STONE Low Ine

Weld Heads

Low Inertia Parallel and Opposed Gap Weld Heads Instruction Pamphlet

Sunspot[™]

Low Inertia Parallel or Opposed Gap Weld Head

- Two weld heads for the price of one
- · Low inertia for fast follow-on pressure
- Adjustable platform and head height
- · Solid and light weight construction
- Cost thousands of dollars less
- Hand lever or foot pedal operated
- Weld battery terminals and more







Opposed Configuration

The Sunspot Weld Head SPOGWH

The Sunspot is a low inertia, series or opposed gap weld head. The weld head accepts the Sunstone dual probe hand piece (DPHP) which can also be used for free hand welding. It can be actuated using a hand lever or a foot pedal (foot pedal sold separately). The Sunspot uses a compliant spring to provide weld pressure. The weld head's light weight construction allows fast follow-on pressure to be applied during weld shrinkage.

The Sunspot is ideal for applications where ease of operation and overall cost are a concern. It is simple to operate and easy to maintain.

Figure 1 shows the Sunspot components. Please refer to this diagram for nomenclature clarification. This instruction pamphlet is intended to provide basic information on the usage of weld heads sold by Sunstone Engineering.



Figure 1: The Sunspot weld head components

For a detailed discussion on capacitive discharge welding and the effects of weld pressure please refer to the Dual Pulse welder instruction pamphlet.

Electrode Placement and Preparation

The Sunspot weld head is designed to accept the Dual Probe Hand Piece (DPHP) free hand welding electrodes. As seen in Figure 2 the DPHP electrodes are placed in the Electrode holder. Use a planar surface to insure electrode tips are at the same level.



Figure 2: Use a planar surface to level electrodes while in the parallel gap configuration. (use a 5/32" Allen/hex wrench and a 3/8" wrench to tighten electrodes in holders.



Figure 3: To insure electrodes are even use a fine grain metal sand paper on a level surface. This electrode maintenance should also be done when electrodes need cleaning. Wipe away dust.

After electrodes have been placed so that the tips are approximately on the same level use a fine grain sand paper to remove small differences in height (Figure 3). This procedure may need to be repeated after a test weld. Level electrodes translate to even electrode pressure and heat on the work piece.

If the DPHP electrodes have experienced excessive wear they can be reshaped using a small file or reconed using a belt sander. After belt sanding use a file or fine sand paper to flatten tip to desired spot diameter.

А



Figure 4: A). Set the weld pressure by placing the work piece under the electrodes. Apply pressure to the work piece by deflection of the compliant spring. At the appropriate spring deflection set the stop to prevent further deflection. Typically only small spring deflections are needed. B). Use this same procedure in the opposed configuration.

Setting Electrode Pressure

As seen in Figure 4 set the weld pressure by placing the work piece under the welding electrodes, touching the electrodes to the weld surface and then deflect the compliant spring to achieve the correct force. As a rule of thumb every mm of spring deflection indicated on the stop post translates to 0.2 lb of force. If a calculation of pressure is desired divide the force by the electrode tip area. Forces of 0.4 to 1 lb are typical. When the spring is in the appropriate deflected state, set the deflection stop to the base of the stop bar to prevent future spring deflection. As seen in Figure 5, the micro-switch should just close when the deflection stop reaches the base.

The steps to achieving the correct weld pressure are:

- 1. Place work piece under welding electrodes
- 2. Touch electrodes to top of work piece
- 3. Deflect weld head spring to desired force /pressure setting
- 4. Set the deflection stop to prevent weld head spring deflection past this pressure setting
- 5. The micro-switch should be actuated just as the defection stop reaches the stop base



Figure 5: Set the stop to prevent further spring deflection when the correct weld pressure is reached. The switch should actuate just as the stop reaches the base.

The micro-switch should be connected to common and normally open (NO) terminals. Wire color to these terminals is unimportant.

Foot Pedal Setup

Figure 6 shows the connection point for the manual foot pedal. Loop the beaded chain around the foot pedal hookup bar. The chain then hangs through openings in the work piece platform and the Sunspot base as shown in Figure 7A.

Table 1 indicates the dimensions show in figure 7. A simplified procedure to make appropriate mounting holes might include using the welder base to mark hole locations with a pencil.



Figure 6: Loop the manual foot pedal beaded chain to the weld head hookup bar. Weld head and work piece platform should be positioned to allow foot pedal chain to pass through weld head base and table holes.



Figure 7: A: Foot pedal chain placement. B: Table bolt down and foot pedal hole placement.

