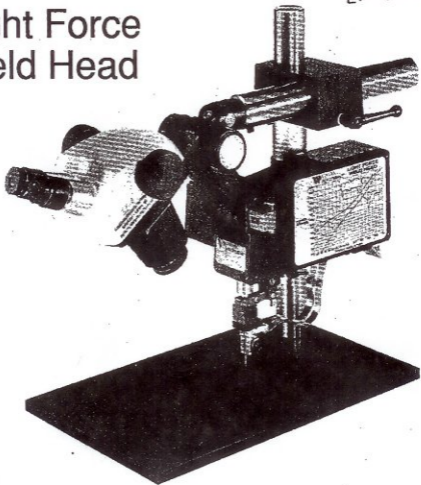


USER'S MANUAL
No. 990-1-135

UNITEK
EQUIPMENT™

EM-00981

Light Force Weld Head



Model 50F	Stock No. 2-162-01	Model 50A/UB	Stock No. 2-163-01-02
Model 50F/UB	Stock No. 2-162-01-01	Model 50A/UB/24	Stock No. 2-163-01-03
Model 50F/RF	Stock No. 2-162-01-02	Model 50A/RF	Stock No. 2-163-01-04
Model 50F/LRF	Stock No. 2-162-01-03	Model 50A/RF/24	Stock No. 2-163-01-05
Model 50A	Stock No. 2-163-01	Model 50A/LRF	Stock No. 2-163-01-06
Model 50A/24	Stock No. 2-163-01-01	Model 50A/LRF/24	Stock No. 2-163-01-07

1.00. DESCRIPTION

1.01. SERIES DESCRIPTION - The Unitek Equipment Series 50 are precision, low inertia, heads designed for a wide variety of delicate, parallel gap welding and reflow soldering applications. True vertical electrode motion, a Series 50 feature, eliminates electrode wiping action at all welding levels and may increase electrode life. Targeting the workpiece is made easier with true vertical motion. The 3/4 inch vertical stroke permits easy access into deep packages. A low mass spring and compound lever force system ensures accurate, repeatable welding force in the 40/125 to 1000 gram-force (g_{mf}) range. The mechanism is designed so that the workpieces and electrodes will not be subjected to forces in excess of the Preset Force. Excessive welding force is a major cause of bond failure or inconsistent bonds, and short electrode life.

1.01.1. The Series 50 Heads are available in four different electrode configurations. Each configuration can be foot pedal or air actuated. The Baseplate and Optic Mounting Assembly provide a stable work place and impose little restriction on the size of the workpiece. Machined mounting surfaces on the left hand side and top of the Head allow them to be easily incorporated into a custom machine or work station.

1.01.2. A selection of electrodes and thermodes allows welding or reflow soldering on devices such as semiconductor, thick film ceramic substrates, or printed circuit boards.

1.01.3. The Welding Force is set by turning the knob located on the front of the weld head. A Force Curve, located on the right-hand side of the cover, converts the Digital Counter Readings to grams-force. Calibration is set at the factory and does not change with time.

1.01.4. All Series 50 Heads are supplied with a Baseplate, Optic Mounting Assembly, Model CP Cable Pedal, Voltage Sensing/Thermocouple Sensing Cable, and #2 AWG Welding cables. Optional Work Holders and Optic Accessories are available.

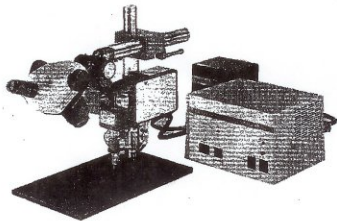


Figure 1 - Model 50F Light Force Weld Head with optional Microscope and Unibond II(R) Constant Voltage Power Supply.

1.02. FOOT ACTUATED SERIES 50 HEADS

1.02.1. Foot actuation allows the operator to control the rate of electrode descent. Targeting of micro or sub-miniature workpieces is generally easier using foot actuation. Four different electrode configurations, each designed for different welding or reflow soldering applications comprise the Series 50 Foot Actuated Heads. The table below lists the features of each model:

Model	Stock Number	Electrode Holder	Electrode Type	Application
50F	2-162-01	HE50	Unitip	Welding
50F/UB	2-162-01-01	HE50UB	Unibond	Welding
50F/RF	2-162-01-02	HE50RF	Thermode	Reflow
50F/LRF	2-162-01-03	HE50LRF	Thermode	Reflow

1.03. MODEL 50F, LIGHT FORCE WELD HEAD

1.03.1. Model 50F, Stock Number 2-162-01, uses only Unitip(R) electrodes for micro-welding. Applications include welding gold or copper ribbon as thin as 0.0003 inch to make interconnections in microwave and hybrid packages, and welding sub-miniature components such as beam lead diodes to flexible printed circuit boards and ceramic substrates. Welding Force is adjustable from 40 to 1000 gaf. The Model 50F is normally used with the Unibond(R) II Power Supply. Voltage sensing wires, connected to the HE50 Electrode Holder, provide the feedback required by the Unibond II Power Supply.

