SPECIFICATIONS

Shinkawa

REF.No. A1-SE10091-01s

DATE March 2, 2007

MODEL

WIRE BONDER UTC-2000

Ⅰ. OUTLINE

This is a fully automatic wire bonder for lead frame type IC, LSI and substrate such as BGA.

1. Lighter XY table and bonding head with low gravity center enable high speed bonding..

2. With implementation of Non-Reaction Servo system (NRS) and other vibration measures as well as further optimization of control system, super-low vibration operation achieved to allow stable, high precision bonding.

3. The employment of a dual camera system having a special magnification on each of the die and the lead side achieves both highly accurate die positional detection and high speed lead locating.

4. Teaching of bonding points is facilitated through the automatic bond point teaching system. Besides, the high precision automatic centering function ensures accurate setting of bonding positions.

5. Windows based GUI menus facilitate operation.

6. Reference Position System (RPS) installed automatically corrects the offset between the tool and the camera to ensure accurate bonding.

Ⅱ. APPLICATION

1. Width 20 – 80 mm
   (Width of transfer carrier is limited as 20 – 78 mm.)

2. Length 95 – 262 mm

3. Thickness Please specify one of the product-type from the following five groups.
(Product- type conversion requires additional conversion parts.)

(1) Standard lead frame type 0.07 – 0.3 mm

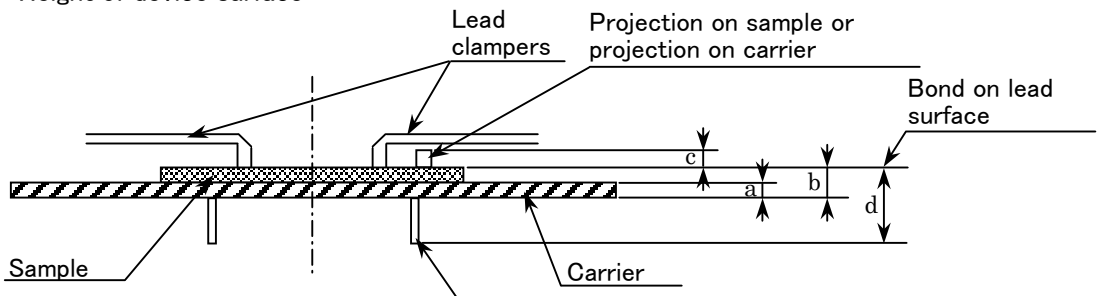
(2) Wide copper lead frame type 0.07 – 0.16 mm
(Width 50 – 70 mm)

(3) Thin substrate type 0.3 – 0.5 mm

(4) Thick substrate type 0.5 – 0.7 mm

(5) Transfer carrier 1.0 – 2.0 mm
(Custom-designed conversion parts are required for each product-type.)

4. Height of device surface



a : 1 – 2 mm
b : 3 mm or less
c : 1.2 mm or less
d : 5 mm or less

If the carrier design is such that devices are heated using projections provided on the paddle adapter and the device pitch exceeds 40 mm, preheating cannot be conducted sufficiently, and thus heating timer is necessary.

When a relief is provided for the projections on the back of the paddle adapter, the area of contact between the paddle adapter and the device must be 60% or more of the device's bond area.

There must be no projection just below the sample bond point.

5. Wire

Gold wire 15 – 38 μm. diameter

(Two-inch double flange spool is used.)

Ⅲ. PERFORMANCE AND FEATURES

1. Bonding method

Au wire thermosonic ball bonding system

2. Bonding speed

   60ms/wire with 2 mm long* (With loop control.)

