



Wire Bonder HB10 / HB16

Operation Manual

Version 4
www.tpt.de



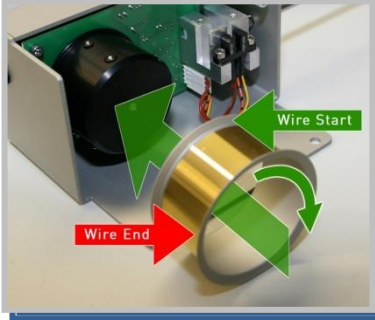
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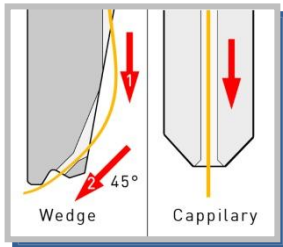
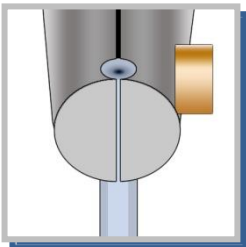
2. Quickstart



1. Switch on
Built in PC boot DOS and load software.
Software check motors and set clamp in middle position.
Bonder can be switch off at any time, last settings are save.



2. Loading wire to motorized wirespool
Thread wire to metal tube with the aid of thick wire with a hook
Then thread wire to glass tube at bondhead



3. Install Wedge Tool or Capillary
Tool have to be flush with the top of trasducer
tight tool with 35 Ncm
4. Thread wire to bond tool.



5. Tail adjustment
set bonder to Ball or Wedge bonding an check Tail parameter



6. Height and Y-way settings
go to menu „Axis Setup”
press „setup” and press bond button (start button) on control puck to measuring the bond heights. Set Loop height and Y-way parameters.
If you change parameters in menu „axis setup” you have to press „enter” to save change.



7. Place substrate to work holder
Make sure your bonding part is hold properly and plain to the surface



8. Go to menu „Bond”
set parameters for first and second bond.
move to first bond-surface and press and hold bond button on control puck,
hold button to stay on search height (200µ over surface) then you can target exactly.
Release button to bond.

3. Unpacking and Packing Instructions

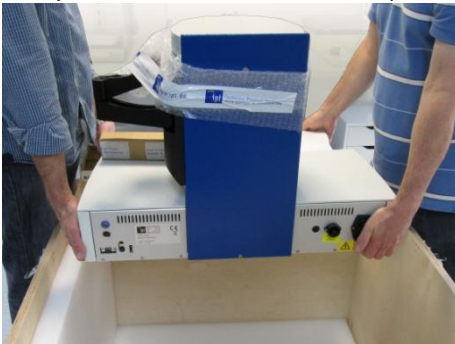
Unpacking Bonder



Remove accessory boxes and foam material



Always handle machine with two persons. Microscope arm can used as handle.



Do not touch bondhead!



Remove lock screw



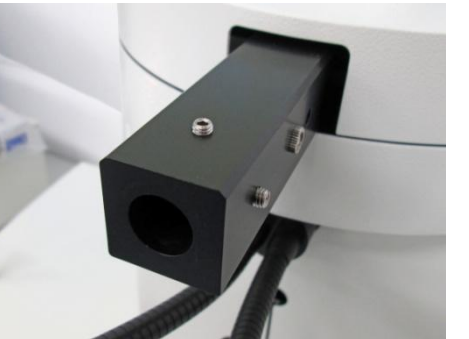
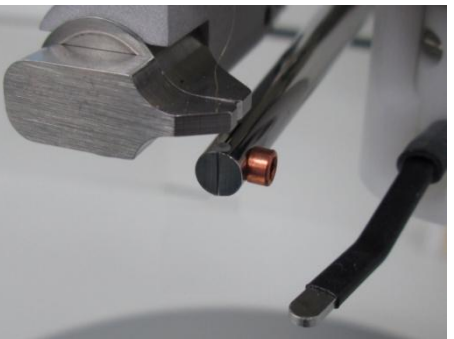
Remove cable tie from clamp



Remove protection foam



Allen keys, microscope holder screws and transducer screws are stored in tool box



Now you are ready for installation → see manual page 8.

4. Safety Instruction

1. Read Instruction:
All the safety and operation instructions should be read before the Bonder is operated.
2. Do not remove Safety Instruction from User Manual
3. When carrying the Bonder around, do not subject the Bonder to heavy shock or vibration. Two people needed for Transportation
4. The Bonder should be installed on a solid horizontal base

5. Power Sources: The Bonder be operated only from the power source indicated on the marking label.

The Bonder is equipped with a three-wire grounding plug
Do not defeat the safety purpose of the grounding plug.
Make sure grounding cable is connected

6. Protection Circuitry: The Bonder is equipped with two power line fuses at the power connector and one fuses inside behind the power connector SI 5 A ,

7. The Cover should only be opened after powering down the machine and removing the power cord from the wall outlet



8. Laser Spot Light, Attention!
Don't stare into the beam. Direct viewing into the Beam can cause permanent eye damage. Please note regulations according to EN 60825-1 and VBG 93 Laser class 2, P = 1mW



9. Hot machine parts:
The maximum temperature of heated Work holder is 250°C.
Allowing parts cooling down before replacing Heated Work holder, illumination lamps or any other hot machine part.



10. EFO (Electronic Flam Off) Only If Bonder is equip with EFO System
Do not touch the electrode or the wire during bonding or when manually firing the EFO.
11. **The System produces a High Voltage spark.** The potential shock hazard is not usually considered life threatening. However, TPT recommends that those persons with abnormal heart conditions or artificial heart stimulation devices (e.g. pacemakers) should not be permitted to operate or service this Bonder



12. Bonding Tools have sharp edges, beware of touching them.

13. All Service and maintenance should be performed by trained, authorized personnel.

4.1. Power-On

Before plugging the power cord into the A. C. power source, check the label located on the rear of the HB Bonder . If the label does not agree with the available A. C. power, do not plug in the power cord. Check the A. C. power socket for correct wiring.

POWER ON/OFF Switch is on back left side,
TFT Display light on indicate that POWER is on.

5. Introduction

The HB XX ultrasonic wire bonder is characterized by vertical feed of wire or ribbon, manual X-Y control of the work piece, HB08/08/10 is equip with motorized control of the Z Axis.

HB12/14/16 is equip with motorized control of the Z & Y Axis

All HBXX Bonder have the exclusive TFT Touch Panel Operation System.

This manual is designed to provide the operator with an understanding of the equipment operation, characteristic features of the bonder, adjustments available to insure the best results in wire bonding, and troubleshooting procedures for fault isolation and correction of malfunctions.

It is strongly recommended that all operations and maintenance people read this manual thoroughly, and obtain hands-on operating experience with the bonder. The precision and ease of operation of the equipment, and quality of the bonding will be better appreciated by using the bonder. Familiarity will also facilitate expeditious introduction of the equipment in production and enhance productivity.

HB06/12 is a manual/ semiautomatic thermo sonic wire or ribbon wedge bonder. This bonder was designed to make 0.5 to 3.0 mil gold or aluminum wire or up to 1.0 x 10. 0 mil gold or aluminum ribbon electrical interconnections on a wide range of microelectronic packages.

HB08/14 is a manual/ semiautomatic thermosonic wire ball bonder. This bonder was designed to make 0.7 to 2 mil gold wire electrical interconnections on a wide range of microelectronic packages.

HB10/16 is a manual/ semiautomatic thermosonic wire bonder for Wedge bonding, Ball bonding and Ball Bumping.

The HB Bonder is characterized by precision mechanism for manual X-Y control of the work platform and work piece, a semiautomatic Z & Y control of the bonding tool, and electronic control of the bonding variables (Force, Ultrasonic, Temperature and Time). Standard features designed into the HB include: Leica 6:1 Zoom Stereo-microscope with 20X eyepieces, and area illuminator; work stage with mechanical or vacuum clamping provisions. All Bond parameters and programs are operated with 6,5" TFT Touch Panel Display. A variety of options are available to enhance operability in special applications.

The design considerations were operator comfort and ease of operation, reliability of the bonding system, low inertial impact of the bonding tool, and operator safety. The mechanical assembly of the bonder consists of close tolerance bonder parts for precision operation and control. The electrical assembly is composed of highly reliable electronic components integrated into a modular assembly to facilitate ease of adjustment and troubleshooting.

6. Overview

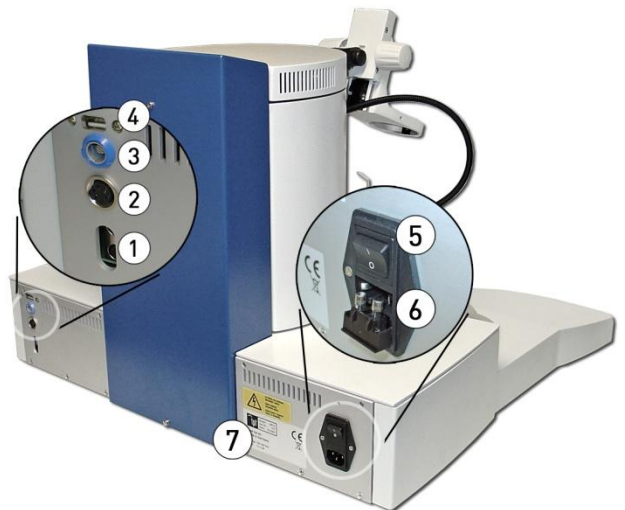
6.1. Front view

1. Bond head
2. 6,5" TFT Touch Panel Operator System Dual
3. Heater Stage
4. Control - Puck
5. Microscope
6. Motorized Wire-Spool
7. Fiber Optic Illuminator

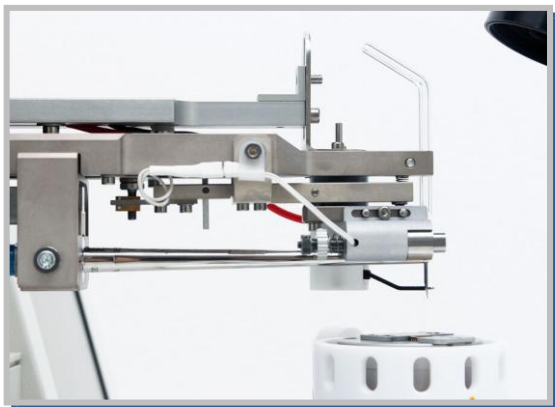


6.2. Back view

1. PC Keyboard and Mouse Connector
2. Manual Z- Connector (Option) see Page 38
3. Foot switch Stitch bonding
4. USB Connector
5. On / Off Switch
6. Power Connector AC 100V - 230V T 6,30 A Fuse
7. Serial number and Bonder type



Detailed view on Bondhead

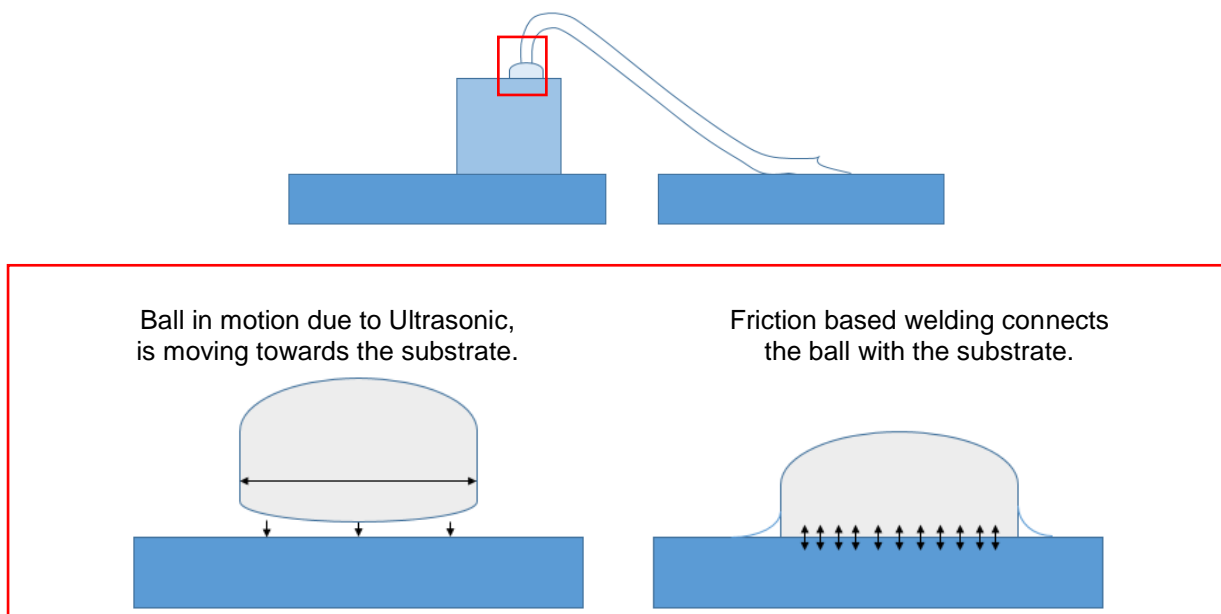


7. Basic Ultrasonic Bonding & Bond Modes

All TPT Bonders utilize the basic ultrasonic bonding method. Bonding two types of metals using the ultrasonic method results from three variables: force, ultrasonic power and time. If the HB16 is used for gold wire bonding, heat is used as a fourth variable. At this point these parameters will be explained briefly. The outcome of altering the variables will be explained in the referenced chapters.

- The force supports the plastic deformation and facilitates the coupling between the bonding tool, the wire and the substrate.
- The scrubbing effect of Ultrasonic (63,3kHz) displaces the contaminants on the surface and ensures metal to metal coupling. When using the Ballbond or Ball Bump option, altering the Ultrasonic also changes the size of the ball.
- The time has to be set sufficiently long to cause solid state diffusion.
- The heat support the ultrasonic. With more heat is less ultrasonic necessary.

Ultrasonic Bonding is a type of friction based welding, but it is not a process which uses high temperatures to fusion 2 metals. To connect the wire with the substrate, it is pressed onto the surface, while being moved laterally according to the settings of the ultrasonic, as shown in the illustrations below. If heat is used as a fourth variable the process is called Thermosonic Bonding



8. Bonding Tools

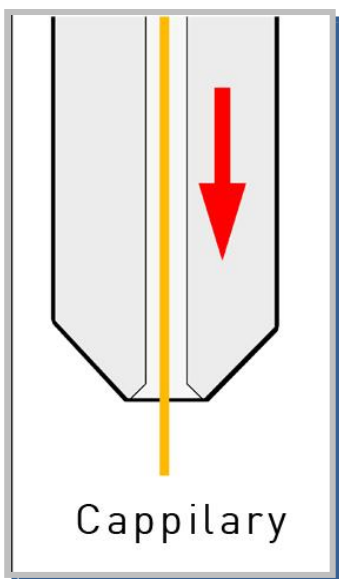
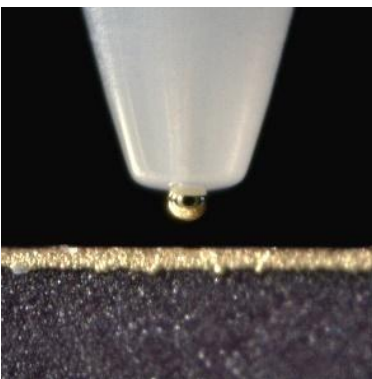
Capillary

- used to perform Ballbonds and Ball Bumps
- conic shape
- can be characterized by e.g. Hole Diameter, Tip Diameter, Chamfer Diameter
- use a suitable Capillary, considering the Wire Diameter, Wire type and Bond Diameter
- the wire diameter is a key factor to determine the optimized hole diameter it is necessary to utilize the optimized hole diameter to reach a high quality first bonding and loop

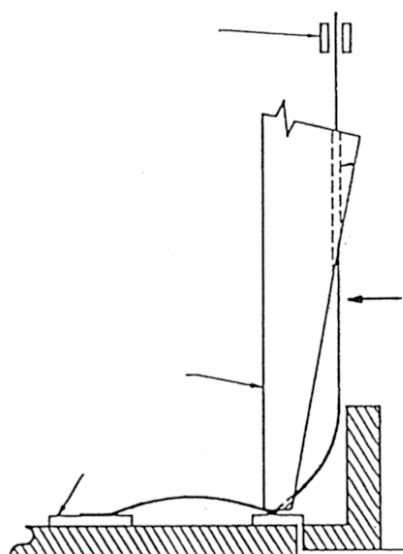
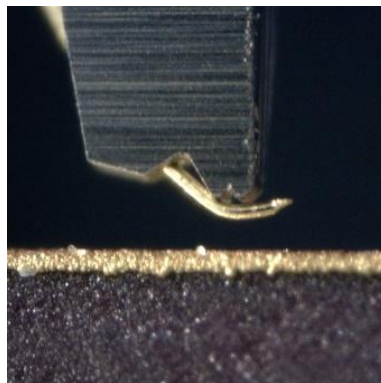
Wedge Tool

- used to perform Wedgebonds
- can be characterized by e.g. Hole Diameters, and angle
- there are different angles for the second hole, 30°,45°,60°
- 45° is the most common angle
- use a suitable Wedge Tool, considering the Wire Diameter, Wire type and Bond size
- the wire diameter is a key factor to determine the optimized hole diameter

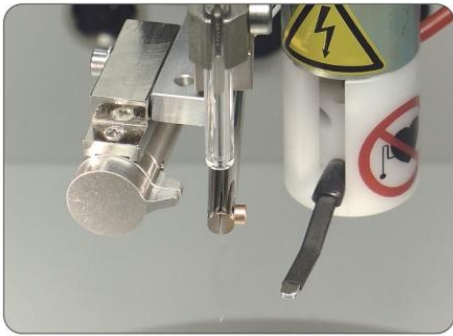
Capillary



Wedge Tool

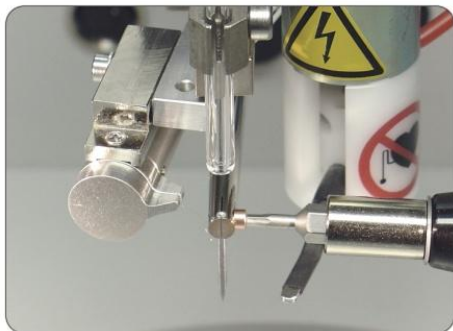


9. Tool Installation

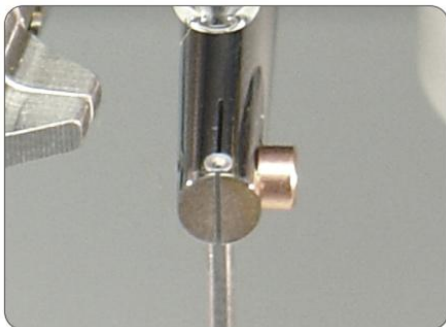


Remove the wire and carefully move the Clamp to the left side. It is recommended to use your right hand to push while buffering the movement using your left hand.

If there is already a Capillary or Wedge Tool in the transducer, make sure to secure it when you loosen the screw. Place the new tool in the transducer.



Tighten the screw using the Torque Wrench 35 cNm after you made sure that the tool is flush with the top of the transducer. To ensure high quality bonding it is mandatory that the tool is in a perfect position. If the tool is not fixed correctly, Ultrasonic vibrations may not be forwarded properly from the transducer into the tool, causing heavy bonding mistakes. Also make sure to only use original components of TPT.



When installing a Wedge Tool the positioning of the tool is an important factor. The spike of the tool has to face the user, the holes for the wire have to face the machine. It is recommended to use the microscope for an accurate adjustment. Carefully move the clamp back to its original position

The bonding tool is fitted into the 1/16 inch diameter hole in the ultrasonic transducer.

The top of the wedge tool must be flush with the top of the transducer.

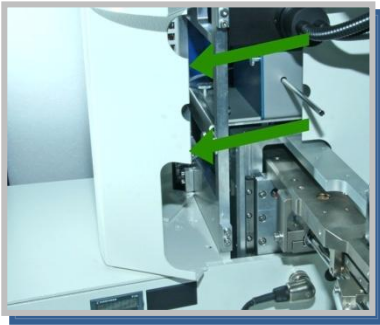
Secure by tightening the special set screw with Torque Wrench **35 cNm**.

Wedge bonding Tool: 1/16" dia. x 0.750 long bonding wedge with a '45 wire or ribbon feed angle is recommended.

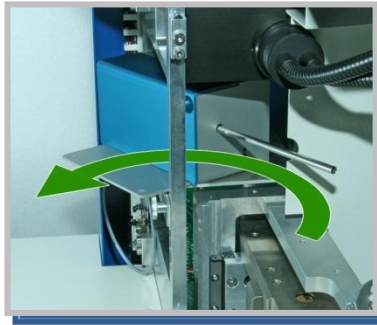
Ball Bond Tool : Capillary 1/16" dia. x 0.450 long is recommended

Refer to your tool supplier catalogue for the tool suitable for the specific application.

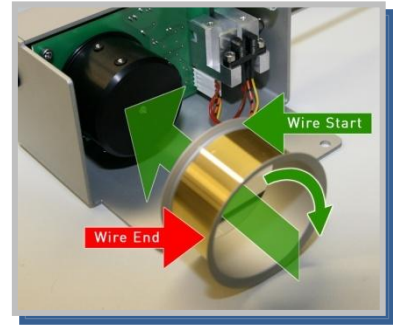
10. Loading Wire to Motorized Wire Spool



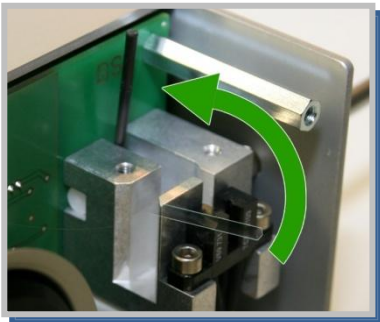
Open left cover



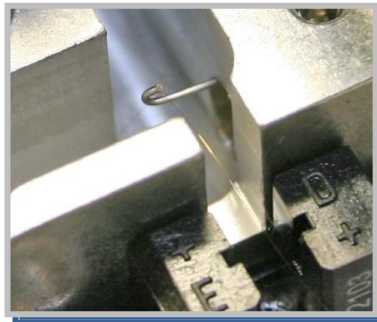
loosen set screws and remove Wire spool



slide wire spool at holder watch out for right spool orientation



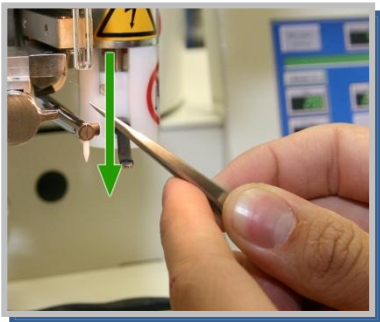
Lift up sensor bar to thread wire



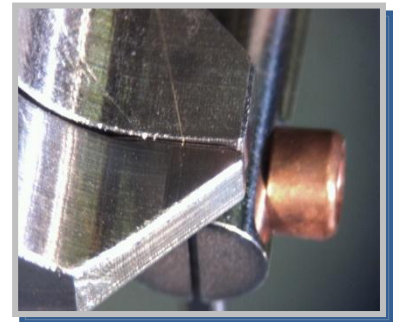
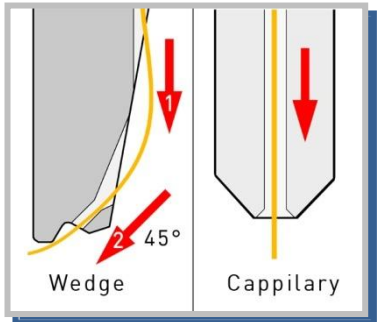
use hook from toolbox to pull wire through tube



move clamp aside and pull wire through glass tube



Use both hands to tread wire through bond tool.



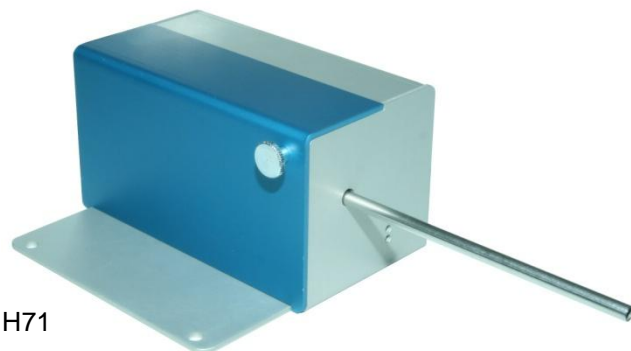
move clamp back make sure wire is in clamp

Explanation Video on Youtube:

"How to thread wire in wedge tool" https://youtu.be/-Ez8a4g_K-E

H71 motorized Wire Spool
H72 manual wire Spool

maximum Wire diameter is 50 μ / Ribbon until 100 x 20 μ
maximum Wire diameter is 100 μ / Ribbon until 250 x 25 μ



H71



H72

11. Control Puck



Figure 15 Control Puck

1. Bond Start button
2. Tail feed upwards
3. Tail feed downwards
4. Reset after first bond, by search height and by height setup

To abort bonding on search height you can do also,
Hold one feed Button (2/3) on search height and lift Bond button (1).

Control Puck "X-Y" Axis Control - 6 :1 ratio manipulator

12. Menu Bond Touch Panel Display



Bond Menu Start menu after Bonder switch on, to program all necessary parameters

Ready display green = Bonder OK
 Test USG button for test of US-Energy

Height Setup button for Auto height Set Up (see page 31) Reset with Feed Button

Loop H Loop Height

Y-way Auto button for Y-way adjustment (see page 25) *Only HB12/14/16 Bonder*

Bond 1 green = Bonder ready for 1st. Bond and switch for reset to 1st Bond
 U/S button for 1st. Bond US energy
 Time button for 1st. Bond time
 Force button for 1st. Bond force

Bond 2 green = Bonder ready for 2nd. Bond
 U/S button for 2nd. Bond US energy
 Time button for 2nd Bond time
 Force button for 2nd Bond force

Prog Button for Load new Programs
 Program Name Display and change Program Name
 Wedgebond program changed from Wedge-/-Ball/-Bump/ Pick & Place (Option)
 Bond Mode Full Automatic, Semi Automatic, Step, Manual (see next Page)

Clamp switch for Wire clamp open/closed
 Advanced Setting parameter for Setup, Tail, Loop and other Setting

All changed program values are automatic saved in displayed program number

13. Bonding Mode

1. Full Automatic : After **press and hold** Bond Button
Bond Tool is moving to 1st Bond Search Height.
After release Bond Button wire Bond is automatic made.
No possibility to correct position on 2nd Bond
2. Semi Automatic : After **press and hold** Bond Button
Bond Tool is moving to 1st Bond Search Height.
After release Bond Button 1st Bond is made and tool is moving
To Loop Height and Y-Distance .
After **press and hold** Bond Button
Bond Tool is moving to 2nd Bond Search Height
After release Bond Button 2nd Bond is made and Tool is moving
To Start Position (Work Height)
3. Step – Mode: With Bond Button Tool will be Step thru Tail Sequence
and Loop Sequence if any programmed
4. Manual Mode: **Only with Option H51 Manual Z-Control**
The Operator using Manual Z-Control to move Bond Tool to Bond surface.
After touching Bond surface 1st Bond is made automatically and Tool is rising 100 Microns.
Then Operator is moving Bond Tool by using Manual Z control
and X-Y Manipulator to 2nd Bond Position.
After touching Bond Surface 2nd Bond is Made and Tool is move back to Start Position



13.1. Dynamic Search and Stitch function (Option H52)



Dynamic Search adjustment:

Function only in Semiautomatic Mode
if Bonder is in search height position ,
Search height can be changed with button down/up

Dynamic bond length adjustment:

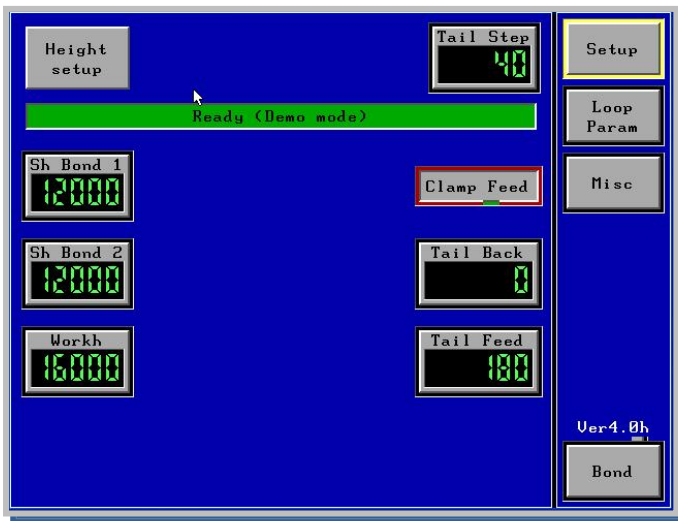
if Bonder is in Loop height position , Bond length (Y-Way) can be
changed with button down/up

Stitch function:

Stitch button has same function like foot switch

14. Menu Setup Wedge Bonder Touch Panel Display

Wedgebond Mode



Clamp Feed

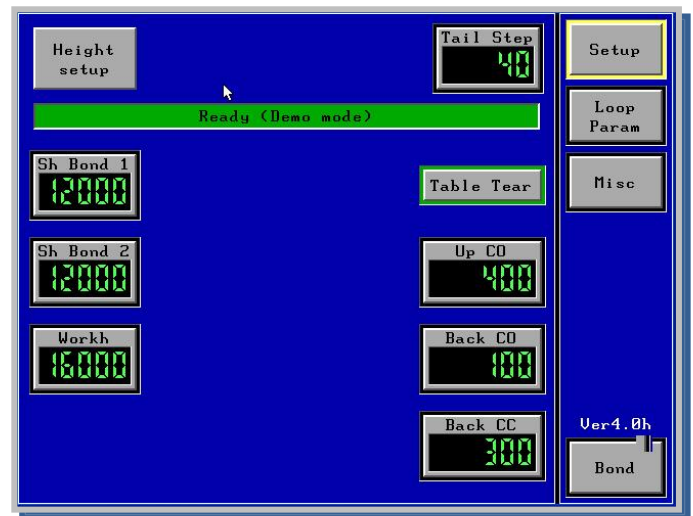


Table Tear

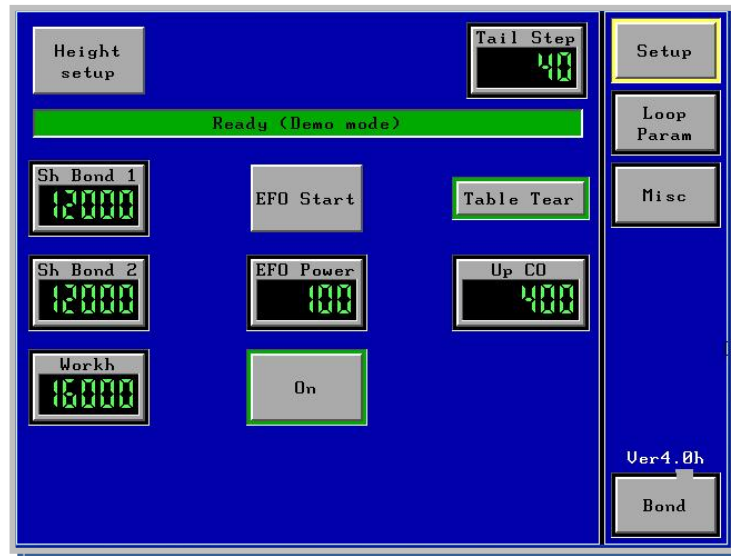
Menu Setup Wedge Bonder Figure 8

Setup	Setup Menu for Height adjustment, Tail adjustment and EFO adjustment
Tail Step	button to change Tail-Step distance for Wire feed switch
Loop Param	loop Parameter Menu for loop profile programming <i>Only HB12/14/16 Bonder</i>
Misc	Menu for light adjusted , and all parameter saved/load to USB & Bonder
Bond	Bond timer displayed, Motor speed and search speed Bondmenu, here are all Bond parameter displayed
Height Setup	button for Auto height Set Up (see page 33) Reset with Feed Button
Sh Bond 1	button for 1st. search height adjustment
Sh Bond 2	button for 2nd search height adjustment
Work h	button for upper work height position (Bond tool)
Table Tear	Change Tail Mode between "Table Tear" and "Clamp Feed"
Table Tear :	After second bond clamp, is still open and move upwards and backwards, then clamp is closing an cut wire by moving upwards or backwards.
Up CO	Clamp is open and bondhead move upwards (Z-way)
Back CO	Clamp is open and table move backwards (Y-way)
Back CC	Clamp is closed and table move backwards (Y-way) to cut wire
Clamp Feed :	After second bond clamp, is closed and move upwards to cut wire. On work height clamp feed wire for new tail.
Tail Back	to cut wire by moving clamp upwards (usually is "0")
Tail Feed	after bonding, on work height, clamp feed new tail (usually is "200")

