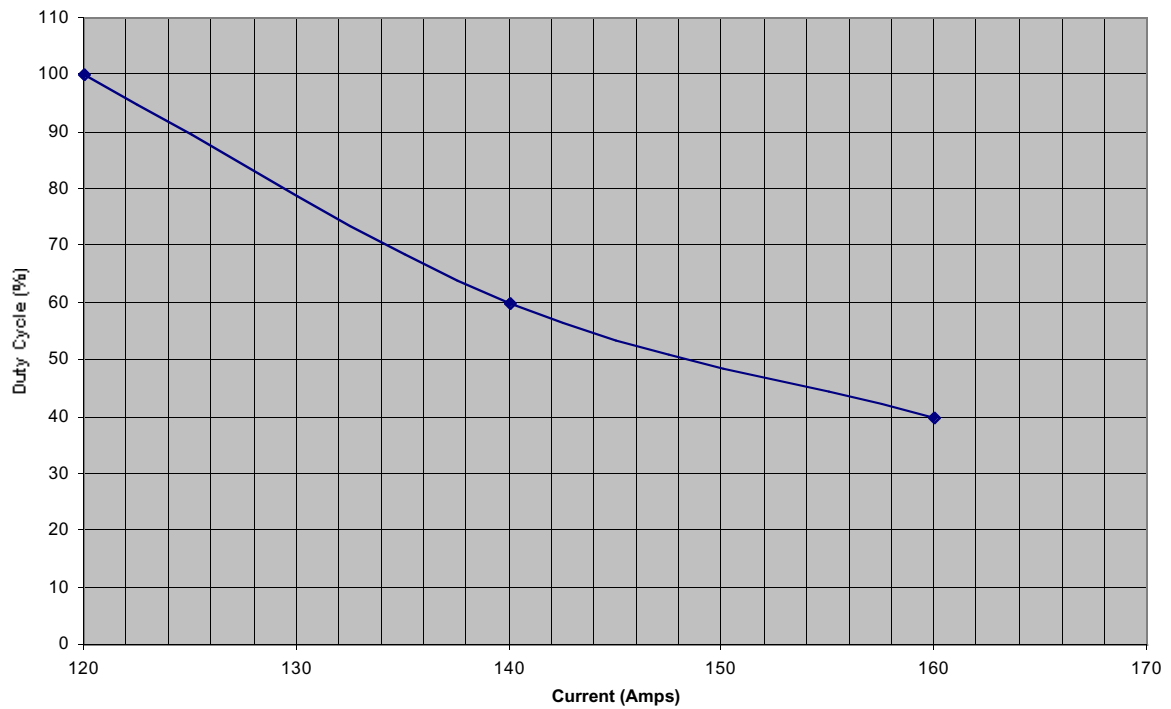
Quick Set Up

- 1) Welding Mode in 2T for foot pedal.
- 2) Slope Down – 0.3 Seconds
- 3) Final Current – 10%
- 4) Post Gas Flow – 5 Sec
- 5) Remote/Local set to Remote
- 6) Lift Arc/HF set to HF
- 7) Ground Clamp plugged into Positive receptacle
- 8) TIG Torch into Negative receptacle
- 9) Pulse off

