

# resistance welding

# DC25 / UB25 Linear DC Welding Controls

- Ultra-fast closed-loop hybrid control provides extremely stable output waveforms in constant current, voltage and power modes.
- Exceptionally fast rise time permits shorter weld times, less part deformation, longer electrode life, and greater weld strength with more part ductility.
- Single phase operation permits easy installation and versatility of use.
- Built-in monitor supports process logging and data collection for SPC purposes.
- Graphical monitor screen provides visual trace of energy over time for easy weld parameter optimization.



UB25, 50-1000A output. Superior low energy control for micro welding.

DC25, 4000A maximum output. Versatile and accurate performance from a single phase power supply.

## Precision control for high reliability welding of miniature and micro-miniature parts

The DC25 Linear DC welding control is ideal for microjoining applications which require exceptional control, fast rise times, and highest quality throughput. The DC25 requires only single phase input power and can output up to 4000 Amps. Ultra-fast rise times permit short overall weld times, resulting in less part deformation and stronger welds. This is extremely important when welding heat sensitive parts such as miniature battery cells or sensitive electronic devices.

The UB25 (successor to the Unibond II) provides unsurpassed levels of control for micro-miniature resistance welding. Requiring only single phase power, UB25 is a 1000 Amp Linear DC control with three feedback modes designed to adapt to part and process variables. This power supply should be used for smaller applications where closed-loop feedback control and fast response times are required. Safety critical applications such as those found in the medical and automotive markets will benefit from UB25's precision low energy control.

### TYPICAL APPLICATIONS



Battery tab to lithium ion cell



Halogen lamp filaments



Catheter guide wire assembly



Air bag detonator module (squib wire)

# Intuitive, Easy-to-Use Programming



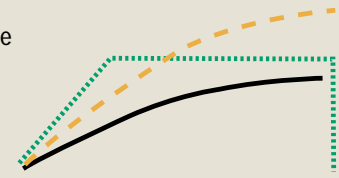
- Intuitive graphical user interface.
- Dual pulse waveforms programmed in current, voltage, or power control modes.
- Programming times to 100  $\mu$ sec increments provides ultimate control.
- Accurate, built-in monitor displays the graphical "trace" of weld current, voltage, power and resistance, along with numerical peak and average values.
- Easy-to-set limits establish process window for acceptable quality.
- User programmable relays can be used in conjunction with visual and audible signals for operators and automation interface.

# Current, Voltage and Power Feedback Modes:

## Constant Voltage: .....

- Compensates for parts misplacement and force problems
- Reduces weld splash
- Ideal for round (non-flat) parts

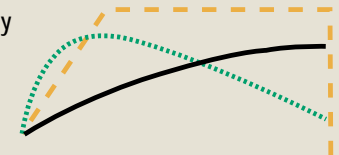
Monitor current



## Constant Power: - - - - -

- Varies current and voltage for consistent energy
- Breaks up surface oxides and plating
- Ideal for automation to extend electrode life

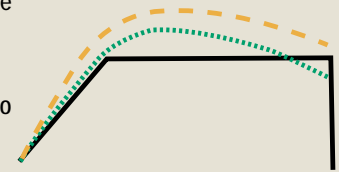
Monitor current or voltage



## Constant Current: —————

- Delivers same current regardless of resistance changes
- Compensates for part thickness changes
- Ideal for flat parts with consistent electrode to part fit-up

Monitor voltage



# Effective Weld Monitoring and Process Tools

## Pre-Weld Function



Run Screen – Shows that 2nd Pulse was inhibited from firing.



Monitor Screen – Shows 1st Pulse weld current exceeded limit.

Sends an initial short, low energy pulse through the assembly, tests key electrical parameters against pre-set limits, and inhibits operation if limits are exceeded.

## Advantages

- Prevents unacceptable welds.
- Prevents electrode damage.
- Alerts operator to weld fault.
- Relay outputs can signal automation.

## Active Part Conditioner (APC)



Run Screen – Constant power first pulse breaks through oxides.



