# KE 2020

JUKI AUTOMATION SYSTEMS

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|---|---|---|---|---|---|---|---|
| **SPECIFICATIONS** | **KE 2020 Series** | Automatic High-Precision Laser Placement Systems for Surface Mount Components. | | | | | |
| **BASIC SYSTEM** | | | M Size | | L Size | | E Size |
| | **Dimensions/Weight** | Width: | 1400mm | (55") | 1400mm | (55") | 1730mm (68") |
| | | Depth: | 1599mm | (62.9") | 1705mm | (67.1") | 1805mm (71.1") |
| | | Height: | 2000mm | (78.7") | 2000mm | (78.7") | 2000mm (78.7") |
| | | Weight: | 1410kg | (3109 lbs) | 1510kg | (3329 lbs) | 1530kg (3373 lbs) |
| | **Power Requirements** | 200, 220, 240, 380, 400, 415 VAC, three phase, 50/60 Hz, 3 KVA | | | | | |
| | **Compressed Air** | Pressure: 71 psi (5kgf/cm²) Consumption: 250 l/min (8.8 cfm) | | | | | |
| | **Environmental Conditions** | 10° to 35°C (50° to 95°F) operating. 50% (35°C) 90% (20°C) relative humidity, non-condensing. | | | | | |
| | **Noise** | 80dB or less | | | | | |
| **SYSTEM CONTROL** | **Computer** | Embedded PC, hard disk drive, 3 1/2" Floppy Disc Drive, Color LCD Monitor, Keyboard with standard trackball. | | | | | |
| | **Operating System** | Windows NT | | | | | |
| | **Programming** | Menu-guided entry of feeder data, placement data and production data. System test, auxiliary operations through Graphical User Interface (GUI), on-line at the machine. Interactive Multi-Window System. Optional off-line automatic program generation from CAD or Gerber Data. | | | | | |
| | **Programming Methods** | On-Line: Teach with placement head, teach camera.<br>Keyboard entry.<br>Off-Line: Keyboard entry | | | | | |
| | **Program Size** | Maximum 3,000 placements per circuit, not to exceed 10,000.<br>Maximum 100 non-matrix or 400 matrix circuits per PCB. | | | | | |
| | **Data Entry Resolution** | X/Y axis 0.004" (0.01mm)<br>Theta axis (rotation) 0.02°<br>Entry in millimeters or inches. | | | | | |
| | **Self-Calibration** | Self calibration routine allows operator to recalibrate at anytime in just minutes. | | | | | |
| | **Up and Down Line connection** | SMEMA standard. | | | | | |
| | **Teach Camera** | Allows teaching of pick and placements locations with a CCD camera mounted on the head assembly. | | | | | |
| **ACCESSORIES** | **Auto Tool Changer** | The tool changer holds up to twenty-nine (29) vacuum nozzles, plus two (2) for large compatibility. Twelve (12) vacuum nozzles are standard.<br>(4 x 502, 4 x 504, 1 each: 505, 506, 507, 508) | | | | | |
| **PLACEMENT** | **Placement Heads** | One Multi-Nozzle Laser Align (MNLA) head plus one Focused Modular Laser Align/ fine pitch head driven by an overhead X/Y gantry positioning system with closed-loop twin AC servo motors and magnetic linear encoders. | | | | | |
| | **Component Pick and Placement Method** | Pickup and placement is performed via vacuum nozzle with programmable pick and placement force. | | | | | |
| | **Component Centering** | Non-Contact TouchLess Centering (TLC®) using LaserAlign™ Sensor or upward looking gray scale vision centering. Laser Coplanarity Inspection optional for fine pitch SMDs. | | | | | |
| | **Component Detection** | Vacuum Sensor and Laser. | | | | | |