3. Wire length

   Max. 8 mm*

4. Wire sway

   50 μm or less* / wiring length of 4.5 mm

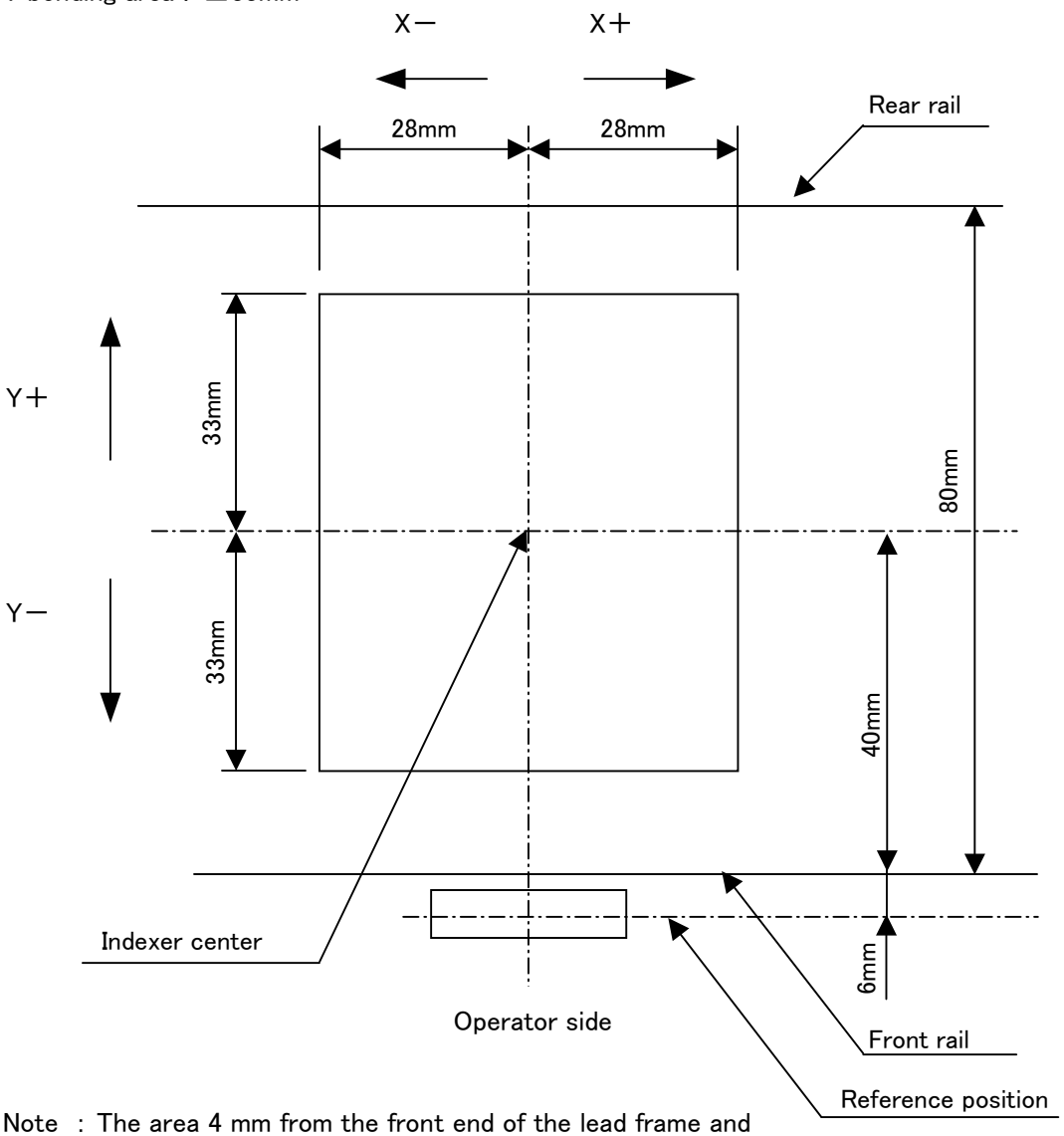
   Wire sway measuring function is provided.

Note* : The items with asterisks may vary according to the device condition.

5. Bonding area

   X bonding area : ±28mm

   Y bonding area : ±33mm



Note : The area 4 mm from the front end of the lead frame and 2.5 mm from the rear end is an area for indexing..