Dimension	inch	cm
A	7.75	19.7
В	8.125	20.6
С	4.375	11.1
D	2.8	7.1
E	0.75	1.9
F	0.625	1.6
D1	0.375	1.0
D2	0.375	1.0
D3	0.375	1.0
D4 (foot pedal)	0.375	1.0
D5 (foot pedal)	2	5.1

Table 1: Suns	pot base	dimensions
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Opposed Sunspot Configuration

As shown in Figure 8 the Sunspot weld head can be configured for opposed operation.

- 1. Unbolt the electrode holder from the compliant spring as shown in Figure 8
- 2. Use the provided 10-32 ³/₄" bolt and washers to bolt the electrode holder to the work piece table.
- 3. Place the electrode into the electrode holder and clamp at the desired height.
- 4. Move work piece table and electrode holder for proper electrode tip to tip alignment. See Figure 9.

Be sure to follow a similar pressure adjustment and electrode leveling procedure as outlined for the parallel configuration.



Figure 8: Move electrode holder down to work piece platform to configure as an opposed weld head (10-32 bolt and washers included)



Figure 9: Adjust work piece platform and weld head such that welding electrodes contact when the weld head is lowered.

SEK500

Low Inertia Parallel Gap Weld Head

- · Parallel gap for battery manufacturing
- Rugged, durable construction
- Independent electrode pressure adjustment
- · Manual foot pedal or air operated
- Four inch head travel
- Micro-switch triggers at set-point pressure
- · Low inertia for fast follow-on pressure



The SEK500 Parallel Gap Weld Head

The SEK500 is a parallel gap weld head suitable for high volume battery pack manufacturing. The SEK500A is actuated via air and the SEK500B with a manual foot pedal. Independent electrode pressure adjustment allows fast welder setup. The SEK500 micro-switch fires when electrodes have reached the set-point pressure and is independent of head travel. This unit is durable and has an excellent track record. Figure 10 lists the different components of the weld head.

Electrode Placement and Preparation

Welding electrodes are held by a brass electrode holder (see Figure 11). Use a level surface to position electrodes in holder before tightening. Additional leveling can be accomplished by pulling sand paper under electrode tips while they are depressed on a flat surface. Be sure to wipe away dust from tip surfaces.

Adjust the two independent electrode pressure knobs to the desired pressure level. For battery welding applications this will typically be around 2.5 lbf. Perform a tests weld to determine if one spot is hotter than the other. If a weld spot is too hot increase electrode pressure. If the weld is too cool, decrease electrode pressure.





Weld Head Hookup

The SEK500 weld head comes with the weld head adapter cable (WHAC) and the external switch hookup cable (ESHC).



Figure 11: Hookup and adjustment bolts of the SEK500.

The ESHC is attached to the SEK500 weld head as indicated in Figure 12. ESHC wires can be attached without specific color orientation.



Figure 12: The ESHC external switch hookup cable attaches to the SEK500 as shown.

Increasing Weld Performance

SEK500 weld performance can be increased using some simple procedures. Use a belt sander to sand the corners off of the electrode tips. Reducing the effective tip area will reduce the required weld energy.

Sunstone Engineering also can provide the SEK500 Hookup and Electrode Holder Upgrade (SHEHU) to reduced required weld energy. The SEHHU shortens the conduction path and increase energy delivered by a significant factor. Figure 13 shows the SHEHU weld head upgrade.



Figure 13: A reduction of required weld energy can be accomplished by using SEK500 Hookup and Electrode Holder Upgrade (SHEHU).

SAFETY

Please follow these points to help insure your comfort and safety.

- 1. Always wear safety glasses when working with spot welders and weld heads.
- Avoid touching welds spots immediately after the weld has been performed as they will be hot.
- 3. Be careful not to pinch fingers in moving weld head parts or between welding electrodes.
- 4. Remove hand jewelry before welding.
- 5. All welds are performed at low voltage for increased safety of operation.

For further information on using the Sunspot or SEK500A weld heads please see our instructional videos on the web

Weld Head Physical Characteristics

		Sunspot		SEK500	
Actuation					
	Hand Lever	Yes		No	
	Foot Pedal	Yes (sold separately)		Yes (SEK500B)	
	Air	No		Yes (SEK500A)	
Electrode Cont	figuration				
	Parallel Gap	Yes		Yes	
	Opposed Gap	Yes		No	
Force					
	Max lbf (N)	5	(22)	4.5	(20)
	Min lbf (N)	0.1	(0.4)	0.25	(1.1)
Dimensions					
	Electrode Diameter inch (cm)	0.25	(0.6)	0.125	(0.3)
	Max Height inch (cm)	21	(53.3)	18	(45.8)
	Max Depth inch (cm)	11	(28.0)	12	(30.5)
	Max Width inch (cm)	7	(17.8)	8	(20.3)
	Max Head Travel inch (cm)	4	(10.2)	4	(10.2)
	Typical Head Travel Inch (cm)	1	(2.5)	1	(2.5)



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