

iQ SERIES ULTRASONIC HAND HELD SYSTEM

PAS offers several hand held welders for Plastic Assembly. 20kHz, 30kHz & 40kHz These compact and portable units are rugged, reliable and easy to use. They are designed specifically for welding, staking, inserting and spot welding applications. These lightweight hand pieces are ideally suited for manual operations with low volume production requirements. These units consist of an ultrasonic power supply and pencil type probe (pistol type optional). The power supplies come standard with both time and energy control. High resolution two color LCD display. One touch hot keys allow programming and operation to be performed with ease. Built in circuit protection ensures reliability in the toughest work environment. The compact size, built in handle allow for portability.

STANDARD FEATURES

- Lightweight hand probes
- Time, energy & continuous duty weld modes
- Amplitude is fully/y adjustable from
- 20% to 100% in 1% increments
- End of cycle audible alarm
- Power graph of last cycle completed
- Digital controls
- Auto frequency tuning
- Overload protection
- Voltage regulation compensates for any fine fluctuations
- Up to 8 programmable setups



High Resolution Display
Status Indication
Stack Frequency Display
Power Draw
Power Graph Bar %

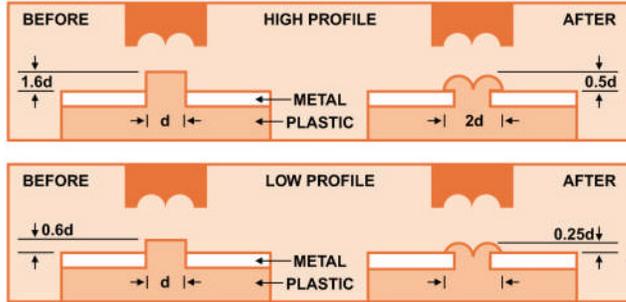
INFO - Intuitive Navigation
SETUP - 8 Programmable Setups
AMP - Front Panel Digital Amplitude adjustment 100%-20%
TRIGGER - Trigger by power mode
TIME - Weld by Time Mode with Secondary Control of Energy
ENERGY - Weld by Energy Mode with Secondary Control of Time
HOLD - Programmable Hold Time

IQ HAND HELD WELDING APPLICATIONS

STAKING

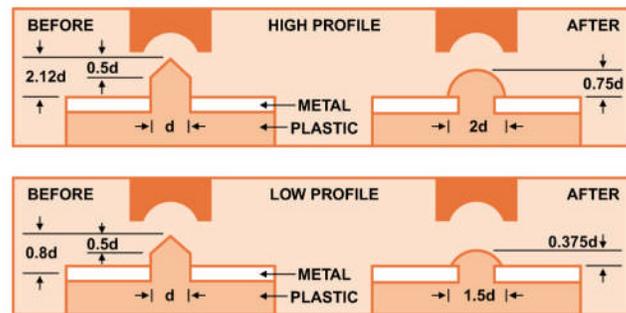
Standard Flared Stake

The standard flared stake satisfies the requirements of most applications. This stake is recommended for bosses with an O.D. of 1/16 inch (1.6mm) or larger, and is ideally suited for low density, nonabrasive amorphous plastics.



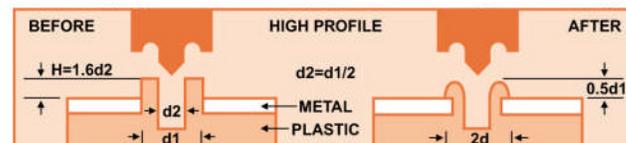
Spherical Stake

The spherical stake is preferred for bosses with an O.D. less than 1/16 inch (1.6mm). It is also recommended for rigid crystalline plastics with sharp highly defined melting temperatures, for plastics with abrasive fillers, and for materials that degrade easily.



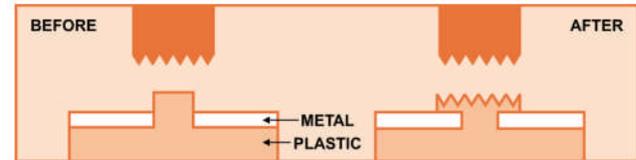
Hollow Stake

Bosses with an O.D. in excess of 5/32 inch (4mm) should be made hollow. Staking a hollow boss produces a large, strong head without having to melt a large amount of material. Also, the hollow stake avoids sink marks on the opposite side of the component, and enables the parts to be reassembled with self-taping screws, should repair and disassembly be necessary.



