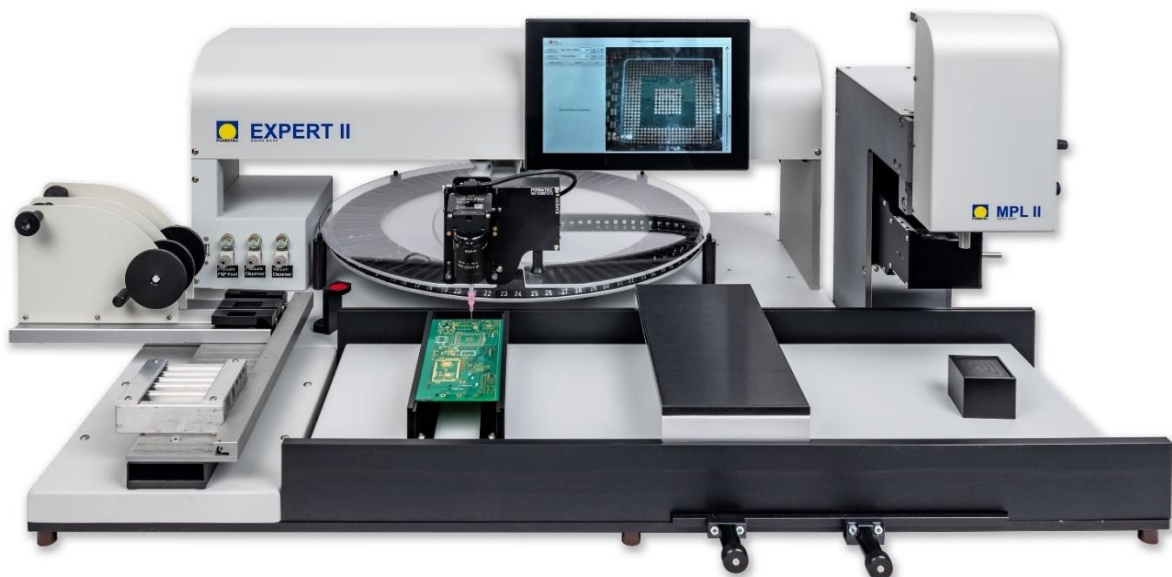# POWATEC

Expert II SMD Pick & Place and Dispensing System

High-End Semi-Automatic Collaborative Device with SW & optical technology to handle BGA's, QFN's and parts sizes of 0201 with an accuracy up to 0.03mm on circuit boards up to 450mm x 250mm. It reaches up to 600 SMD parts per hour and provides extensive SW guidance and PCB data import for full Quality-Assurance.

Expert II – SMD assembly with SW guided full Quality Control

The absolute x-y position system on the cartesian lever together with the latest SW and graphics, provides direct guidance of the placement sequence and a position information accuracy of 0.05mm for the part placing based on the PCB layout import via USB stick. A 10" touch display serves as interface to operate all required process steps. A motorized table rotates automatically to the correct picking bin according to the imported PCB project. Ergonomic perfection is provided with detection sensors in the cartesian lever head which recognizes the operators picking and placing intend which both, automatically controls the nozzle vacuum and displays the correct process visual on the screen. Prism technology in the motorized Microplacer allows visual superposing of backside pins of BGA's & QFN's with the PCB contact pins. An automated blocking system of either x or y axis of the cartesian lever serves to conveniently dispense or place repeatedly within one of the cartesian dimension. Latest SW comes along with algorithms for quality monitoring which prevent the operator from placing parts mistakably or inaccurately.

The Expert II system is the successor of the widely known Expert of Essemtec which is globally used in more than 4000 production facilities, laboratories and educational institutions. Also, this new generation offers you a big variety of options and features to fit the system to the needs of your application.

Features and options

High precision mechatronic ensures x-y-z positioning and accurate placement. Optionally with independent brake per axis.

Monitor your placement with the high-resolution camera (1080x1920) and a prism for parallax free view.

Turn table drive for 45 or 90 different single part type bins.

Adjust the head lowering force with the patented air damping.

Load you project data for enhanced SW guidance and quality control.

EXPERT II
SWISS MADE

Precisely adjust the head lifting force, part gripping force and dispensing parameters.

Dispense fast and efficiently solder paste, glue or resign out of 5ccm or 10ccm cartridge.

Intuitive and guided operation of the system over the movable 10.1″ touch display

Flexible interface for your part feeding needs. Mount Tray feeders, tape feeders, stick feeders or design your own part storage.

PCB support with magnets for best workflow placement.

Enable semi-automatic project execution for part pick and place guidance and monitoring for enhanced quality assurance.

SW supported multiple identical PCBA assembly at the same time.

Precisely adjust zoom and focus of the motorized high resolution camera and dim pin position light source.

Precise part lifting and theta aligning with the Microplacer

MPL II

SWISS MADE

Work with panels up to 450mm x 250mm and up to 450mm x 500mm by flipping.

Position BGA, CSP or flip chip parts in an overlay picture by the split optic and two-color illumination.

Ergonomic hand support for a convenient SMD placing.

Position alignments down to 0.03 mm with Microplacer, fine pitch table and auto Z function.

Engineered and manufactured in Switzerland

Expert II Main Device (EXPERT II-M)

- x-y-z cartesian lever with assembly head
- x-y absolute positioning sensor system
- controllable pressure adjustment for z-axis damping
- high-resolution camera (1080x1920 px)
- integrated and movable 10" touch display with 1080x1920 px
- adjustable LED intensity work area illumination
- SW supported pick & place vacuum control at pick-up nozzle
- Pick & Place tips (nozzles)[1].
- pedal for foot operation of the vacuum[2]
- magnetic stands and magnetic brackets to hold PCB[2]
- slidable hand rest[2]
- Part flip table[2]
- interface for external monitor, mouse and keyboard
- basic SW with pick & place functions for small parts (0201) and BGA/QFN
- limited version of the full SW package (import of max. 12 parts)
- The device requires compressed air (oil free!) of min 4.5 bar for operation [3]. There is no need of vacuum pump. The EXPERT II produces its own vacuum with the air pressure.

Initial configurations

The following configurations are combinable with each other but cannot be added later and require to be ordered initially.

x-y-z cartesian lever blocking system (CLB)

This feature allows convenient dispensing or placing of parts within a repeated cartesian dimension or it supports to place very small parts (0201). Together with the option of the fine pitch table adjuster, the adjustment accuracy reaches +- 0.03 mm in following working sequence:

1. Block Z axis with picked part close above the PCB within placement proximity.
2. Block X and Y axis.
3. Adjust precise position with fine pitch table adjuster supported by the high resolution camera and display.
4. Start Auto Z function. The nozzle places part onto the PCBA automatically.

The basic SW supports the x-y cartesian lever blocking system

Dispenser (UP5001 II)

Adjustable pressure valves for dispenser flow and vacuum drop-stop function. The dispensing time is controlled by the basic SW.

Contains the holder and tube to operate 5ccm and 10ccm standard cartridges.

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[1] See details in chapter "pick & place tip"
[2] See details in chapter "additional details of the delivery content of the main device"
[3] Min. 2 bar, max 6 bar

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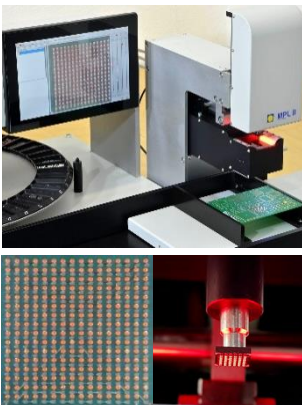CH-6331 Hünenberg | www.powatec.com

Motorized turn table (EXP520-24VDC)

Motorized turn table rotating to the required part bin.

The motor is either operated by two buttons on the assembly head (basic SW) or automatically by the SW (full package) according to a project import.

Functional Options

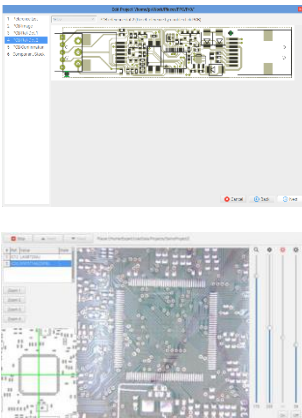The following options can be added later if required [4].