6. Bonding accuracy

±2.5 μm (3σ)

However, ±3.5 μm (3σ) for multi-dice setting.

7. Positional alignment

7.1 Alignment range

(1) Manual alignment

XY : ±5 mm

θ : No limitation

(2) Automatic alignment (when standard lens tube assembly used.)

Lead side { X : ±1.08 mm; Y : ±0.74 mm; θ : ±5° }

Die side { X : ±0.31 mm; Y : ±0.21 mm; θ : ±5° }

7.2 Alignment method

	Alignment method	Description
Lead side	2 points Alignment	XYθ
	1 point Alignment	XY
	0 point Alignment	XYθ
Pad side	2 points Alignment	XYθ
	1 point Alignment	XY
	0 point Alignment	XYθ

NOTE : Alignment method can be designated for each die for multiple chip devices.

8. Bond force time

3 – 150 ms (0.1 ms / step)

Settable for each bond point.

9. Bond force

30 – 2940 mN (1 mN / step)

{3 – 300 gf (0.1 gf / step)}

Settable for each bond point.

10. Search speed

1 – 80 mm/s (0.1 mm/s step)

Settable for each bond point.

11. Loop control
    (1) Effective loop modes are available for various type devices.
    (2) Loop mode is settable for each wire.
    (3) Bump and bump wire mode.

12. Bonding coordinates setting
    Interactive teaching method.

13. Automatic teaching
    Automatic pad/lead teaching
    Pads/leads locations are teachable where the pads are arranged in same direction with linear pitches.
    ●Automatic pad/lead centering function
    ●Automatic pad alignment function

14. Automatic offset correction function (RPS)
    The optical reference positioning system automatically corrects the offset between the camera and the tool.
    The intervals of offset corrections and its timing are programmable.

15. Z drive

(1)	Stroke	9.6 mm
(2)	Driving system	Swing linear motor.
(3)	Z axis resolution	0.1 μ m / step

16. XY drive

(1)	Driving system	Low-vibration linear motor
(2)	XY axes resolution	0.1 μ m / step

17. Transducer and ultrasonic generator

US power setting	50 – 999 steps (Programmable)
US oscillation time	0 – 50 ms (Programmable)
US output waveform mode	11 profiles (Programmable)

18. Wire feeding
    The wire supply mechanism based on rotary spool system will be installed independently of the bonding head and the wire feed amount will be detected by contactless sensor to ensure stable wire feed.
    Besides, the stop of wire feed will be detected by a contactless sensor to detect the wire end.

19. Wire clamper

Actuated by piezoelectric drive system.

20. Electric flame-off

(1) System : Fixed electrode system

(2) Electric flame-off

	Standard Specification
Spark Time	0.05～2.0 ms
Spark Current	10～80 mA

21. Illumination for pattern recognition

(1) Side lamp Fibber optics LED lamp. (Programmable)

(2) Coaxial lamp LED lamp. (Programmable)

22. Detection camera

1/3 inches CCD 2 pieces

23. Lens tube

	High magnification side	Low magnification side
Magnification	6×	1.75×
Depth of focus	±0.10mm	±0.40mm
Visual field	0.79×0.59 mm	2.70×2.03mm

24. Monitor TV

15 inches color LCD monitor

25. Pattern recognition

Patterns in the search area are compared with the reference pattern pre-stored in the memory, and the most matched one is detected as a target pattern to read its positional deviation.

25.1 Recognition system. Gray scale correlation system.

25.2 Search area (One zone detection setting)

Lead side X : Max. ±1.08 mm Y : Max. ±0.74 mm (Programmable)

Die side X : Max. ±0.31 mm Y : Max. ±0.21 mm (Programmable)

25.3 Recognition time

Average 0.11s or less /2 points. (Travel time in one zone detection setting included.)

