Dual Pulse Series

125DP/250DP Precision CD Welders

250DP

125DP

- Dual Pulse function eliminates surface inconsistencies
- Microprocessor controlled
- Optional built-in weld monitor
- Up to 128 programmable weld schedules

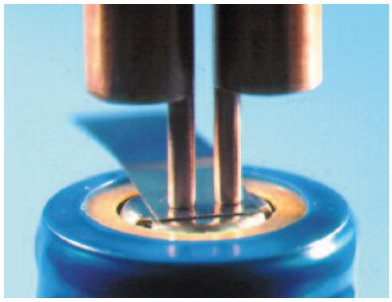
Wide Range of Models and Features to Match Application Requirements

Miyachi Unitek's Dual Pulse Series is a full range of capacitive discharge (CD) power supplies for precision resistance welding applications. Dual Pulse Series power supplies are microprocessor controlled, store multiple weld schedules, and provide consistent weld energy.

The CD welders deliver high peak energy with fast rise times. This is important when welding highly conductive materials such as copper and brass. The control system provides a highly stable output, independent of line voltage fluctuations, resulting in repeatable energy delivery from weld to weld. The DP Series short weld times result in minimal part deformation and marking.

Context sensitive "User Help Screens" (not featured on 125DP model) easily guide the user through the operating program. Most models are available with an optional built-in weld monitor, "Weld Sentry®." The Weld Sentry provides weld current, voltage, power, and resistance values along with SPC data. Miyachi Unitek offers a wide range of weld heads to interface with the Dual Pulse Series,creating a system solution for micro-joining applications.

typical application



***Battery Tab** – Nickel tab to nickel plated steel*

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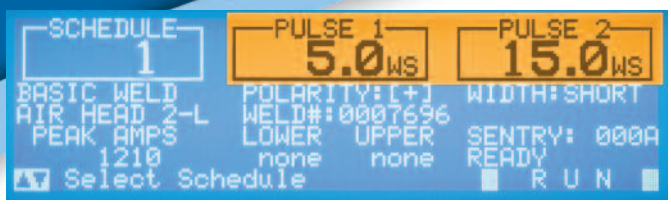
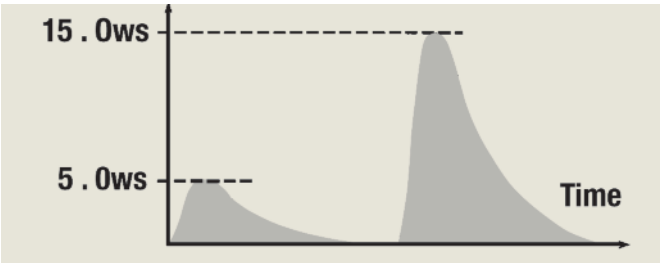


*Display with Dual Pulse settings in watt-seconds (ws)**



First Pulse
- *Seats Electrodes*
- *Displaces Surface Contamination*

Second Pulse
- *Provides Weld Energy*

Dual Pulse Series Technical Control and Monitoring tools

Dual Pulse Function Overcomes Process Variables

Part and electrode surface inconsistencies contribute to poor welds. Plating irregularities or contaminants, including oxides and oils, affect weld reliability. The "Dual Pulse" function, featured in all DP Series power supplies, virtually eliminates these problematic variables.

Programmed in dual pulse mode, the control will fire twice from a single actuation. The first pulse (Figures 1 and 2) is set at a lower energy level relative to the second pulse. It is specifically designed to properly seat the electrodes and prepare the parts by displacing surface contamination without significantly reducing the interface resistance between the parts. The second pulse (Figures 1 and 2), or "weld pulse" joins the base metals. The second pulse energy level is typically set three to four times that of the first. This important feature, pioneered by Miyachi Unitek, produces repeatable and acceptable results in difficult-to-weld situations.

Built-In Weld Monitor Provides Validation, Control and SPC Data

The Dual Pulse Series offers an optional, built-in Weld Sentry for measuring output voltage and current (not available on the 125DP). The user can view numerical data (Figure 3), graphical data (Figure 4), and use this information to optimize the welding process. User defined alarm limits (Figure 3) are programmed to trigger Output Relays for external device control (Figure 5) such as PLC inputs in automated systems. The built-in Weld Sentry stores up to 20,000 individual weld results, which are used to provide SPC data.