All changed program values are automatic saved in displayed program number

15. Menu Setup Ball Bonder Touch Panel Display

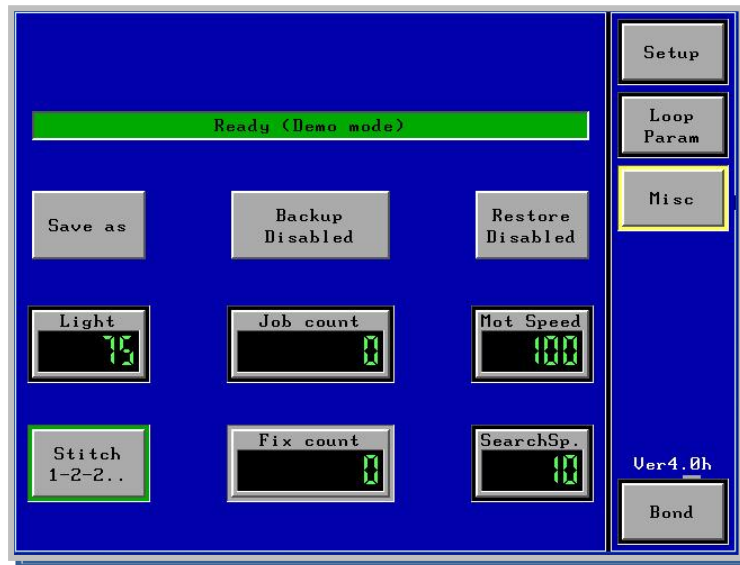
Ballbond Mode



Setup	Setup Menu for Height adjustment, Tail adjustment and EFO adjustment
Loop Param	loop Parameter Menu for loop profile programming <i>Only HB12/14/16 Bonder</i>
Misc	Menu for light adjusted , and all parameter saved/load to USB & Bonder
Bond	Bond timer displayed, Motor speed and search speed Bond menu, here are all Bond parameter displayed
Height Setup	button for Auto height Set Up (see page 33) Reset with Feed Button
Test USG	button for test of US-Energy
Sh Bond 1	button for 1st. search height adjustment
Sh Bond 2	button for 2nd search height adjustment
Work h	button for upper work height position (Bond tool)
Table Tear	Change Tail Mode between "Table Tear" and "Clamp Feed"
EFO Start	Button to activate EFO Wand (Only Ball Bonder)
EFO Power	Button for Value EFO Power/ Energy
ON/OFF	ON = EFO starts automatically after 2 nd Bond OFF = EFO start only by pushing Start button
Up CO	after second bond bondhead move this parameter upwards, then clamp is closing and cut the wire.

All changed program values are automatic saved in displayed program number

16. Menu Misc Touch Panel Display



Setup	Setup Menu for Height adjustment, Tail adjustment and EFO adjustment
Loop Param	loop Parameter Menu for loop profile programming <i>Only HB12/14/16 Bonder</i>
Misc	Menu for light adjusted , and all parameter saved/load to USB & Bonder
Bond	Bond timer displayed, Motor speed and search speed Bond menu, here are all Bond parameter displayed
Save as	Save Program to new program number
Backup	backup all programs to USB Stick
Restore	Restore all programs from USB Stick
Light	switch to set light value
Job Counter	reset able counter, push and hold 3 sec.
Fix Counter	Bond counter not reset able
Mot. Speed	button to change Motor speed from 20-100%
SearchSp.	to change search speed from 10 to 50%
Stitch	Button to change stitch Mode from 1-2-2 to 1-2-1

All changed program values are automatic saved in displayed program number

Only HB12/14/16 Bonder



Loop Profile Software can be used to create Loop shape with maximum 10 Steps

Setup	Setup Menu for Height adjustment, Tail adjustment and EFO adjustment
Loop Param	loop Parameter Menu for loop profile programming <i>Only HB12/14/16 Bonder</i>
Misc	Menu for light adjusted , and all parameter saved/load to USB & Bonder
Bond	Bond timer displayed, Motor speed and search speed
Arrow	Bond menu, here are all Bond parameter displayed
	Button to adjust direction of Bond head movement, ↑ Z up, ↓ Z down, → Y forward, ← Y backward
CO/CC	Movement with closed or open clamp
0000	travel distance in Micron

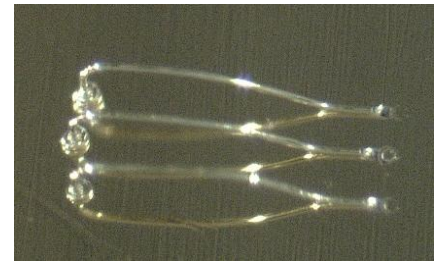
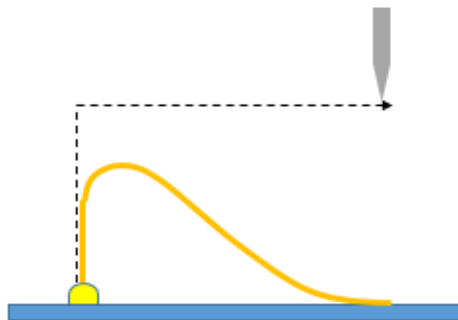
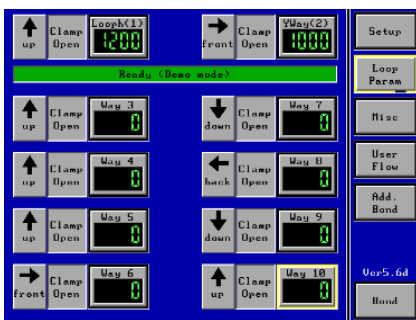
All changed program values are automatic saved in displayed program number

18. Loop Profile Samples

Different applications require different loop shapes. To perform the desired loop, it is necessary to fill in suitable values in the Advanced Settings - Loop Parameter Menu. Different shapes lead to different characteristics of the bond, for example increasing its stability. We will now provide you different Loop Shapes from basic settings to a more complex program of a bond. Therefore, this manual displays the path of the capillary, the necessary settings to perform that path and the Loop Shape as the output of the programming.

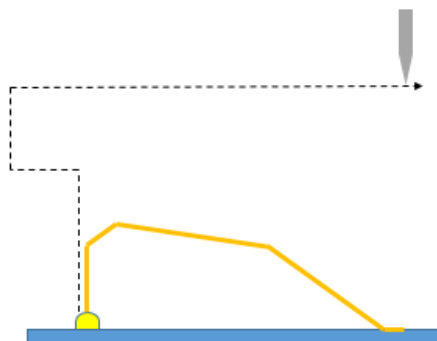
1. Basic Loop

By programming the capillary movement upwards and to the front, the operator will perform a Basic Loop. Increasing the value of way 2 will lead to a longer loop. Be aware that this may also cause an increasing amount of tension between the ball and the wire because the angle between those has also been changed. Aside from the tension, the longer the loop will be the more stability will be lost. The height of the loop can be adjusted by altering the value of way 1.



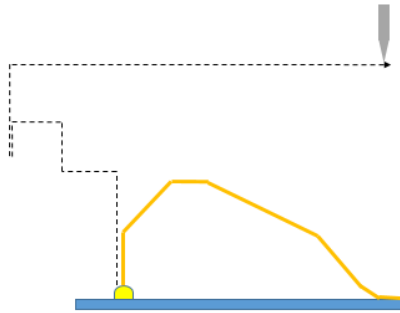
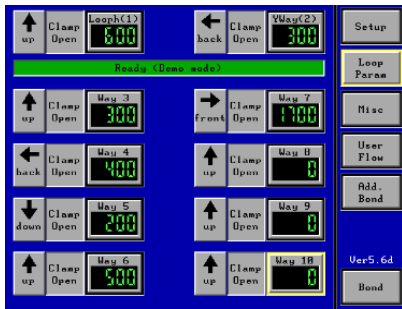
Reverse Loop

In addition to the Basic Loop, the capillary moves backwards before it reaches its desired height. The loop gets a more stable shape, provided by the new set of angles of the wire. With this shape it is possible to realize longer loops without losing its stability.



Double Reverse Loop

By adding another 3 steps it is possible to perform the

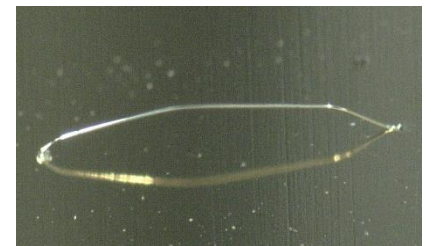
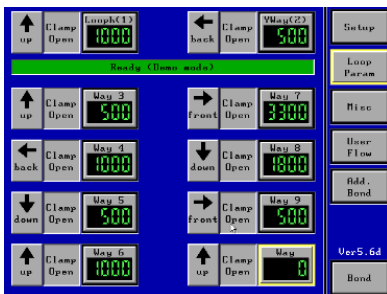


Double Reverse Loop. This loop is characterized by its curved shape. It is a very stable loop and also lowers the tension between the ball and the wire. This shape is also suitable for loops with a height gap between bond 1 and bond 2.

Value	Changes	Effect
Way 1	increasing	Loop height, same length
	decreasing	Flat loop, same length
Way 2	increasing	Loop is strained backwards, shorter length
	decreasing	Flat and longer loop, loss of angles
Way 3	increasing	Loop is strained backwards, more wire on same length
	decreasing	Flat loop, loss of angles
Way 4	increasing	Loop is strained backwards, bulbous and shorter loop
	decreasing	Longer and flat loop
Way 5	increasing	Flat loop, more tension between ball and wire
	decreasing	Higher loop
Way 6	increasing	Loop is strained backwards, bulbous loop, loss of angles
	decreasing	Flat loop, loss of angles
Way 7	increasing	Longer loop, tension between ball and wire increases
	decreasing	Loop is strained backwards and shorter

Long Loop

The Long Loop can be performed by moving the capillary downwards and to the front as the last program steps. This ensures a pulling effect on the bond, performing a long and flat loop. At the same time the added angles provide stability to the loop. However, the flatness causes tension between the ball and the wire. The flat shape of the loop is a result of a pulling effect (Way 9) on a very low Z-Level (determined by Way 8). By keeping all values unchanged and increasing the pulling variable, the loop becomes longer and more flat. If you desire a longer loop with the same characteristics, please make sure to adjust the other values.



19. Menu Keyboard Touch Panel Display



Figure 25

At any number field touch twice, Keyboard pad appears

Bond arm HB12/14/16 Bonder

- 19mm Wedge Bond tool
- 16 mm deep access
- 165 mm deep reach transducer
- 90° Bond Tool

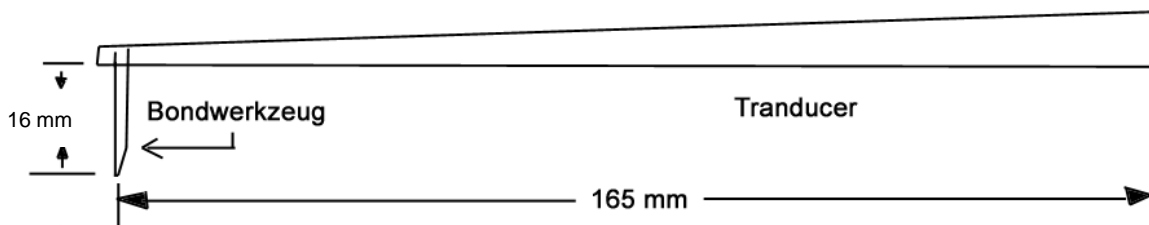


Figure 12

20. Pitch and Pad Size

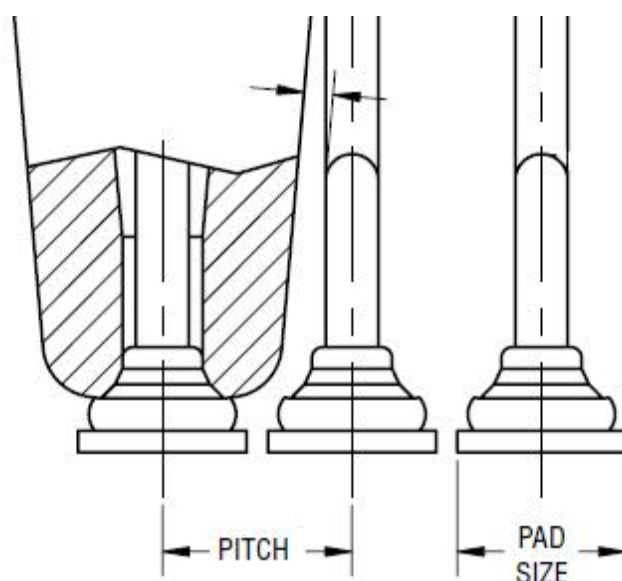
Pitch means the distance between the middle point of one bond to the next bond.

Notice: bonding is easier with bigger pitch and pad size.

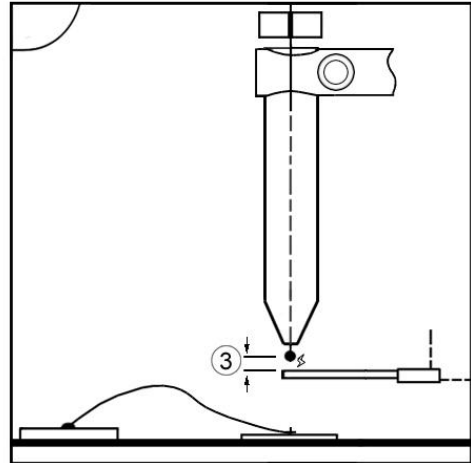
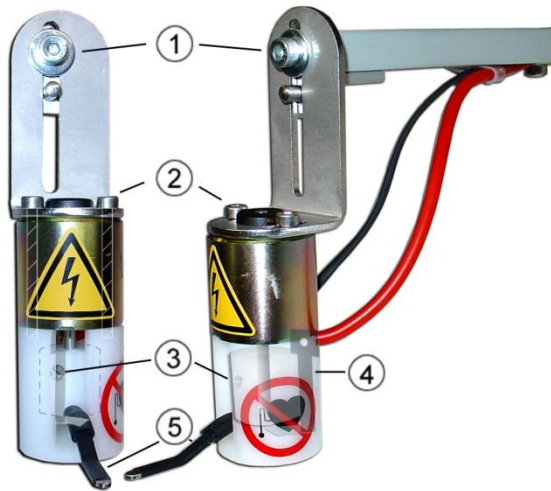
Smaller pitch and pad size is possible but you need special tools and optimize all conditions of parameter.