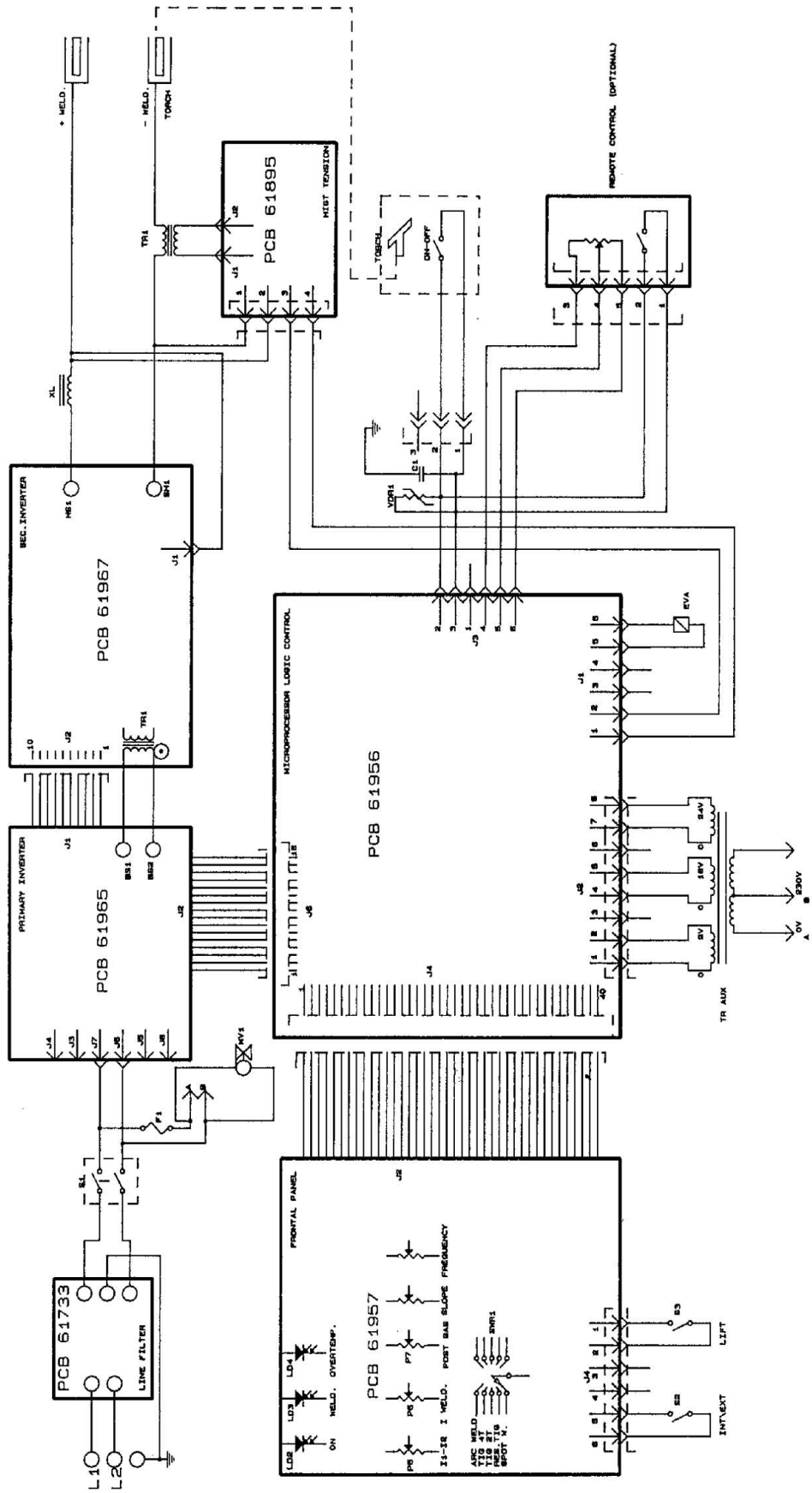
Volt/Amp Curve - HTP Invertig 160 DC



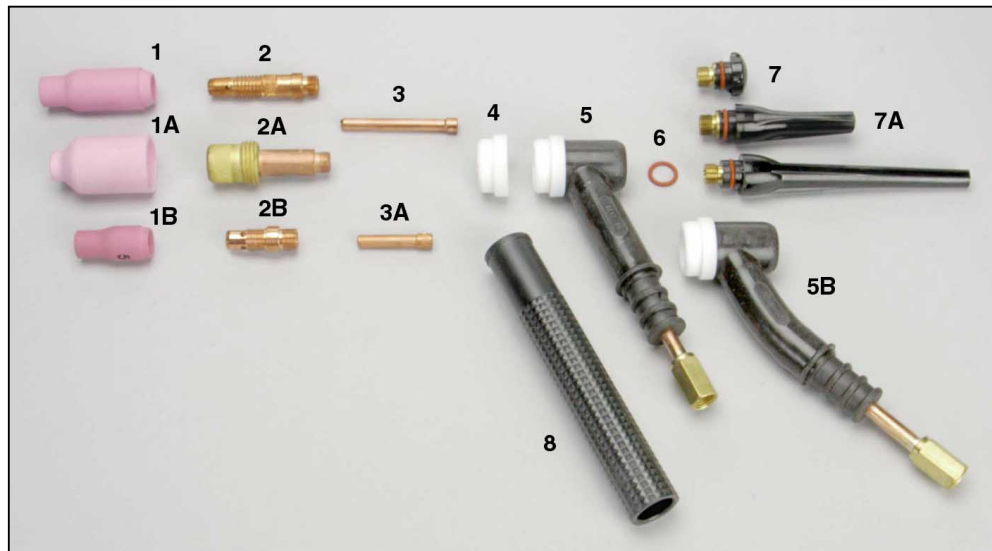
Duty Cycle Curve - HTP Invertig 160 DC



Wiring Diagram



17 Series Air-Cooled Tig Torch Parts Breakdown

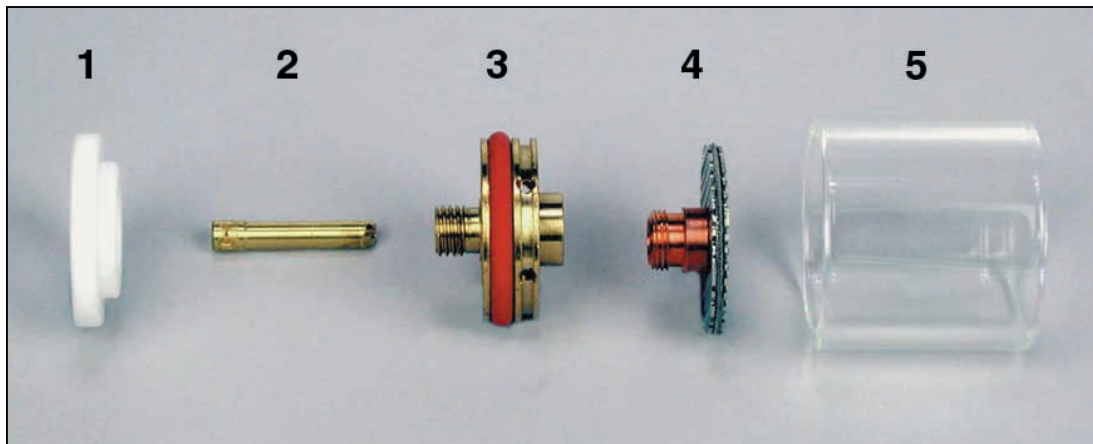


Illus #	Description	Tungsten Diameter			
		0.040"	1/16"	3/32"	1/8"
Standard Configuration					
1	Alumina Nozzle	10N49	10N48	10N47	10N46
2	Collet Body	10N30	10N31	10N32	10N28
3	Collet	10N22	10N23	10N24	10N25
Gas Lens Configuration (optional)					
1A	Alumina Nozzle	54N17	54N16	54N15	54N14
2A	Gas Lens Collet Body	45V24	45V25	45V26	45V27
3	Collet	10N22	10N23	10N24	10N25
Short Configuration (optional)					
1B	Alumina Nozzle	13N08	13N09	13N10	13N11
2B	Collet Body	17CB20	17CB20	17CB20	17CB20
3B	Collet	13N21	13N22	13N23	13N24
Following parts fit all tungsten diameters					
4	Cup Gasket (Std& Short)	300HS			
	Cup Gasket (Gas Lens)	3GHS			
5	Torch Head	SR-17			
5A	Flexible Torch Head	SR-17F			
6	O-Ring	300R			
7	Short Back Cap	300S			
7A	Medium Back Cap	300M			
7B	Long Back Cap	300L			
8	Handle	17HR			

