HF25 HIGH FREQUENCY
RESISTANCE WELDING POWER SUPPLY
WITH BUILT-IN MONITOR

• Precisely controlled DC energy for exact heating of small, miniature and micro-miniature parts.
• Ultra-fast (25kHz) closed-loop digital control and adaptive feedback for quick compensation of welding process variables.
• Built-in weld monitor with graphical display measures voltage, current, and power.
• Active Part Conditioning (APC) compensates for varying part conditions and oxide layers.
• Optional displacement monitor measures initial part thickness, set down, and final part thickness.
• User defined limits and alarms improve process control and provide feedback to operator.
• RS-232 and RS-485 I/O ports for remote weld schedule control and weld data output.
• Minimal menu levels mean easy to understand, intuitive user operation.
• Multiple weld-head interfaces increase application flexibility and weld force control.
• “Plug and go” operation automatically detects weld head type, firing switch, and foot switch.
• Built-in Weld Transformer simplifies installation and saves space.
High Reliability Microjoining
The HF25 power supply addresses the challenges of microjoining. Miniature welds are highly sensitive to small heat profile fluctuations in the resistance welding process; overheating deforms and destroys parts, while under heating results in weak, unacceptable bonds. To achieve consistent, reliable welds, precisely controlled heating is required. This necessitates superior control of the energy output.

The HF25 incorporates recent advances in high frequency switch mode power processing technology (HF-DC) and closed-loop digital feedback into a single unit. Closed-loop digital feedback simultaneously monitors and adjusts voltage, current, and power output by providing an exceptionally rapid response to fluctuations in the welding process. This, combined with high output resolution and ultra-fast-in-process compensation creates a well controlled heating profile.

Best Automation Control
The HF25 utilizes three phase input power and efficient control circuitry to provide exceptional energy delivery at high repetition rates. Easily accessible I/O connections and complete remote programming capability make the HF25 well suited to automated applications.

**EFFECTIVE WELD MONITORING AND PROCESS TOOLS**

**Pre-Weld Function**
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)**
First pulse adapts weld time to displace oxides then terminates allowing a second pulse with up-slope 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.

**Energy Limit Function**
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.
The HF25 is available with a built-in, fully integrated displacement monitor for use with Unitek Peco weld heads. A Linear Variable Differential Transformer (LVDT) provides displacement feedback to the HF25 and is easily mounted to Unitek Peco Series 80 Weld Heads. Relay outputs can be programmed to signal automation when any of the following limits are reached:

- Initial Thickness (Part Detection)
- Final Thickness
- Weld Displacement (Set Down)
- Energy Stop (Weld to Limit)

The Series 300 is available with a built-in, fully integrated displacement monitor for use with Unitek Peco weld heads. A Linear Variable Differential Transformer (LVDT) provides displacement feedback to the HF25 and is easily mounted to Unitek Peco Series 80 Weld Heads. Relay outputs can be programmed to signal automation when any of the following limits are reached:

- Initial Thickness (Part Detection)
- Final Thickness
- Weld Displacement (Set Down)
- Energy Stop (Weld to Limit)

Multi-function Feedback Modes

**Current Mode:** Will deliver the programmed current regardless of work piece resistance changes. Can compensate for slight changes in part thickness without affecting weld quality. Is best suited for welding flat parts where the part-to-part and electrode-to-part contact is controlled and consistent.

**Voltage Mode:** Controls the voltage across the work piece during welding. Helps to compensate for part misplacement and force problems. Automatically reduces weld splash, which is often associated with non-flat parts and wire welds. Ideal for welding round parts.

**Power Mode:** Precisely varies the weld current and voltage to supply consistent weld energy to the parts. Especially useful for breaking through surface oxides and plating. Should be considered for automated applications where part or electrode surface conditions can vary over time. Extends electrode life in automated applications.

**Series 300 Linear Actuated Weld Head**
The Series 300 is programmed electronically for precise and repeatable control over the rate of weld force application, static weld force, and dynamic follow-up force. The weld to displacement feature ensures consistent collapse (set down) of parts during welding. The force range is 2.0 to 20 lbs. (8.9 to 89 Newtons) weld force and 2.0 to 50 lbs. (8.9 to 222 Newtons) follow-up force.

**80A/EZ Precision Weld Head**
The Unitek Equipment 80 Series weld heads with either foot or patented EZ-AIR® actuation provide the fine levels of precision control required for microjoining applications from <0.001 inch (25 microns) to 0.04 inch (1mm) in diameter or thickness. The force range of the 80A/EZ is 0.25 to 20 lbs. (1.1-89 Newtons) EZ-AIR prevents overforce and guarantees force repeatability. The EZ-Clean feature permits easy electrode set-up and maintenance.