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| | **Positioning** | X:<br>Y:<br>Z:<br>Theta:<br>Linear Encoders: | Dual synchronized AC Servo Motors<br>Dual synchronized AC Servo Motors<br>Five (5) independent AC Servo Motors<br>Five (5) independent AC Servo Motors<br>Sony Digirulers; three (3) |
| | **Placement Accuracy** | LaserAlign™:<br>Vision: | ±0.08mm (±0.0031") at 3σ on chips<br>±0.04mm (±0.0016") at 3σ on QFP's (with local fiducials) |
| | **Placement Angle** | 360° in 0.02° increments (MNLA), 0.005° (FMLA) | |
| | **Placement Rate** | 11,000 on actual high speed test PCB (chips); 1,800 (vision) | |
| **COMPONENT SPECIFICATION** | **Dimensions-with LaserAlign™** | 0.6mm x 0.3mm minimum to 33.5mm x 33.5mm maximum<br>(0.02" x 0.01" minimum to 1.32" x 1.32" maximum)<br>Height (MNLA): 0.2mm to 12mm (0.008" minimum to 0.47" maximum)<br>Height (FMLA): 0.3mm to 12mm (0.012" minimum to 0.47" maximum)<br>Optional Height: 20mm (0.78" maximum) | |

**Dimensions-with Vision Centering**

| | Min | Max |
|---|---|---|
| QFP | 0.31" x 0.31" (8mm x 8mm) | 2.91" x 2.91" (74mm x 74mm) |
| PLCC/BGA | 0.28" x 0.28" (7mm x 7mm) | 1.97" x 1.97" (50mm x 50mm) |
| TSOP | 0.20" x 0.20" (5mm x 5mm) | 1.97" x 1.97" (50mm x 50mm) |
| Connector | 0.12" x 0.12" (3mm x 3mm) | 1.97" x 5.91" (50mm x 150mm) |
| Option VCS 1 | 0.12" x 0.12" (3mm x 3mm) | 1.32" x 1.32" (34mm x 34mm) |
| Option VCS 2 | 0.12" x 0.12" (3mm x 3mm) | 0.94" x 0.94" (24mm x 24mm) |
| Option VCS 3 | 0.12" x 0.12" (3mm x 3mm) | 0.61" x 0.61" (15.5mm x 15.5mm) |

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| | **Component Types** | Chip Cs, Rs, Micro-Melfs, Mini-Melfs, Melfs, SOTs, SOICs, SOLICs, SOJs, PLCCs, CSPs[1], Bare Die[a], QFPs[a], BGAs[a], Connectors[a], IC Sockets[a], TSOPs[a], SKT-Js[a], BQFPs[a], Micro BGAs[a] |
| | **Lead Pitch** | Minimum: 0.4mm (0.015") standard.<br>Optional [V1-V3] 0.3mm (0.012")<br>BGA ball pitch: 1mm – 3mm standard.<br>Optional [V1] 0.7 – 2.0mm; [V2] 0.5 – 2.0mm; [V3] 0.35 – 2.0mm<br>Ball diameter: 0.5 – 1.0mm standard.<br>Optional [V1] 0.28 – 0.63mm; [V2] 0.2 – 0.63mm; [V3] 0.14 – 0.63mm |
| | **Lead Pitch** | Minimum: 0.015" (0.4mm) standard. Optional 0.012" (0.3mm)<br>BGA ball pitch: 1mm – 3mm standard. Optional 0.5 – 2.0mm<br>Ball diameter: 0.5 – 1.0mm standard. Optional 0.2mm minimum |
| | **Component Packaging** | Tape, Tray, Bulk and Stick |
| | **Number of Feeder Inputs** | Up to 80 depending on Feeder Mix. |

**COMPONENT FEEDERS**

**Feeder Capacity**

| Width | Position | Qt. per Bank | Max. # per Machine |
|---|---|---|---|
| 8mm | 2 | 40 | 80 |
| 12mm | 3 | 26 | 52 |
| 16mm | 3 | 26 | 52 |
| 24mm | 4 | 20 | 40 |
| 32mm | 5 | 16 | 32 |
| 44mm | 8 | 10 | 20 |
| 56mm | 8 | 10 | 20 |

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| | **Interchangeable Feeder Banks** | Feeder banks are interchangeable using optional feeder trolley for quick and easy changeovers. |

[a] Component centered on package (body).