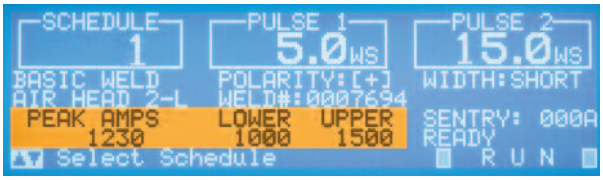


Figure 3 – *Display of peak current with lower and upper limit values**

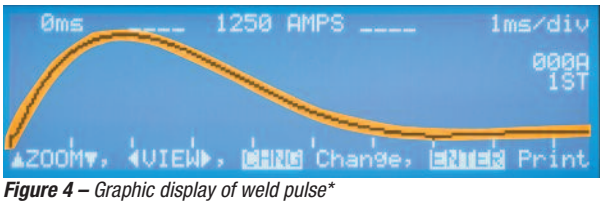


Figure 4 – *Graphic display of weld pulse**

Figure 5 – *Solid state relays with user-defined settings for alarm conditions and timing control**

Automatic Weld Schedule Changes Reduce Down-Time

Electrode wear is a major cause of process inconsistencies. Electrode tips can "mushroom" when making large quantities of welds, increasing in diameter over time due to impact force and high heat density. The Weld Sentry measures changes in weld voltage and current which can be correlated to electrode wear. Using the correlated measurement data, multiple weld schedules can be developed to compensate for these changes. The power supply can then be programmed to automatically "step" to schedules with higher weld energy at fixed intervals, i.e., 1,998 welds (Figure 6), in order to maintain constant weld heat at the electrode tips. Using this "Chain Schedules" feature reduces time consuming electrode maintenance.

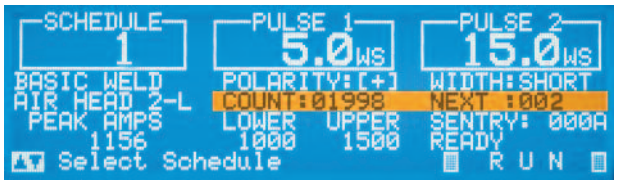
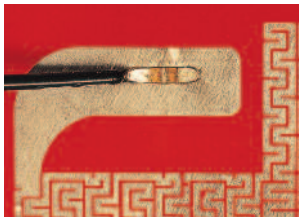


Figure 6 – *Weld schedule "1" automatically changes to "2" after 1,998 welds.**

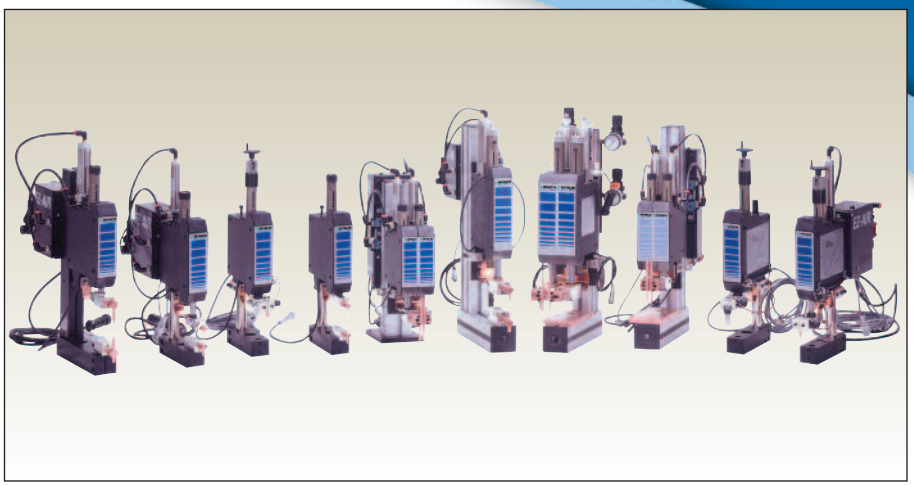


Flat Heating Element
Pre-flattened copper wire to nickel heating element using 125DP and 88A/EZ weld head

**Highlighted area is for illustration purposes only. Actual displays are white characters on blue background.*

Resistance Welding Solutions – Weld Head Choices

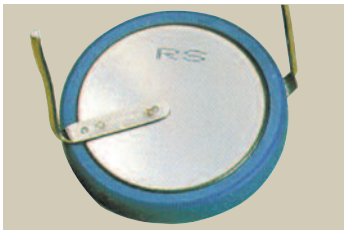
Miyachi Unitek has an extensive range of manual and pneumatic weld heads to match specific application requirements. Manual weld head actuation via a foot pedal is preferred when parts are positioned by operators. Air actuated weld heads are recommended when parts are fixtured. Actuation of a pneumatic weld head is achieved with either a footswitch or a programmable logic control (PLC). All Dual Pulse Series welders have valve drivers for controlling the complete timing sequence of an air actuated weld head. For complete information about weld heads, request literature No. 991-100 or contact Miyachi Unitek Applications Engineering.



