

## Operating Instructions and Parts Manual

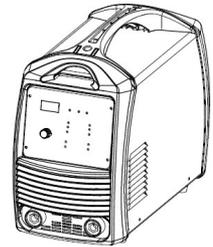
*Please read and save these instructions. Read through this owner's manual carefully before using product. Protect yourself and others by observing all safety information, warnings, and cautions. Failure to comply with instructions could result in personal injury and/or damage to product or property. Please retain instructions for future reference.*

# MMA WELDER

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## Features

1. The range of working voltage is wide, from AC110V to 575V single, three-phase arbitrary connection, and fully automatic adjustment, especially suitable for multi-grid area;
2. Industrial design standard, suitable for various working conditions;
3. The output of the no-load voltage is constant and is not affected by the net pressure fluctuation.
4. The weight light load continues to be high, with the following output current for different grids:
  - (1). Single-phase 120V input voltage output 110A @ 40 ° (60%);
  - (2). The input of single-phase 220V output 200A @ 40 ° (60%);
  - (3). Three-phase 220V and above (3). Input output and single-phase 380V and above 300A@ 40 ° (40%);
5. Power platform: PFC control + inverter module IGBT + digital control technology, high reliability, high power factor, small influence of power grid;
6. Protection grade: IP21S;  
Cable length: more than 50 meters of electrical cable can be properly welded.
7. Dimensions: 535 \* 241 \* 410



## Unpacking

**1.1 Remove cartons, bags or Styrofoam containing the welder and accessories.**

**1.2 Check the contents with the packing list below.**

DC Inverter Arc Welder	1 unit
Welding cable with electrode holder	1pc
Grounding cable with earth clamp	1pc
Operator's Manual	1set

**1.3 After unpacking unit, inspect carefully for any**

damage that may have occurred during transit. Check for loose, missing, or damaged parts. Shipping damage claim must be filed with carrier.

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Specifications

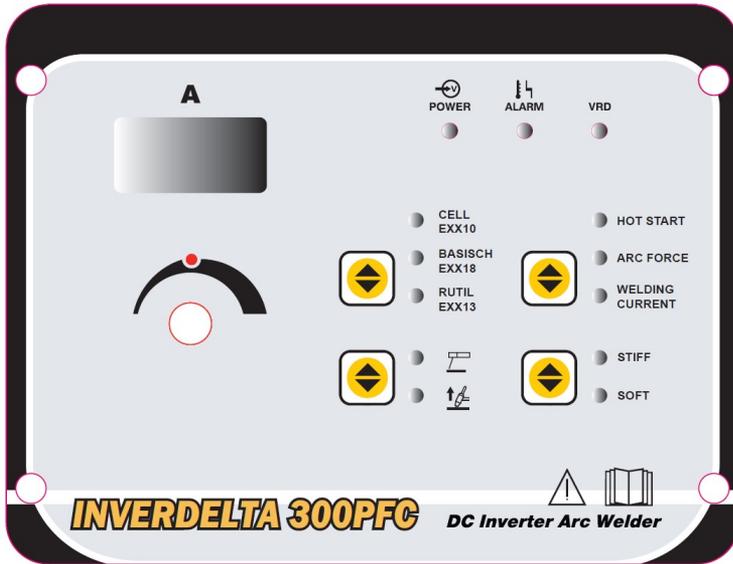
MODEL: INVERDELTA 300PFC		NO.:					
10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100		EN 60974-1					
		1-120V	MMA	25 A / 21 V - 110 A / 24,4 V			
			TIG	10 A / 10,4 V - 110 A / 14,4 V			
		1-220V	MMA	25 A / 21 V - 200 A / 28 V			
		1-240V	TIG	10 A / 10,4 V - 200 A / 18 V			
		$U_0 = 77 V$	X	60 %	100%		
			MODE	MMA	TIG	MMA	TIG
			I <sub>2</sub>	110 A	110 A	85 A	85 A
			U <sub>2</sub>	24,4 V	16,4 V	23,2 V	13,2 V
			I <sub>2</sub>	200 A	200 A	155 A	155 A
			U <sub>2</sub>	20 V	19 V	25,2 V	16,2 V
		$U_1$	$I_{1max}$	$I_{1eff}$			
					1-120V	32 A	25 A
					1-220 V	32 A	25 A
					1-240 V	30 A	
		$U_0 = 77 V$	MMA	25 A / 21 V - 300 A / 32 V			
			TIG	10 A / 10,4 V - 300 A / 22 V			
		$U_0 = 77 V$	X	40 %	100%		
			MODE	MMA	TIG	MMA	TIG
		$U_2$	I <sub>2</sub>	300 A	300 A		
			U <sub>2</sub>	32 V	22 V	27,8 V	
		$U_1$	$I_{1max}$	$I_{1eff}$			
					1-400 V	30 A	19 A
					1-440 V	29 A	17,7 A
					1-460 V	28 A	16,5 A
					1-480 V	25 A	15,3 A
					3-220 V	33 A	20,9 A
		$U_1$	$I_{1max}$	$I_{1eff}$			
					3-240 V	31 A	18,6 A
					3-200 V	19 A	12 A
					3-440 V	17 A	10,5 A
					3-460 V	15 A	10 A
					3-480 V	15 A	9,5 A
IP21S							