**Belt Feeders**

MBF Series Lane Configurations – Standard

| Part Number: | Number of Lanes: |
|---|---|
| MBF80-SOIC | 8 |
| MBF80-SOL | 5 |
| MBF80-SO/SOL | 6 (3 SOL + 3 SOIC) |
| MBF80-PLCC28/32 | 4 |
| MBF80-SOJ | 4 (3 x 0.300" + 1 x 0.400") |
| MBF44-SOIC | 4 |
| MBF44-SOMC | 3 |
| MBF44-SOL | 2 |
| MBF44-SOW | 2 |
| MBF44-SOY | 2 |
| MBF44-SOJ | 3 (2 x 0.300" + 1 x 0.400") |
| MBF44-PLCC20 | 2 |
| MBF44-PLCC28/32 | 2 |
| MBF44-PLCC44 | 2 (1 PLCC44 + 1 SOL) |
| MBF44-PLCC52 | 2 (1 PLCC52 + 1 SOIC) |
| MBF44-PLCC68 | 1 |
| MBF44-PLCC84 | 1 |
| MBF26-SOL | 1 |
| MBF26-SOJ300 | 1 |
| MBF26-SOJ400 | 1 |

Note: Front mounted only.

**BOARD SPECIFICATIONS**

**Dimensions**

| | | M Size | L Size | E Size |
|---|---|---|---|---|
| Length | min | 50mm (1.97") | 50mm (1.97" | 50mm (1.97") |
| | max | 330mm (13") | 410mm (16.1' | 510mm (20") |
| Width | min | 30mm (1.18") | 30mm (1.18' | 30mm (1.18") |
| | | 50mm AWC (1.97") | 50mm AWC (1.97' | 50mm AWC (1.97") |
| | max | 250mm (9.8") | 360mm (14.1' | 460mm (18.1") |
| Thickness | min | 0.40mm (0.016") | 0.40mm (0.016' | 0.40mm (0.016") |
| | max | 4mm (0.158") | 4mm (0.158' | 4mm (0.158") |
| Warp Tolerance | | 0.2mm per 50mm; 1mm max total | | |

**Registration Methods**

Shape clamp. (Registration is performed by edge reference of PWB)
Tooling pins:
Tooling Pin Diameter: 4mm (0.16") (other diameters are optional)
Tooling Pin Edge Distance: 5mm (0.2")

**Clearances**

Below PCB: 40mm (1.58")
Transport Edge: 3mm (0.12")

**Transport System**

- Manual width adjustable. PCB direction from left to right with fixed front rail standard.
- Height 950mm (37.40") ±20 mm. Optional 900mm (35.43") ±20mm.
- 3 buffer stations
- One placement station
- Options: Rear fixed rail, R to L, Auto width adjust

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| OPTIONS | | |
|---|---|---|
| | **Host Line Computer (HLC)** | The host line computer optimizes feeder arrangement and placement programs for multiple in-line machines. (Includes External Programming Unit (EPU) Functions.) Consult factory for availability. |
| | **IC Collection Belt** | Conveyor belt used to collect rejected fine pitch parts. |
| | **High-Speed Matrix Tray Changer** | Elevator style matrix tray changers capable of storing and presenting twenty (20) to forty (40) trays of components. Several models available. |
| | **External Programming Unit (EPU)** | Allows off-line programming, editing and transfer of assembly programs. Incorporates a user-defined database of all components, eliminating programming related down-time. Optimizes feeder locations. |
| | **Bad Mark Sensor** | Senses and skips marked circuits in multiple circuit PCBs.<br>Minimum Mark Size: 2.5mm (0.10")<br>Contrast: Bright on dark or dark on light<br>Sensing Time: 0.2 s/mark |
| | **Feeder Trolley** | For fast and efficient exchange of feeder banks on the machine with minimal reteaching. Allows offline setup of future jobs. |
| | **Component Verification System** | For verification of resistors, capacitors, diodes, and transistors. |
| | **Coplanarity Inspection** | True Coplanarity Inspection.<br>Minimum Lead Pitch: 0.3mm (0.012")<br>Minimum Component Size: 12mm (0.47")<br>Maximum Component Size: 50mm (1.97") toe to toe |
| | **Height Measurement Sensor (HMS)** | Automatically detects component pick-up height reducing programming time. |
| | **Tape Cutter** | Cuts and collects of empty tape automatically. |
| | **Rear Side Monitor** | Additional monitor and keyboard allows programming from the rear side increasing efficiency. |
| | **Matrix-Tray Holder** | Holds JEDEC standard trays for component picking. |
| | **Feeder Position Indicator (FPI)** | LED array to signal feeder position for faster setup and to indicate an error. |
| | **Option VCS 1** | For 0.3mm (12mil) pitch devices |
| | **Option VCS 2** | For Micro BGA®s, CSPs and 12mil pitch QFPs |
| | **Option VCS 3** | For flip chips and other CSPs |

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTIFICATION.