

PUMA ULTRA SMD Pick & Place System

Version 3.1 / July 2025

Specifications

		PUMA ¹		PUMA ²		PUMA ⁴	
		Stand Alone	In Line	Stand Alone	In Line	Stand Alone	In Line
Productivity	Optimum placement speed ⁽¹⁾	Chip 9'000 cph		Chip 17'400 cph		Chip 30'000 cph	
	Speed (IPC 9850) ⁽¹⁾	Chip 7'100 cph QFP 6'600 cph		Chip 13'300 cph QFP 6'600 cph		Chip 20'100 cph QFP 9'400 cph	
	Speed (IPC 9850A) ⁽¹⁾	Chip 6'900 cph QFP 5'200 cph		Chip 12'400 cph QFP 5'200 cph		Chip 18'100 cph QFP 6'600 cph	
	Jet speed solder paste up to Shockwave valve	Optimum ⁽²⁾ Dot matrix ⁽³⁾ Application average ⁽⁴⁾		780'000 dots/h 480'000 dots/h 310'000 dots/h			
	Jet speed glue up to Piezo valve	Optimum ⁽⁵⁾ Dot matrix Jet-on-the-Fly ⁽⁶⁾ Dot matrix Stop 'n Jet ⁽⁶⁾		2'000'000 dots/h 780'000 dots/h 177'000 dots/h			
	Dispensing speed up to ⁽⁶⁾	Time/pressure valve Archimedeian screw valve Volume dispenser valve		38'000 dots/h 30'000 dots/h 26'000 dots/h			
	Job changeover time	< 1 min (loading job, adjust conveyor/table, restart production)					
Feeder ⁽⁷⁾	Feeder system	EVO and hyQ (intelligent single feeder) CLM (intelligent cassette feeder)					
	Feeder capacity (8mm tape)	260	140	260	140	^(*) 260 / 280 ^(*) 140 / 160 ^(*) ^(*) with optional Extended Rack, pick position cannot be taught with top camera	
Components	Component size range	008004 (imp.) - 109 x 87 mm Complete range, see constraints below Constraints: 0201 (imp.) - 40 x 40 mm incl. leads → Standard Up to 99 x 35 mm incl. leads → With optional MFOV ^(*) software license Up to 109 x 87 mm incl. leads → With opt. MFOV license and Vision Box ^(**) 01005 (imp.) → With opt. Nozzle 0 and EVO feeder type 008004 (imp.) / 0201 (m) ⁽⁸⁾ → With opt. Nozzle 0 and EVO feeder type ^(*) Multi Field of View ^(**) Requires space up to 22 hyQ/EVO - 30 CLM Feeder lanes, front side mounting only (see System Description)					
	Mass moment of inertia	200 g x cm ²					
	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					
	Linear encoder resolution XY	0.2 µm					
	Rotation axis resolution	0.007°					
	Overall placement accuracy XY chip	± 40 µm (3σ) ⁽⁹⁾					
Overall placement accuracy XY QFP	± 30 µm (3σ) ⁽⁹⁾						
PCB	Min. PCB dimensions	20 x 20 mm (0.8 x 0.8")	50 x 50mm (2 x 2")	20 x 20 mm (0.8 x 0.8")	50 x 50mm (2 x 2")	20 x 20 mm (0.8 x 0.8")	50 x 50mm (2 x 2")
	Max. PCB dimensions	560 x 610 mm (22 x 24") standard 1830 x 610 mm (72 x 24") with longboard option					
	PCB thickness	0.5-3.5 mm (0.02 - 0.13")	0.5-5.0 mm (0.02 - 0.2")	0.5-3.5 mm (0.02 - 0.13")	0.5-5.0 mm (0.02 - 0.2")	0.5-3.5 mm (0.02 - 0.13")	0.5-5.0 mm (0.02 - 0.2")
	PCB edge clearance	3.0-5.0 mm (0.11 - 0.2") (varies with PCB thickness)	T: 3.0 mm (0.11") B: 5.0 mm (0.2")	3.0-5.0 mm (0.11 - 0.2") (varies with PCB thickness)	T: 3.0 mm (0.11") B: 5.0 mm (0.2")	3.0-5.0 mm (0.11 - 0.2") (varies with PCB thickness)	T: 3.0 mm (0.11") B: 5.0 mm (0.2")
	Max. board weight	-	4 kg (8.8 lb)	-	4 kg (8.8 lb)	-	4 kg (8.8 lb)
	Conveyor height	-	SMEMA 940 - 965 mm	-	SMEMA 940 - 965 mm	-	SMEMA 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")