Pyrex Parts

Pyrex Cup Kits

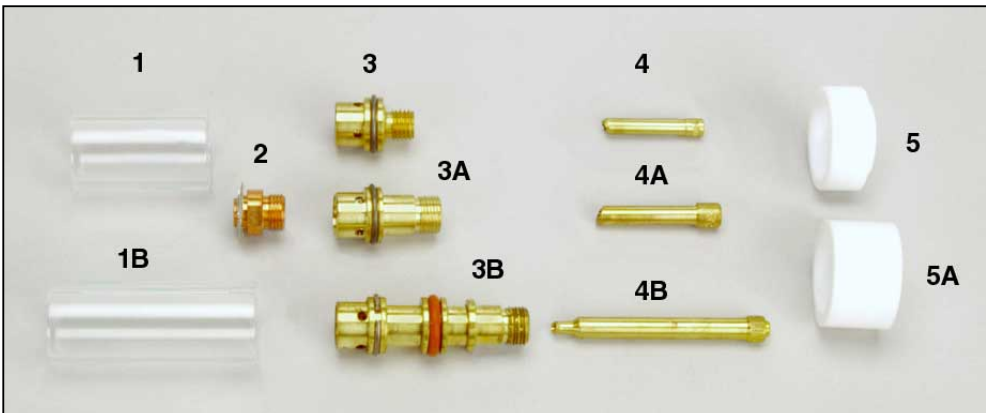
Nothing makes welding easier than being able to see what you are doing. HTP's Pyrex Cup kits do just that! The clear Pyrex cup gives you unparalleled visibility of the arc and work. The Pyrex Cup kit also comes standard with our special gas saver gas lens kit. This unique system saves gas while at the same time providing better gas coverage with a more even and uniform gas flow. Eliminates gas turbulence which can cause weld quality problems. Pyrex cup kits are available to fit all standard torches. There is even a special large diameter kit available for welding titanium.