1.03.2. Model HE50 Electrode Holder, Stock Number 12-077-01, standard on the 50F, is a low inertia, compliant electrode holder which ensures that the Unitip electrode will maintain the Preset Force on the workpiece as it deforms during the welding process. The HE50 compliance feature functions in the Preset Force range from 40 to 125 gaf.

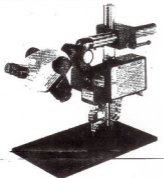


Figure 2 - Model 50F Light Force Weld Head shown with optional optic.

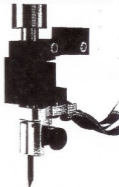


Figure 3 - Close-up of the Model HE50 Unitip Electrode Holder with Model UTM 112C Unitip Electrode.

1.04. MODEL 50F/UB, LIGHT FORCE WELD HEAD WITH PARALLEL GAP ADJUSTMENT

1.04.1. Model 50F/UB, Stock Number 2-162-01-01, uses parallel gap Unibond electrodes. Applications include fine wire or ribbon bonding and tacking of hybrid lids to their packages in preparation for seam sealing. Welding Force is adjustable from 125 to 1000 *gmf*. The Model 50F/UB can be used with Unibond II Power Supply or the Models 60 and 125 Stored Energy Power Supplies.

1.04.2. Model HE50UB Unibond Electrode Holder, Stock Number 12-078-01, standard on the 50F/UB, features flexures which allow the Unibond electrodes to conform to uneven work surfaces. The Electrode Gap Adjustment Knob feature permits a 0.040 inch maximum electrode gap spacing.

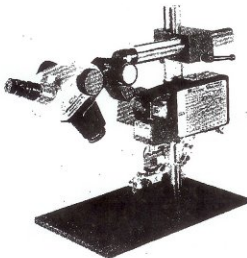


Figure 4 - Model 50F/UB Light Force Weld Head shown with optional Optic.

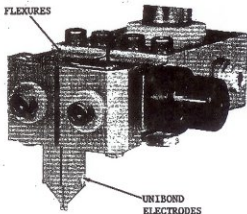


Figure 5 - Close-up of the Model HE50UB Unibond Electrode Holder with Unibond Electrodes.

1.05. MODEL 50F/RF, REFLOW SOLDERING HEAD

1.05.1. Model 50F/RF, Stock Number 2-162-01-02, uses single point and small reflow soldering tips called thermodes. Applications include sub-miniature wire bonding, multiple lead bonding, and inter-ocular lens staving. The Reflow Soldering Force is adjustable from 125 to 1000 *gmf*. The Model 50F/RF is used with the Phasemaster IV, Time-at-Temperature Control, and one of two output transformers.

1.05.2. Model HESORF Thermode Holder, Stock Number 12-079-01, standard on the 50F/RF, should only be used with the 17P Series of Single Point Thermodes, 17M Series of non-thermocouple controlled Blade Thermodes, and the 17BM Series of Blade Thermodes. Blade Thermodes wider than 0.380 inches should use the Unitek Equipment Model 87 Reflow Soldering Head since they generally require more than 1 *Kgf* reflow force to produce a good, multiple lead, reflow joint. The HESORF does not use flexures since thermode follow-up is not critical to making a reflow soldering joint. In addition, long time-at-temperatures of one to three seconds can cause flexures to anneal which radically reduces their life.

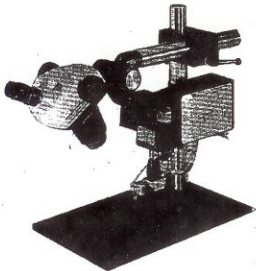


Figure 6 - Model 50F/RF Reflow Soldering Head shown with optional Optic.

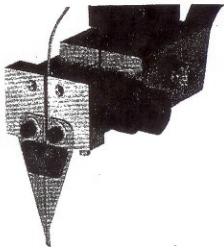


Figure 7 - Close-up of the Model HE50RF Thermode Holder with a Model 17BM070 Blade Thermode.

