ULTRASONIC WIREBONDER

Ultrasonic Thin Wire Bonder M17

F & K DELVOTEC – the Thin Wire Bonder specialist – delivers the perfect solution for any bonding challenge in the automotive, opto-electronics, hybrid technology, COB, MCM and HF technology industries.

M17 benefits from an innovative platform strategy with a number of work areas, whereby the different wirebond technologies and transducer frequencies can be deployed on the same machine base.

Advantages

• Integrated thin wire and deep access applications in a single machine platform through fast system change-over
• Solutions for any customer requirements from prototyping to series manufacture
• Ensures repeatable bond quality through patented BPC for real-time adjustment of the bond parameters with varying material surfaces
• Ensures process transparency through seamless integration in industry 4.0/IOT procedures
• Shortens set-up times through intelligent pattern recognition with multiple structure and feature identification
MADE FOR YOU – YOUR ADVANTAGES AT A GLANCE

- Smallest footprint on the market with maximum productivity
- Optimised scaling of your investment
- Sustainable technology through proven, exchangeable bond head principle
- Manual or automatic parts handling

- Smallest footprint on the market with double the output
- Perfect for high-volume production
- Best TCO through combination of thin wire and heavy wirebond technologies
- Pin or belt indexer

- Largest work area on the market
- Flexible parts handling height, up to 500 mm
- Highest flexibility with the combination of manual and automatic parts handling:
  - Two manual work holders
  - Single track indexer with manual work holder
  - Dual track indexer with bond-off station

THIN WIRE MACHINE MODELS

<table>
<thead>
<tr>
<th></th>
<th>M17 S</th>
<th>M17 D</th>
<th>M17 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-axis</td>
<td>254 mm (10”)</td>
<td>254 mm (10”)</td>
<td>652 mm (25”)</td>
</tr>
<tr>
<td>Y-axis</td>
<td>152.4 mm (6”)</td>
<td>152.4 mm (6”)</td>
<td>350 mm (14”)</td>
</tr>
<tr>
<td>Z-axis</td>
<td>40 mm (1.57”), optional 60 mm (2.36”)</td>
<td>40 mm (1.57”), optional 60 mm (2.36”)</td>
<td>100 mm (4”)</td>
</tr>
<tr>
<td>Width</td>
<td>553 mm</td>
<td>1,073 mm</td>
<td>1,073 mm</td>
</tr>
<tr>
<td>Height with/world signal lamp</td>
<td>2,249 / 1,721 mm</td>
<td>2,283 / 1,734 mm</td>
<td>2,503 / 1,954 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>1,135 mm</td>
<td>1,135 mm</td>
<td>1,237 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>780 kg</td>
<td>1,165 kg</td>
<td>1,100 kg</td>
</tr>
<tr>
<td>Working height</td>
<td>SMEMA compliant 850-1,050 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>120 V +/- 10 %, 230 V +/- 10 %, single phase, 50-60 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>0.5 kW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressed air</td>
<td>4-8 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum connection</td>
<td>&lt; -0.8 bar</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The technical information provided reflects our current knowledge. The details shown do not take any particular considerations of unique cases into account.
THIN WIRE 30°, 45°, 60°,
DEEP ACCESS 90° BOND HEAD

THIN WIRE BOND HEAD WEDGE-WEDGE 30°, 45° AND 60°

- Wire feed angle
  30°, 45° or 60°, convertible
- Wire diameter
  - Standard 17.5-75 µm (0.7-3 mil)
  - Optional 12.5 µm and 100 µm
- Wire material
  Al, Au, Cu, Pt, Pd
- Wire spool
  - 2” diameter
  - Wire end detection using CCD sensor
- Cutting process
  Table tear or clamp tear, programmable
- Bond tool
  1”, all common tool manufacturers
- Touchdown sensor
  - Inductive sensor with linear working range
  - Anti-crash hardware sensor
- Transducer frequencies
  - 55 to 167 kHz
  - Largest range of transducer frequencies on the market
  - In-house F & K transducer manufacture for 25 years
- Bond force
  - 10 to 400 cN, programmable for each bond
  - Exact control of the bond force to 1 cN
- Ultrasonic generator
  - F & K, digital 30-250 kHz,
  - Resolution < 1 Hz
  - Power, max. 100 W, programmable
- Bond head fast-change system
  Proven, fast-change system with intelligent bond head recognition, enables exchange of bond heads in less than 15 minutes
- Speed
  - Speed up to 7 wires/sec (application dependent)
  - Welding time: Al-wire on metallised wafer: 25 µm 20 ms, 50 µm 40 ms

DEEP ACCESS BOND HEAD WEDGE-WEDGE 90°

- Wire feed angle
  90°
- Wire diameter
  Standard 17.5-75 µm
- Ribbon size
  Al, Au: 6 µm x 35 µm (0.25 mil x 1.4 mil)
  up to 50 µm x 250 µm (2 mil x 10 mil)
- Wire material
  Al, Au, Cu optional
- Wire spool
  - 2” diameter
  - Wire end detection using CCD sensor
- Cutting process
  Table tear
- Bond tool
  3/4” and 1”, all common tool manufacturers
- Touchdown sensor
  - Inductive sensor with linear work area
  - Anti-crash hardware sensor
- Transducer frequencies
  - 65-145 kHz
- Bond force
  - 10 to 400 cN, programmable for each bond
  - Exact control of the bond force to 1 cN
- Ultrasonic generator
  - F & K, digital 30-250 kHz,
  - Resolution < 1 Hz
  - Power max. 100 W, programmable
- Bond head fast-change system
  Proven, fast-change system with intelligent bond head recognition, enables exchange of bond heads in less than 15 minutes
- Speed
  - Speed up to 2.5 wires/sec (application dependent)
  - Welding time: Al-wire on metallised wafer: 25 µm 20 ms, 50 µm 40 ms

THIN WIRE MACHINE MODELS

M17 S
M17 D
M17 L
## MACHINE SPECIFICATION

### MANUAL WORKSTATIONS
- **4” x 4”, 6” x 6”, 8” x 6”, 10” x 6”, up to 650 mm x 350 mm (25” x 14”)**
- Vacuum and / or mechanical clamping
- Heated or unheated

### AUTOMATIC PARTS HANDLING
- **Pin indexer**
  - Leadframes, e.g. QFN, D-PAK, PDFN and other packages
  - Leadframe length 152-324 mm, optionally < 152 mm
  - Leadframe width 18-105 mm
  - Downset 3 mm
- **Belt indexer**
  - Flat substrates, e.g. ceramic substrates, PCB or workpiece carriers
  - Variable product length, up to 650 mm without index steps
  - Product width up to 760 mm
  - Parts handling height up to 15 mm
  - Can be combined with manual work station, optionally heated with 2 pre-heat stations

### MAGAZINE LIFT SYSTEM
- **F & K leadframe lifts, dual axes**
  - Magazine width 24-115 mm
  - Height 94-200 mm
  - Length 154-244 mm, optionally 234-324 mm
- **F & K Substrate / boat lifts, single axis**
  - Magazine width max. 240 mm
  - Height max. 300 mm
  - Length max. 240 mm
  - Substrate width max. 160 mm
  - Substrate length < 150 mm or > 300 mm, Substrate widths > 160 mm are treated individually as special requirements

### NETWORK CONNECTIVITY
- TCP/IP/FTP data exchange
- SMEMA for in-line connections to other machines
- SEMI communication standard SECS/GEM

### PATTERN RECOGNITION
- Pattern recognition unit: Cognex® 8000 Pat Max® System
- Recognition time: Up to 2 ms per pattern recognition
- Alignment correction: Flexsearch, single point recognition incl. phase angle, two point recognition, phase angle correction +/- 5 %
- Camera: Moving CCD-camera, 640 x 480 pixel
- Resolution: 2-30 µm per pixel, adjustable using different optics
- Image size: Standard 1.2 mm x 1 mm up to 20 mm x 18 mm

### MACHINE SPECIFICATION
- X-Y-axes: Linear encoder resolution better than 0.1 µm
- P-axis: +/- 200° AC servomotor with absolute encoder, resolution 0.0035”
- Z-axis: Optionally 60 mm (2.36”), AC servomotor with absolute encoder, resolution 0.5 µm
- Positional accuracy: < +/- 5 µm @ 3 sigma, incl. PRU/Wire/Tool/Application
- Repeatability on the product: < +/- 3 µm @ 3 sigma, incl. PRU/Wire/Tool/Application
- Monitor: 21” flat screen
- Microscope: Stereo zoom microscope, adjustable lighting
- Connections: SMEMA, USB, RJ 45, Digital I/O
- Operating system: Real-time, Unix®-based multi-tasking OS
- Certification: SEMI S2, CE

### MICROSCOPE
- Monitor: 21” flat screen
- Microscope: Stereo zoom microscope, adjustable lighting
- Connections: SMEMA, USB, RJ 45, Digital I/O
- Operating system: Real-time, Unix®-based multi-tasking OS
- Certification: SEMI S2, CE

### AUTOMATION AND CONTROL
- Operating system: Real-time, Unix®-based multi-tasking OS
- Certification: SEMI S2, CE
QUALITY TOOLS

BOND PROCESS CONTROL (BPC): What exactly are the advantages of the new BPC?

- Closed-loop-system for continuous monitoring and real-time control of the bonding parameters time, ultrasonic power and bond force
- Adjustment of the ultrasonic power to surface variations in the current process

Tool inspection
- Graphical display of the expected positioning of wedge and wire clamp, using the pattern recognition unit
- Minimum set-up time with maximum traceability when changing the wedge

Traceability
- Link up to standard F & K or customer specific MES
- Link to an existing host
- For manual and automatic parts handling

Load cell
- Load cell and housing for fully automatic calibration of the bond weight

DRAG and BOND panorama pattern recognition
- Innovative self-scanning-system for maximum overview
- Intuitive user interface for generation of bond programmes

Barcode & DMC-Reader
- Fully automatic part recognition, recipe and process data assignment
- Available as flexible hand-held DMC-reader or fixed-position integrated unit

Transducer
- Optimised, tuned system comprising transducer and ultrasonic generator
- Continuous in-house development for 25 years ensures constant and outstanding quality
- Measurement of every transducer using extensive test procedures properly documented by the transducer laboratory

BOND ACADEMY: your advantages?
Our support for implementing your requirements and optimising your processes:

- Competent advice
- Determining the correct transducer frequency for the application
- Rapid prototyping
- Validation of product design
- Sample bond tests and pilot series manufacture
- Training your service technicians
- Ramp-up-support
Together with our parent company, Strama-MPS, we integrate our wireboniders into complete assembly lines with other joining, assembling and testing stations. Our customers profit from the combination of our bonding and automotive expertise, „One-stop-shopping“, and the interface free quality of the complete package.