Comprehensive range of weld heads to interface with precision CD Welders.

Weld Head Selection

Product Series	Minimum Force	Maximum Force
80 Series	0.25 lbs. (1.1 N)	40 lbs. (178 N)
180 Series	5 lbs. (22 N)	100 lbs. (445 N)



Lithium Ion Battery Tabs *Nickel terminal to nickel plated steel cap using 125DP and 88A weld head*

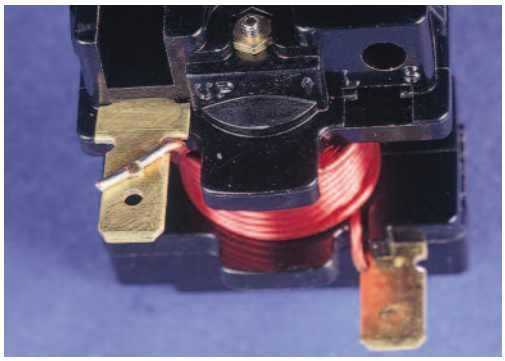
Wide Application Capabilities with Dual Pulse Welders

Conductive Metals

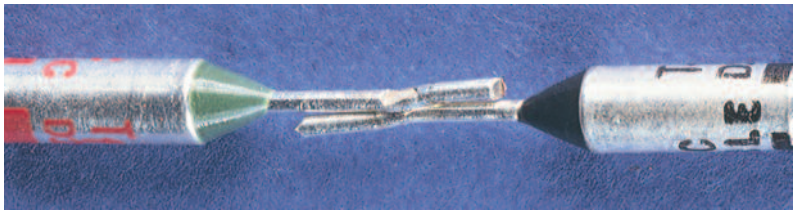
Capacitive Discharge welding technology can join many different metals and alloys. Thermally and electrically conductive materials such as brass and copper are normally difficult to weld because the weld energy is quickly dissipated, preventing adequate weld nugget formation. These materials are best welded using CD controls. A high peak energy is applied over a very short weld pulse period, thus minimizing the weld heat dissipation effect.

Resistive Metals

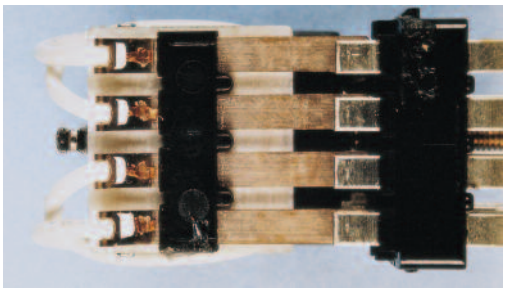
Thermally resistive materials such as nickel, steel, and titanium can also be easily welded using CD technology. The dual pulse feature aids in welding these resistive metals by helping to seat the electrodes with the initial pulse. Additionally, the DP Series permits the selection of longer energy pulse widths to control weld splash and expulsion.



Relay *– Solid copper wire to brass terminal*



Thermal Cut-Off Assembly *– Silver plated copper lead to silver plated copper lead*



Relay Terminal Connection *– Stranded copper wire to tin plated brass terminal*

specifications

FEATURE	125DP		250DP	
Dual Pulse	Yes		Yes	
Air Head Driver Output	24/115VAC		24/115VAC	
Weld Function: Basic; Dual Pulse; Rollspot; Repeat	Basic, Dual Pulse (only)		All	
User Friendly Help Screens	N/A		Yes	
Weld Schedules	8		128	
Chain Schedules (Automatic Step)	N/A		Yes	
Programmable Squeeze Time	Yes		Yes	
Remote Schedule Selection	Yes		Yes	
Two Head Sequential Control Capability	N/A		Yes	
Polarity Program Select Option	N/A		Yes	
End Cycle Buzzer	N/A		Yes	
Output Relays	N/A		2	
Microprocessor Control	Yes		Yes	
Weld Counter	N/A		Yes	
Optional Built-in Weld Sentry	N/A		Yes	
Single Pulse Welding Speed: (welds/minute)	Rep Rate	Hit Rate	Rep Rate	Hit Rate
Percent of full energy:	*under 2%*	265	305	300 300
	25%	85	160	175 180
	50%	62	120	120 124
	100%	45	60	65 70

WELDING SPEED – Repetition ("Rep") Rate, is the average number of welds allowable in one minute based upon the thermal rating of the system components. The averaging period used to determine the Rep Rate can be as long as twenty minutes. The "Hit" Rate, or maximum intermittent welding speed, defines how fast the power supply can make consecutive welds on a non-continuous basis.