Standard Tools			
	Tool No.	Minimal Pad Size	Minimal Pitch
Ball 17µm	1572-10-437 GM	60µm Ø	120µm
Ball 25µm	1572-15-437 GM	100µm Ø	150µm
Wedge 17µm	4445-1515-3/4-CG-F-TIC	25µm x 38µm	80µm
Wedge 25µm	4445-1520-3/4-CG-F-TIC	40µm x 50µm	100µm

Fine Pitch Tools			
	Tool No.	Minimal Pad Size	Minimal Pitch
Ball 17µm	1732-10-35-437 CZ3	45µm Ø	50µm
Ball 25µm	1732-15-35-437 CZ3	80µm Ø	90µm
Wedge 17µm	4445-1307-3/4-CG-F-DSR(003x008)-W=0025-TIC	20µm x 18µm	64µm
Wedge 25µm	4445-1507-3/4-CG-F-DSR(003x008)-W=0025-TIC	30µm x 25µm	64µm



21. EFO System (only Ball Bonding HB08/10/14/16)



For Automatic adjustment press Setup Button in Menu Axis Setup (only at Ball Bond Mode, see also page 30)

1. EFO Wand height adjustment
2. EFO Wand side adjustment
3. set screw for white small cylinder in the inside
4. plate spring for EFO power
5. EFO lever

gap between wire and EFO Wand should be 100μ to 300μ

DANGER: Do not touch EFO Wand , 2000V discharge



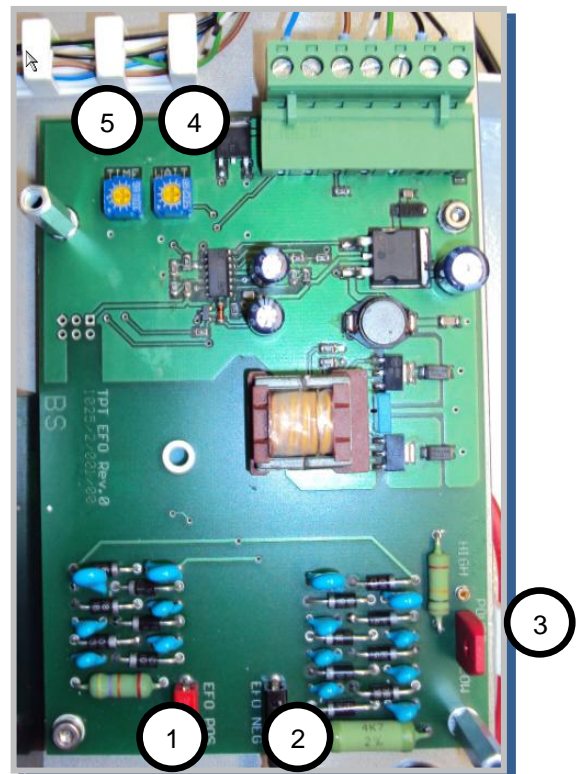
1. Positive EFO
use for 25μ wire 60% power

2. Negative EFO
use for 25μ wire 100% power

3. Jumper for High and Low Voltage

4. Wait
set a delay for EFO spark

5. Time
set the msec for EFO Power



22. Work Stage connector and Height Adjustment

1. Plug in the work stage cable into the matching connector.

TPT optional work stage H26 is a heated work stage with provisions for both vacuum clamping and mechanical clamping. Mechanical clamping provisions allow clamping of work pieces with dimensions of up to 40mm. Mechanical clamping adjustments are accomplished with the adjustable back stop. When the vacuum clamping provision is used, a vacuum hose must be attached to the work stage vacuum tube to provide a vacuum in the hole in the work stage top plate.

1. Mechanical clamping
2. Lose clamping bolt to change stage height screw bottom plate up or down
3. Vacuum Hose



Figure 2

22.1. Temperature Controller for Work Stage & Tool Heater

To set work stage temperature (only used by Gold Wire) 120°C – 150°C



CAUTION !

Never connect two heater stages in parallel in front and back connector

23. Adjust Search height, Loop height and Work height

A: Automatically with “Set Up” Button: see page 47

B: Manually

Press Search Height 1st Bond in Menu “ Setup”
And enter number for request search height
The same for 2nd Bond search height and Work height parameter.

with Dynamic Search see Page 27

Search height 1st Bond = height tool stop before 1st.bond
by pressing and hold start button on control puck (Figure 15)
Now height can be adjusted with dynamic search up/down button

Search height 2nd.Bond = height tool stop before 2nd.bond
by pressing and hold start button on control puck (Figure 15)
Now height can be adjusted with dynamic search up/down button

Loop Height = Height Bond tool rise after 1st Bond
Work height = Height Bond tool rise after 2nd Bond

23.1. Adjust Y-Way Bond Length *Only HB12/14/16 Bonder*

Press Y-way Auto in Menu “Bond or Loop Parameter”
And enter number for request Bond length

After 1st. Bond Y table travels to programmed value

23.2. Adjust Bonding Parameter in Menu “Bond”

Ultrasonic

You can adjust the Ultrasonic settings by altering the values in the bar “U/S” in the Bond Menu. The settings can be adjusted from **0 to 2000** displaying the relative strength of the U/S signal to the tool. The shape and the characteristics of the first and second bond differ depending on the settings. Based on your application and the utilized substrate, finding the optimal Ultrasonic settings is a key factor for a good bonding performance.

If the U/S is set with very low values, the strength of the U/S may not be enough to perform a bond, or it will perform a very weak bond.

By increasing the U/S, the diameter of the Bond will increase too. However, setting the U/S value too high will damage the substrate.

Time

The time control is used to set the time period for application of force and ultrasonic energy during the bond cycle. The bond time is available from **15 milliseconds to 2000** milliseconds. However, the time is not a key factor for manual bonding. For most applications, it is recommended to set the time value unchanged to 200.

Force

The force control is used to set the amount of force that will be applied to the bonding tool during the bonding cycle. The purpose of the force is to support the plastic deformation. Having set the force with too low values, it may not be enough to perform a bond. The amount of force that is needed for an accurate bond is also depending on the utilized wire. Therefore, we recommend to start with the force values shown in the chapter “Recommended Starting Parameters”. The first and second bond forces are adjustable from **15 grams to 150 grams**. The force generator provides current to effect the bond force. On signal from the logic control circuit, the current is provided to the force solenoid in a ramped fashion until the set level is reached. At this level the power is held until the bond time is over. The force level and bond time can be set using the Bond Menu of the touch panel controls. To measure the static bond head force, use a gram gauge. Place the point or arm of the gram gauge at the end of the transducer. Slowly raise the gauge until the transducer lifts to find out the actual applied force.

24. Find Bonding Parameters

At the next page you will find start parameters for different wire sizes and bonding methods.

In general ultrasonic power has the most influence at the bond.

Always start modifying US-Power first then Force parameter.

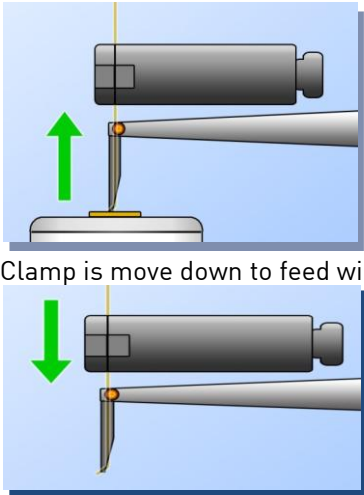
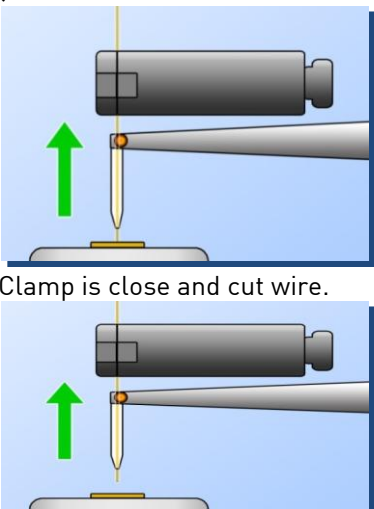
Important is that your sample is well fixed by mechanical clamping or vacuum holder.

Generally the recommended bonding parameters can vary due to the following reasons:

- Bonding Tool (manufacturer, bonding foot length, wear and tear)
- Epoxy (for the DIE)
- Bonding surface (material, roughness, surface layers)
- Age of surface material (oxidation, cleanliness)
- Age of aluminum wire
- also Transducer all have slight variations in frequency and resistance

24.1. Tail Parameters

Tail parameters are in "Advan. Settings" menu.

	Clamp Feed	Table Tear
Recommended for	Wedge bonding	Ball bonding
Tail length	140-220 for Wedge bonding	400 -500 for Ball bonding
Function	After second bond clamp is close. Bondhead move up and cut wire	After second bond clamp is open. Bondhead move up. (Distance of the defined tail length).
	 <p>Clamp is move down to feed wire</p>	 <p>Clamp is close and cut wire.</p>

Wedge bonding:

"Table Tear" mode for wedge bonding is useful to prevent:

Lift off of second bond. Wire feed problems, in case wire is stuck into wedge tool.

It can happen that aluminum wire is stick to the tool tip after bonding.

To cut wire in a backward movement make sure the wire is straight.

Ball bonding:

For ball bonding also the „clamp feed“ mode can be used,

but the „table tear“ mode delivers more repeatable results.

A case where "clamp feed" mode may be useful is, when the wire tear off after the second bond.

Ribbon bonding

If possible use "Table Tear" mode to cut the ribbon, this prevent lift off of second bond and tear the wire to the tool.

"Table Tear" for wedge bonding is only available in HB16 Bonder

25. Bonding Parameter

Wedge-Wedge Gold Wire

17µm

Tail Length 170

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program WEDGE	Bond 2
US 120			US 160
Time[ms] 200		Wedgebond	Time[ms] 200
Force[mN] 200		Semi Automatic	Force[mN] 250
Clamp C	Heater 60		Advan. Settings

25µm

Tail Length 200

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program WEDGE	Bond 2
US 160			US 180
Time[ms] 200		Wedgebond	Time[ms] 200
Force[mN] 200		Semi Automatic	Force[mN] 250
Clamp C	Heater 100		Advan. Settings

33µm

Tail Length 230

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program WEDGE	Bond 2
US 330			US 380
Time[ms] 200		Wedgebond	Time[ms] 200
Force[mN] 350		Semi Automatic	Force[mN] 400
Clamp C	Heater 120		Advan. Settings

50µm

Tail Length 260

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program WEDGE	Bond 2
US 620			US 700
Time[ms] 200		Wedgebond	Time[ms] 200
Force[mN] 400		Semi Automatic	Force[mN] 450
Clamp C	Heater 120		Advan. Settings

Aluminum Wire

25µm

Tail Length 200

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program WEDGE	Bond 2
US 180			US 220
Time[ms] 100		Wedgebond	Time[ms] 100
Force[mN] 300		Semi Automatic	Force[mN] 350
Clamp C	Heater 0		Advan. Settings

33µm

Tail Length 230

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program WEDGE	Bond 2
US 320			US 350
Time[ms] 100		Wedgebond	Time[ms] 100
Force[mN] 400		Semi Automatic	Force[mN] 450
Clamp C	Heater 0		Advan. Settings

Bonding Parameter

Ball-Wedge Gold Wire

17µm

Table Tear 400

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program	Bond 2
US 150			US 180
Time[ms] 200	Ballbond		Time[ms] 200
Force[mN] 220	Semi Automatic		Force[mN] 250
Clamp C	Heater 60		Advan. Settings

25µm

Table Tear 500

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program	Bond 2
US 200			US 250
Time[ms] 200	Ballbond		Time[ms] 200
Force[mN] 250	Semi Automatic		Force[mN] 250
Clamp C	Heater 100		Advan. Settings

33µm

Table Tear 550

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program	Bond 2
US 300			US 350
Time[ms] 200	Ballbond		Time[ms] 200
Force[mN] 350	Semi Automatic		Force[mN] 440
Clamp C	Heater 120		Advan. Settings

50µm

Table Tear 600

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program	Bond 2
US 520			US 620
Time[ms] 200	Ballbond		Time[ms] 200
Force[mN] 500	Semi Automatic		Force[mN] 550
Clamp C	Heater 120		Advan. Settings

Ribbon Wire

13x76µm

Table Tear Mode

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program	Bond 2
US 500			US 700
Time[ms] 200	Ballbond		Time[ms] 200
Force[mN] 450	Semi Automatic		Force[mN] 550
Clamp C	Heater 120		Advan. Settings

20x200µm

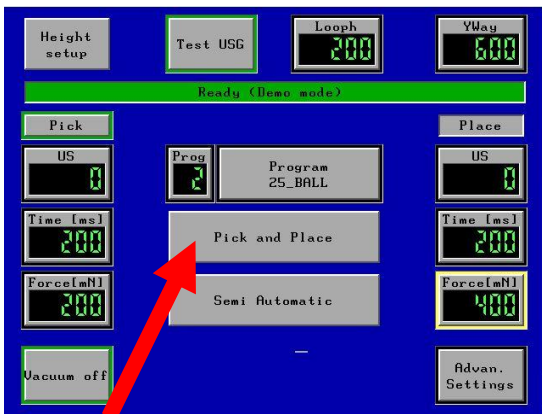
Table Tear Mode

Height setup	Test USG	Looph 500	YWay 500
Ready			
Bond 1	Prog 1	Program	Bond 2
US 1500			US 1700
Time[ms] 200	Ballbond		Time[ms] 200
Force[mN] 750	Semi Automatic		Force[mN] 800
Clamp C	Heater 120		Advan. Settings

26. Option H80 "Pick and Place"



Switch Bond Mode to "Pick and Place" and connect Vacuum Pump Tube



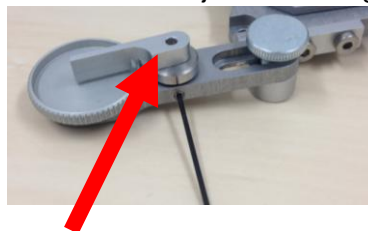
27. Epoxy Stamping Pot

adjusting Blade height
Loosen set screw



360° turn is 500µm
180° turn is 250µm
90° turn is 125µm

Turn screw to adjust Blade height



Clean
Loosen set screw



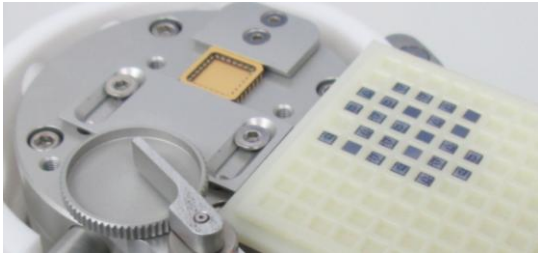
remove cam to clean



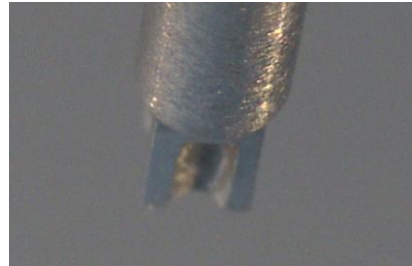
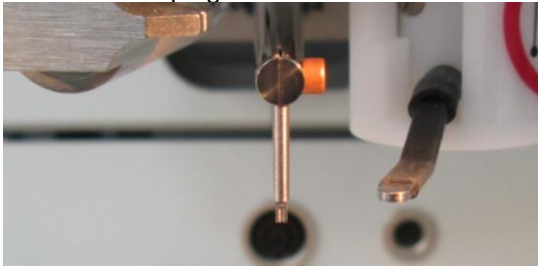
It is possible to clean the aluminum pot with acetone and other solvents.
It is also possible to remove the pot complete for cleaning.