Pyrex-Big Parts

Large Diameter Pyrex Cup Kits

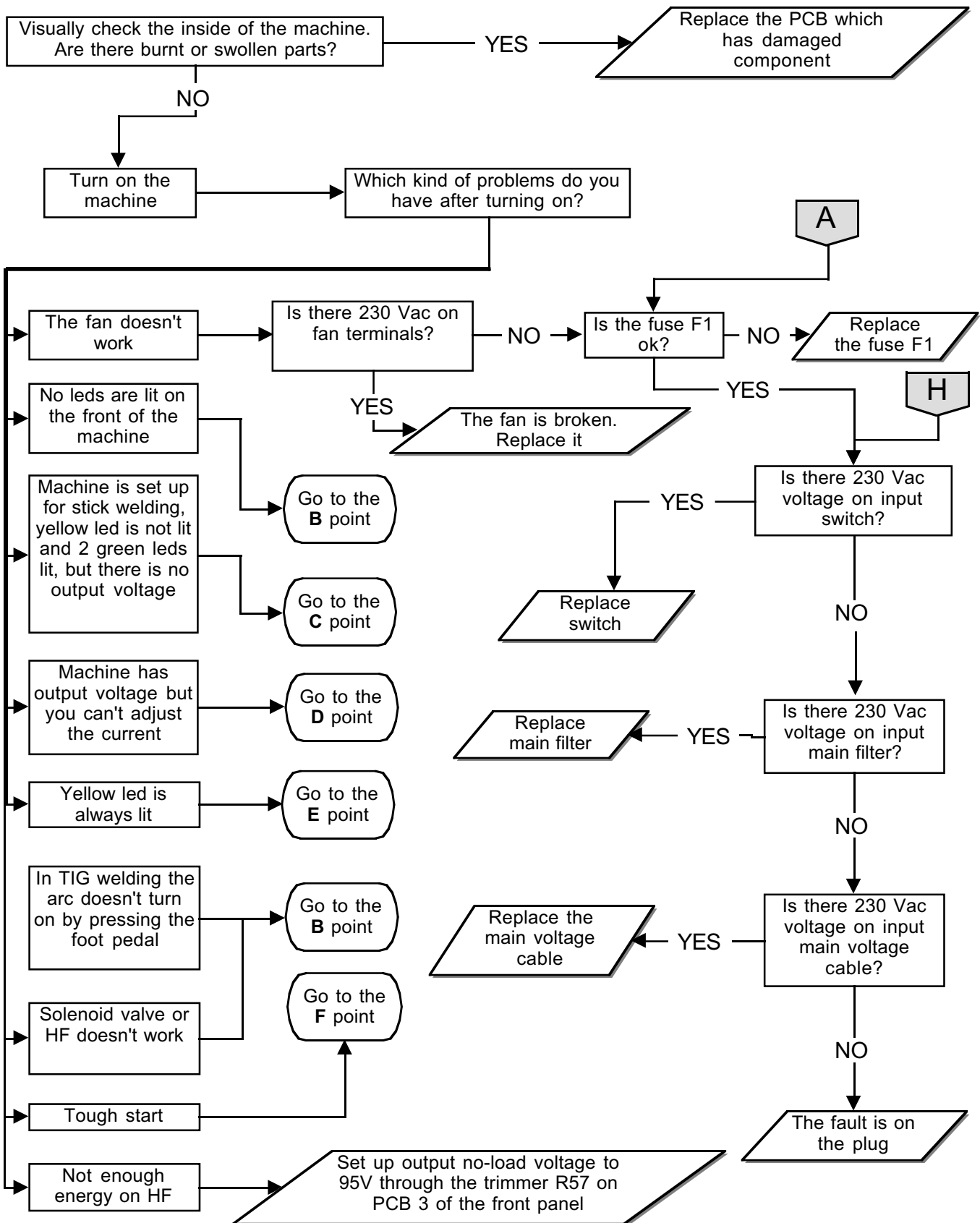
Illus #	Description	Tungsten Diameter				Price
		0.040"	1/16"	3/32"	1/8"	
9 and 20 Series Tig Torches						
1	Heat Shield	2HSGSLD	2HSGSLD	2HSGSLD	2HSGSLD	
2	Wedge Collet	PYR20C040	PYR20C116	PYR20C332	PYR20C18	
3	Collet Body	PYR20LDCB	PYR20LDCB	PYR20LDCB	PYR20LDCB	
4	Tungsten Adapter	PYR040TA-LD	PYR116TA-LD	PYR332TA-LD	PYR18TA-LD	
5	Pyrex Cup	PYR20LD	PYR20LD	PYR20LD	PYR20LD	
	Complete Kit	PYREX20LD-040	PYREX20LD-116	PYREX20LD-332	PYREX20LD-18	
17, 18, and 26 Series Tig Torches						
1	Heat Shield	4HSGSLD	4HSGSLD	4HSGSLD	4HSGSLD	
2	Wedge Collet	PYR17SC040	PYR17SC116	PYR17SC332	PYR17SC18	
3	Collet Body	PYR17LDCB	PYR17LDCB	PYR17LDCB	PYR17LDCB	
4	Tungsten Adapter	PYR040TA-LD	PYR116TA-LD	PYR332TA-LD	PYR18TA-LD	
5	Pyrex Cup	PYR17LD	PYR17LD	PYR17LD	PYR17LD	
	Complete Kit	PYREX17LD-040	PYREX17LD-116	PYREX17LD-332	PYREX17LD-18	

