# 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

NOT JUST MACHINES.
BUT BONDING SOLUTIONS.

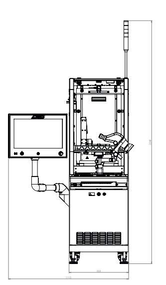
# MADE FOR YOU – YOUR ADVANTAGES AT A GLANCE

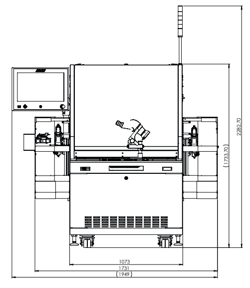
- Smallest footprint on the market with maximum productivity
- Optimised scaling of your investment
- Sustainable technology through proven, exchangeable bond head principle
- Manual or automatic parts handling

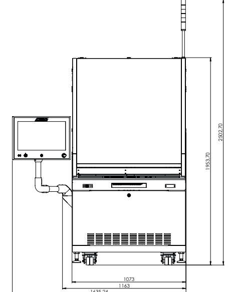
- Smallest footprint on the market with double the output
- Perfect for high-volume production
- Best TCO through combination of thin wire and heavy wirebond technologies
- Pin or belt indexer

- 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







| M17 | S | D | L |
|---|---|---|---|
| X-axis | 254 mm (10″) | 254 mm (10″) | 652 mm (25″) |
| Y-axis | 152.4 mm (6″) | 152.4 mm (6″) | 350 mm (14″) |
| Z-axis | 40 mm (1.57″), optional 60 mm (2.36″) | 40 mm (1.57″), optional 60 mm (2.36″) | 100 mm (4″) |
| Width | 553 mm | 1,073 mm | 1,073 mm |
| Height with/without signal lamp | 2,249 / 1,721 mm | 2,283 / 1,734 mm | 2,503 / 1,954 mm |
| Depth | 1,135 mm | 1,135 mm | 1,237 mm |
| Weight | 780 kg | 1,165 kg | 1,100 kg |
| Working height | SMEMA compliant 850-1,050 mm | | |
| Power supply | 120 V +/- 10 %, 230 V +/- 10 %, single phase, 50-60 Hz | | |
| Power | 0.5 kW | | |
| Compressed air | 4-8 bar | | |
| Vacuum connection | < -0.8 bar | | |

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

# MACHINE SPECIFICATION

## 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 |

## 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 |

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

## MAGAZINE LIFT SYSTEM

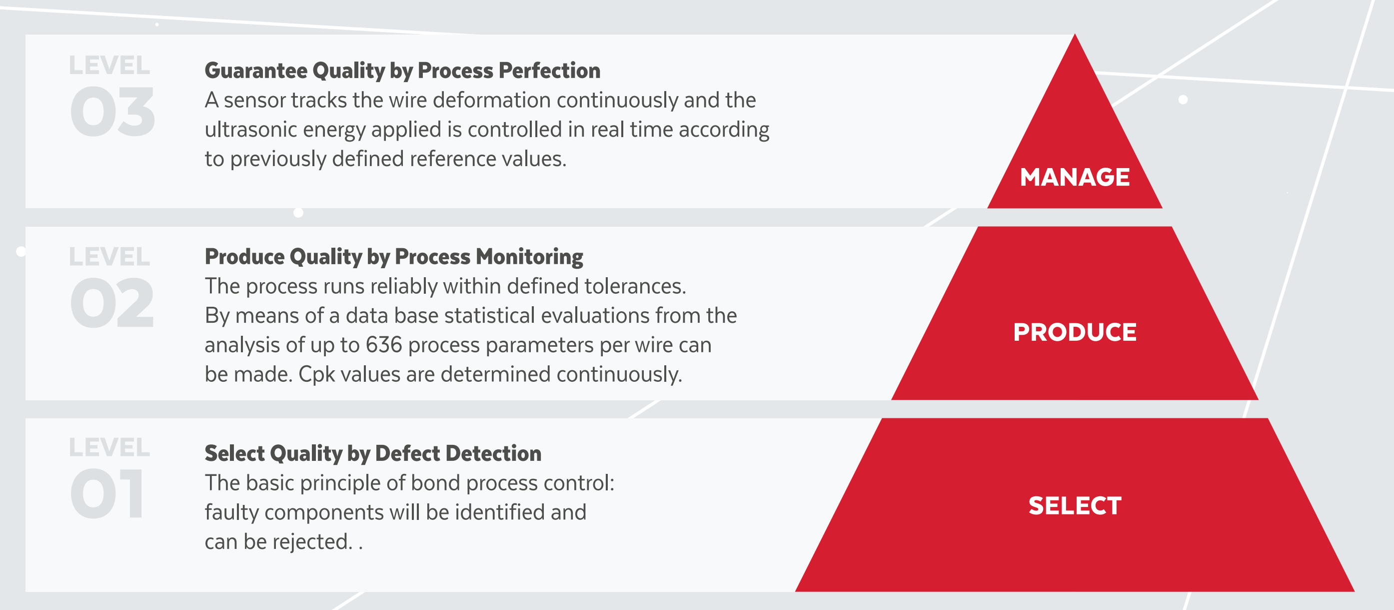
| | | | |
|---|---|---|---|
| F & K leadframe lifts, dual axes | Magazine width 24-115 mm | Height 94-200 mm | Length 154-244 mm, optionally 234-324 mm |
| F & K Substrate / boat lifts, single axis | Magazine width max. 240 mm | Height max. 300 mm | Length max. 240 mm |
| | Substrate width max. 160 mm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

# NOT JUST MACHINES. BUT BONDING SOLUTIONS.

## 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

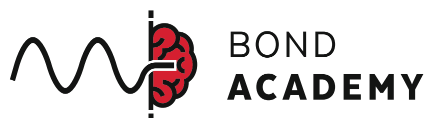
**Transducer**

- 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?**

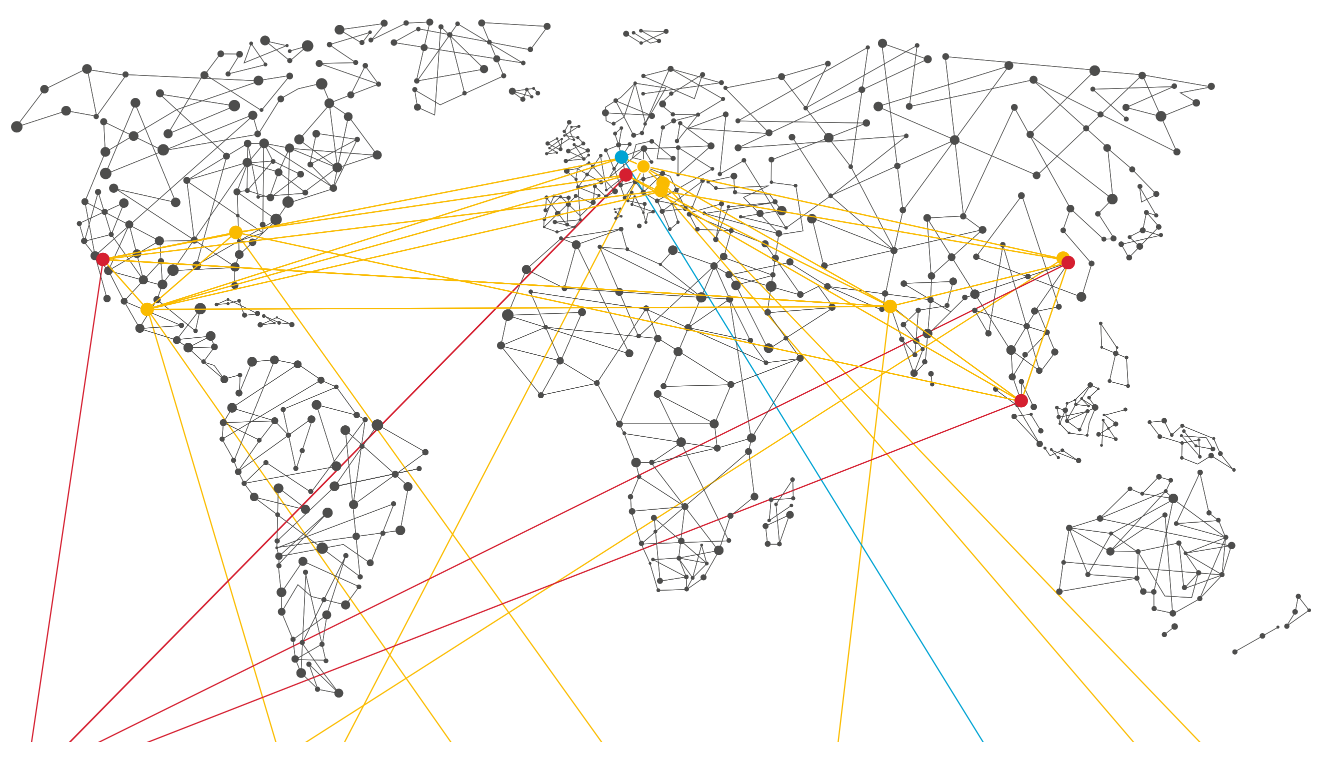
Our support for implementing your requirements and optimising your processes:

- 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



# POWERFUL SYNERGIES AS „MEMBER OF STRAMA GROUP“

Together with our parent company, Strama-MPS, we integrate our wirebonders 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.



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