Functions

1. With digital display, the functions of MMA and LIFT TIG can be realized by multi-purpose, TIG minimum current 10A, which meets the requirements of ascending arc argon arc welding;MMA minimum current 25A;
2. Good welding performance, with hot arc, anti - sticking, thrust function and thrust and hot arc continuously adjustable;
3. according to different electrode type differential control, can welding E6013, E7018, E6010 electrode, arc stability, weld forming good, room temperature can be continuous welding electrode diameter of 5 mm don't protect (overheating);

Panel function description

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1. The CELL EXX10 fiber welding rod selection, such as E6010 / E7010 / E8010, thrust inflection point (superposition voltage) about 21V;
2. Selection of basic electrode and cast iron welding rod, such as E7018 / E507 / E506, thrust inflection point (superposition voltage) about 18V;
3. RUTIL EXX13 conventional acid welding rod selection, such as E6013 / E4013 / E422, thrust turning point (superimposed point voltage), about 14V;
4. The hard characteristic arc of STIFF is a bit better than SOFT, SOFT electric arc gentle, splash slightly small .the user can adjust according to the welding habit.
5. The VRD function is selected for the customer before the factory. Regular standard doesn't have this.

## Operation

### 2.1 Holding the electrode

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## 2.2 Striking the arc

### Installation

#### 1. Extension cord

During normal use an extension cord is not necessary. It is strongly recommended that an extension cord should not be used because of the voltage drop they produce. This drop in voltage can affect the performance of the welder. If you need to use an extension cord it must be a #12 gauge cord at the smallest.

-Do not use an extension cord over 25 ft. in length.

#### 2. Setting up the work piece

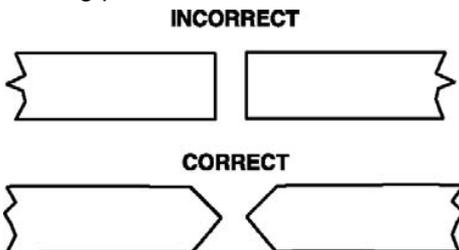
##### 2.1 Welding positions

There are two basic positions, for welding: Flat and Horizontal. Flat welding is generally easier, faster, and allows for better penetration. If possible, the work piece should be positioned so that the bead will run on a flat surface.