28. Pick and Place sequence

1. Prepare holder and fill glue to epoxy pod.

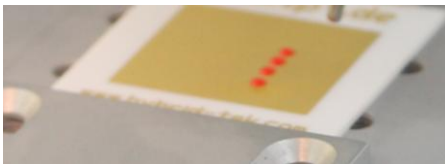


2. Install Stamping tool

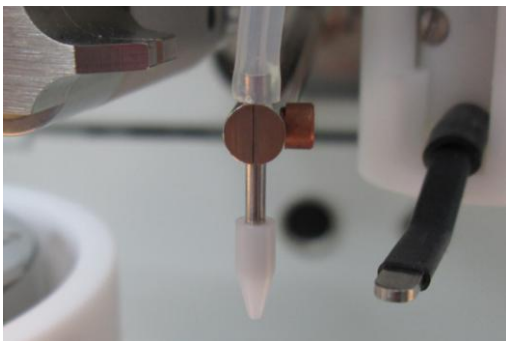


3. Make Height setup from epoxy to surface.

4. Stamp epoxy to your surface. Stamping is with "semiautomatic" and "manual" mode possible.



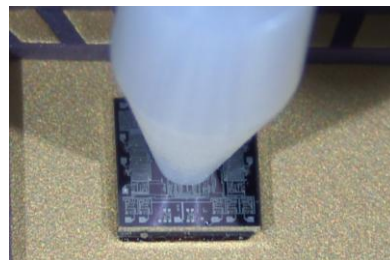
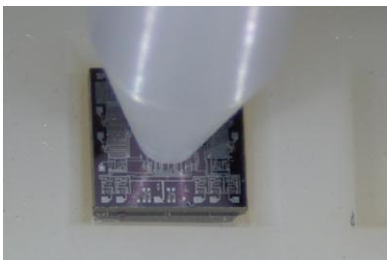
5. Install Pick and Place tool and connect vacuum tube



6. Check parameters: .

Important: loop height have to be high enough (4000µm) and Y-way is "0"

7. Make Height setup from chip to surface. **Important: add chip height to surface height.**



8. Pick and Place is with "semiautomatic" and "manual" mode possible

Important: "Full Automatic" mode is not working

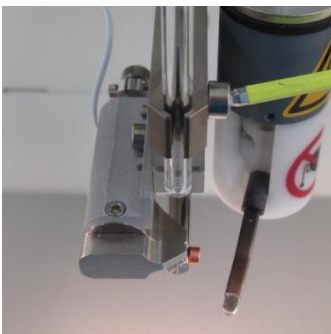
29. Option H53 "Pull Tester"

Mechanical pull tester for destructive bond tests
Installation on bond head with easy take on & off
Works on the complete bonder range HB02 - HB16
H51 „Manual-Z“ or H52 „Dynamic Search“ required
Measurement gauges max.15g or 30g

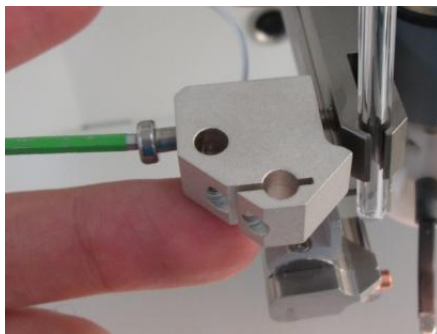


Installation Holder for Pull Tester

Remove screw at glass tube



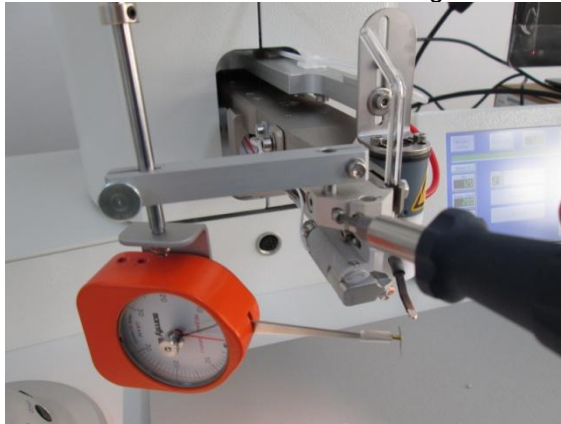
Install holder with long screw



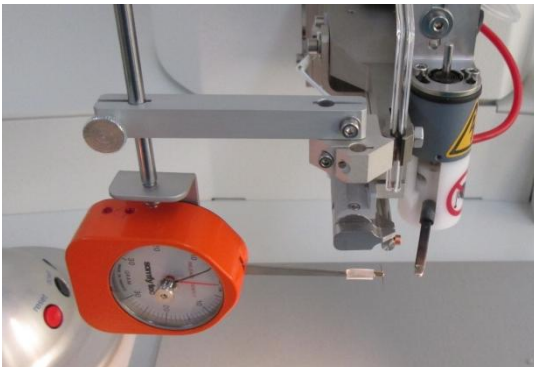
Secure glass tube with M4 nut



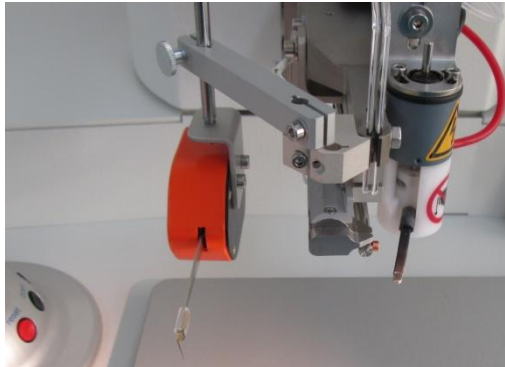
attach Pulltester arm to holder and tighten M2 screw



Test Position

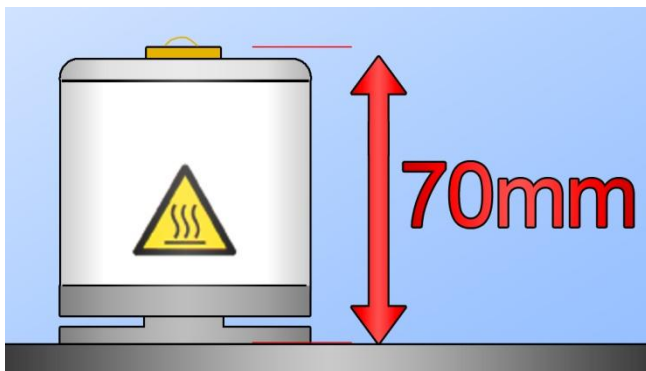
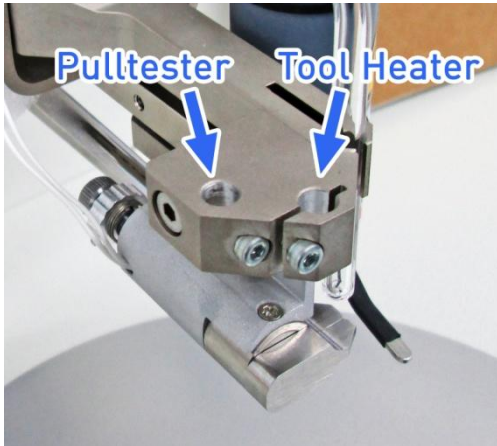


Rest Position



Installation of Pull-Tester

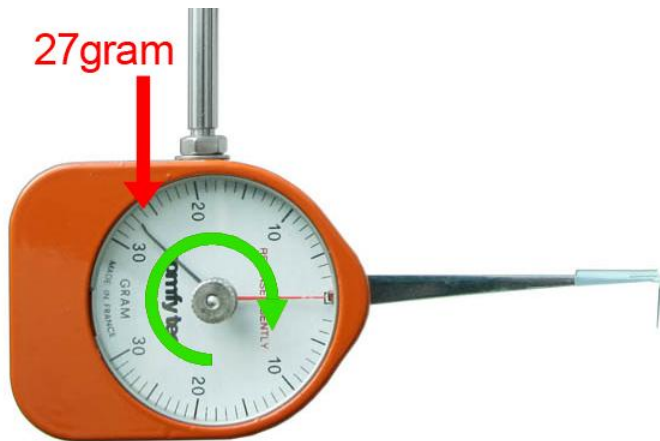
1. Mount the pull-tester like shown on the pictures
2. The pull-hook has to be adjusted close below the bonding tool.
3. Set height from stage to 70mm.
4. Machine settings Set Bondtype to "Pull Tester" Mode



3. Operation of Pull Tester with manual-Z (HB10/HB16) or Z lever (HB05)

1. The pull-hook is moved with H51 manual-Z (HB10/HB16 only) or the Z lever (HB05).
2. Move it below your wire bond
3. Then move carefully up until the wire breaks.
4. Now you can read the breaking load at the force gauge. The unit is grams.
5. Finally reset clock by returning the red pointer back to zero.

4. Operation of Pull Tester with H52 Dynamic Search (HB10/HB16)



5. Operation of Pull Tester with H52 Dynamic Search

- The pull-hook is moved to Pull Position by press Bond Button.
- with H52 Dynamic Search adjust position with up and down.
- To Start Pull, press Bond Button again
- Bond head move up to rest position
- Now you can read the breaking force at the force gauge. The unit is grams.
- Finally reset clock by returning the red pointer back to zero.



30. Option 85-1 "Digital Camera"

Functions:

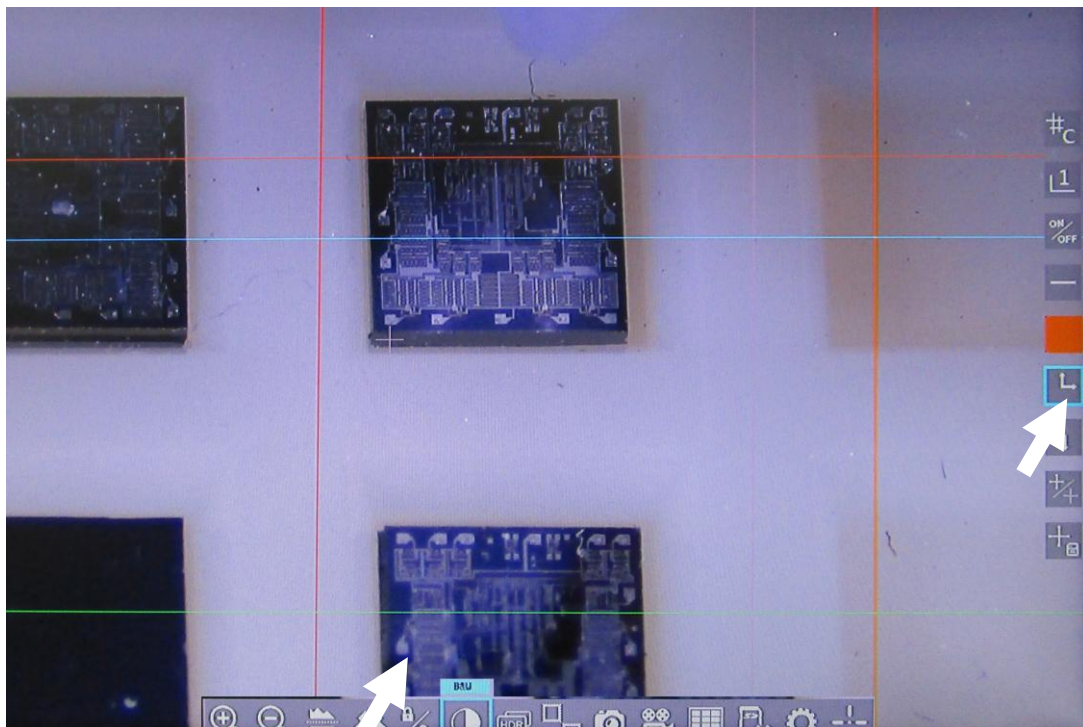
- Full HD resolution
- Make pictures to SD cards
- Make videos to SD cards
- Crosshair for targeting
- Full control of camera settings
- Works also as USB camera



Connect a mouse to USB.

Move with mouse to lower screen border to open function menu.

If you switch on cross hair you can adjust settings at the left screen border.



31. Optional Software "Add Bond" for automatic Security Bond

The Add Bond Menu can combine two bonds with a distance in between. Bumps or Wires are possible.

Add Bond menu:

This program is only active if you are in the Add Bond menu



Semi Automatic or Automatic:

With Semi Automatic it is possible to adjust the position of the every bond. With Automatic 1.Bond Program and 2. Bond Program will be performed complete at once.

Direction:

The direction specifies in which direction the way will move. In front of the first bond or behind the first bond.

Distance:

The distance is the way between the first bond of the 1.bond program and the first bond of the 2. Bond program

Security Ball Bump example

1. Create a complete ball program. Height Setup, bond parameters, Tail parameters, EFO parameters Prog. 30 Ball-Wedge bond with 500 Loop and 500 length



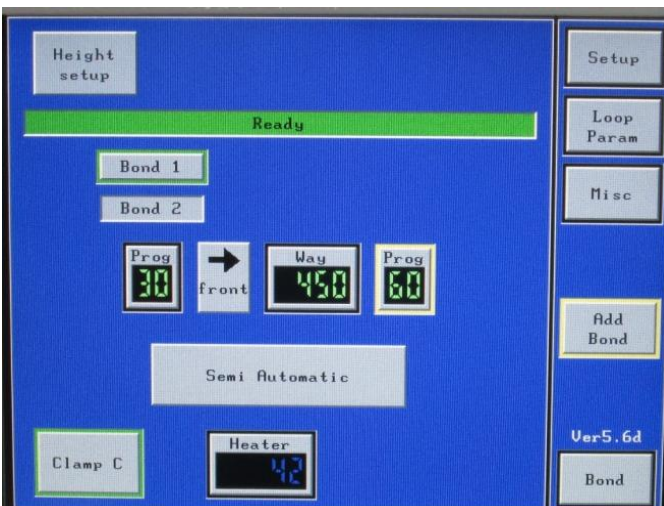
2. Create a complete ball bump program. Height Setup, bond parameters, Tail parameters, EFO parameters Prog. 60, a bump program without tail



3. Combine program 30 and program 60 for Bond Ball on Wedge also known as "Security Bond"

The goal is to bond the bump on the wedge bond. The wedge bond is on the edge of the capillary not in the middle like the ball. So there is a difference between stitch bond position and ball band position. This difference depends on wire size and capillary shape. With Standard TPT 25µm capillary the difference between stitch and ball is 50µm

The 1. Bond Program has a Y-way of 500µm. We want bond in the front of the ball bond on the stitch, so the arrow shows to right side. The distance between Stitch and ball is 50µm, so the way is 450µm



32. Bump bonding

You can use standard Ball bonding tool for making Bumps.
The Ball size depends at Tail length, EFO power and wire size.
Recommended are: 400 Tail length, EFO power 90%

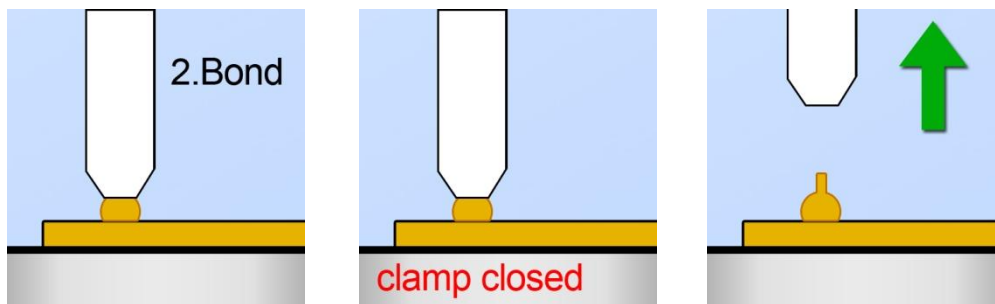
The ball size will never be smaller than three times wire size.
Example: for 25 μ wire diameter it is minimal 75 μ diameter Ball
The final Bump size depends to the bond parameters and bump tool.
In any case it will be bigger than the Ball size before bonding.