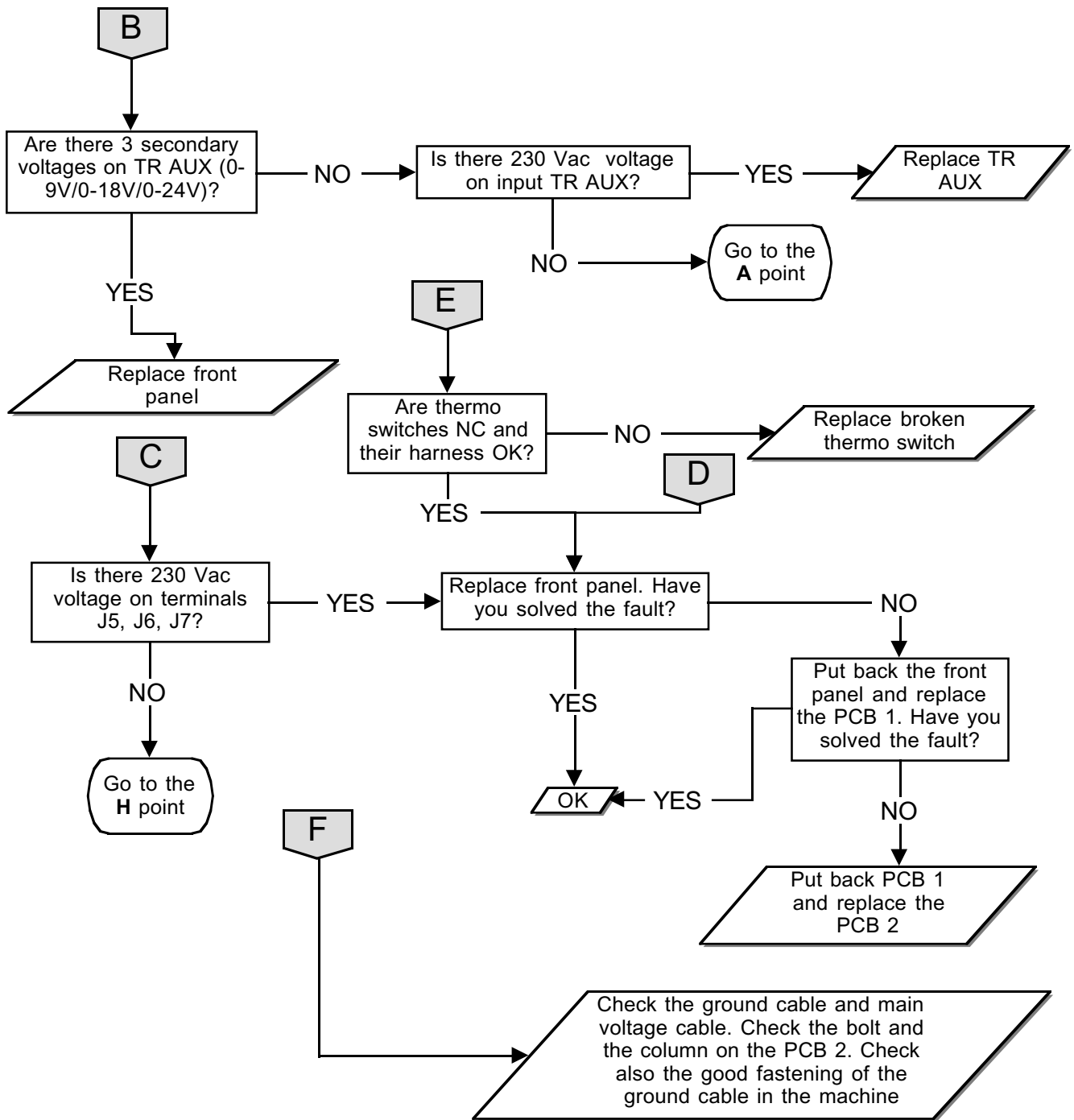


Pyrex Cup Parts

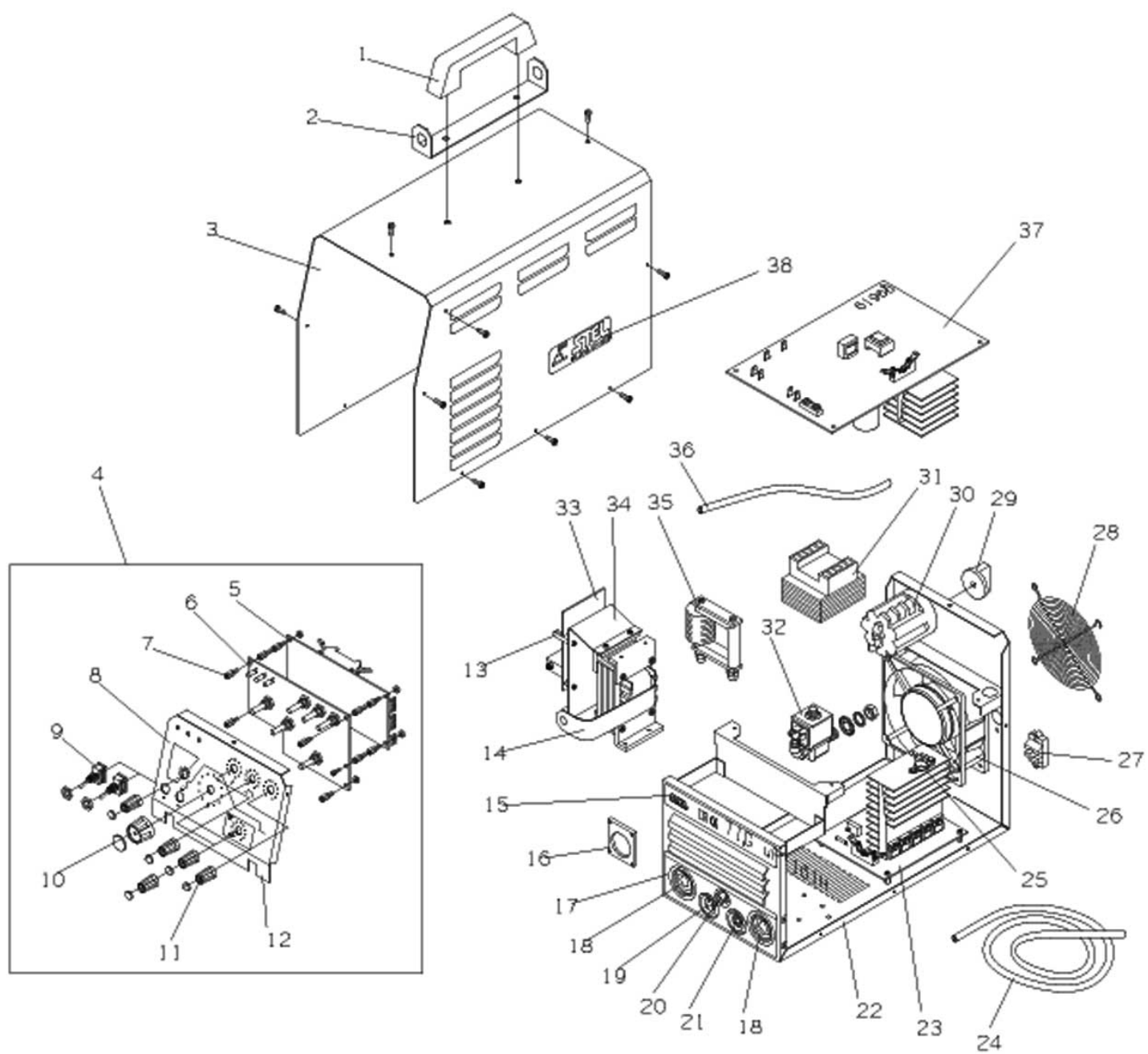
Illus #	Description	Tungsten Diameter				Price
		0.040"	1/16"	3/32"	1/8"	
For 9 and 20 Tig Torches						
1	Pyrex Cup	PYR8S	PYR8S	PYR8S	PYR8S	
2	Tungsten Adapter	PYR040TA	PYR116TA	PYR332TA	PYR18TA	
3	Collet Body	PYR20CB	PYR20CB	PYR20CB	PYR20CB	
4	Wedge Collet	PYR20C040	PYR20C116	PYR20C332	PYR20C18	
5	Heat Shield	2HSGS	2HSGS	2HSGS	2HSGS	
	Complete Kit	PYREX20-040	PYREX20-1/16	PYREX20-3/32	PYREX20-1/8	
For 17, 18, and Series 26 Tig Torches						
Short Configuration						
1	Pyrex Cup	PYR8S	PYR8S	PYR8S	PYR8S	
2	Tungsten Adapter	PYR040TA	PYR116TA	PYR332TA	PYR18TA	
3A	Collet Body	PYR17SCB	PYR17SCB	PYR17SCB	PYR17SCB	
3A	Wedge Collet	PYR17SC040	PYR17SC116	PYR17SC332	PYR17SC18	
5A	Heat Shield	3HSGS	3HSGS	3HSGS	3HSGS	
	Complete Kit	PYREX17S-040	PYREX17S-1/16	PYREX17S-3/32	PYREX17S-1/8	
Standard Configuration						
1B	Pyrex Cup	PYR8L	PYR8L	PYR8L	PYR8L	
2	Tungsten Adapter	PYR040TA	PYR116TA	PYR332TA	PYR18TA	
3B	Collet Body	PYR17LCB	PYR17LCB	PYR17LCB	PYR17LCB	
4B	Wedge Collet	PYR17LC040	PYR17LC116	PYR17LC332	PYR17LC18	
5A	Heat Shield	3HSGS	3HSGS	3HSGS	3HSGS	
	Complete Kit	PYREX17-040	PYREX17-1/16	PYREX17-3/32	PYREX17-1/8	