output pulse characteristics

Model	Min Output	Max Output	Dual Pulse	Capacitor Bank	Pulse Width		Rise Time	Minimum Pulse Height
125DP	0.75 ws	125 ws	Yes	1,500 mfd	Short	2.3 ms	0.65 ms	7.0V (.001 Ω Load)
					Long	4.0 ms	1.05 ms	4.5V (.001 Ω Load)
250DP	1.5 ws	250 ws	Yes	3,000 mfd	Short	6.7 ms	1.6 ms	6.7V (.001 Ω Load)
					Medium	7.8 ms	2.1 ms	5.7V (.001 Ω Load)
					Long	10.7 ms	2.6 ms	4.4V (.001 Ω Load)

physical characteristics

	125DP		250DP	
Height	9.5 inches	24.1 cm	10.5 inches	26.7 cm
Width	13.0 inches	33.0 cm	15.5 inches	39.4 cm
Depth	13.3 inches	33.8 cm	16.0 inches	40.6 cm
Weight	44 lbs (20 kg)		99 lbs (45 kg)	

ordering guide

Model	125DP	250DP
With Weld Sentry Option	N/A	250DPS
Voltage Selection	Add 100, 208, 230 for voltages other than 115VAC *Example:* 250DPS/230, 250DP for 230VAC operation	
Required Welding System Components	Weld Head and foot actuation selection (see page 3 or consult Thin-Line brochure 991-100); or Hand-Piece (Consult Accessories Brochure 991-160)	

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MIYACHI UNITEK
1820 S. Myrtle Ave. • P.O. Box 5033
Monrovia, CA 91017-7133 US • T: (626) 303-5676 • F: (626) 358-8048
info@muc.miyachi.com • www.miyachiunitek.com
ISO 9001 Certified Company • 24/7 Repair Service: 1-866-751-7378

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follow us on:

MIDWEST Sales/Applications Lab:
50384 Dennis Ct., Wixom, MI 48393
T: 248 313 3078 • F: 248 313 3031
midwestsales@muc.miyachi.com

MEXICO Sales Office:
5959 Gateway West, Ste 327, El Paso, TX 79925
T: (915) 881-8765 • mxsales@muc.miyachi.com

ASIA Sales Office:
Unit D, 20/F, Infotech Centre, 21 Hung To Road
Kwun Tong, HK • T: +852 2833-6998
F: +852 2833-6672 • asiapacific@muc.miyachi.com

SOUTH ASIA Sales Office:
No 26, Sin Ming Lane, #04-125,
Midview City, 573971, SG
T: +65 96318407 • southasia@muc.miyachi.com

Miyachi Corporation HQ -Tokyo, Japan
2-6-6 Motoasakusa Taito, Tokyo, 111-0041, JP
T:+81-3-5246-6700 • F:+81-3-5246-6890

Miyachi Europe GmbH
Lindberghstrasse 1 • DE-82178 Puchheim
T: +49 (0) 89 83 94 030 • F: +49 (0) 89 83 94 0310
www.miyachieurope.com • info@mec.miyachi.com

Miyachi Brazil:
Av. Ceci, 608 – Bloco 16B – Empresarial Tamboré,
06460-120, Barueri, SP, BR
T: +55 (11) 4193-1187
www.miyachibrasil.com.br
sasales@muc.miyachi.com

Miyachi Shanghai Corporation
Room 01,15th Floor, SML Center, No.610 Xujiahui
Road, Huangpu District, Shanghai 200025, CN
T:+86-21-6448-6000 • F:+86-21-6448-6550

Miyachi Taiwan Corporation
Rm.5, 2F., No.9, Dehui St., Zhongshan Dist.,
Taipei 10461, CN
T:+886-2-2585-0161 • F:+886-2-2585-0162

Miyachi Thailand Co. Ltd
40/14 Bangna Tower C, 17th Floor, Unit B, Moo 12,
T. Bangkaew, A. Bangplee, Samutprakarn 10540, TH
T:+66-2751-9337-8 • F:+66-2751-9340

Miyachi India Private Limited
No.23, Velvette House, Ground F, Dr. Ambedkar
Rd., Kodambakkam, Chennai, 600 024, IN
T:+91-44-4354-6814 • F:+91-44-4354-6816

Miyachi Korea Corporation
28, Dongtanhana 1-gil, Hwaseong-si,
Gyeonggi-do, 445320, KR
T:+82-31-8015-6810 • F:+82-31-8003-5995

Miyachi Vietnam Co., Ltd.
M floor, 400 Nguyen Thi Thap Street,
Tan Quy Ward, District 7, Ho Chi Minh City, VN
T:+84-8-3771-7972 • F:+84-8-3771-7974

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