The Pitch (distance from Bump to Bump) depends to the bond tool.
There are special Bump tools for fine pitch and easy targeting.
Recommended tool: H61-17B 1732-10-16-437 for Bump bonding

There are two possibilities to make Bumps:

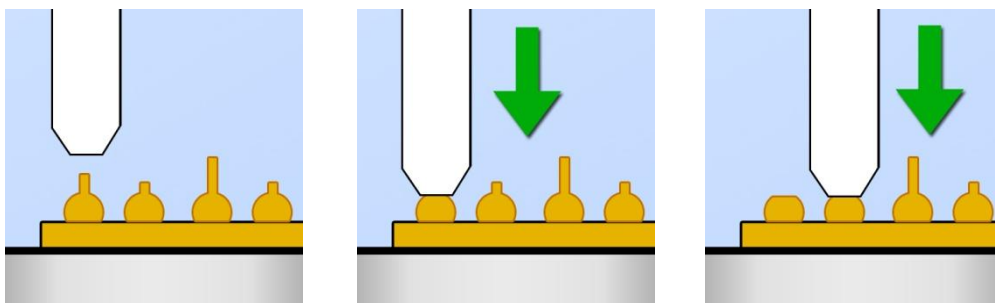
a) Bump with Tail and Coin Tool.

Change bondmode to “**Ball Bump**”.
Then you can do only the second Bond.
Now at second Bond are the parameters for the Bump bond.
After the Bump bond the wire will be cut and the next Ball will be made.



The wire will be break near above the Ball.
Some wires like **HD6** from Hereaus are more constant about break point.

If you need flat Bumps you have to use a coin tool after making the Bumps.
Coin tool is complete flat, with no hole.
It depends at your application if you need a tail above the Bumps.



33. Bumps without tail.

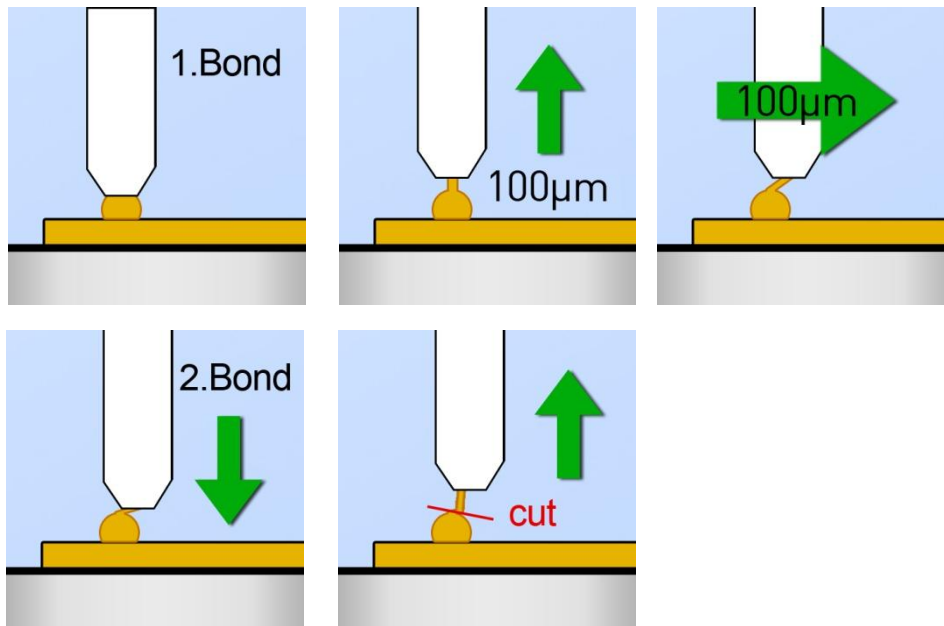
Go to standard Ball bond mode and program a standard Ball-Wedge bond.

To get a Bump without a tail you have to make a small groove to the wire at tip of the ball.
To get this small groove you have to make the second bond with very less parameters on the Ball.

Use a Tail between 400 and 500 and **TableTear Mode**.

Parameters for second Bond: 80 US / 200 Time / 150 Force
Use a Loop Program with: 100 Up / 100 Forward
Loop Program can be varied. Up to: 140 Up / 120 Forward

Second Bond parameters are critical for Bump height.
You have to try different Loop parameters and bond parameters to get a good and constant result.



34. Ribbon bonding

For ribbon from 15x60 μ to 25x250 μ wire.

You have to install H72-2 2" Ribbon spool holder (Option H72-2).
You need also a bond tool for your ribbon size.

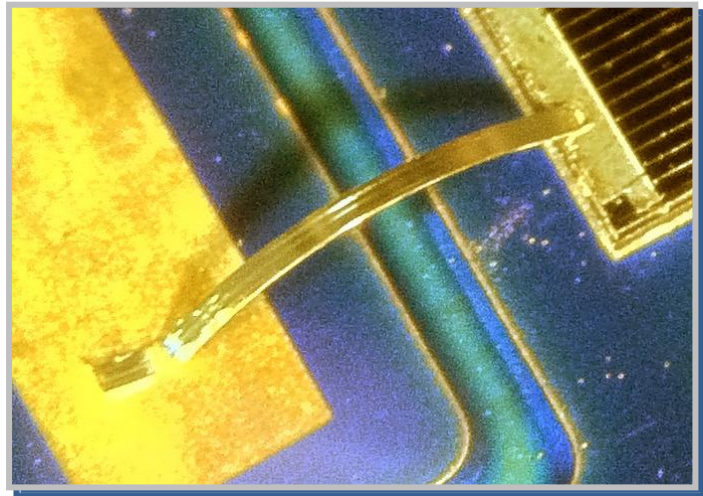
Ribbon Bond parameters could be very variable on different surfaces.
In general Ultrasonic has the most influence at the bond, change first US parameter then Force.
Ribbon bonding is better between 100°C to 200°C temperature.

13 μ x 76 μ Gold Ribbon

Bond1		Bond2
600	US	700
200	Time	200
450	Force	450

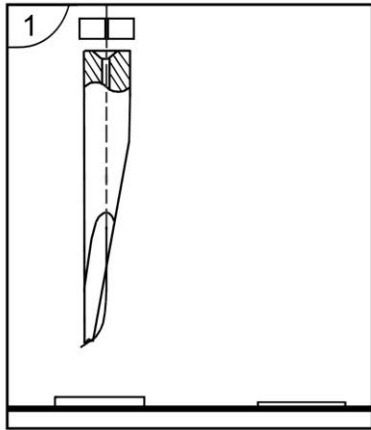
20 μ x 200 μ Gold Ribbon

Bond1		Bond2
1500	US	1700
200	Time	200
750	Force	800

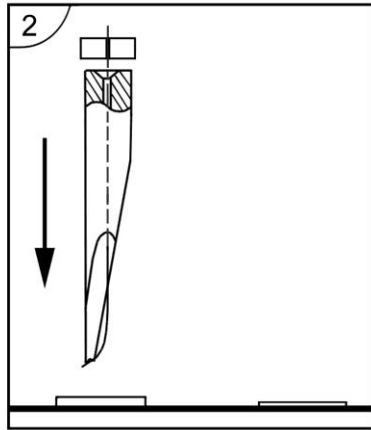


25 μ x 250 μ Gold Ribbon

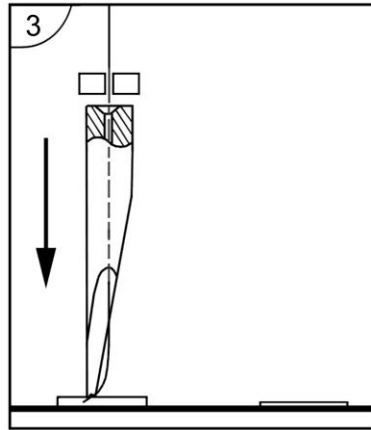
Bond1		Bond2
1800	US	1900
200	Time	200
800	Force	900



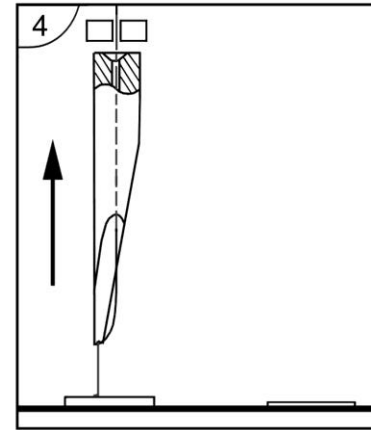
1. Start Position
Operator positions **target under spotlight**. Clamp is closed



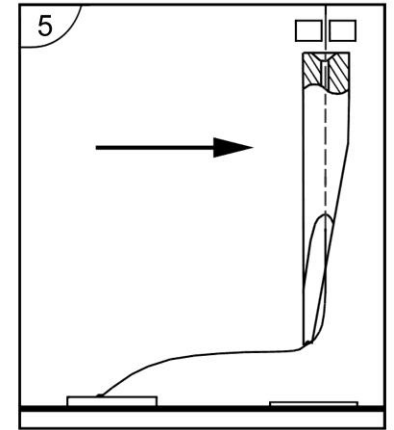
2. Operator holds down Control Puck Start button
Bond Head travels down to 1st.search height
Operator repositions target if necessary.



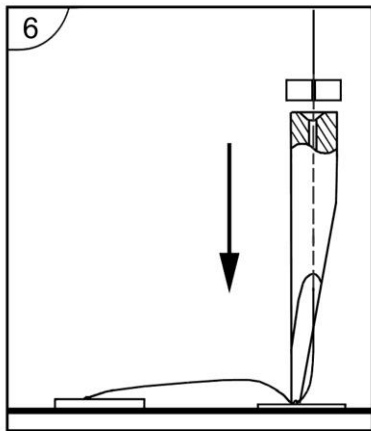
3. Operator releases Control Puck Start button
Bond tool descends to 1st. Bond
TDSW activate all Bond Parameters



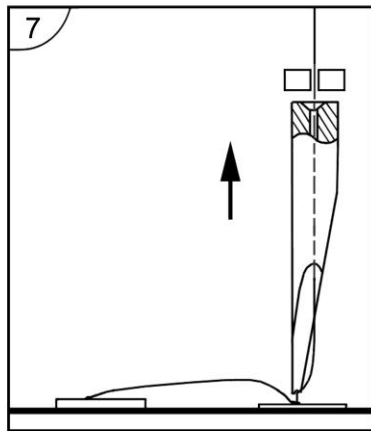
4. clamp opens and tool rise to loop height



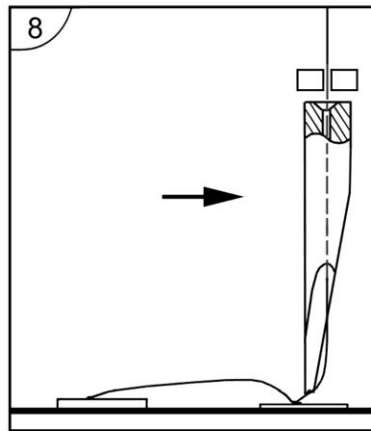
5. Operator positions 2nd **target under spotlight**
and/or Y-Table moves to programmed position



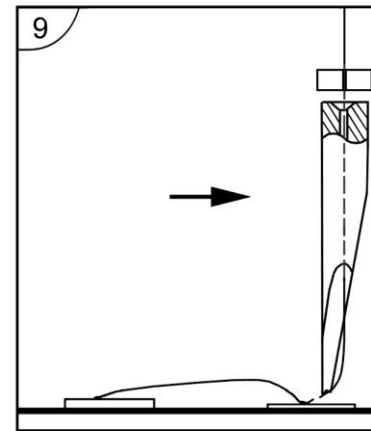
6.Operator holds down Control Puck Start button. Bond Head travels down to 2nd.search height. Operator repositions target if necessary..
Operator releases Control Puck Start button. Bond tool descends to 2nd Bond .TDSW activate all Bond Parameters



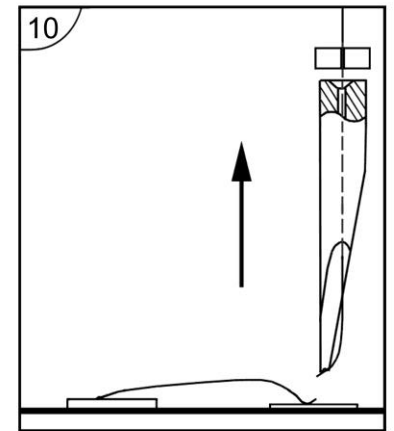
7.Tool rise to programmed Tail up (clamp open) position



8. Tool moves to programmed Tail y-way (clamp open) position

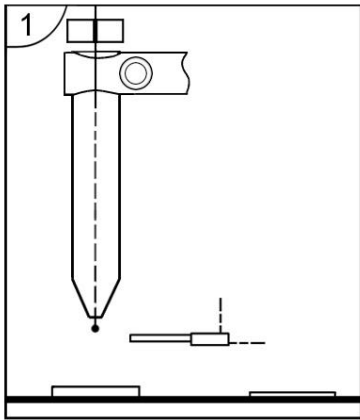


9. Tool moves to programmed Tail y-way (clamp closed) position

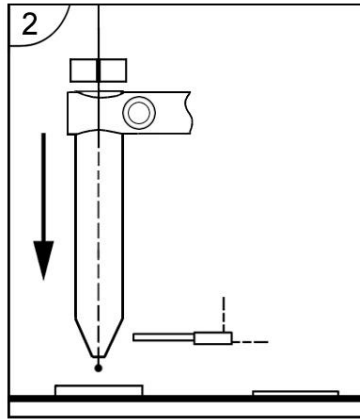


10. Tool moves to programmed Work height position

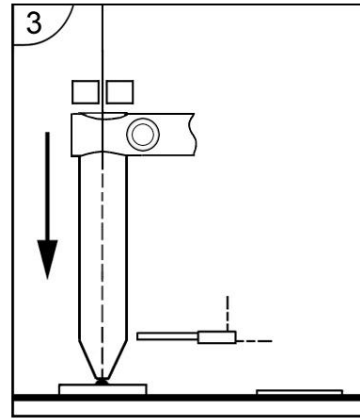
Wedge Bonding Sequence
Figure 13



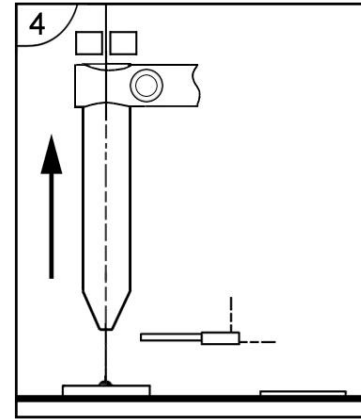
1. Start Position
Operator positions target under spotlight. Clamp is closed



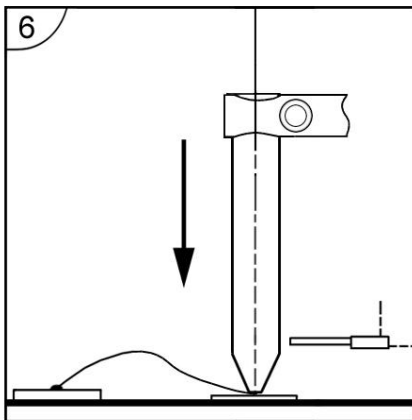
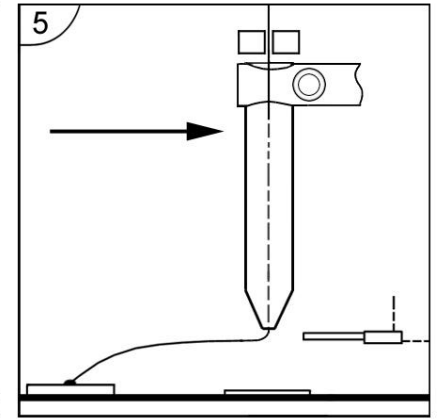
2. Operator holds down Control Puck Start button, Clamp opens
Bond Head travels down to 1st.search height
Operator repositions target if necessary.



