

# Owners Manual

## Invertig 100 & 130



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## **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 one year 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.

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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

### Invertig 100

Your Invertig 100 operates on 115 volt [+10% (126.5 volts) -15% (98 Volts)] Input power and will require a 25 amp circuit when operating at 85 amps. The input power cord has three wires - a yellow-green wire which is the ground, a brown wire which is the hot, and a blue wire which is the neutral. Should the plug become disconnected, make sure it is reconnected properly.

The Invertig 100 can also be wired to operate on 220 volt power. To have the voltage changed from 115 volts to 220 volts return your machine to HTP America. There is a \$25.00 charge for this service.

### Invertig 130

The Invertig 130 operates on 230 volt [+15% (264 volts) -15% (196 volts)] and will require a 16 amp circuit when operating at 130 amps. The input power cord has three wires - a yellow green which is the ground wire, a blue wire which is a hot lead and a brown wire which is also a hot lead.

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## Front Panel Controls (See Fig. C)

**1 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 using your Invertig Welder to TIG weld, all work will be done in straight polarity.

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.

**2 Negative Output Receptacle** - When Tig welding, this is where the Tig Torch connects to your Invertig 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 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.

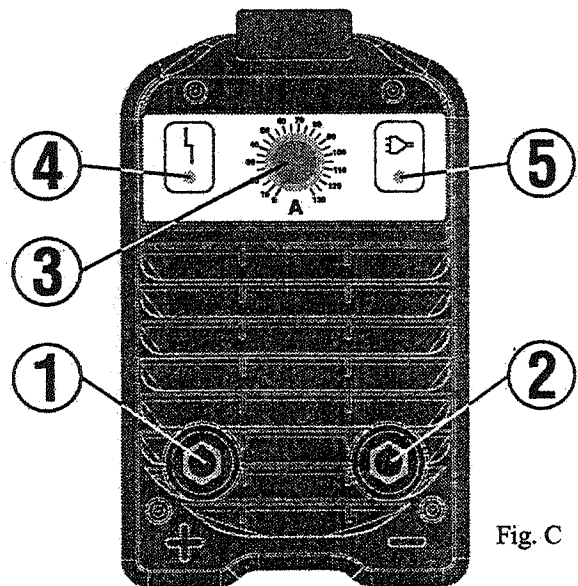


Fig. C

**3 Current Adjustment** - This knob controls welding current. It is infinitely adjustable from 5 to 85 amps on the Invertig 100 and 5 to 130 amps on the Invertig 130.

**4 Thermoswitch Indicator Lamp** - The thermoswitch indicator lamp will light up when the duty cycle of the Invertig has been exceeded. When this lamp is illuminated, the machine will no longer weld because the machine has overheated. Allow the machine to cool for 15 to 30 minutes, the thermoswitch should reset and your Invertig will be ready to weld.

**5 Power Indicator Lamp** - When the power indicator lamp is on, the On-Off Switch on the back of your Invertig welder is in the on position, and the machine is plugged into the correct AC voltage.

## Rear Panel Controls (See Fig. B)

### 1 On-Off Switch

This switch controls the input power to your Invertig Welder. 0 is off and 1 is on. When you turn the machine on, an indicator lamp will be illuminated inside the On-Off Switch. This is an indication your Invertig is on and ready for use.

### 1 Main AC Power

This is your input power cord. Your Invertig 100 comes wired from the factory to operate on 115 v AC power. Your Invertig 130 comes wired from the factory to operate on 230 v AC power.

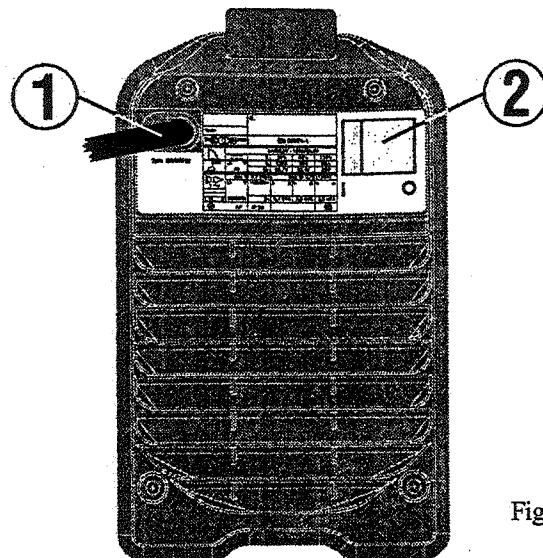


Fig. B

## 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 regulator such as HTP Part #12020 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.

