

# WEST-BOND<sup>®</sup> INC.

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## **Specifications: Model 7440E Series Insulated Wire Bonders, Manual X-Y-Z**

*Last Revised: 09/19/18 - microscope*

The machines of West-Bond's Model 7440E Series are dedicated ultrasonic wire bonders for interconnecting insulated, gold plated, copper wire to thin film sliders or Flex-Circuits of Computer Disk Drives, or for other similar insulated wire connection applications.

These machines bond insulated wires of 0.0007 to 0.002 inch diameter directly to thin film gold without the need to first strip off the insulation. This is accomplished by a specially designed wedge tool applied with programmed ultrasonic energy, force, and time, to soften and disperse insulation, then to bond the exposed wire to the work piece metallization. West-Bond's unique single lever X-Y-Z micromanipulator makes it possible to use this process for bonding disk sliders by enabling the operator to engage a free standing end of a twisted wire pair in mid air and direct that end to touch down on the work piece at the bond target, all under microscope observation. Touchdown is sensed by the machine to initiate the bond program.

Embodied in this series is a new and unique West-Bond three-axis micromanipulator in which the entire mechanism is arrayed above the work plane, so that there is now no limit to the size of a work piece. Each of the X, Y, and Z axes is straight-line and purely orthogonal, and each can be braked pneumatically on signal. In this application, all axes are braked during the ultrasonic bond time to aid operator control. Dual counterweights balance the pantograph arm and the tool support individually, and they are complemented by an adjustable spring to counterbalance different tool assemblies. The resulting feel and balance are the best of all the model series.

It should be understood that the pneumatic axis brakes cannot prevent deliberate efforts at movement, but that they are a significant aid in maintaining correct tool to work contact during bonding.

Range of movement of the tool by manipulator control is 0.5625 in. vertically and 0.6250 in. in horizontal directions.

The tool assembly is mounted on a four-bar linkage, like the "B" Series, so the tool remains vertical and can be extended down to any position that tunes ultrasonically. In standard arrangement, the extended tool provides clearance of 0.28125 in. under the ultrasonic transducer stack, and 0.3750 in. everywhere else above the work plane. Rigid bearing mounts, rather than taper loading, fix the strut bar of this assembly so that any required bond force can be applied. The standard set of force springs generates 25 to 300 grams, and together with the work-sensing firing switch, are built into the four-bar linkage. Wire feed mechanism is omitted, as wire is positioned manually by the operator.

The ultrasonic transducer is K~Sine Model 26-D, one half wave in length, operating at a nominal frequency of 63 KHZ. The built in ultrasonic power supply is K~Sine Part No. 7086, five Watts.

Controls on the machine panel include:

- Digital potentiometers to adjust ultrasonic power and time.
- A test switch and indicator light to verify that the transducer is operating in resonance.
- An LCD display to show the count of bonds done by this tool for the purpose of changing tools within the wear limit.
- Selector switch to enable or silence the beeper. When enabled, the beeper is on for the duration of the ultrasonic pulse.
- On-off power switch.

The microscope recommended for this model is either the Olympus SZ51-60E with the "Luxuray" LED illuminator #10265. Neither microscope nor illuminator is included. One bonding wedge tool is included.

No work holder is supplied as work piece fixturing is normally done by the user. For information for this purpose, the distance from the platform (if included) to the work elevation is 2.6875". The work platform is a bolt-on assembly.

The mechanism of this series was designed to mount above a customer's work handling system, to be confined entirely above the work plane, and so not to have any base or work platform. In this configuration, models of this series are designated as "7~~~EX". For use as stand-alone complete bonding machines, the mechanism will be completed with a plain base and the bolt-on work platform from "C" Series, and will be designated as "7~~~E". An adjustable height platform, Feature -79C, is available as an option for "E" machines.

In either the "E" or the "EX" configurations, an optional control arm is included to move the single control point five inches vertically from its normal position near the machine base to a new location above the work plane. When the high control location is used, the customer must provide a suitable operator's forearm rest. This is essential both for the operator's safety and comfort, and to provide a stable platform from which to direct control motions with the accuracy required for wire bonding.

Mounting points for the "EX" version of this mechanism are provided at two foot locations at the work plane elevation 5.000 in. above table surface, approximately 22.000 in. apart, and 10.000 in. to the rear of the work point. Alternately, the mechanism can be mounted at a single location at the rear of the main plate, 0.3750 in. above the work plane; however, preferably in combination with one of the two side mounts.

#### **Definitions of complete stand-alone Models of the Insulated Wire Bonder Series:**

- **Model No. 7440E.** This machine described herein.
- **Model No. 7445E.** This machine with K~45-W Ultrasonic Transducer, Part No. 8841, and Power Supply, Part No. 8347, capable of delivering 20 watts and force range increased to 2 pounds for bonding of Insulated Wire up to 6 mils, or 34 Gauge, in diameter. Ultrasonic energy is delivered as two pulses, each having individual control of power and time. Bond counter is eliminated.

#### **Definitions of Models of the Insulated Wire Bonder Series without base or work platform:**

- **Model No. 7440EX.** This machine described herein, less base.
- **Model No. 7445EX.** This machine, less base, but with K~45-W Ultrasonic Transducer, Part No. 8841, and Power Supply, Part No. 8347, capable of delivering 20 watts and with force range increased to 2 pounds for bonding of Insulated Wire up to 6 mils, or 34 Gauge, in diameter. Ultrasonic energy is delivered as two pulses, each having individual control of power and time. Bond counter is eliminated.

#### **Features available for this Series:**

- **Feature No. 79.** Adjustable height work platform. ("E" Models only).

Compressed air, regulated to 50 psig, is required. Connection is via 1/4-inch tubing.

Electrical service required is 50-60 Hz, single phase, normally 115 VAC but configurable at the factory for 230 VAC. A fuse and three-prong power cord connector are provided for 115 VAC: For 230 VAC, these must be changed to conform to local requirements.

"E" Series machine size is 24.0" wide x 21.250" deep x 11.625" high, exclusive of microscope, or 15.0" in height to scope eyepieces. Weight is 60 lb. uncrated, or 140 lb. accessorized and crated.

"EX" Series machine size is 22.312" wide x 14.625" deep x 6.625" high above work plane, exclusive of microscope, or 10.0" high from work plane to scope eyepieces. Weight is 40 lb. uncrated, or 115 lb. accessorized and crated.

7445 Models, both "E" and "EX" Series, require the electrical power supply to be packaged in a separate enclosure 8.75"wide x 8.00 deep x 3.00 high.