Trouble Shooting Guide - HTP Invertig 160 DC





Part List



1	Handle	66112	21	5-pin Male Connector	64466
3	Outer Cover	62417	22	Base	62414
4	Front Panel Assy	610017	23	PCB Secondary Power	61967
5	PCB Logic μ P	61956	24	Power Cable	61649
6	PCB Front Plate	61957	25	Thermostat 80°C	65775
7	Hex Stud	63130	26	Cooling Fan	64182
8	Front Panel Label	660314	27	Cable Clamp	66061
9	Switch	64156	28	Grille	66098
10	Knob (29mm Dia)	66208	29	Knob for Switch	66231
11	Knob (15mm Dia)	66081	30	On-Off Switch	64031
12	Front Panel	62420	31	Auxiliary Transformer	65908
13	Peg	66173	32	Solenoid Valve	64102
14	Inductance	61408	33	PCB HF	61895
15	Front Label	660313	34	PCB HF Support Bracket	62419
16	Insulating support	66797	35	Step-up Transformer	61845
17	Connection Plate	660155	36	Gas Hose	66160
18	Female Dinse Socket	64274	37	PCB Primary Power	61966
19	3-pin Male Connector	64467	38	Side Label	660312
20	Male 1/4 BSP Gas Fitting	63197			

Invertig 160DC Accessories

Part #	Description
60546	Invertig 160DC - Power source only
70200-FP	Foot Pedal - 25'
70200-HC	Hand Control - 25' w/velcro straps
70200-CART	Cart
SR17-25	25' SR17 Super Flex Tig Torch
SR17-12.5	12 1/2' SR17 Super Flex Tig Torch
22313	Male Dinse Connection
22315-ARC	15' Electrode Holder
22311	10' Ground Cable Complete
22311-15	15' Ground Cable Complete
64465	5 Pin Male Plug
500.0082	1/4 BSP Female Gas Nut
500.0112	Nipple for above (must be ordered together)

Specifications

Invertig 160DC #70160DC

Input Voltage	110 volts	230 volts
Input Amperage	30 amps	18 amps
Amperage Range	5-130 amps	5-160 amps
Duty Cycle	60%@130 amps	40%@160 amps
	100%@120 amps	100%@120 amps
No Load Voltage	90 volts	
Welding Voltage	10 – 16.4 volts	
Arc Force	35%	
Hot Start	35%	
Slope Down	0.3 – 6.0 sec	
Pre Gas	0.5 sec	
Post Gas	3 – 20 sec	
Pulsing Frequency	0.5 to 300 Hz	
Final Current	10% to 90%	
Spot Welding Time	0.3 – 6.0 sec	
Torch Length & Type	WP-17 – 25'	
Foot Pedal Length	25'	
Weight	32 lbs.	
Dimensions	16"L x 12 _W x 8"H	