##### 3.2 Preparing the Joint

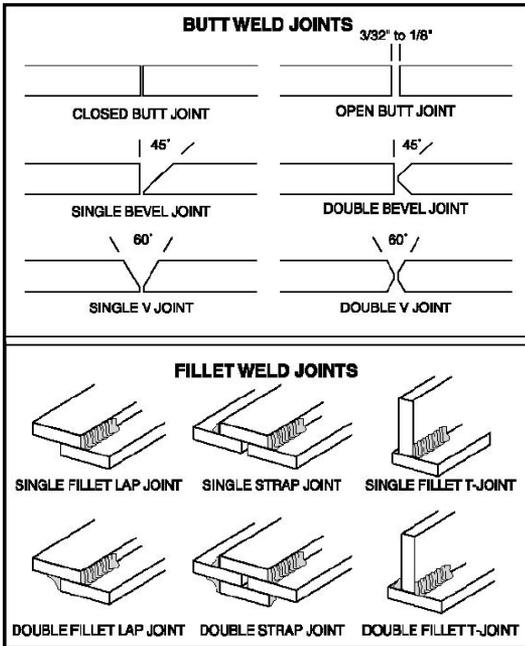
Before welding, the surface of work piece needs to be free of dirt, rust, scale, oil or paint. Or it will create brittle and porous weld. If the base metal pieces to be joined are thick or heavy, it may be necessary to bevel the edges with a metal grinder. The correct bevel should be around 60 degrees.

See following picture:



Based on different welding position, there are different welding joint, see following images for more information

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**3. Ground clamp connection**

Clear any dirt, rust, scale, oil or paint on the ground clamp. Make certain you have a good solid ground connection. A poor connection at the ground clamp will waste power and heat. Make sure the ground clamp touches the metal.

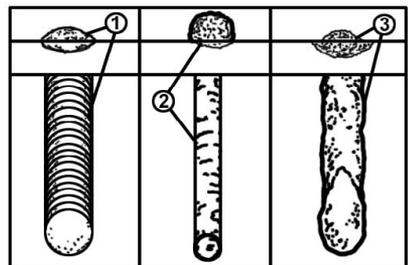
**4. Electrode**

The welding electrode is a rod coated with a layer of flux. When welding, electrical current flows between the electrode (rod) and the grounded metal work piece. The intense heat of the arc between the rod and the grounded metal melts the electrode and the flux. The most popular electrodes are:

- E6011 60,000 PSI tensile strength deep penetrating applications.
- E6013 60,000 PSI tensile strength used for poor fit up applications
- E7014 70,000 PSI tensile strength used for high deposition and fast travel speeds with light penetration
- E7018 70,000 PSI tensile strength, Used for out of position and tacking.

**5. Selecting the proper electrode**

There is no golden rule that determine the



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exact rod or heat setting required for every situation. The type and thickness of metal and the position of the work piece determine the electrode type and the amount of heat needed in the welding process. Heavier and thicker metals required more amperage. It is best to practice your welds on scrap metal which matches the metal you intend to work with to determine correct heat setting and electrode choice. See following some helpful trouble shooting tips to determine if you are using a correct electrode

### **1. When proper rod is used:**

- a. The bead will lay smoothly over the work without ragged edges
- b. The base metal puddle will be as deep as the bead that rises above it
- c. The welding operation will make a crackling sound similar to the sound of eggs frying

### **2. When a rod too small is used**

- a. The bead will be high and irregular
- b. The arc will be difficult to maintain

### **3. When the rod is too large**

- a. The arc will burn through light metals
- b. The bead will undercut the work
- c. The bead will be flat and porous
- d. Rod may be freeze or stick to work piece

**Note:** Rate of travel over the work also affects the weld. To ensure proper penetration and enough deposit of rod, the arc must be moved slowly and evenly along the weld seam.

## **Operation**

### **1.Setting the amperage control**

The welder has an infinite output current control. It is capable of welding with 1/16" and 5/64" and 3/32" electrodes.

here is no golden rule that determines the exact amperage required for every situation. It is best to practice your welds on scrap metal which matches the metals you intend to work with to determine correct setting for your job. The electrode type and the thickness of the work piece metal determine the amount of heat needed in the welding process. Heavier and thicker metals require more voltage (amperage), whereas lighter and thinner metals require less voltage (amperage).