Your Invertig welder comes with an SR-9V TIG welding torch. This TIG Torch has a gas valve built into the torch head. Rotate the flow control knob counter-clockwise to start the flow of shield gas. It is important to start the shield gas before striking the arc, and stop the flow of shield gas after the arc has been extinguished.

### Filler Wire

Like MIG welding, Tig welding generally requires the use of a filler wire. Unlike Mig welding, this filler wire is fed into the molten weld puddle by hand. The filler wire must be chosen to correctly match the alloy you will be welding.

For welding mild steel, use an E70S-6 wire. This is a high quality wire which flows nicely and absorbs impurities. When welding 4130 chrome-moly steel, use a 4130 alloy filler wire. If you are welding stainless steel, try to match the stainless alloy with the filler wire alloy. For example if you are using 308 alloy stainless steel, buy a 308 alloy filler wire.

The diameter of the filler wire is based on the thickness of the material you will be welding. For example, if you are welding something which is 1/16" thick, then you would probably want to use a filler wire which is 1/16" thick. If you are welding something 1/4" thick, then you would want to use a larger diameter filler wire than you used when welding 1/16" material, say 1/8" to 5/32".

### Tungsten Electrodes

Since this is a DC Tig welder, we only recommend using 2% thoriated tungsten electrodes. These electrodes can be easily identified by the red tip on one end. Use the following chart as a guide for electrode and filler wire diameter.

Metal Thickness	Tungsten Electrode Diameter	Filler Wire Diameter
< 1/16"	.040" - 1/16"	1/16"
1/16" - 1/8"	1/16"	1/16"
1/8" - 3/16"	3/32"	3/32"
3/16" - 1/4"	3/32"	1/8"
1/4" >	1/8"	5/32"

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.

### **Starting to Weld**

Select the correct tungsten electrode for your application. If you have never welded before, I would recommend using the 3/32" tungsten, since it is less likely to break if you stick the electrode to the work when trying to start your arc. Be sure to sharpen the tungsten as described above. Have the tungsten stick out past the alumina cup 3/16" to  $\frac{1}{2}$ ". For starters use a piece of 16 gauge steel to practice on. Be sure the material you are working with is clean! The more time you spend cleaning and fitting the material, the easier and quicker the welding will go. Cleanliness is imperative!

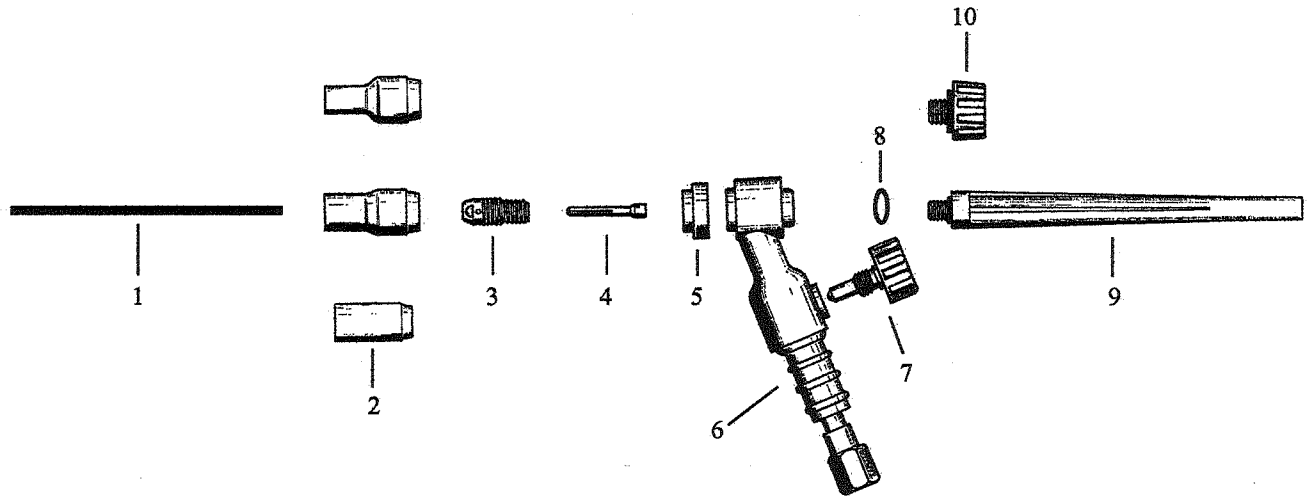
Begin with the amperage set at 35 amps. Lightly touch the tungsten electrode to the workpiece and immediately lift