Monitor Screen – First pulse time automatically compensates for varying levels of oxides.

First pulse adapts weld time to displace oxides then terminates allowing a second pulse with upslope to complete the weld thus avoiding weld splash.

## Advantages

- Brings each part to the same resistance prior to application of welding current.
- Provides for consistent welding of difficult-to-weld oxidized parts.
- Prevents weld splash.
- Increases process yields.

## Weld Stop



Run Screen – Shows termination of weld current during weld pulse.



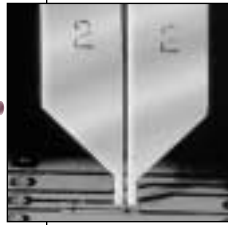
Monitor Screen – Shows weld current exceeding limit.

Terminates the weld energy during the welding process if pre-set weld current or voltage limits are exceeded.

## Advantages

- Prevents blow-outs and parts damage.
- Prevents electrode damage.
- Alerts operator to weld fault.
- Relay outputs can signal automation.

# Full Range of Weld Heads for the Complete Welding System



## 86A/EZ Precision Parallel Gap Weld Head

The Model 86 weld head with either foot or patented EZ-Air® actuation provides precision control for

parallel gap welding applications from <math><0.001</math> inch (25 microns) to 0.005 inch (0.127mm) in diameter or thickness. The force range of the 86A/EZ is 0.5 to 20 lbs. (2.2-89 Newtons). EZ-Air technology prevents overforce and guarantees force repeatability. The Model 86 is normally matched with the UB25 power supply.



## Model 50 Light Force Weld Head

The 50 Series weld heads with either foot or air actuation provide accurate levels of precision

required for welding fine ribbons and wires to substrates. The force range of the 50F is 40-1000 gram-force (0.39 - 9.8 Newtons), continuously adjustable with no overforce. Holder options for either Unitip or Unibond electrodes are available. Model 50 is normally matched with the UB25 power supply.



## 70 Series Weld Head

The Servomotor driven 70 Series weld head with overforce protection and

soft-touch part clamping provides superior force control from 0.5-15 lbs. with excellent follow-up. The 70 Series, available in both opposed and parallel gap can store 32 motion control schedules for position and speed. The heads are ideal for automation and delicate or critical parts welding.



## 88A/EZ Precision Weld Head

The fast rise time and precision control of the DC25 make it ideal for

battery pack welding. The Miyachi Unitek 88 weld head, with either foot of patented EZ-Air actuation provide fine levels of precision control required for microjoining applications from <math><0.001</math> inch (25 microns) to 0.04 inch (1mm) in diameter or thickness. EZ-Air prevents overforce and guarantees force repeatability. The EZ-Clean feature permits easy electrode set-up and maintenance.

# SPECIFICATIONS

MODEL NUMBER	DC25	DC25/230	UB25	UB25/230
Nominal Line Voltage (Single Phase)	115 VAC 50/60 Hz	230 VAC 50/60 Hz	115 VAC 50/60 Hz	230 VAC 50/60 Hz
Line Voltage Range	±15 %	±15 %	±15%	±15%
Repetition Rate	20kW @ 1 weld/sec for 10 msec (per weld)		5kW @ 1 weld/sec for 10 msec (per weld)	
Setting Ranges:	Current: 100A - 4000A Voltage: 0.1V - 9.9V Power: 0.1kW - 9.9kW		5A - 1000A 0.01V - 4.9V 0.01kW - 4.9kW	
Peak:	Current: 4000 amps Voltage: 15V Power: 40kW		1000 amps 9V 10kW	
Output Regulation versus Line Voltage Variance	2%		2%	
Output Regulation versus Load Resistance Variance	2%		2%	
Output Repeatability Current, Voltage, Power ± of Setting	2%		2%	
Weld Period Ranges	Ranges	Resolution (steps)	Ranges	Resolution (steps)
First / Second Pulse (msec.) – Ranges Scale	0.01 - 0.99 / 1.0 - 9.9	0.01 / 0.1	0.01-0.99 / 1.0-9.9 / 10-99	0.01 / 0.1 / 1
Upslope / Downslope Periods (msec.) – Ranges Scale	0.01 - 0.99 / 1.0 - 9.9	0.01 / 0.1	0.01-0.99 / 1.0-9.9 / 10-99	0.01 / 0.1 / 1
Output Accuracy	The greater of ±2% of setting or 2 Amps, .05 V, or 20W			
<b>PHYSICAL CHARACTERISTICS</b>				
Dimensions L x W x H Inches (mm)	20.5 x 9.25 x 12.75 (521 x 235 x 324)			
Weight Lbs (Kg)	52 (24)			