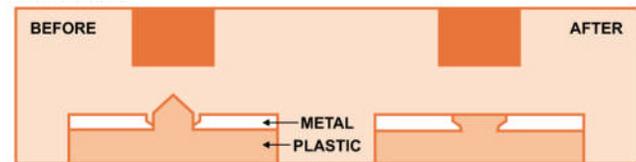
Knurled Stake

The knurled stake is used in applications where appearance and strength are not critical. Since alignment is not an important consideration, the knurled stake is ideally suited for high volume production, and is often recommended for use with a hand held ultrasonic welder. Knurled tips are available in a wide variety of fine, medium and course configurations.



Flush Stake

The flush stake is used for applications requiring a flush surface. The flush stake requires that the retained piece has sufficient thickness for a chamfer or counter bore.



Ultrasonic staking, also referred to as ultrasonic "heading" or "riveting", controls the flow of the molten plastic used to capture or retain another component in place. Ultrasonic staking provides an alternative to welding when the two parts consist of dissimilar materials that cannot be welded or when simple mechanical retention of one part relative to another is inadequate (i.e. as distinct from molecular bonding). A common application is the attachment of plastic to metal. Typically a metal part, with location holes, is placed over a plastic part with molded bosses. The horn tip is then pressed against the plastic boss and the vibratory motion creates friction and localized heating. As the boss melts the light pressure from the horn forms a head to a shape determined by the horn tip configuration. When the vibrations stop, the plastic material solidifies, and the dissimilar materials are fastened together.

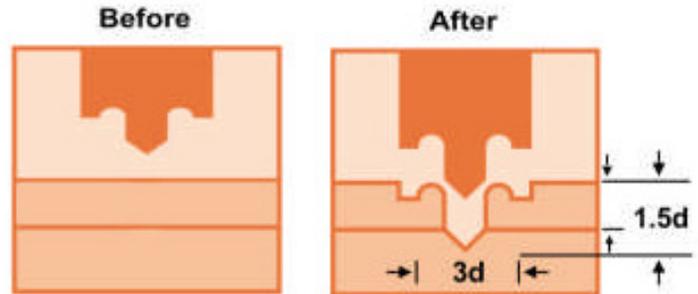
With staking, tight assemblies are possible because mating parts are clamped under pressure of the horn until the rivet head solidifies. There is no elastic recovery as is the case with heat staking or cold forming. A major advantage of ultrasonic staking is that the ultrasonic staking tip remains relatively cool during the process, forming a clean head with no sticking or stringing during assembly.

IQ HAND HELD WELDING APPLICATIONS

STAKING

Spot Welding

During spot welding, the horn tip penetrates through the top sheet and enters the bottom sheet to a depth of one half the top sheet thickness. The displaced molten plastic is shaped by a cavity in the tip to create an annular formation around the weld. Simultaneously, the molten plastic displaced from the second sheet flows into the preheated area and forms a permanent molecular bond. Large thermoplastic parts and applications with hard to reach joining surfaces can easily be welded together using an ultrasonic spot welder and standard replaceable tips.



Ultrasonic Insertion

Ultrasonic insertion involves a metal insert to be placed in a cored or drilled hole that is slightly smaller than the insert. This hole provides a certain degree of interference and also serve to guide the insert into place. The vibrating ultrasonic horn contacts the insert and the ultrasonic vibrations travel through the insert to the interface of the metal and plastic. Heat, generated by the insert vibrating against the plastic, causes the plastic to melt, and as the horn advances, the insert is embedded into the component. The molten plastic flows into the serrations, flutes, or undercuts of the inserts and, when the vibrations terminate, the plastic re-solidifies and the insert is securely encapsulated in place. Inserts can be ultrasonically installed in most thermoplastics.

Ultrasonic insertion provides the high performance strength values of a molded-in insert while retaining all of the advantages of post-molded installation. Some of the advantages of ultrasonic insertion over other methods include rapid installation, minimal residual stresses in the component following insertion, elimination of potential mold damage, reduced most fabrication costs and increased productivity as a result of reduced mold cycle times.



