

# PUMA SMD Pick & Place System

Version 1.4 / June 2021

## Specifications

|                                      |                              | PUMA <sup>1</sup>  |   | PUMA <sup>2</sup>  |   | PUMA <sup>4</sup>  |  |  |
|--------------------------------------|------------------------------|--|---|--|---|--|--|--|
|                                      |                              | Stand Alone  | In Line                                     | Stand Alone  | In Line                                     | Stand Alone  | In Line  |  |
| Productivity <sup>(1)</sup>          | Optimum placement speed Chip | 6'700 cph  |   | 11'200 cph   |   | 18'100 cph   |  |  |
|                                      | Speed (IPC 9850)             | Chip 5'800 cph<br>QFP 5'200 cph  |   | Chip 10'100 cph<br>QFP 5'200 cph                             |   | Chip 15'300 cph<br>QFP 7'200 cph                             |  |  |
|                                      | Speed (IPC 9850A)            | Chip 5'600 cph<br>QFP 4'200 cph  |   | Chip 9'600 cph<br>QFP 4'200 cph                              |   | Chip 14'200 cph<br>QFP 5'300 cph                             |  |  |
|                                      | Dispensing speed             | Piezo Jet valve up to 145'000 dots/h   |   |  |   |  |  |  |
|                                      | Job changeover time          | < 1 min (loading job, adjust conveyor/table, restart production)   |   |  |   |  |  |  |
| Feeder <sup>(2)</sup>                | Feeder system                | EVO and hyQ (intelligent single feeder)<br>CLM (intelligent cassette feeder)   |   |  |   |  |  |  |
|                                      | Feeder capacity (8mm tape)   | 260  | 140   | 260  | 140   | 260 / 280 <sup>(*)</sup>                                     | 140 / 160 <sup>(*)</sup><br><i>(*) with optional Extended Rack, pick position cannot be taught with top camera</i> |  |
| Components                           | Component size range         | 0201 (imp.) – 33 x 33 mm incl. leads → Standard<br>0201 (imp.) – 80 x 33 mm incl. leads → With optional MFOV <sup>(*)</sup> software license<br>Up to 80 x 80 mm incl. leads → With opt. MFOV license and Vision Box <sup>(**)</sup><br>01005 (imp.) → With opt. Nozzle 0 and EVO feeder type<br><br><sup>(*) Multi Field of View</sup><br><sup>(**) Requires space up to 18 hyQ/EVO - 30 CLM Feeder lanes, front side mounting only (refer to System Description)</sup> |   |  |   |  |  |  |
|                                      | Mass moment of inertia       | 60 g x cm <sup>2</sup>   |   |  |   |  |  |  |
|                                      | Min. lead pitch              | 0.3 mm (12mil)   |   |  |   |  |  |  |
|                                      | Min. ball diameter / pitch   | 0.2 mm   |   |  |   |  |  |  |