# FEATURES

WELD HEAT PROFILE CONTROL	DC25	DC25/230	UB25	UB25/230
Weld Pulse Control	Dual pulse with independent control of <b>current, voltage</b> or <b>power</b> on each pulse.			
Programmable Weld Pulse Segments	Squeeze, upslope 1, weld 1, downslope 1, cool, upslope 2, weld 2, downslope 2, hold.			
Weld Schedule Memory	Save up to 99 different weld schedules, protected from unauthorized changes.			
Weld Schedule Chaining	Allows automatic linking of weld schedule sequence.			
<b>BUILT-IN WELD MONITOR FUNCTIONS</b>				
Measurement Parameters	Current, voltage, and power on each pulse.			
Graphic Display	Back-lit LCD displays programmed and actual weld current, voltage, or power, and upper and lower limits.			
Measurement Selection	Peak or average.			
Current Measurement Range/Accuracy	0.1 – 4.0 kA, ±2% of setting or ±2 A.		0.005 – 1.00 kA, ±2% of setting or ±2 A.	
Voltage Measurement Range/Accuracy	0.1 – 9.9 V, ±2% of setting or ±0.05 V.		0.01 – 4.9 V, ±2% of setting or ±0.05 V.	
Power Measurement Range/Accuracy	0.1 – 9.9 kW, ±5% of setting or ±20W.		0.01 – 4.9 kW, ±5% of setting or ±20W.	
Alarms	Display alert, four user programmable AC/DC relays; audio alarm.			
Programmable Weld Energy Limit	Terminates weld energy when exceeding user defined current, voltage, or power limits.			
Weld Pre-Check	Inhibit second weld pulse when first test pulse exceeds user programmed limits.			
Active Part conditioner	First pulse current limit in constant power.			
<b>I/O AND DATA COMMUNICATIONS</b>				
Input	Input Isolation			
	All inputs and outputs are fully isolated.			
	Control Voltages			
	Selectable: +5V, +24V, sourcing or sinking inputs.			
	Foot Switch Initiation			
	1-level foot switch, 2-level foot switch.			
	Firing Switch Input			
Mechanical or opto firing switch.				
Remote Control	Remote weld schedule select, process inhibit, emergency stop.			
	RS232			
	Change weld schedules and individual parameters.			
	RS485			
	Change weld schedules and individual weld parameters; "Daisy Chain" unit to unit, unit(s) to host computer.			
Output	Electrode Voltage			
	Weld voltage signal for voltage feedback operation (0 to 10V peak).			
	Monitor			
	RS232/485 Weld data out			
Weld Head Air Valve Driver				
24 VAC, 1A; timing controlled by DC25 or UB25.				
Alarm Relays				
Four user-programmable mechanical relays; programmable normally open or normally closed contacts: 250 VAC at 5 A; 30 VDC at 5 A. Conditions: weld, end of weld, alarm, out of limits.				

# ORDERING GUIDE

Specify DC25 or UB25	Add XXX for voltages other than 115 VAC where XXX is the line voltage. Example: DC25/230 for 230 VAC operation.
Included Accessories	Weld cable bolts, D sub-connector, voltage sense cable, voltage sensor clip, manual, CE safety sheet.
Required Accessories	Weld head (see previous page); air, electromagnetic or foot actuation.
Optional Accessories	Datacom kit for DC25 and UB25 system including PC data logging software and interface cables for collecting current, voltage, and power weld data.

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