HEATSTAKING & SPOT WELDING TIPS

HEATSTAKING

Wear resistant carbide-faced tips available for special order.

Plastic Boss Diameter		Solid Boss Flare Head				Conical Boss Flare Head		Hollow Boss
		High Profile		Low Profile		High Profile	Low Profile	
inches	mm	Tip Size	Stud Height	Tip Size	Stud Height	Tip Size	Tip Size	
1/32	0.793	A	.050	G	.019	AA	GG	-
1/16	1.587	B	.100	H	.0375	BB	HH	-
3/32	2.381	C	.150	I	.056	CC	II	-
1/8	3.175	D	.200	J	.075	DD	JJ	R
5/32	3.969	E	.250	K	.094	EE	KK	S
3/16	4.762	F	.300	L	.112	FF	LL	T

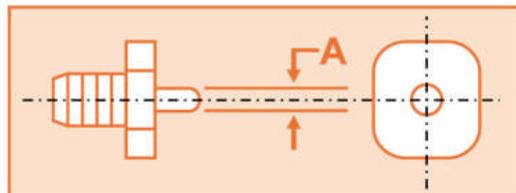
INSERTION

SAE			Metric		
Insert Size	Inner Diameter	Tip Pilot Diameter	Insert Size	Inner Diameter	Tip Pilot Diameter*
4-40	0.088	0.078	2.5 x 0.45	0.079	0.069
6-32	0.106	0.096	3 x 0.5	0.097	0.087
8-32	0.133	0.123	3.5 x 0.6	0.114	0.104
10-24	0.147	0.137	4 x 0.7	0.129	0.119
10-32	0.160	0.150	5 x 0.8	0.165	0.155
1/4-20	0.200	0.190	6 x 1	0.195	0.185
5/16-18	0.262	0.252	8 x 1.25	0.265	0.255

SPOT WELDING

Material Thickness		Tip Size
Inches	mm	
1/32	0.793	SA
3/64	1.190	SB
1/16	1.587	SC
5/64	1.984	SD
3/32	2.381	SE
7/64	2.778	SF

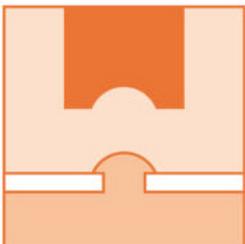
SEE DIMENSION "A" BELOW



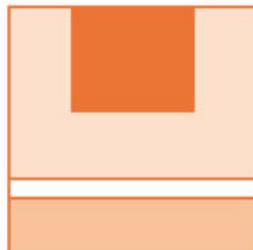
Ordering Information:

Please specify tip size using appropriate letter code. Knurled, flat and custom-faced tips available upon request.