PUMA ULTRA Specifications

Configuration

		PUMA ¹	PUMA ²	PUMA ⁴
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	•	•	•
PCB Handling	Signal tower (3 color)	•	•	•
	IPC-HERMES-9852, SMEMA interface	•	•	•
	Inline systems: Conveyor direction L/R, R/L, batch mode R/R, L/L	•	•	•
	Inline systems: Automatic conveyor width adjustment	□	□	□
	Inline systems: Conveyor extensions	□	□	□
Control and software	Inline systems: PCB inspection station on conveyor	□	□	□
	ePlace P&P/Disp. software (En, De, Fr, Ru, Pl, Zh, Es, Cs, Ja)	•	•	•
	Machine PC with Windows 11 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 bigger components	□	□	□
	Laser height measurement	□	□	□
Dispensing valves (Cartridge sizes)	Piezo jet valve (5, 10, 30 cm ³)	□	□	□
	Shockwave jet valve (5, 10, 30 cm ³)	□	□	□
	Time/pressure valve (5, 10, 30 cm ³)	□	□	□
	Archimedean screw valve (5, 10, 30 cm ³)	□	□	□
	Volume dispenser valve (10, 30, 55 cm ³)	□	□	□
	Cartridge level control	□	□	□
	Dispenser needle heating	□	□	□
Various	Standard user level management	•	•	•
	Bad mark sensing with vision	•	•	•
	Universal CAD conversion	•	•	•
	Automatic pick position correction and feeder advance optimization	•	•	•
	Automatic placement constraints	•	•	•
	Basic calibration set P&P	•	•	•
	Maintenance kit	•	•	•
	Process Improvement Tool P&P (PIT1 - 3 pictures)	•	•	•
	Key Performance Indicator (KPI with SEMI E10 standard)	□	□	□
	Barcode reading over top camera	□	□	□
	Disp. Process Control Adjustment & Stabilization (PCAS)	□	□	□
	Second touch screen for machine backside	□	□	□
	Clean room option ISO7 (class 10 ⁰ 000)	□	□	□
	CVU (Component Verification Unit)	□	□	□
	Tray slider (space for 2 additional JEDEC trays)	□	□	□
	Tray changer (space for up to 18 JEDEC trays)	□	□	□
	Extended feeder rack (additional feeder lanes)	□	□	□
	Recipe import in ePlace	□	□	□
	Interface for host communication: IPC-CFX, ITAC, SECS/GEM, OIC, EEIP etc.	□	□	□
	Integrated inspection system for pick & place and dispensing (SW-I2S)	□	□	□
	Jet on the fly - Extended Speed Performance (SW-ESP), see Application Matrix	□	□	□

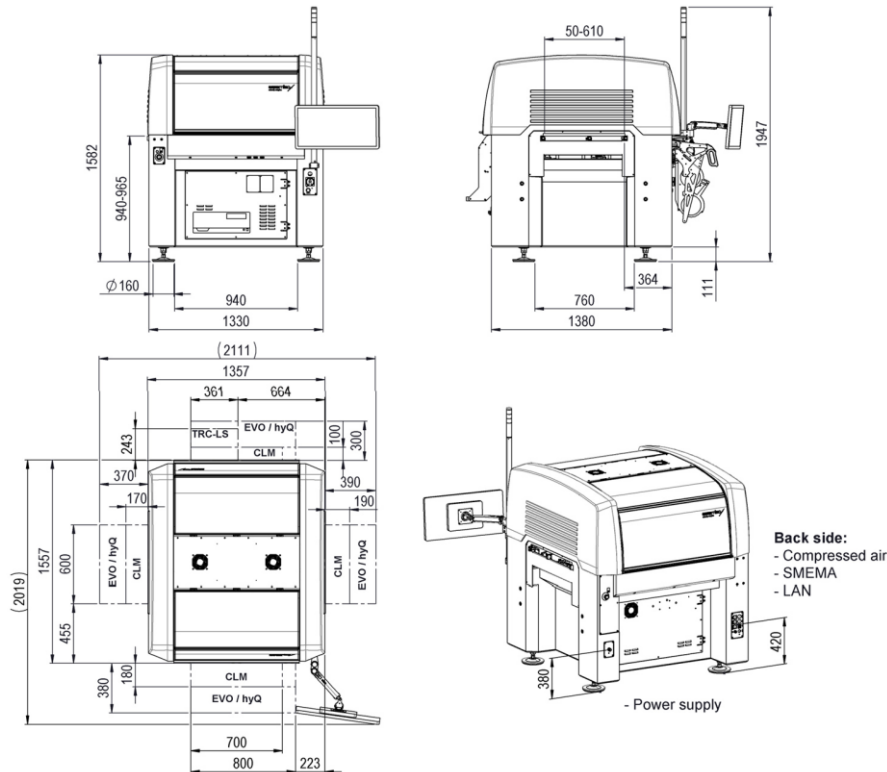
• standard feature □ optional feature



Machine Dimensions, Packaging and Supplies

Machine dimensions	Footprint without hood (L x W)	1380 x 1330 mm (54 x 52")
	Footprint with hood (L x W)	1557 x 1357 mm (61 x 53")
	Operating floor space (L x W)	2600 x 2500 mm (102 x 98")
	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 ² (1.5 lb/sq. in)
	Packaging weight	80 kg (176 lb)
Supplies	Electrical	3 x 400 VAC/50Hz or with optional transformer: 3 x 190 - 600 VAC/60Hz
	Power consumption (peak)	3 kW
	Entry fuse	16A / 400V
	Min. wire cross section	1.5 mm ²
	Electrical connector	400V, CEE-16, 16A, 400V, 5P 3L+N+PE 6h, red color, cable length 3 m
	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 ³)
	Air consumption	max. 60 NI/min (2.1 cfm) With dispensing option vacuum cleaning station max. 90 NI/min (3.2 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) Maximum valve frequency, using settings from solder paste Application Matrix with Jet-on-the-Fly capability (req. SW-ESP license)
- 3) Dot matrix 33x33 with pitch 1.0 x 1.0 mm, using settings from solder paste Application Matrix with Jet-on-the-Fly capability (req. SW-ESP license)
- 4) Average of 17x different industrial PCB, using settings from solder paste Application Matrix with Jet-on-the-Fly capability (req. SW-ESP license)
- 5) Maximum valve frequency
- 6) Dot matrix 33 x 33 with pitch 0.8 x 0.8 mm, dot size 0.5mm, medium Loctite 3621
- 7) Feeder type «CSM» are not compatible. See System Description for more information
- 8) Under conditions specified by Essemtec
- 9) Used speed mode "very accurate", up to 3 different speed modes available. Measured with chip 0402 and glass QFP100. Only applicable at zero height and within performance temperature / humidity range.

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