### **2.Welding techniques**

The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. Do not attempt to make any repairs on

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valuable equipment until you have satisfied yourself that your practice welds are of good appearance and free of slag or gas inclusions.

**2.1 Holding the electrode**

The best way to grip the electrode holder is the way that feels most comfortable to you. To Position the Electrode to the work piece when striking the initial arc it may be necessary to hold the electrode perpendicular to the work piece. Once the arc is started the angle of the electrode in relation to the work piece should be between 10 and 30 degrees. This will allow for good penetration, with minimal spatter.

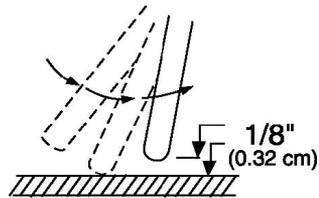
**2.2 Striking the arc**

**▲WARNING**

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN.

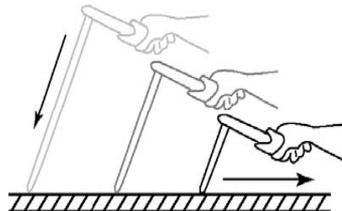
- Never strike an arc or begin welding until you have adequate protection.
- Wear flameproof welding gloves, heavy long-sleeved shirt, cuffless trousers, high-topped shoes and a welding helmet or shield.

Scratch the work piece with the end of electrode to start arc and then raise it quickly about 1/8 inch gap between the rod and the work piece. See following picture



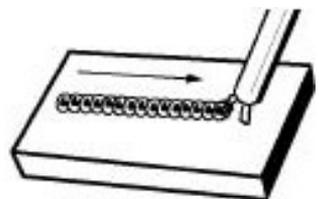
It is important that the gap be maintained during the welding process and it should be neither too wide or too narrow. If too narrow, the rod will stick to the work piece. If too wide, the arc will be extinguished. It needs much practice to maintain the gap. Beginners may usually get sticking or arc extinguishing. When the rod sticks to the work piece, gently rock it back and forth to make them separate. If not, the circuit is short connection, and it will overload the welder. A good arc is accompanied by a crisp, cracking sound. The sound is similar to that made by eggs frying. To lay a weld bead, only 2 movements are required; downward and in the direction the weld is to be laid, as in following figure:

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**2.3 Types of weld bead**

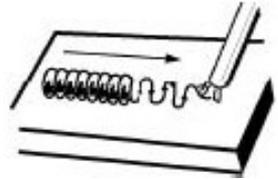
The following paragraphs discuss the most commonly used arc welding beads.



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The stringer bead Formed by traveling with the electrode in a straight line while keeping it centered over the weld joint.

The weave bead Used when you want to deposit metal over a wider space than would be possible with a stringer bead. It is made by weaving from side to side while moving with the electrode. It is best to hesitate momentarily at each side before weaving back the other way to improve penetration.



**2.4 Welding position**

Flat position is the easiest of the welding positions and is most commonly used. It is best if you can weld in the flat position if at all possible as good results are easier to achieve.

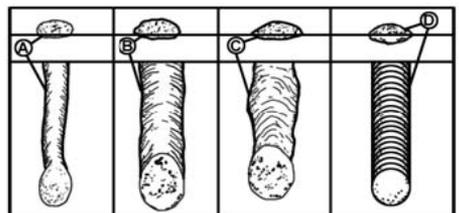


The horizontal position is performed very much the same as the flat weld except that the angle is different such that the electrode, and therefore the arc force, is directed more toward the metal above the weld joint. This more direct angle helps prevent the weld puddle from running downward while still allowing slow enough travel speed to achieve good penetration. A good starting point for your electrode angle is about 30 degrees DOWN from being perpendicular to the work piece.