off. The arc should ignite. Keep the tungsten 1/8" to 3/16" away from the workpiece. If you hold the torch further away from the workpiece, it will have a tendency to make the arc less concentrated and put more heat into the metal. If you keep the tungsten within the 1/8" to 3/16" distance, the arc will stay relatively concentrated. This is one way you can vary the heat without a footpedal. Tig welding is much harder than other welding processes and will not be mastered overnight.

As the metal gets hot, it changes from a dull orange to a shiny orange. The shiny orange area is the molten puddle. Gradually dip the welding rod into the molten puddle to add filler metal. Let the molten puddle melt the welding rod, do not melt the rod with tig torch.



# Invertig 100 & 130 SR-9V Tig Torch Parts List



Item #	Part #	Description	Item #	Part #	Description
1	TT2-7040	2% Thoriated Tungsten Electrode (red tip) .040" x 7"	3	13N26	Collet Body (.040")
	TT2-7116	2% Thoriated Tungsten Electrode (red tip) 1/16" x 7"		13N27	Collet Body (1/16")
	TT2-7332	2% Thoriated Tungsten Electrode (red tip) 3/32" x 7"		13N28	Collet Body (3/32")
2	13N08	Alumina Cup #4 (1/4" ID) (use with .040" Tungsten)	4	13N21	Collet Body (.040")
	13N09	Alumina Cup #5 (5/16" ID) (use with 1/16" Tungsten)		13N22	Collet Body (1/16")
	13N10	Alumina Cup #6 (3/8" ID) (use with 3/32" Tungsten)		13N23	Collet Body (3/32")
			5	598882	Insulator
			6	9V	Torch Head (SR-9V)
			7	VS917	Gas Valve
			8	98W77	O-Ring (f/gas valve & back cap)
			9	41V24	Long Back Cap
			10	41V33	Short Back Cap

