

# Ultrasonic Fine Wirebonder

## F & K Model 2017

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

F & K Model 2017 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

- Industry 4.0: Over 600 input, process and output parameters to avoid manufacturing faults
- Panorama pattern recognition to create new bond programmes in the shortest possible time
- Superior processing of even the most critical surfaces with varying pattern and structure algorithms
- Low-mass linear-motor-X/Y table and a new high-speed motion system
- Sophisticated, vibrations damping machine frame with the smallest footprint on the market

# MADE FOR YOU – YOUR ADVANTAGES AT A GLANCE

## F&K MODEL 2017 S

- 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

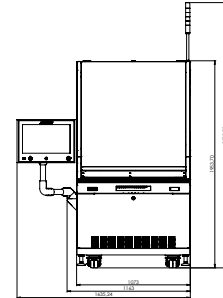
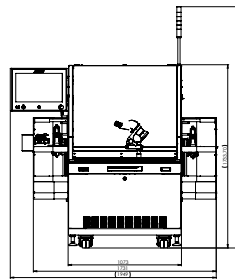
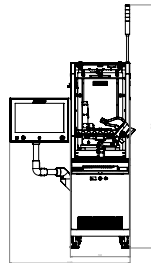
## F&K MODEL 2017 D

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

## F&K MODEL 2017 L

- 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

## FINE WIRE MACHINE MODELS



F & K Model 2017	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 mm-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		

# FINE WIRE 45°, 60°, DEEP ACCESS 90° BOND HEAD

## FINE WIRE BOND HEAD WEDGE / WEDGE 45° AND 60°

- **Wire feed angle**  
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

## FINE WIRE MACHINE MODELS

**F&K**  
MODEL  
**2017 S**



**F&K**  
MODEL  
**2017 D**



**F&K**  
MODEL  
**2017 L**



# 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 bis 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
Repeatability +/- 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



LEVEL  
**03**

#### Guarantee Quality by Process Perfection

A sensor tracks the wire deformation continuously and the ultrasonic energy applied is controlled in real time according to previously defined reference values.

LEVEL  
**02**

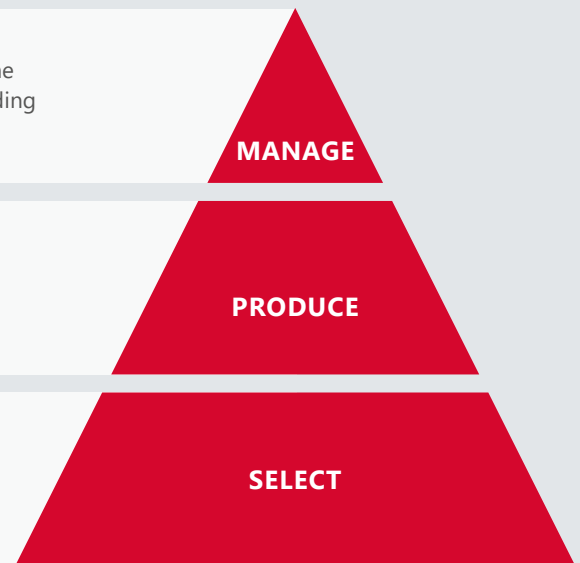
#### Produce Quality by Process Monitoring

The process runs reliably within defined tolerances. By means of a data base statistical evaluations from the analysis of up to 636 process parameters per wire can be made. Cpk values are determined continuously.

LEVEL  
**01**

#### Select Quality by Defect Detection

The basic principle of bond process control: faulty components will be identified and can be rejected.



#### 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?

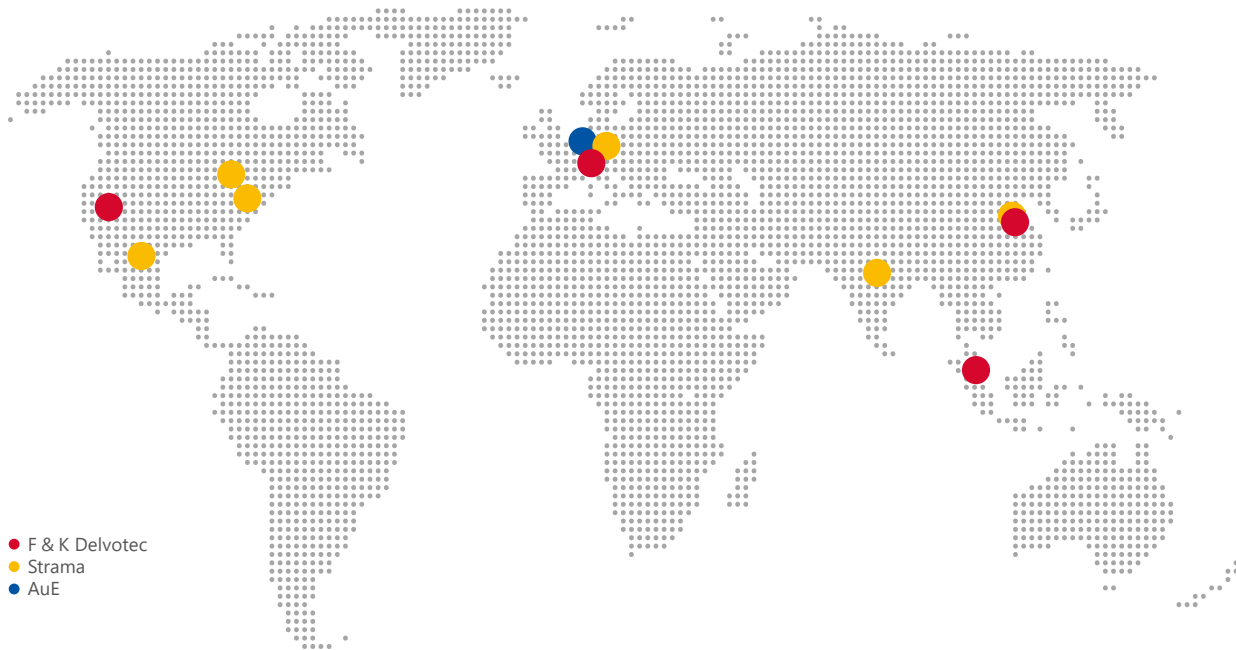
Our support for implementing your requirements and optimising your processes:

- 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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USA Foothill Ranch  
CHINA Shanghai  
SINGAPUR



GERMANY  
Straubing  
  
CHINA Taicang  
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