FOX ULTRA SMD Pick & Place System

Version 5.2 / December 2025

Specifications

		FOX^1		FOX^2		FOX^4	
		Stand Alone	**In Line**	**Stand Alone**	**In Line**	**Stand Alone**	**In Line**
Productivity	Optimum placement speed (1)	Chip 9'100 cph		Chip 17'500 cph		Chip 31'000 cph	
	Speed (IPC 9850) (1)	Chip 7'300 cph QFP 6'700 cph		Chip 13'600 cph QFP 6'700 cph		Chip 20'500 cph QFP 9'600 cph	
	Speed (IPC 9850A) (1)	Chip 7'000 cph QFP 5'300 cph		Chip 12'700 cph QFP 5'300 cph		Chip 18'500 cph QFP 6'700 cph	
	Jet speed solder paste up to Shockwave valve	Optimum (2) 1'100'000 dots/h Dot matrix (3) 665'000 dots/h Application average (4) 350'000 dots/h				–	
	Jet speed glue up to Piezo valve	Optimum (5) 2'000'000 dots/h Dot matrix Jet-on-the-Fly (6) 780'000 dots/h Dot matrix Stop 'n Jet (6) 177'000 dots/h				–	
	Dispensing speed up to (6)	Time/pressure valve 38'000 dots/h Archimedean screw valve 30'000 dots/h Volume dispenser valve 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) (*) (*) *Restrictions on FOX^4 with CLM racks on front, see System Description*					
	Feeder capacity (8mm tape)	180	120	180	120	180 / 200(*) (*) *with optional Extended Rack, pick position cannot be taught with top camera*	120 / 140(*)
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 87 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					
Accuracy	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	406 x 305 mm (16 x 12")					
	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")

Configuration

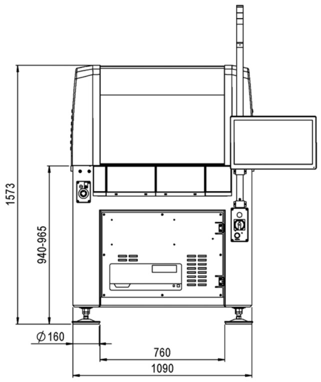
			FOX^1	FOX^2	FOX^4
Machine base	Pick & Place head with 1 spindle, optional 1x dispensing axis		●		
	Pick & Place head with 2 spindles, optional 1x dispensing axis			●	
	Pick & Place head with 4 spindles				●
	Dual bottom camera system				●
	Stand alone type (PCB table, magnetic PCB holder, support pins)		○	○	○
	In line type (conveyor 3 stage, support pins, manual width adjustment)		○	○	○
	Dispensing preparation kit (dot plate, purge and z-height calibration station)		○	○	
	Interior lighting LED		●	●	●
	Signal tower (3 color)		●	●	●
PCB Handling	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		○	○	○
	Inline systems: PCB inspection station on conveyor		○	○	○
Control and software	ePlace P&P 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 (extract)	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		○	○	○
	CVU (Component Verification Unit)		○	○	○
	Tray slider (space for two additional JEDEC trays) Reduces max. PCB dimension in Y from 305 to 260 mm (*) Picking-area restrictions, see System Description		○(*)	○	○
	Tray changer (space for up to 18 JEDEC trays)		○	○	○
	Extended feeder rack (additional feeder lanes)				○
	Recipe import in ePlace		○	○	○
	Communication interfaces: IPC-CFX, HERMES, 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		○	○	○

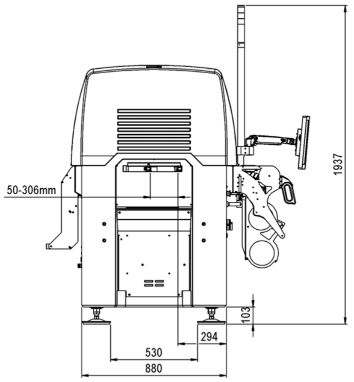
● **standard feature** ○ **optional feature**

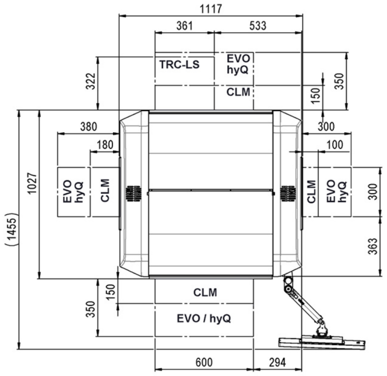
Machine Dimensions, Packaging and Supplies

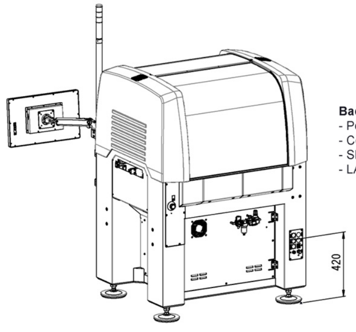
Machine dimensions	Footprint without hood (L x W)	880 x 1090 mm (35 x 43")
	Footprint with hood (L x W)	1027 x 1117 mm (40 x 44")
	Operating floor space (L x W)	1865 x 1797 mm (73 x 71")
	Height (without / with light tower)	1578 mm (62") / 1939 mm (76")
	Approx. machine weight (without / with feeder)	875 kg (1929 lb) / 1020 kg (2249 lb)
	Approx. floor loading (without / with feeder)	912 kg/m^2 (1.3 lb/sq.in) / 1065 kg/m^2 (1.51 lb/sq.in)
	Packaging weight	70 kg (154 lb)
Supplies	Electrical	230V / 50Hz or 120V / 60Hz (with optional transformer)
	Power consumption (average / peak)	0.75 kW / 1.7 kW
	Entry fuse	13A / 230V
	Min. wire cross section	1.5 mm^2
	Electrical connector	230V, CEE-16, 16A, 230V, 3P L+N+PE 6h, blue color, cable length 2.7 m 120V, CEE-16, 16A, 120V, 3P L+N+PE 4h, yellow color, cable length 2.7 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 Nl/min (2.1 cfm) With dispensing option vacuum cleaning station max. 90 Nl/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









Back side:
- Power supply
- Compressed air
- SMEMA
- LAN

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 PCBs, 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) Some feeder type «CSM» are also compatible. See System Description for possibilities and details.
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 FOX ULTRA System Description and Product Notes.

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