# Spare Parts List

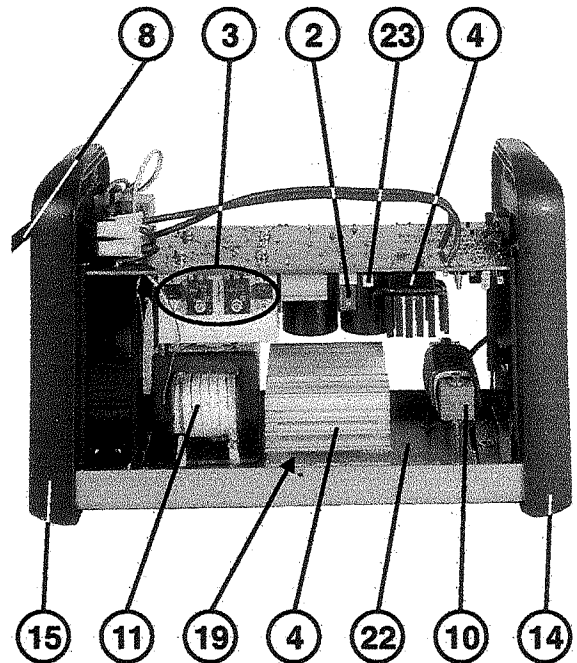
