

# PLASMA WELDING



MP 200



Plasma Weld



Plasma Weld



MP200 with Lathe

## Perform High Class Welding With High Tech Plasma Welding Systems.

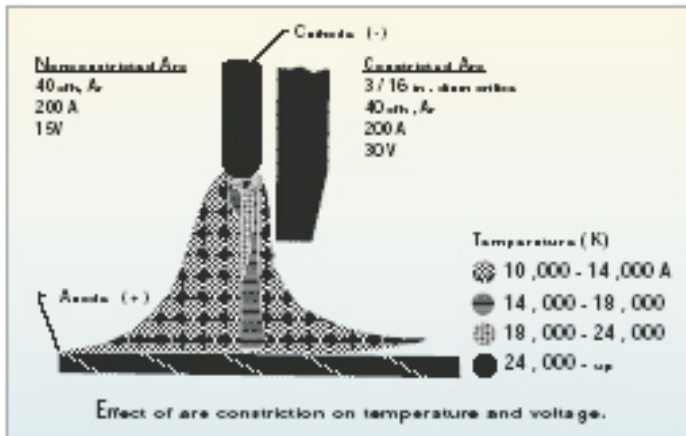
### Advantages of Plasma Welding

1. Less sensitivity to changes in Arc length.
2. Recessed electrode reduces the possibility of tungsten inclusions in the weld and can substantially increase the period between electrode dressings resulting in increased life.
3. Weld in a single pass up to 6 mm plates in square butt position and 10 mm plates in only two passes.
4. Keyhole mode of welding gives smaller heat affected zone resulting in reduced strength loss at the joint for heat treated metals, promotes less grain growth which gives better ductility.
5. Reduced weld time results in less embrittlement by carbides and complex intermetallic compounds for stainless steel and super alloys.
6. Equalization of distortion stresses results in less residual stress.
7. Less filler metal required in keyhole mode significantly reduces porosity.



MODEL SPECIFICATIONS	PW 200	PW 400
Input Supply	415V +/-10%	415V +/-10%
Phase/ Freq.	3/50-60Hz	3/50-60Hz
Max Power	8.15KW/11HP	16.3KW/22HP
Input KVA @ 60%	8.9	17.8
Input KVA @100%	6.85	13.7
Current Range (Amp)	5-200	5-400
Current @ 60%	200	400
Current @ 100%	160	308
OCV (Volts)	75-85	75-85
Pre Flow	1-5 Sec	1-5 Sec
Post Flow	1-5 Sec	1-5 Sec
Up Slope	1-5 Sec	1-5 Sec
Down Slope	1-5 Sec	1-5 Sec
Plasma Gas Down Slope	1-5 Sec	1-5 Sec
Pulse Frequency (Hz)	1-100	1-100
Pulse Time	10-90%	10-90%
Pre Settable Current	Yes	Yes
Class of Insulation	H	H
Pilot Arc Current (Amp)	5	5
Power Source	Cooling Air	cooled Air cooled
Torch Cooling	Water cooled	Water cooled
Dimensions W x L x H	700 x 685 x 920 (mm)	700 x 685 x 920 (mm)
Weight in Kgs.	125	145

## What is Plasma Welding ?

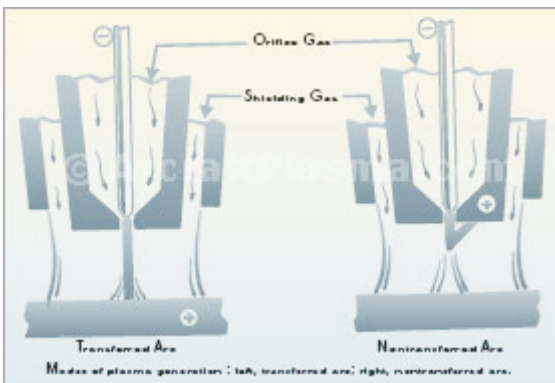


Plasma arc welding (PAW) is an advanced version of the tungsten inert gas (TIG) welding process. TIG welding has a free-burning arc, which is unstable and tends to wander in the low current range. With increase in current, the arc power increases and the arc diameter also increases. This leads to a lack of concentrated power in the work-piece, which results in a bigger seam and a larger heat-affected zone. Unlike TIG-welding torches, PAW uses a constricting nozzle and employs two separate gas flows, which give

rise to a concentrated plasma arc having a narrow columnar shape.