|                                      | Min. component height        | > 0.0 mm   |   |  |   |  |  |  |
|                                      | Max. component height        | Standard: 18 mm / On request other heights   |   |  |   |  |  |  |
|                                      | Process height               | ± 18 mm (0.71") from zero height   |   |  |   |  |  |  |
|                                      | Accuracy                     | Linear encoder resolution (x,y)  | 0.2 µm                                      |  |   |  |  |  |
|                                      |                              | Rotation axis resolution   | 0.007°                                      |  |   |  |  |  |
|                                      |                              | Overall placement accuracy XY Chips  | ± 50 µm (3σ) <sup>3)</sup>                  |  |   |  |  |  |
| Overall placement accuracy XY QFP100 |                              | ± 45 µm (3σ) <sup>3)</sup>   |   |  |   |  |  |  |
| PCB                                  | Min. PCB dimensions          | 20 x 20 mm<br>(0.8 x 0.8")   | 50 x 50mm<br>(2 x 2")                       | 20 x 20 mm<br>(0.8 x 0.8")                                   | 50 x 50mm<br>(2 x 2")                       | 20 x 20 mm<br>(0.8 x 0.8")                                   | 50 x 50mm<br>(2 x 2")  |  |
|                                      | Max. PCB dimensions          | 560 x 610 mm (22 x 24")  |   |  |   |  |  |  |
|                                      | PCB thickness                | 0.5 – 3.5 mm<br>(0.02 – 0.13")   | 0.5 – 5.0 mm<br>(0.02 - 0.2")               | 0.5 – 3.5 mm<br>(0.02 – 0.13")                               | 0.5 – 5.0 mm<br>(0.02 - 0.2")               | 0.5 – 3.5 mm<br>(0.02 – 0.13")                               | 0.5 – 5.0 mm<br>(0.02 - 0.2")  |  |
|                                      | PCB edge clearance           | 3.0 – 5.0 mm<br>(0.11 – 0.2")<br>(varies with PCB thickness)   | T: 3.0 mm<br>(0.11")<br>B: 5.0 mm<br>(0.2") | 3.0 – 5.0 mm<br>(0.11 – 0.2")<br>(varies with PCB thickness) | T: 3.0 mm<br>(0.11")<br>B: 5.0 mm<br>(0.2") | 3.0 – 5.0 mm<br>(0.11 – 0.2")<br>(varies with PCB thickness) | T: 3.0 mm<br>(0.11")<br>B: 5.0 mm<br>(0.2")  |  |
|                                      | Max. Board weight            | -  | 4 kg (8.8 lb)                               | -  | 4 kg (8.8 lb)                               | -  | 4 kg (8.8 lb)  |  |
|                                      | Conveyor height              | -  | SMEMA<br>940 – 965 mm                       | -  | SMEMA<br>940 – 965 mm                       | -  | SMEMA<br>940 – 965 mm  |  |
|                                      | Clearance below PCB          | 40 mm (1.57")  | 27 mm (1.1")                                | 40 mm (1.57")  | 27 mm (1.1")                                | 40 mm (1.57")  | 27 mm (1.1")   |  |