**2.5 Judge a good weld bead**

When the trick of establishing and holding an arc has been learned, the next step is learning how to run a good bead. The first attempts in practice will probably fall short of acceptable weld beads. Too long of an arc will be held or the travel speed will vary from slow to fast (see following)

- A. Weld speed is too fast.
- B. Weld speed is too slow.
- C. Arc is too long.
- D. Ideal weld.



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A solid weld bead requires that the electrode be moved slowly and steadily along the weld seam. Moving the electrode rapidly or erratically will prevent proper fusion or create a lumpy, uneven bead. To prevent ELECTRIC SHOCK, do not perform any welding while standing, kneeling, or lying directly on the grounded work.

**2.6 Finish the bead**

As the coating on the outside of the electrode burns off, it forms an envelope of protective gasses around the weld. This prevents air from reaching the molten metal and creating an undesirable chemical reaction. The burning coating, however, forms slag. The slag formation appears as an accumulation of dirty metal scale on the finished weld. Slag should be removed by striking the weld with a chipping hammer.

**Trouble shooting Chart**

NO	Faulty	Reason	Debugging
1	Thermal protection LED on	Bad-ventilated condition	Add a fan, or move to a well-ventilated condition
		Working circumstance hot	Wait until it cools down
		Duty cycle reached	Wait until it cools down.

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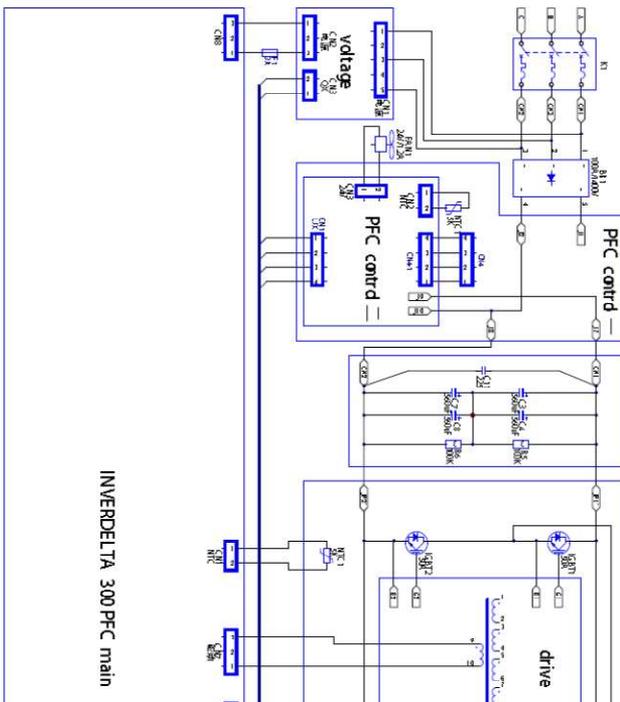
2	Output current not adjustable	Current potentiometer knob broken	Replace knob
3	Fan does not work	Main switch broken	Replace main switch
		Fan broken	Replace the fan
		Fan cable broken	Replace the broken cable
4	No OCV	Machine body overheat	See Part 1
		Main switch broken	Replace main switch
5	Welding cable, electrode holder and socket heat	Electrode holder capacity not enough	Replace with a larger holder
		Cable mm2 not enough	Replace with a larger holder
		Socket loose	Clean the parts and retighten
		Contact resistance raise between electrode holder and welding cable	
6	Main power trip	Power capacity not enough	Raise the power capacity

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		Trip during welding	Contact the manufacture/distributor
7	Others		Contact the manufacture/distributor