The plasma column is now stabilized along the axis of the electrode and is more intense than the TIG-welding arc. The column temperature is 10,000-24,000 K compared to 8,000-18,000 K in case of TIG-welding.

## ARCRAFT PW 200 and PW 400 Plasma welding machines operational capabilities



1. Manual plasma-arc welding is usually adapted to non key hole fusion type welding.

2. Mechanized plasma-arc welding is required for high current plasma-arc applications such as making key hole mode welds or high current filler passes. Metals welded by these processes: Weld unalloyed, low alloy and high alloy steels, nickel, copper, titanium, zircon and their alloys and special materials.

Arc Modes in Plasma Welding

**Welded Coupon of 5mm SS Plate completed in one single pass using Key hole Plasma process**

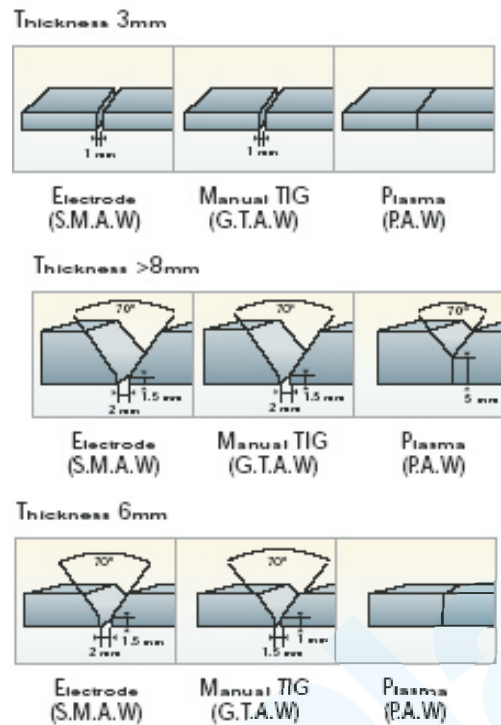
## The Plasma-keyhole welding process



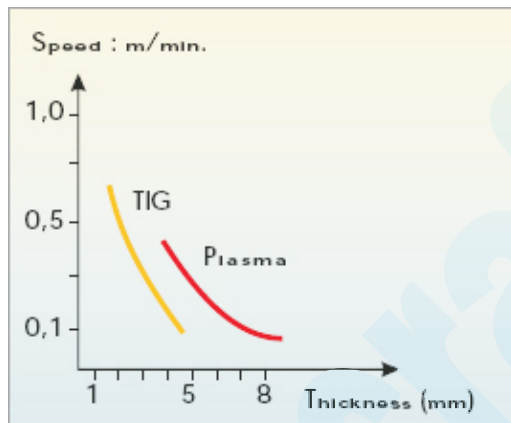
The Plasma-keyhole method is a welding process where the gas flow is restricted through a reduction of the gas orifice. This increases the gas velocity and the arc temperature. The plasma arc blows a hole through the joint or the plate. Behind the hole the molten metal flows together filling the hole, due to the gravity forces, surface tension and the gas pressure from the shielding gas.

The advantage of the Plasma-keyhole technique is the ability to weld simple I-butt joints in one single run up to a plate thickness of 8 mm. This will greatly improve welding efficiency. An other advantage is the limited distortion obtained with the process due to the even distribution of heat through the plate thickness.