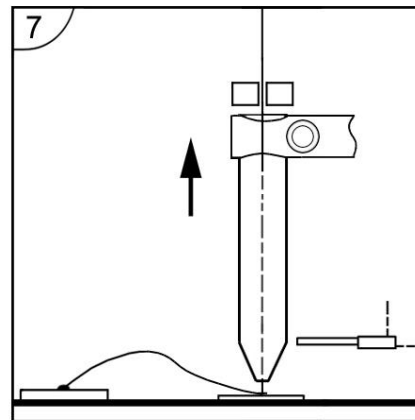
3. Operator releases Control Puck Start button
Bond tool descends to 1st. Bond
TDSW activate all Bond Parameters



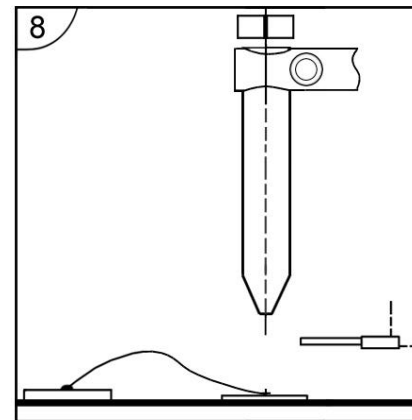
4. after Bond tool rise to loop height



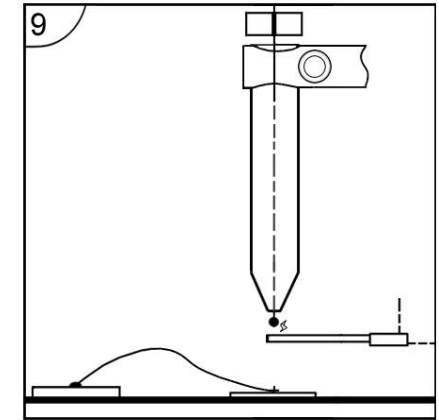
6. Operator holds down Control Puck Start button
Bond Head travels down to 2nd.search height
Operator repositions target if necessary.
Operator releases Control Puck Start button
Bond tool descends to 2nd Bond
TDSW activate all Bond Parameters



7. Tool rise to programmed Tail up (clamp open) position



8. Tool moves to programmed Work height (clamp closed) position



9. EFO Wand moves under Tail (Wire end) and forms Ball

Ball Bonding Sequence
Figure 14

36. Ultrasonic Generator

The signal from the logic control circuit, the ultrasonic generator provides 62 kHz power to the transducer at a level set on program. The ultrasonic energy is applied until the bond time is complete. (PLL) phase loop lock system is provided to insure work piece coupling, and to maintain transducer operation at the specified frequency.

36.1. Force System

The force generator provides current to effect the bond force. On signal from the logic control circuit, the current is provided to the force solenoid in a ramped fashion until the preset level is reached. At this level the power is held until the bond time is over. The force level and bond time are preset by the front touch panel controls.

36.2. Electronic Basic force adjustment

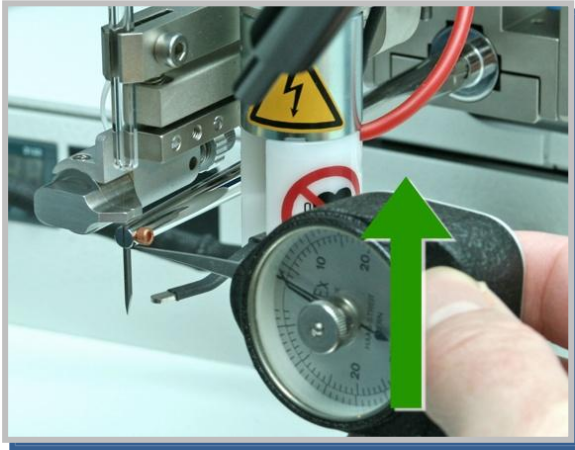


Figure 22

Basic Bond force 17 – 20 gram

Use a gram gauge to measure the static bond head force. Place the point or arm of the gram gauge at the end of the transducer. Slowly raise the gauge until the transducer lifts and a gauge reading is required force

Basic Force adjustment is made in Bonder.ini file

BasicForce: 160 to 300 // Magnet basic force as DAC value

```
USMaxTestTime: 15 // max. Testtime for USG Test in sec
USMaxTime: 100 // max. Bond Time in seconds [1..100]
ClampMaxOpenTime: 200 // max. Clamp Open Time in sec
SH_FineStep: 30 // +- Fine Correction Step Search Height [um]
ZWayMaxmm: 17 // maximum allowed Z-Way in mm

FastMotors: 1 // 1 = fast motors with 1:5 gear; 0= 1:10 gear
MotMinSpeed: 10 // minimum Motor speed in % (5..50), < max!
MotMaxSpeed: 100 // maximum Motor speed in % (5..100), > min!
MotMinSSpeed: 10 // min. motor search speed in % (5..50), < ma
MotMaxSSpeed: 50 // max. motor search speed in % (5..100), > mi

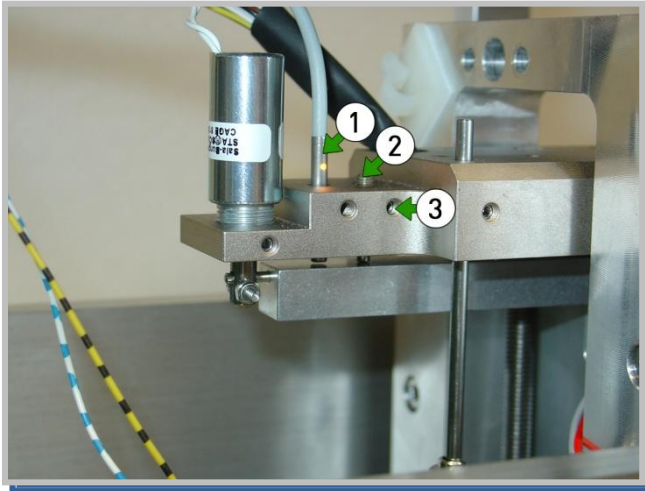
YWayMax: 7000 // max. pos. way for y motor in um (<= 17000)
BasicForce: 28 // Magnet basic force as DAC value (0..255=max
// see also magnets.dat for force in mN

HB30Mode: 0 // 1= special HB30 mode, 0= standard HB10-16
HB30Overdrive: 300 // HB30 Z overdrive after touch down in um

C:\BONDER>
F1 Help F2 Save F3 Open F5 Block F6 Dupe F7 Search F8 Print F10 Menu
```

37. TDSW Touch Down Switch adjustment

If Z-movement not works please check TDSW (touch-down-switch).
Yellow light has to be on, that means ready for bond (no touchdown).



1. TDSW Touch Down Switch
2. Stop screw
3. Set screw for stop screw

Figure 23 TDSW Touch Down Switch

To adjust TDSW open set screw (3) screw and adjust stop screw (2) until light is shine from TSDW (1)

38. Stitch Bonding and Dynamic Search

Stitch Bonding is option H58

The HB has basic 1-2-2 and 1-2-1 bond parameter capability. In 1-2-2 stitching mode, the first bond parameters are applied for the first bond, and second bond parameters are applied at subsequent bonds. Stitch Foot switch is connected on back of Bonder.

I

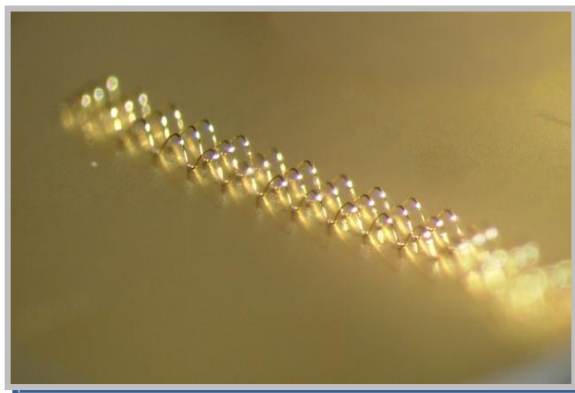
A: If Foot switch is activate before first Bond, then automatically 3 Bonds are Bonded, before Terminating wire.

B: When the Foot switch is actuated after first bond, the bonder will not terminate the bonding cycle after Foot switch is released.

Footswitch



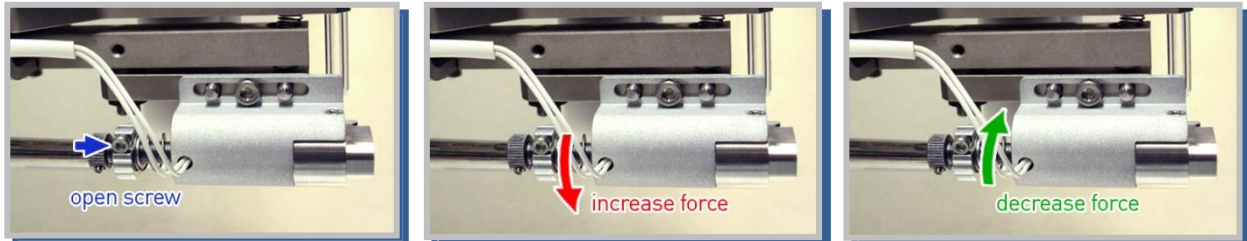
Stitch bonding



39. Wire Clamp

There is no convenient way to measure the clamp force. The user must therefore be alert to deformation of the wire to identify excess force. When force is inadequate, the wire clamps will not hold the wire in the tool during closed clamp conditions or will not break the wire after second bond.

Clamp force adjustment

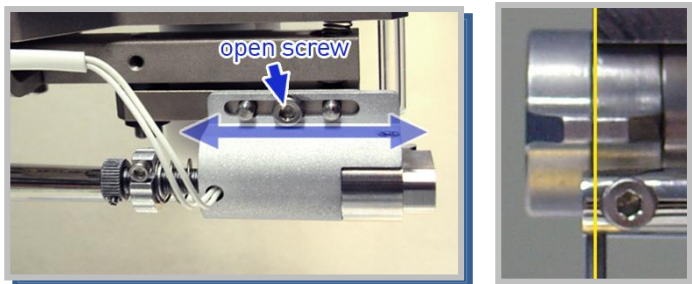


Clamp gap adjustment



Clamp position

the wire should be straight between clamp and wedge tool.



Clamp problems:

Clamp is not open.

- open set screw for gap adjustment and increase the gap size.
- check clamp connector

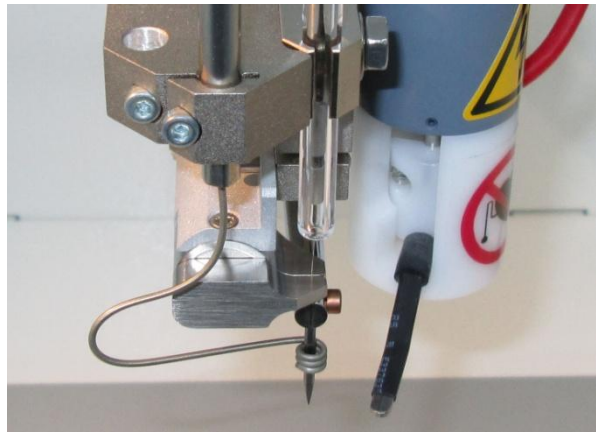
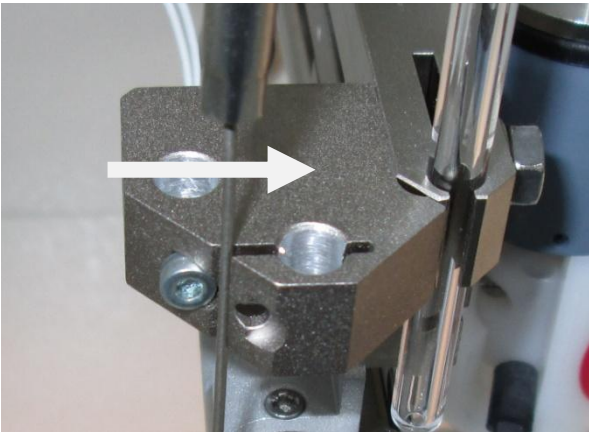
Clamp is not closing

- check clamp force, increase clamp force
- open set screw for gap adjustment and increase the gap size

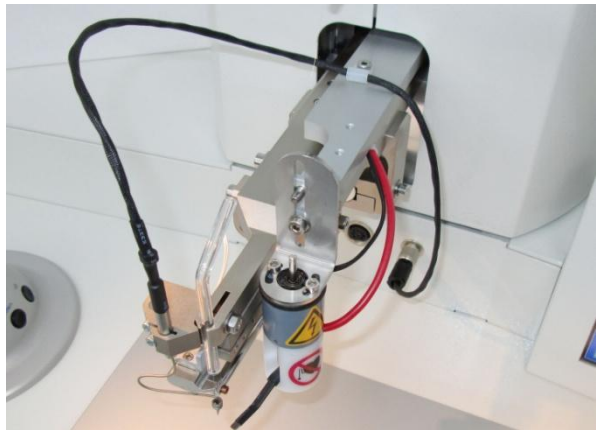
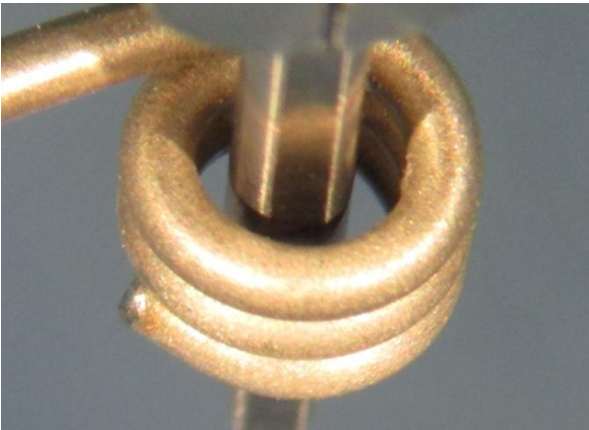
To clean wire clamp increase gap to 2mm, use alcohol or acetone to soak a clean paper, put this paper in clamp gap, close clamp and pull the paper down, repeat that 5 times.

40. Tool Heater Option H40

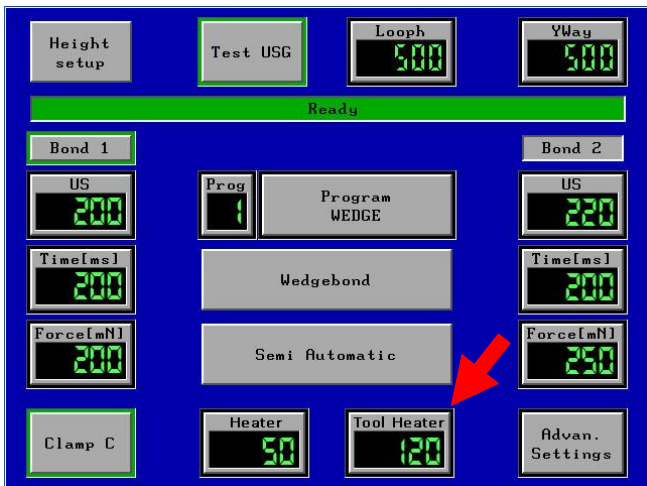
- Mount the Tool Heater Holder like shown on the pictures.
- Remove screw and install tool heater.