25.4 Accuracy (High magnification side)

0.31 μm

25.5 Reference pattern

(1) Reference pattern size X,Y : 50 – 1200 μm (Programmable)

(2) Detection point Freely movable within the reference pattern area.

25.6 Lead locator

Incorporated with a function to directly detect deviation of leads.

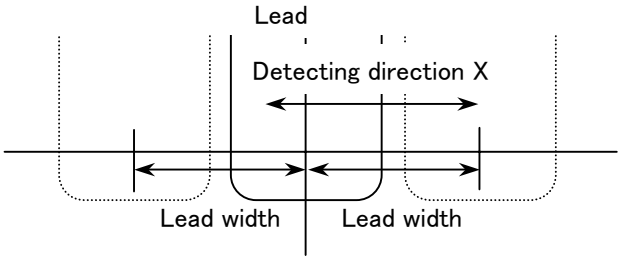
(1) Recognition method

Leads are located by searching their edges.

Positional deviation in X or Y direction is detected after recognizing lead's direction.

(2) Search area

A lead is detected on condition that its center line is located within the length of the lead width from the reference center line of the lead.



(3) Lead width 50 – 800 μm

(4) Lead locating time

Less than 2.5 ms/lead on condition that 16 leads are concurrently detected.

26. Post-wire-bond inspection (Option)

26.1 Inspection method Contactless inspection system through image reading.

26.2 Sampling method 100% inspection and sampling inspection are selectable.

(1) In sampling inspection, the interval is settable in the number of ICs, lead frames or magazines.

(2) Inspection items are selectable.

26.3 Inspection speed

(1) Ball inspection 5 ms max/ball (when all items are inspected)
(When 8 balls are detected simultaneously)

(2) Wire inspection 1.5 ms max/wire (when all items are inspected)
(When 16 wires are detected simultaneously)

26.4 Inspection items

The specifications in this section are finalized after conducting inspection test of each of your designated device.

26.4.1 Ball presence

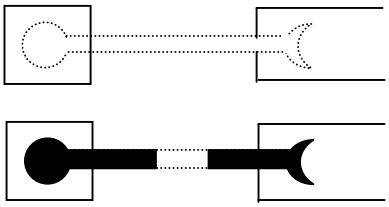
(1) The ball presence is detected on the designated pad.

(2) Inspection criteria

If an error is detected, the machine will be stopped after finishing the inspection..

26.4.2 Wire presence

(1) The wire presence is detected around the middle point between the designated pad and lead.
(A broken wire included.)



(2) Inspection criteria

If an error is detected, the machine will be stopped just after finishing the inspection.

27. Loader/unloader

(1) Full-automatic magazine stacker type

The magazine width, magazine length and center position are programmable according to product type.

(2) Magazine size

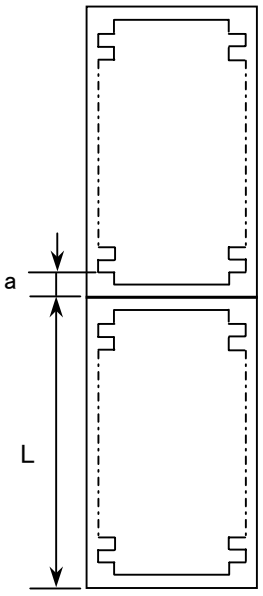
Width : 23 – 90 mm

Length : 110 – 265 mm

Height : L＋a≦212

L－a≧56

Note : Magazine length must be within 57 mm longer than the lead frame length.



(3) Width direction moving pitch

10 μm / steps, front and back independent setting.

(4) Longitudinal direction moving pitch

10 μm / steps

(5) Magazine up-down moving pitch

10 μm / steps

(6) Lead frames in a loader magazine are pushed out and supplied to the lead frame indexer by the digital lead frame pusher.

(7) The overload detection capability is provided to the lead frame pusher.

28. Indexer

(1) Universal indexer

Indexing rails are settable to the positions on the base of the center line of the heater block.

The IC pitch and the width of a lead frame can be programmed for every product type.