Configuration

|  |  | PUMA <sup>1</sup> | PUMA <sup>2</sup> | PUMA <sup>4</sup> |
|--|--|-------------------|-------------------|-------------------|
| Machine base                                   | Pick & Place head with 1x spindle, optional up to 2x dispensing axis           | ●                 |                   |                   |
|  | Pick & Place head with 2x spindles, optional up to 2x dispensing axis          |                   | ●                 |                   |
|  | Pick & Place head with 4x spindles, optional 1x dispensing axis                |                   |                   | ●                 |
|  | Dual Bottom Camera System  |                   |                   | ●                 |
|  | Stand Alone type (PCB table, magnetic PCB holder, support pins)                | ○                 | ○                 | ○                 |
|  | In Line type (Conveyor 3 stage, support pins, manual width adjust.)            | ○                 | ○                 | ○                 |
|  | Dispensing preparation kit (Dot plate, purge and z-height calibration station) | ○                 | ○                 | ○                 |
|  | Interior lighting LED  | ●                 | ●                 | ●                 |
|  | Signal tower (3 color)   | ●                 | ●                 | ●                 |
|  | <b>Clean room compatible ISO7 (class 10'000)</b>                               | ●                 | ●                 | ●                 |
| PCB Handling                                   | IPC-HERMES-9852, SMEMA interface   | ●                 | ●                 | ●                 |
|  | Inline systems: Conveyor direction L/R, R/L, batch mode R/R, L/L               | ●                 | ●                 | ●                 |
|  | Inline systems: Automatical conveyor width adjustment                          | ○                 | ○                 | ○                 |
|  | Inline systems: Conveyor extensions  | ○                 | ○                 | ○                 |
|  | Inline systems: PCB inspection station on conveyor                             | ○                 | ○                 | ○                 |
| Control and software                           | ePlace P&P/Disp. software (En, De, Fr, Ru, Pl, Zh, Es, Cs, Ja)                 | ●                 | ●                 | ●                 |
|  | Machine PC with Windows 10 OS and 21.5" touch screen                           | ●                 | ●                 | ●                 |
|  | Technical support software   | ●                 | ●                 | ●                 |
| Alignment systems                              | Cognex SMD4 PatMax vision license (fiducials, chip, QFP, asymm. BGA and leads) | ●                 | ●                 | ●                 |
|  | Red and Blue color illumination for top camera                                 | ●                 | ●                 | ●                 |
|  | Multi Field of View license (MFOV)   | ○                 | ○                 | ○                 |
|  | Vision Box for 80x80mm components  | ○                 | ○                 | ○                 |
|  | Laser height measurement   | ○                 | ○                 | ○                 |
| Dispensing valves (Cartridge sizes)            | Piezo Jet valve (5, 10, 30 cm <sup>3</sup> )                                   | ○                 | ○                 | ○                 |
|  | Shockwave Jet valve (5, 10, 30 cm <sup>3</sup> )                               | ○                 | ○                 | ○                 |
|  | Time/pressure valve (5, 10, 30 cm <sup>3</sup> )                               | ○                 | ○                 | ○                 |
|  | Archimedean screw valve (5, 10, 30 cm <sup>3</sup> )                           | ○                 | ○                 | ○                 |
|  | Volume Dispenser valve (10, 30, 55 cm <sup>3</sup> )                           | ○                 | ○                 | ○                 |
|  | Cartridge level control  | ○                 | ○                 | ○                 |
|  | Dispenser Needle Heating   | ○                 | ○                 | ○                 |
| Various  | Standard User Level Management (software)                                      | ●                 | ●                 | ●                 |
|  | Bad mark sensing with vision (software)  | ●                 | ●                 | ●                 |
|  | Universal CAD conversion (software)  | ●                 | ●                 | ●                 |
|  | Automatic Placement constraints (software)                                     | ●                 | ●                 | ●                 |
|  | Basic calibration set P&P  | ●                 | ●                 | ●                 |
|  | Maintenance kit  | ●                 | ●                 | ●                 |
|  | Process Improvement Tool P&P (PIT1 – 3 pictures) (software)                    | ●                 | ●                 | ●                 |
|  | Key Performance Indicator (KPI) (software)                                     | ○                 | ○                 | ○                 |
|  | Barcode Reading over Top Camera (software)                                     | ○                 | ○                 | ○                 |
|  | Disp. Process Control Adjustment & Stabilization (PCAS) (software)             | ○                 | ○                 | ○                 |
|  | Second touch screen for machine backside                                       | ○                 | ○                 | ○                 |
|  | Keyboard and mouse holder underneath monitor                                   | ○                 | ○                 | ○                 |
|  | CVU (Electrical Component Verification)  | ○                 | ○                 | ○                 |
|  | Tray Slider (space for 2 additional JEDEC trays)                               | ○                 | ○                 | ○                 |
|  | Tray Changer (space for up to 18 JEDEC trays)                                  | ○                 | ○                 | ○                 |
| Extended Feeder Rack (additional feeder lanes) | ○  | ○                 | ○                 |                   |