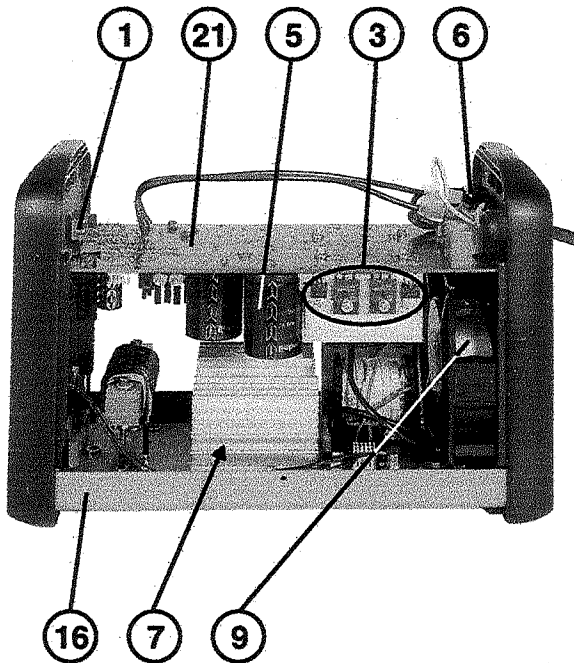
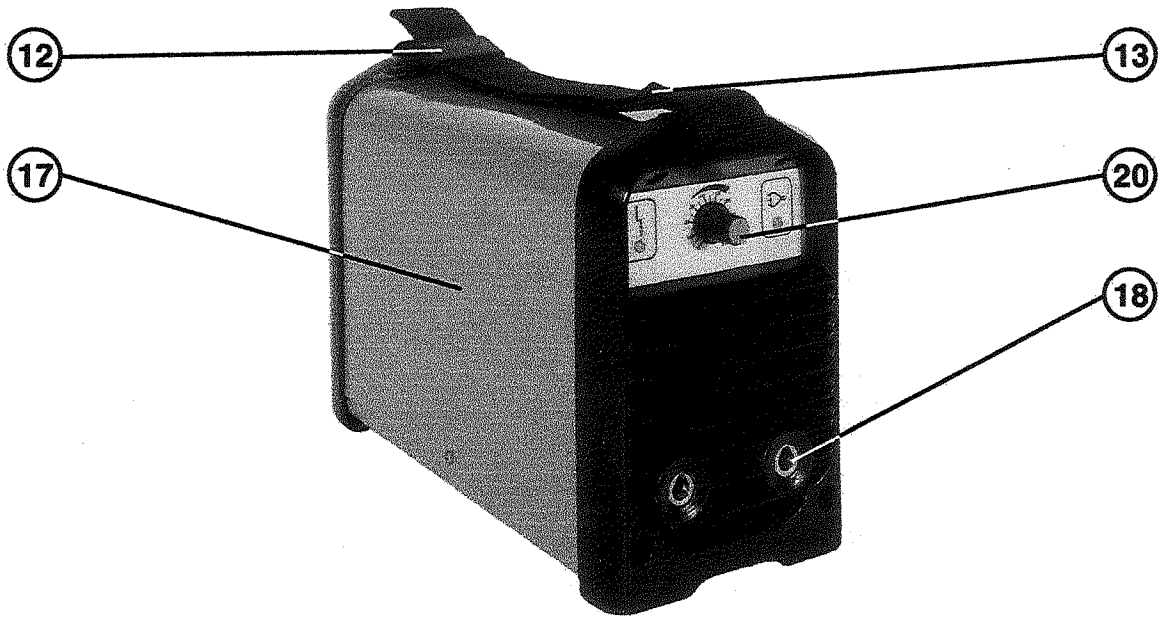