1.06 MODEL 50F/LRF, LIGHT FORCE REFLOW SOLDERING HEAD

1.061. Model 50F/LRF, Stock Number 2-162-01-03, uses only single point thermodes. Applications include TAB (Tape Automated Bonding) solder joint repair and gold to gold thermocompression bonding. The Reflow Soldering Force is adjustable from 40 to 1000 gf. The Model 50F/LRF is used with the Phasemaster IV, Time-at-Temperature Control, and one of several output transformers.

1.06.2. Model HE50LRF Thermode Holder, Stock Number 12-080-01, standard on the 50F/LRF, can only be used with the 17T Series of Micro-miniature Single Point Thermodes. The following table lists the recommended thermodes, all thermode holders, and application uses:

Model	Thermode Holder	Application
17T08/10	HE50LRF	Thermocompression bonding
17P20	HE50RF	Single Point Reflow
17P40	HE50RF	Single Point Reflow
17P50	HE50RF	Single Point Reflow
17P75	HE50RF	Single Point Reflow
17P93	HE50RF	Single Point Reflow
17SR40	HE50RF	Single Point Reflow
17M300	HE50RF	PCB Trace Repair
17BM070	HE50RF	Multiple Lead Reflow
17EM180	HE50RF	Multiple Lead Reflow
17BM360	HE50RF	Multiple Lead Reflow



Figure 8 - Close-up of the Model HE50LRF Thermode Holder with a 17T08/10 Single Point Thermode.

1.07. AIR ACTUATED SERIES 50 WELD AND REFLOW SOLDERING HEADS

1.07.1. All Series 50 heads can be ordered with air actuation already installed. Air actuation makes it easier to incorporate the Series 50 Heads into automated systems. An air cylinder replaces the Model CF Cable Pedal as the actuation source. The speed of the air actuated system is limited by the speed at which the electrode holder can move without damaging the electrodes, thermodes, or workpieces as a result of the impact.

1.07.2. 115 VAC and 24 VAC Solenoid Valves are offered. A 3/4 inch Air Cylinder, with two Flow Controls, is mounted on the rear of the head using adaptor hardware which is supplied with the Air Kit. A separate housing contains a Four-Way Air Solenoid Valve, a Pressure Gauge, and a Pressure Regulator which ensures easy control of the electrode holder. The two Flow Controls on the Air Cylinder allow independent adjustment of the up and down speed of the electrode holder. Model 50AK, 115 VAC Air Kit, and Model 50AK/24, 24 VAC Air Kit, can be ordered to convert existing foot pedal models to air actuated models. Air actuated model and stock numbers for each head type are listed below:

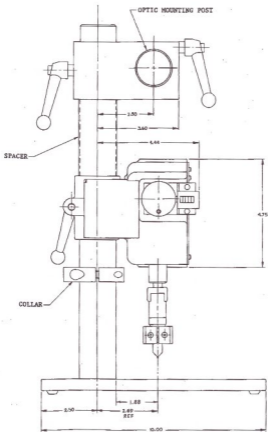
Model	Stock Number	Electrode Holder	Electrode Type	Application
50A	2-163-01	HES0	Unitip	Welding
50A/24	2-163-01-01	HES0	Unitip	Welding
50A/UB	2-163-01-02	HES0UB	Unibond	Welding
50AUB/24	2-163-01-03	HES0UB	Unibond	Welding
50A/RF	2-163-01-04	HES0RF	Reflow	Reflow Soldering
50ARF/24	2-163-01-05	HES0RF	Reflow	Reflow Soldering
50A/LRF	2-163-01-06	HES0LRF	Reflow	Thermocompression Bonding
50ALRF/24	2-163-01-07	HES0LRF	Reflow	Thermocompression Bonding

1.07.3. The Model Unibond II, Model 60, and Model 125 Power Supplies require that the Model FSAC Footswitch be used to energize the Four-Way Air Solenoid Valve.

1.07.4. The Phasemaster IV Time-At-Temperature Control has a 115 and 24 VAC Valve Output for energizing and controlling the timing of the Air Solenoid Valve. The Model FS2L Footswitch is used to initiate the PM4.

1.07.5. SPECIFICATIONS FOR AIR ACTUATION

Description	Specification
Air Pressure Line	65 psi. maximum.
Repetition Rate	.5 weld per second
Solenoid Voltage	Either 115V or 24V, 50/60 Hz.
Air Cylinder Diameter	3/4 inch (19 mm) bore.
Regulator Output	35 psi maximum.
Regulator Gauges	1 x 50 psi.



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