PUMA Specifications

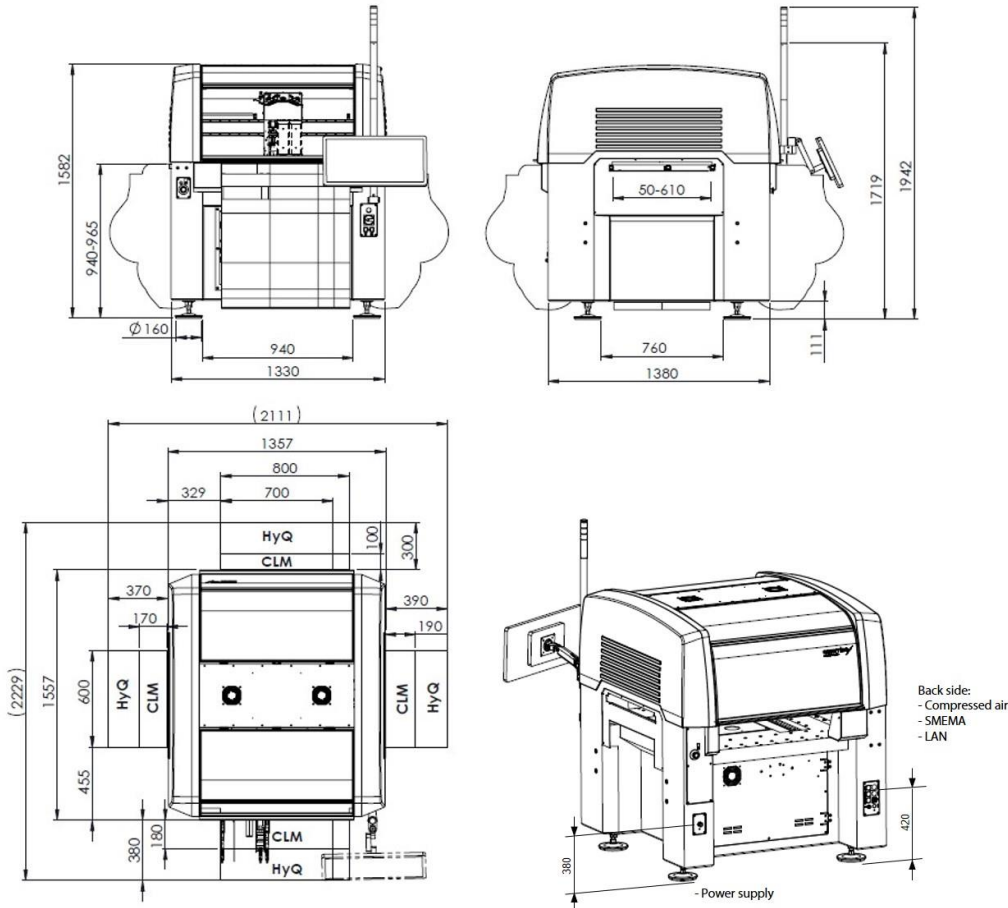
● standard feature ○ optional feature



Machine Dimensions, Packaging and Supplies

|                    |   |  |
|--------------------|---|--|
| Machine dimensions | Machine footprint without hood (L x W)              | 1380 x 1330 mm (54 x 52")  |
|                    | Machine footprint with hood (L x W)                 | 1557 x 1357 (61 x 53")   |
|                    | Operating floor space (L x W)                       | 2600 x 2500 mm (102 x 98")   |
|                    | Machine height (without / with light tower)         | 1582 mm (62") / 1942 mm (76")  |
|                    | Approx. machine weight (without / with full feeder) | 1670 kg (3680 lb) / 1920 kg (4233 lb)  |
|                    | Approx. floor loading (with full feeder)            | 1050 kg/m <sup>2</sup> (1.5 lb/sq.in)  |
|                    | Packaging weight                                    | 80 kg (176 lb)   |
| Supplies           | Electrical  | 3 x 400 VAC/50Hz (or 3 x 208VAC/60Hz with optional transformer)  |
|                    | Power consumption (peak)                            | 3 kW   |
|                    | Entry Fuse  | 16A / 400V   |
|                    | Min. Wire cross section                             | 1.5 mm <sup>2</sup>  |
|                    | Electrical connector                                | 400V, CEE-16, 16A, 400V, 5P 3L+N+PE 6h, red color  |
|                    | Compressed air                                      | 6 - 7 bar (87 - 102 psi), clean and filtered, dry, ISO 8573-1: class 3 (max. part diameter 5µm, dew point < -20°C, oil ≤ 1 mg/m <sup>3</sup> ) |
|                    | Air consumption                                     | max. 60 NI/min (2.1 cfm)   |
| Air connection     | Push-in connector for outer hose Ø8 mm              |  |
| Environment        | Performance temperature range / humidity            | 22 - 24°C / 50 - 70% RH  |
|                    | Operational temperature range / humidity            | 15 - 30°C / 30 - 70% RH (non condensing)   |
|                    | Noise level   | max. 75 dB (A)   |

Dimension Drawings



- 1) Values reached using EVO and hyQ feeder type only
- 2) Feeder type «CSM» are not compatible. See System Description for more information
- 3) **Used speed mode "Very Accurate", up to 3 different speed modes available. Only applicable at zero height and within performance temperature / humidity range**

For more information ask for the PUMA System Description and Product Notes.

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