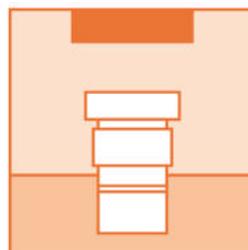
SPOT WELDING



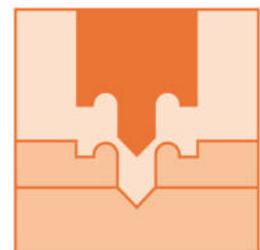
WELDING



INSERTION

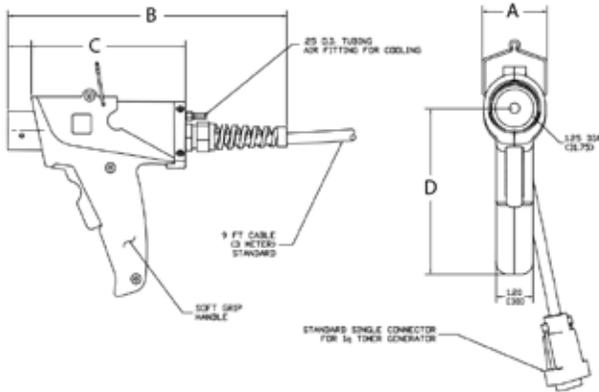


STAKING

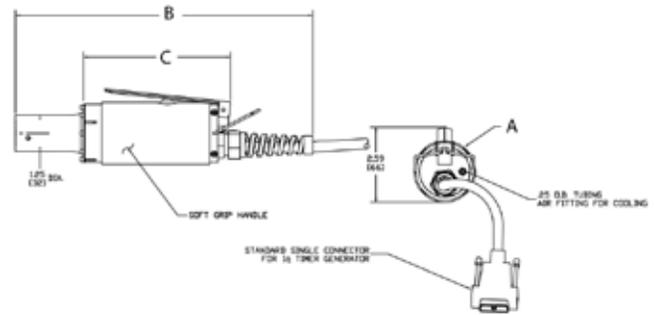


HAND HELD WELDER SPECIFICATIONS

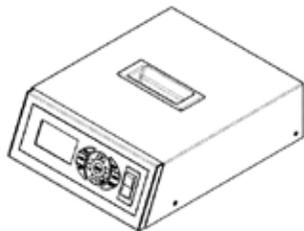
PISTOL



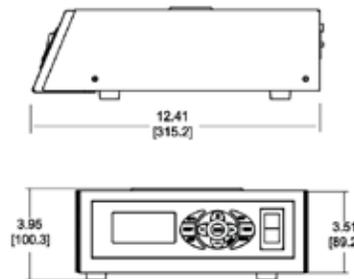
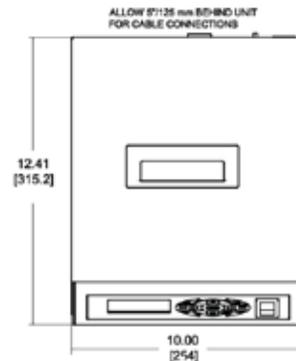
HAND PROBE



GENERATOR



*Weight 12.00lbs (5.4 Kg)



POWER SUPPLY

20kHz	
Frequency/Power	20 kHz: 600 watts
Input Voltage	Standard 120 volts or optional 220 volts, 50/60 Hz Regulated between 950135 volts or 190-265 volts
Weld Time	0.1-9.9 seconds
Dimensions	8.5 in. H x 13.5 in. W x 7.5 in. D (216mm H x 340mm W x 190mm D)
Weight	Weight
30kHz	
Frequency/Power	20 kHz: 600 watts
Input Voltage	Standard 120 volts or optional 220 volts, 50/60 Hz Regulated between 950135 volts or 190-265 volts
Weld Time	0.1-9.9 seconds
Dimensions	8.5 in. H x 13.5 in. W x 7.5 in. D (216mm H x 340mm W x 190mm D)
Weight	Weight
40kHz	
Frequency/Power	20 kHz: 600 watts
Input Voltage	Standard 120 volts or optional 220 volts, 50/60 Hz Regulated between 950135 volts or 190-265 volts
Weld Time	0.1-9.9 seconds
Dimensions	8.5 in. H x 13.5 in. W x 7.5 in. D (216mm H x 340mm W x 190mm D)
Weight	Weight

HAND GUN

20kHz	
Dimensions	1.9 in. (48.3mm) D, 7.6 in (193mm) L (with standard tip)
Weight	1.5Lbs. (0.68kg)
Horn	Integral with threaded end to accept replaceable tips
Material	Titanium
Tip	Standard - 1/2" (12.7mm) diameter flat faced titanium tip.
Cable Specification	Hardwired into hand gun. Optional detachable cable available.
Length	10 ft. standard, optional 15 ft. or 25 ft. available
30kHz	
Dimensions	1.9 in. (48.3mm) D, 7.6 in (193mm) L (with standard tip)
Weight	1.5Lbs. (0.68kg)
Horn	Integral with threaded end to accept replaceable tips
Material	Titanium
Tip	Standard - 1/2" (12.7mm) diameter flat faced titanium tip.
Cable Specification	Hardwired into hand gun. Optional detachable cable available.
Length	10 ft. standard, optional 15 ft. or 25 ft. available
40kHz	
Dimensions	1.9 in. (48.3mm) D, 7.6 in (193mm) L (with standard tip)
Weight	1.5Lbs. (0.68kg)
Horn	Integral with threaded end to accept replaceable tips
Material	Titanium
Tip	Standard - 1/2" (12.7mm) diameter flat faced titanium tip.
Cable Specification	Hardwired into hand gun. Optional detachable cable available.
Length	10 ft. standard, optional 15 ft. or 25 ft. available

WARRANTY:

PAS warrants its products for a period of one year from the date of shipment against defects in material and workmanship under normal installation, use, and maintenance.