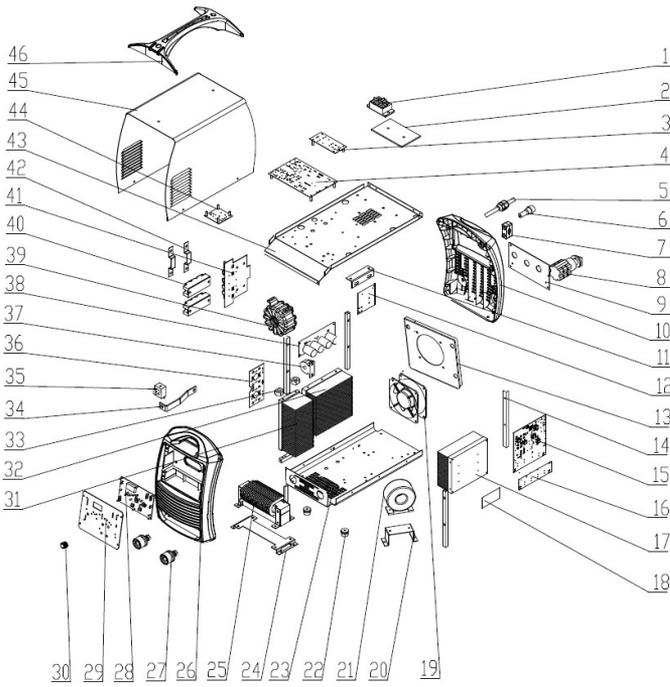
### Main Circuit chart



INVERDELTA 300 PFC main

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Spare Part List



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No	Code	English Name	Qty
1	20070370027	Three Phase Bridge	1
2	11020015738	Rectification bridge radiator panel	1
3	11050110551	Network linking plate	1
4	11050021037	Main control board	1
5	12070024600	power input cable	1
6	20070520004	Fuse holder	1
7	20050170019	Pressing plate	2
8	20070800051	Universal transfer switch	1
9	11010032483	rear bottom panel	1
10	20050050284	plastic back panel	1
11	11020015133	Current transformer bracket	1
12	11050110480	Load plate	1
13	11020015739	fan fixed plate	1
14	20050050638	Support bar	2
15	11050070402	UVMB control board	1
16	11050070403	UVMA control board	1
17	20070430290	Radiator	1
18	20050120079	Insulation plate	1
19	20070890143	fan	1
20	11020011057	Inductance fixed plate	1
21	20070040135	PFC inductance	1
22	20050050542	Machine leg	4

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23	11010041289	bottom panel	1
24	11020011058	Reactor mounting plate	1
25	11040030055	reactor	1
26	20050050283	plastic front panel	1
27	20070570185	quick connector	2
28	11050070371	control board	1
29	11020010047	printing support plate	1
30	20070110023	Potentiometer knob	1
31	20070430243	Radiator	1
32	20070430244	Radiator	1
33	20050060001	Radiator insulation sleeve	2
	20050060004	Radiator insulation sleeve	2
34	11020015737	Output busbar	1
35	20070390035	Hall current sensor	1
36	12020150417	Output rectifier plate assembly	1
37	12070024170	Mutual inductor harness	1
38	11050010177	Capacitance plate	1
39	20070250642	Main transformer	1
40	20070330067	IGBT model ROHS	2
41	11050030109	Driver board	1
42	11030040012	busbar 1	2
43	11010050410	Assembly plate	1
44	11050110553	Arc board	1
45	11010010602	Cover	1
46	20050080018	Plastic Handle	1

### **Service, Maintenance, Transportation and Storage**

The welder needs regular maintenance as following: Periodically clean dust, dirt, grease, etc. from your welder. Every six months, or as necessary, remove the cover panel from the welder and air-blow any dust and dirt that may have accumulated inside the welder. Replace power cord, ground cable, ground clamp, or electrode assembly when damaged or worn.

**MINOR AND ROUTINE MAINTENANCE** Store in a clean dry

Store in a clean dry

facility free from corrosive gas, excess dust and high humidity.

Temperature range from 10F120°F and the relative humidity not more than 90%.

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When transporting or storing the welder after use, it is recommended to repack the product as it was received for

protection. (Cleaning is required before storage and you must seal the plastic bag in the box for storage