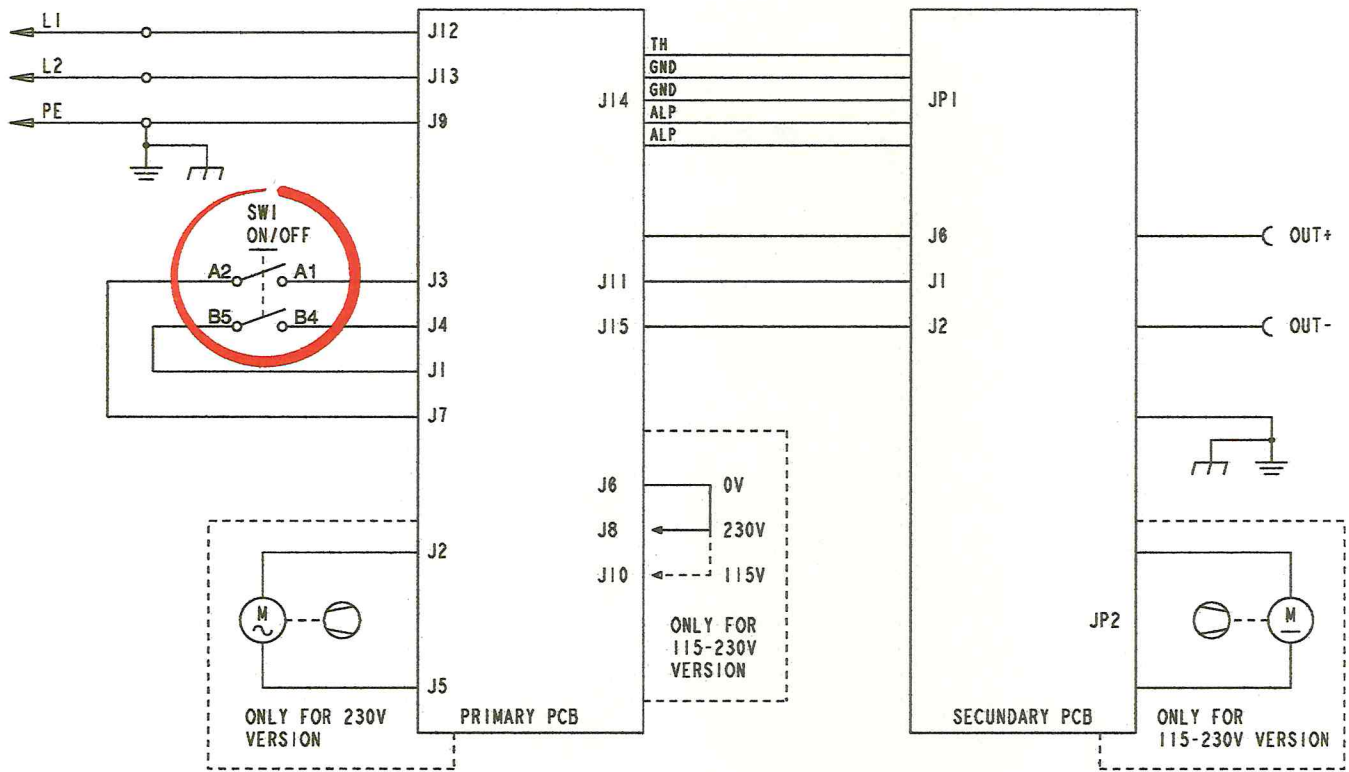
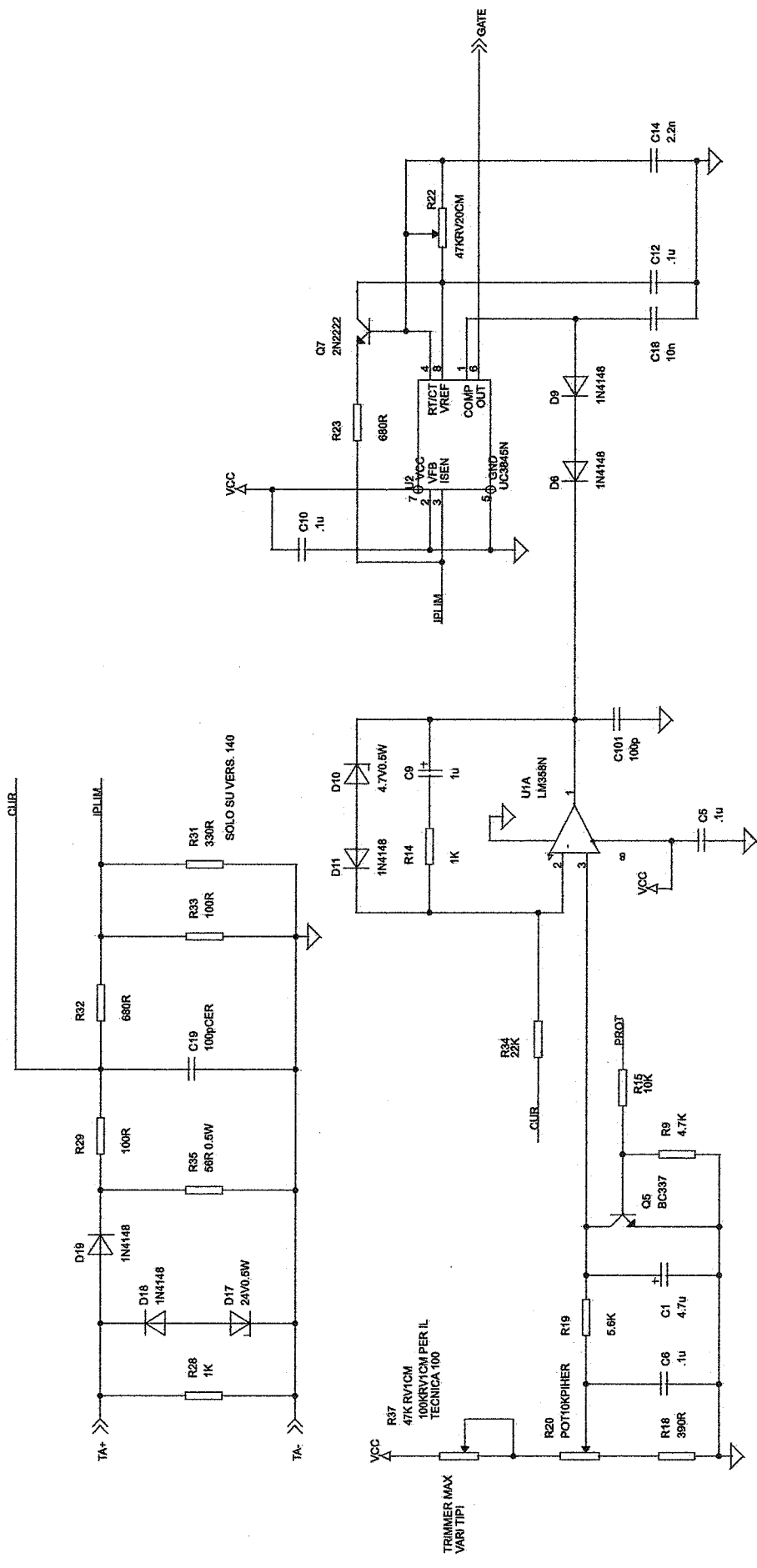