- Make sure Heater Coil is not touching bond tool.



- Connect Tool Heater to connector and program temperature in TFT Display



41. Troubleshooting

Troubleshooting for bonding problems see section
"Wire Bond Technology"

HB Bonder technical problems:

Symptom / Error Message

Cause / Corrective Action

A. No Bond Head movement
Adjust TDSW switch (Page 29)

switch Bonder Off/On
Switch to Menu "Bond"

B. No Ball after Bond

Check if ON/OFF in Menu Config Tail is ON
Check gap between wire and EFO Wand
(for 25 μ wire 100 to 400 μ)

C: Low EFO Power
(Page 19)

EFO Board has No Ground screw

D: Tail is moving sideways
under Wedge Tool

Tool longer as 19 mm
Hole in Wedge to big
Clamp defect
Wedge defect

E: Error no USG found using Demo Mode

Transducer not connected on US Board
US Board Defect
D-Sub Connect Bond head not connected
24V missing
Motherboard Defect

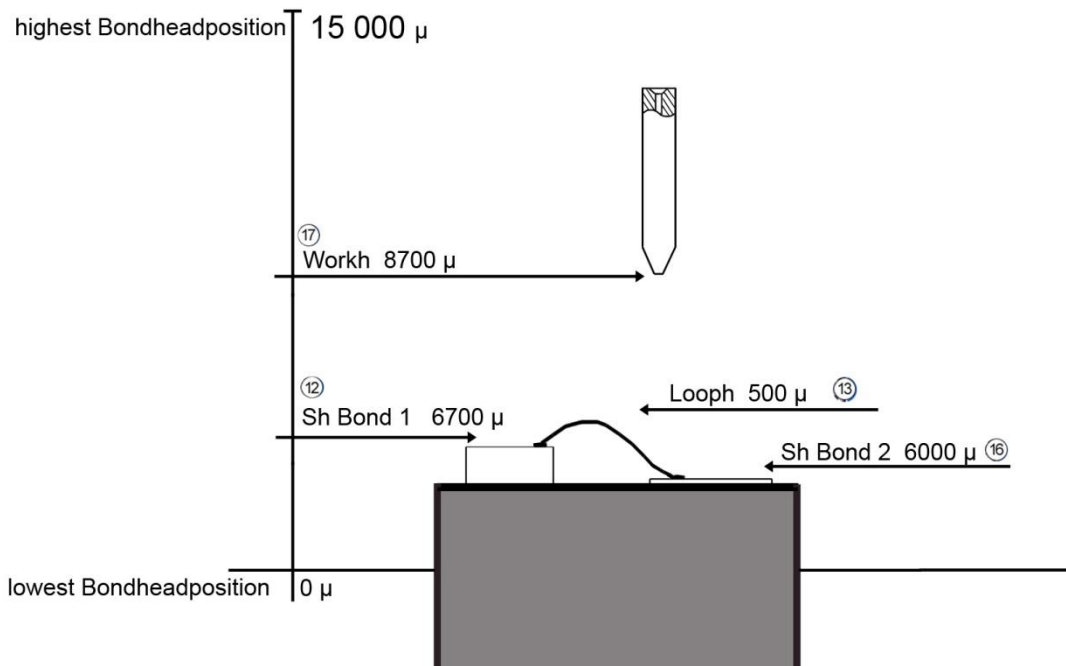
F: Set up error, using defaults

Bond level to deep

G. "Setup. Offset.WB" not found in File

Wrong Software in use

42. Height Setup in Menu Bond and Setup



Height Setup Button is used to find automatically Search height for 1st and 2nd Bond and Work height.

Setup procedure:

1. Press Height Setup Button (Page 11)
2. Press Start Button on Control-Puck (Page 23 Figure 15-1)
Bondtool is moving to 1st Bond level .
Measured Height plus 200 is Displayed in "Sh Bond1 " in Menu Setup
3. Press Start Button on Control-Puck (Page 23 Figure 15-1)
Bondtool is moving to 2ndBond level
Measured Height plus 200 is Displayed in Sh Bond 2 in Menu Setup
4. *At Ball bonding Mode Press Start Button again*
Work-Height = Measured EFO Arm distance to Bondtool
5. Loop Height will not change at Setup procedure
6. Work-Height is set automatic to 2000 after Bond level

Set up procedure can be done every time

All changed program values are automatic saved in displayed program number

90° Wedge Tool

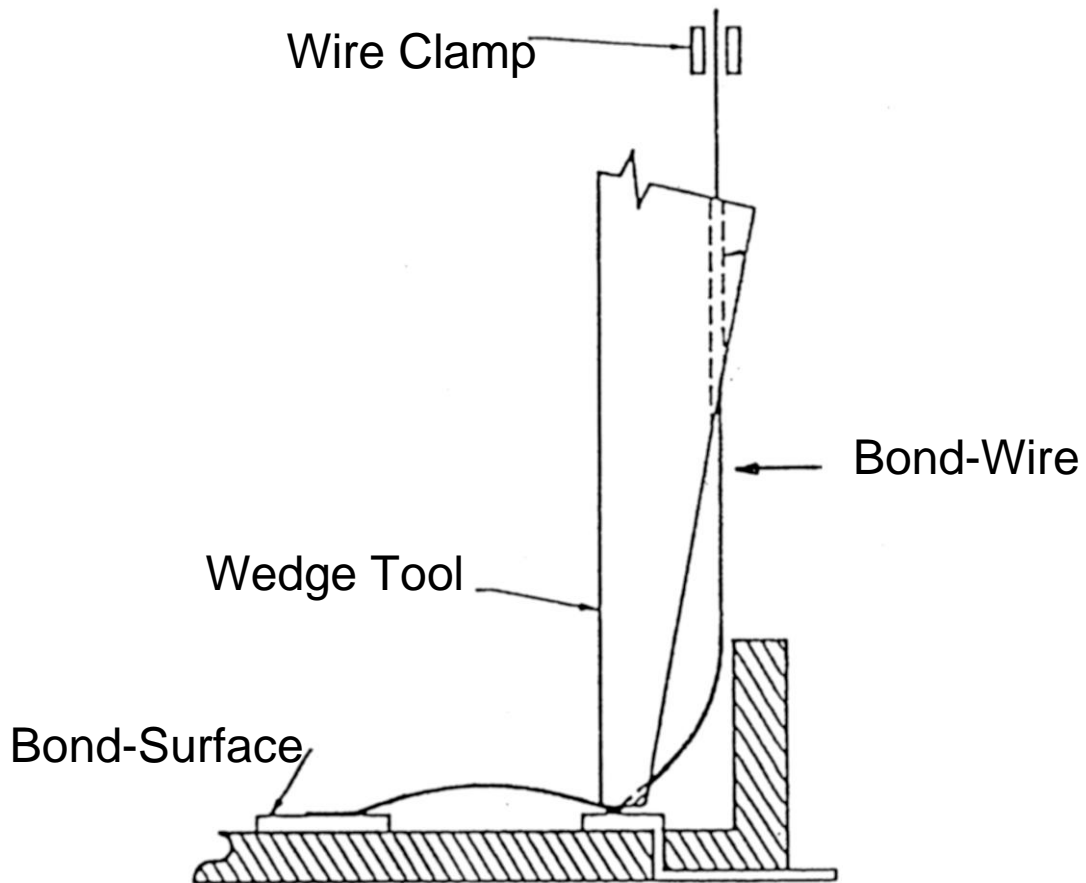


Figure 11

44. Packing Instructions

1. Remove from Bonder:

- A. Bondtool (wedge, Capillary)
- B. Bond Wire
- C. Glass wire Guide
- D. Dual Fiber Optic Illuminator
- E. Microscope with Holder
- F. Laser Spot light targeting system
- G. Heater Stage
- H. Remove Control - Puck
- I. and any other options from Bonder.

2. Secure the work plate by inserting the Table Lock Screw.
Tighten softly the screw to secure the work plate.

- 3. Secure Display with Carton
- 4. Secure Tower-Cover with soft foam
- 5. Secure between Transducer and clamp with foam

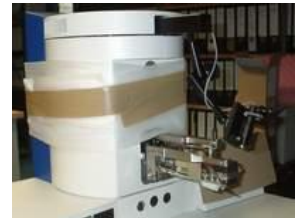
6. Carefully move Bonder in wooden box

Pack accessories (i.e., work stage, microscope, illuminator, eyepieces, etc.)

Position these items at suitable locations around the sides of the bonder so that they are secure from movement and so the foam cover can be installed.

Place the foam cover around and over Bonder .

7. Position and bolt the wooden cover on to the crate.



45. Heater Stage



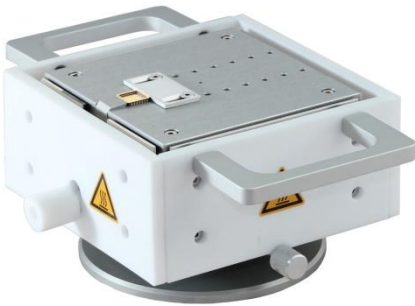
H26

hot plate: 60mm diameter
temperatur range: until 250°C
height adjustable from 65mm to 80mm
dimension: 75 mm diameter



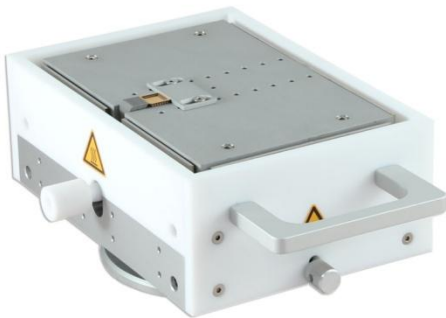
H29

hot plate: 90mm diameter
temperatur range: 250°C
height adjustable



H21-250

heating plate 100 x 100 mm
temperature range until 250°C
height adjustable from 65 to 80 mm
dimension 125x125mm height 65-80mm



H22-250 hot plate 100 x 150 mm

temperature range until 250°C
height adjustable from 65 to 80 mm

46. Laser Spotlight (Option H50)

Mount the Spotlight holder on the Microscope holder Figure 1 (3)

Beam-Distance to Bondlevel is about 100 mm

ATTENTION ! Don't stare into the beam. Direct viewing into the beam or reflected beam can cause permanent eye damage. Laser class 2 / $P_o = 1 \text{ mW}$ / $r = 635 \text{ nm}$

Adjust Spotlight focus

Switch light off to locate Laser spotlight.

Loose Knob (1) for rough adjustment.

If you don't find a red point the distance from laser to surface is wrong.

If the point too big adjust the distance by move laser up or down.

(picture 1 / 2)

If necessary adjust voltage on power supply for more or less brightness. (picture 3)

Adjust Spotlight to correct position

Do first bond without y-way and

adjust with screws (2 / 3) Laser Point to the Bond.

(picture 4 / 5)

To focus spot adjust knurled screw (4)



If you do not can find the laser point, please darken the room.

The Laser has the focus point on 100mm. Move from the laser

surface with the laser up, around 100mm you should see a tiny dot.

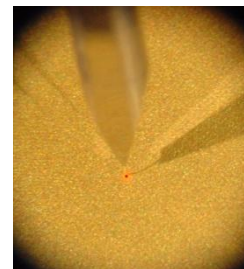
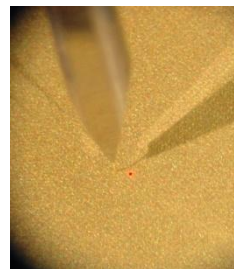
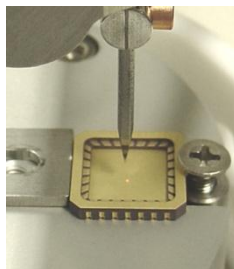
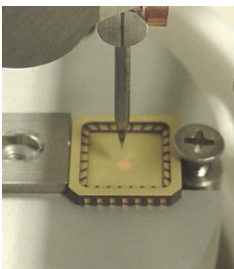
Picture 1

Picture 2

Picture 3

Picture 4

Picture 5



47. Manual Wire Spool 1/2" and 2"

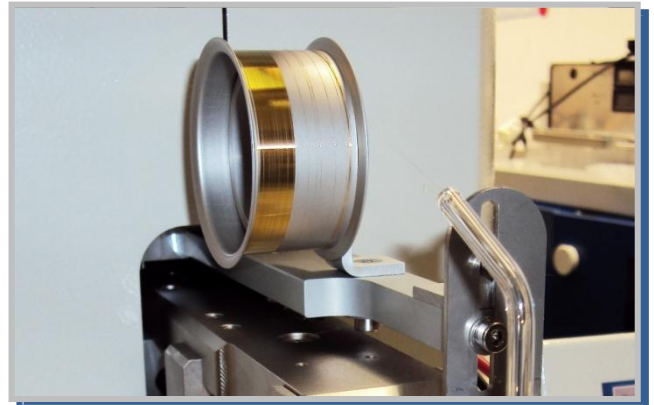
1/2" manual Wire Spool (Option H72-1)

please install spool holder like the picture shows.



2" Manual Wire Spool (Option H72-2)

please install spool holder like the picture shows.



47.1. USB Stick

1. USB Stick must insert before Power ON Bonder
2. Only Remove USB Stick after Power OFF Bonder
3. Use only USB Stick with max. 1 GB
4. USB Stick must be 1.1 compatible

48. SPECIFICATION

The TPT Bonder is a bench top size wire bonder, easy to operate and ideal for laboratories, pilot and pre-production runs and small scale production lines. One Deep-access 90° Bond head for wire and ribbon bonding. No hardware change necessary. Easy operation with 6,5" TFT Touch Panel Operator System. Digital self tuning Ultrasonic generator, Stitch bonding, 100 Program storage capacities and Heater stage Controller. Motorized 2" Wire Spool

Options:

H10 Zoom Stereo-Microscope Leica S6 20x
H26 Adjustable height heated work stage surface 60 mm Ø
H29 Adjustable height heated work stage surface 90 mm Ø
H40 Tool Heater and Temperature Controller with LCD Display
H50 Spot light targeting System
H51 Manual Z-Control
H55 Dual Fiber Optic illuminator
H60-XX Bonding tool for 25µ wire
H70 Gold-Wire 25m, 60 Meter, 2" Spool
H72 ½" Wire Spool Adapter
H73 Torque Wrench 35 cNm for Bonding Tool

Technical specifications

Ultrasonic system	63,3 kHz transducer, PLL Control
Ultrasonic power :	0 - 10 watt output
Bond time:	15 - 9999 msec.
Bond force:	15 - 150 grams.
Gold and Aluminium wire Ø	17 to 75µ (0,7 to 3 mil)
Gold ribbon	up to 25 x 250µ (1x 10 mil)
Motorised Wire Spool	50,8 mm (2 inch) Option
Wire termination	table tear / clamp Tear
Wire feed angle	90° for Wire and Ribbon
Motorized Y travel	7 mm (240 mil)
Motorized Z travel	15 mm
Throat depth	165 mm (6,7")
Fine Table motion	10 mm (0,55 ")
Mouse ratio	6:1
Temperature controller	up to 250°C +/- 1°C
Electrical Requirements	100 – 120 / 220 - 240V +/-10% 50/60 Hz 10A max.
Operating temperature range	18°C – 32°C
Physical Dimensions	680 mm W x 640 mm D x 490 mm H
Weight	Net 50 kg
Industry Standard	CE standard

NOTE: These specifications are subject to change without prior notice.