## Joint preparation for different welding processes



## Welding speed (cm/min.)

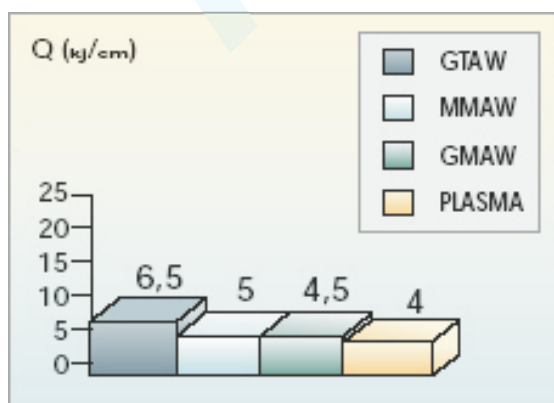


Example of productivity gain with carbon steel (5mm):

- MMAW: preparation + 2 passes at 15 to 20 cm/min +slag removal + grinding.
- Manual TIG: preparation + 2 passes at 10cm/min.
- Key hole plasma: 1 pass at 40 cm/min.

Thickness (mm)	Plasma cm/min
3	50
4	35-40
6	25-30
8	15-20

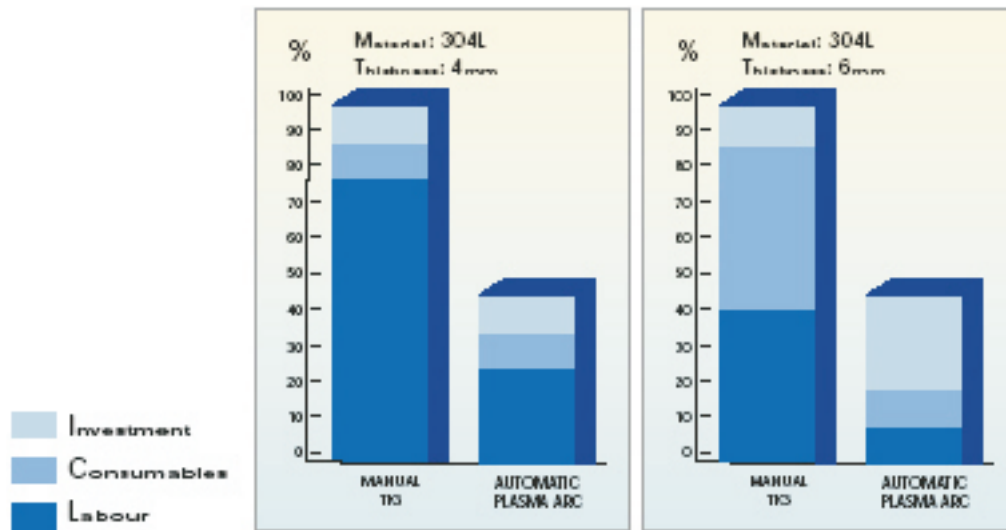
## Approximate heat input for different welding process



Maximum plate thickness that can be welded in one pass without preparation using plasma process :

Carbon steel and stainless steel, austenitic up to 8 mm, titanium up to 10 mm.

## Cost of Welding with TIG/Plasma



In thicknesses from 2.5 to 10 mm, plasma arc welding (downhand or horizontal- vertical) achieves significant productivity improvements through:

- reduced preparation time (no welding preparations, square edge butt Without gap),
- reduced welding time (single pass),
- reduced finishing and clean-up times,
- elimination of rework due to lack of defects.

Unique Features of ARCRAFT Plasma Welding Machine Model PW 200 and PW 400

1. Customization of technical features possible.
2. Programmable Current and Gas Down Slope available for automatic closing of key hole during mechanized welding.

User Industries

Aerospace and Space Industries, Cryogenics, Foodstuff and Chemical Industries, Machine and Plant Construction, Automobile, Railway, Ship Construction, Tank, Equipment and Pipeline Construction etc.

\* Technical information given in this brochure are to the best of our knowledge, but we do not undertake any responsibility for the use there of.

**Welding Automation Range of Products :** • Welding Gun • Oscillator ( weld weaver ) • Cold wire feeders • Seam trackers • AVC • Cameras and video displays • X-Y slides ( manual and motorized ) • Welding turntables • Welding positioners • Welding Turning Rolls • Welding lathes • Column and boom (manipulators )

Represented by :



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Note : Specifications subject to change without notice