(2) Index system

Digital type clamp index system.

(3) Indexing pitch

Max. 71 mm (5 μm / steps)

(4) Width between guide rails

The width is settable through data input.

Settable range : 20 – 80 mm (10 μm / steps)

(Each rail location is individually settable.)

(5) Paddle adapter height adjustment

Height adjust system by data setting

Settable range : 2.4mm (10 μm / steps)

29. Conversion kit

(1) The lead clamper and the paddle adapter are custom-designed to accommodate each product type.

(2) Lead clamper

(a) Self align mechanism

(b) Quick change system (Tool-less)

(c) Universal for UTC-1000 and UTC-2000

Lead clamper for UTC-1000 can be used.

(3) Heater block

(a) Universal for UTC-1000 and UTC-2000

Heat block for UTC-1000 can be used.

(b) Heater block is heated with the cartridge heater.

Temperature range Room temperature – 300℃

(Programmable)

Three sets of temperature controllers and heater blocks enable setting three zones.

(c) Vacuum chuck function is provided.

Die pad size must be 36 mm^2 (□6 mm) or larger to use this function.

Vacuum source of −74 kPa{−550 mmHg} or less (gauge pressure) is required.

If vacuum source is not provided, CONVUM (Air/Vacuum converting unit) is available as an option.

30. Data management

30.1 Data storage

30.1.1 Data type

(1) Bonding parameters including taught data.

(2) Indexer related data.

30.1.2 Memory capacity

(1) Number of storable wires Max. 8000 wires.

(2) Product types to store Depends on the built-in hard disk capacity

・Built-in hard disk capacity: 80 GB or over

・The total of system software and stored product type data to be less than the built-in hard disk capacity

30.1.3 External data storage

(1) 3.5 inch micro floppy disk. (2HD)

(2) CD R/W

30.1.4 Others

(1) Data lock function.

(2) Limiter of bonding parameter setting range.

30.2 Communication interface (Option)

The machine can be connected with an external computer.

(1) Hardware link RS-232C, Ethernet

(2) Protocol SECS Ⅰ / SECSⅡ, HSMS (GEM)

31. Monitoring capabilities

(1) NSOP (nonstick on pad) detection

(Detection will be possible using devices that are conductive between the die pad and the back face during bonding.)

(2) Missing ball detection

(3) US power output level check

(4) Depleted wire detection

32. Bonding station monitoring microscope

(1) Type Stereo-microscope

(2) Magnification ×10.5 – 45

(3) Others Visual field is movable.

33. Information of production status

(1) Production status function

- Throughput (2 types settable)
- Machine run time and down time
- Spool Set length – remaining length
- Capillary Set count – remaining count
- Electrode Set count – remaining count

(2) Error status

- Motor error
- Index error
- Number of wire breakage errors
- Number of non-sticking detection errors
- Number of detection errors

(3) Measuring function (Manual measurement)

- Ball diameter
- Ball position
- Wire sway

(4) Operation log acquisition function

34. Signal tower for warning indication

(1) Warning indicated by three color lights.

(2) Available colors are red, yellow and green.

(3) The meaning of each color is programmable.

Ⅳ. PHYSICAL DIMENSIONS AND MASS

1. Machine base dimensions (W × D × H) 700 × 700 × 1420 mm
   Overall dimensions (W × D × H) 1075 × 910 × 1910 mm

2. Mass Approx. 590 kg

Ⅴ. UTILITIES

1. Power supply 100 VAC ±5%, Single phase 50 / 60 Hz
   (A stepdown transformer will be added and built in for different voltage. Option)

2. Power consumption Approx. 1000 W

3. Compressed air 500 kPa{5 kgf/cm^2} 60 l / min
   (105 l / min. when CONVUM. used.)

4. Vacuum pressure −74kPa{−550mmHg} or less (Gauge reading)

Configuration and specifications of this machine may be subject to partial modification without prior notice.

Ⅵ. MACHINE LAYOUT.