**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 <0.001 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.
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Nominal Line Voltage (3 phase) | 240 VAC | 400 VAC | 480 VAC
Line Voltage Range (VAC) | 192 to 280 | 200 to 350 | 283 to 358
Input Circuit Rating (per phase) | 2KA | 20A | 13A
Input KWA @ 3% duty cycle | 30kVA | 5.2V | 30kVA
Output KW @ maximum demand | 12kW | 12kW | 12kW
Output Transformer Voltage @ Maximum Rated Output Current | 5.7V | 5.7V | 5.7V
Open Circuit Maximum Output Voltage @ Nominal Line | 11.5V | 11.5V | 11.5V
Setting Ranges | Current – 50A to 2400A; Voltage – 0.2V to 10V; Power – 10W to 10kW
Output Current | 2400A @ 3% duty cycle
Output Feedback Response Time (Current, Voltage, Power) | 40 Microseconds
Output Regulation versus Line Voltage Variance | 2%
Output Regulation versus Load Resistance Variance | 2%
Output Repeatability Current, Voltage, Power @ Setting | 2%
Weld Period Ranges | All segments except squeeze and hold 0.10ms to 10ms, 0.1ms steps; 10 to 99ms, 1ms steps; squeeze and hold 0 to 999ms, 1ms steps
Weld Energy Setting Accuracy | Current: 2% of setting or 2kW, whichever is greater; Voltage: 2% of setting or 0.050V, whichever is greater; Power: 5% of setting or 20W, whichever is greater

FEATURES

WELD HEAT PROFILE CONTROL
Weld Pulse Control: Dual pulse with independent control of current, voltage or power 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 100 different weld schedules, protected from unauthorized changes.

BUILT-IN WELD MONITOR FUNCTIONS
Measurement Parameters: Independent monitor of current, voltage, power, and resistance on each pulse.
Graphic Display: Back-lit LDI displays programmed and actual weld current, voltage or power, upper and lower limits, and resistance.
Measurement Selection: Peak or average
Current Measurement Range/Accuracy: 50.0A to 2.400KA/±2% of reading or ±2A, whichever is greater.
Voltage Measurement Range/Accuracy: ±0.2V to ±9.999V/±2% of reading or ±0.050V, whichever is greater.
Power Measurement Range/Accuracy: ±0.01KW to ±9.999KW/±5% of reading or ±20W, whichever is greater.
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 allows second pulse to fire.

I/O AND DATA COMMUNICATIONS
Input Isolation: All inputs and outputs are fully isolated.
Remote weld schedule select, process inhibit, emergency stop.
Control Voltages: Selectable: +5V, +24V, sourcing or sinking inputs.
Remote Control: Remote weld schedule select, process inhibit, emergency stop.
Remote T/W/I Initiation: 2-level foot switch, 2-level foot switch, mechanical or opto firing switch.
Remote Head Air Valve Driver: 24 VAC, 1A, timing controlled by HF25. Operates new EZ-Air.
Weld Head Air Valve Driver: Change weld schedules and individual weld parameters; “Daisy Chain” unit to unit, unit(s) to host computer.
RS232: RS485: Change weld schedules and individual weld parameters; “Daisy Chain” unit to unit, unit(s) to host computer.
I/O Ports: RS232, RS485, Change weld schedules and individual weld parameters; ”Daisy Chain” unit to unit, unit(s) to host computer.
Weld Schedule Memory: 100 different weld schedules, protected from unauthorized changes.
Alarm Relays: Change weld schedules and individual weld parameters; ”Daisy Chain” unit to unit, unit(s) to host computer.
Active Part Conditioner: First pulse current limit in constant power allows second pulse to fire.

LVDT OPTION
Capabilites: Part detection, final thickness measurement, set down measurement, energy stop (weld to limit)
Accuracy of displacement readings (mm): ±0.003 (0.076)
Repeatability: ± 1.5 %
Maximum Travel (mm): 1 (25)
Alarm Relays: Additional conditions: Any LVDT, initial LRH, final LRH, displacement LRH, initial NC, displacement NC, energy stop
LVDT Mount: Attaches to Unitek Peco Series 80 weld heads

PHYSICAL CHARACTERISTICS
Dimensions (L x W x H) (inches): 18 x 9 x 12.8 (460 x 230 x 325)
Weight - Lbs (Kg): 18 (460)

ACCESSORIES ORDERING GUIDE
Included Accessories: All models listed above include: Control weld cable bolts, rear panel Phoenix connectors, voltage sense cable, manual, CE safety sheet.
Required Accessories: Weld head (See previous page); Foot switch or Foot Pedal.
Optional Accessories: HF25DC: Datacom kit for HF25, PC data logging software and interface cables for collecting current, voltage, and power weld data; microscope.
Built in LVDT option includes hardware and software, interface cable, LVDT and mount for Series 80 weld head.