Illustration #	Description	Part #
1	Potentiometer	112017
2	Relay	113493
3	IGBT Kit	990613
4	Rectifier	112357
5	Capacitor	122381
6	On-Off Switch	122381
7	Thermo Switch	
8	Input Power Cable	20137
9	Cooling Fan	1520101
10	Reactor Coil	
11	Power Transformer	
12	Carry Strap Buckle	322065

Illustration #	Description	Part #
13	Carry Strap	322408
14	Cabinet, Front Panel	322438
15	Cabinet, Back Panel	322439
16	Cabinet, Bottom	650451
17	Cabinet, Top Cover	650450
18	Power Receptacle (2)	712000
19	Diode Kit	990061
20	Knob, Potentiometer	990328
21	Primary PCB	990612
22	Secondary PCB	990611
23	Resistor	112048

# Main Wiring Diagram





# Primary PCB Control

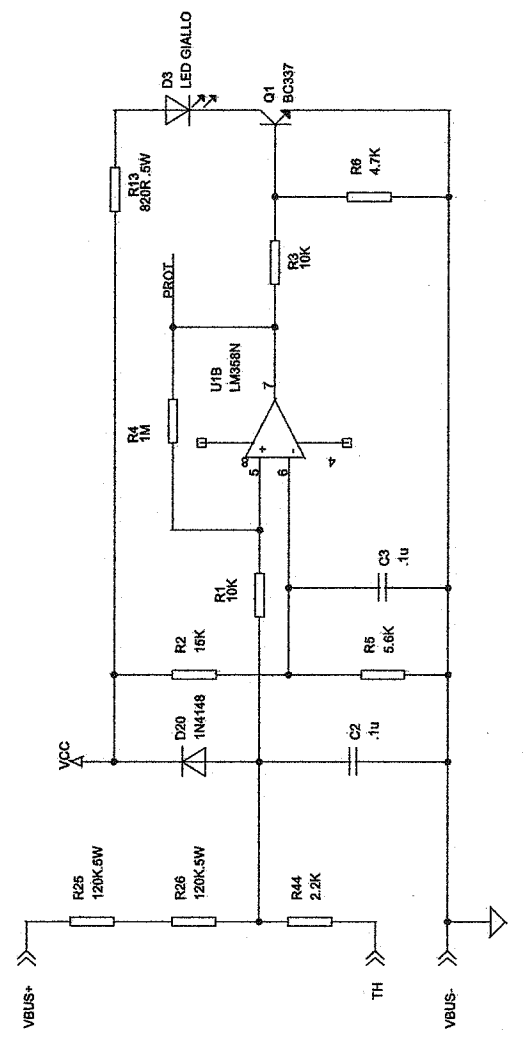
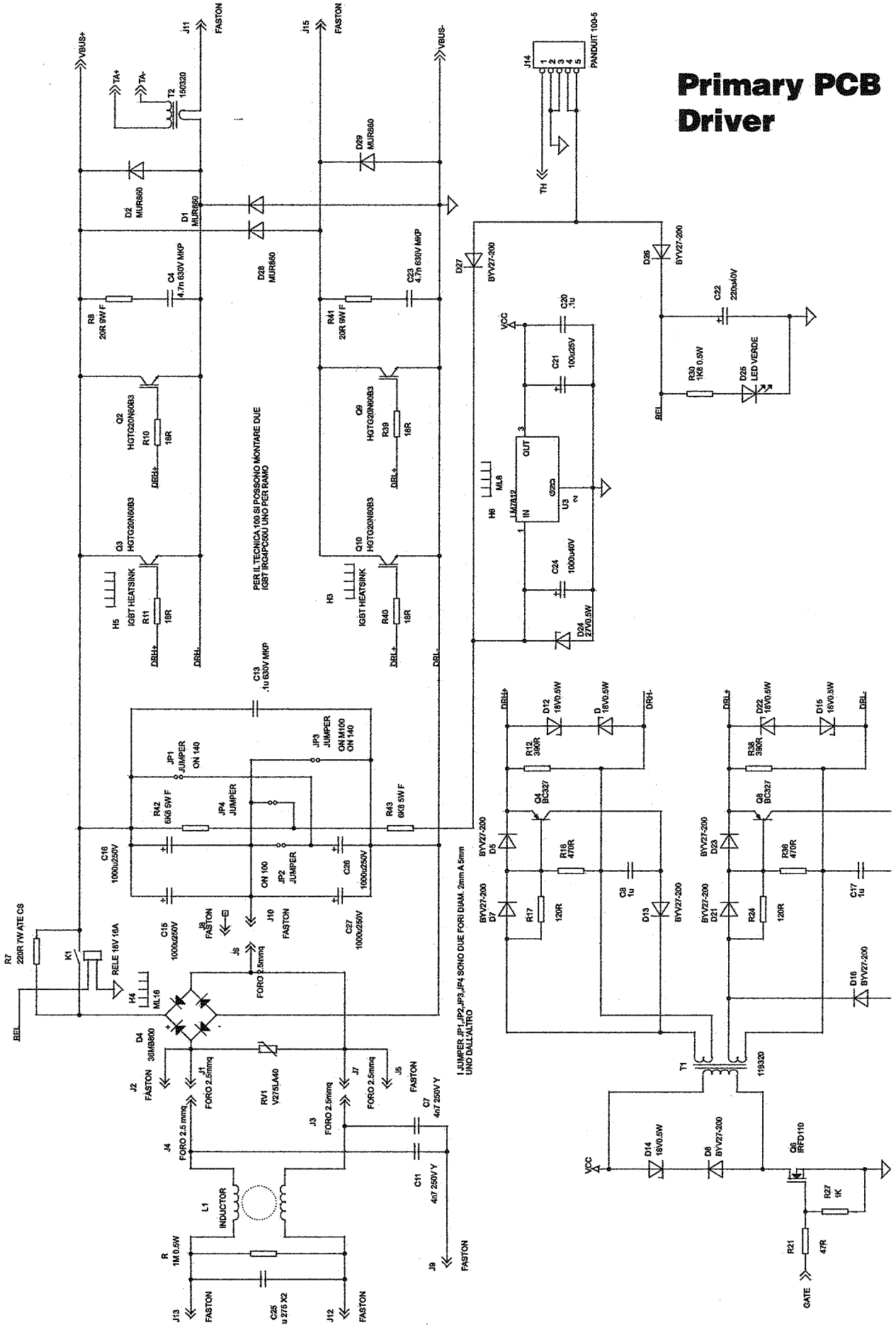


TABELLA MONTAGGIO CONDENSATORI E JUMPER  
 VERS 140 : C15,16,26,47,60,60V, JP3 ON  
 VERS 150 : C16,17,47,60,60V, JP3 ON  
 VERS 160 : C16,17,47,60,60V, JP3 ON  
 VERS 180 : C16,17,47,60,60V, JP3 ON



# Primary PCB Driver

1 JUMPER JP1, JP2, JP3, JP4 SONO DUE FORI DIAM. 2mm A 5mm UNO DALL'ALTRO

PER IL TECNICO 100 SI POSSONO MONTARE DUE IGBT IN CASO UNO PER 100MM

# Secondary PCB