Micro Placer (MPL II)

The micro placer MPL II serves to place BGA, micro-BGA, QFN, MLF, QFP, PQFP, CSP or flip chip parts. The necessary pick & place tips are included [5]. It also serves to place very small parts 0201 with the pick & place tips included in the main device.

With a motorized high-resolution beam splitter camera both pin layers and PCB pad are visually overlayed. The red highlighted part bottom pins are then optically overlayed onto the white illuminated PCB pin positions. Fine adjusters allow to align x-y and theta in an accuracy of 0.03 mm. The head lowers and rises motorized.

The MPL II needs to be ordered with the option of the fine pitch table adjuster to ensure the precise positioning of the parts.

Expert II Full Software Package

The Place Software is activated with a license key and ensures full supervision of your project based on the imported PCBA design data. All feeding options are be stored and made available for repeated actions and projects. The software monitors the correct pick and place location of the part and eliminates placement mistakes. With the optional automated turn table drive the correct part bin is automatically brought into picking position right after having placed the previous part correctly. The display automatically switches between camera and assembly plan.

Key features of the SW are:

- Reference the PCB position based on a loaded reference point list. Drag and drop functions ease the visuals on the touch screen.
- Direct import of part lists and layout from the PCBA design tool via USB stick. Import assembly lists to enable guided and controlled placement of parts.
- Import circuit board images to support visual guidance.
- Create and store feeder inventory. The tables and trays can then be re-activated for the next project.
- Create your own feeders and their inventory.

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[4] After a certain period, the compatibility needs to be confirmed with POWATEC
[5] See details in chapter "Additional details of the delivery content of the MPLII"
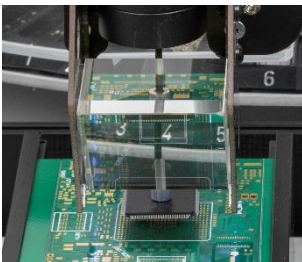
- Create assembly projects for single PCBs or panels with repetitive PCB pattern.
- Automatic calibration feature to ensure placement accuracy quality at all times.

External monitor (VS705-LCD)

It is recommended to supply the qualified monitor from POWATEC. However, principally any HDMI monitor can be connected to the Expert II system [6].

This option includes a plate for the external monitor.

Prism (VS710II)

This option is usually only used when many SOP or QFP should be processed because the Glass prism with work area illumination allows a parallax top view onto the pins of the parts.

The prism is supplied with a specific nozzle set [7].

Accessories

Turn tables and additions

Turn table for 45 parts
(EXP505-B)

Turn table for 90 parts
(EXP506-B)

Cover for the turn table to protect parts while working or when storing. The cover has an opening for picking parts which can be turned to the desired working position. The cover is available in plexiglas or in ESLON for ESD sensitive parts.
- Plexi glass cover (E510)
- ESLON cover (E511)

Locking mechanism for plexi glass or Eslon cover to protect parts from falling out during transportation and exchange of trun tables
(VS)

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[6] Note that the compatibility cannot be guaranteed for all monitors on the market.
[7] See details in chapter "additional details of the delivery content of the prism"

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POWATEC

Feeder Systems

Base plate for 3 feeder boxes or Tray table
(E533)

Tape feeder box 10x 8mm. Can be used for rest pieces of tapes or in combination with Tape reel holder for 10x 8mm tape reels
(E570)

Tape feeder box 4x 8mm, 3x 12mm, 1x 16mm. Can be used for rest pieces of tapes or in combination with Tape reel holder for 4x 8mm, 3x 12mm, 1x 16mm tape reels
(E571)

Tape reel holder 10x 8mm. Can be attached to Tape feeder box 10x 8mm.

(E572)

Tape reel holder 4x 8mm, 3x 12mm. Can be attached to Tape feeder box 4x 8mm, 3x 12mm.

(E573)

Tray table 310mm x 135mm. To be placed on Base plate
(532)

Additional Details of the delivery content of the Main Device

Part flip table with tissue to place parts and flip to the right side with the pick & place tip

Pedal for foot operation of the vacuum or the dispensing.

4x magnetic stands to place and hold the PCB

magnetic bracket stands to place and hold the PCB
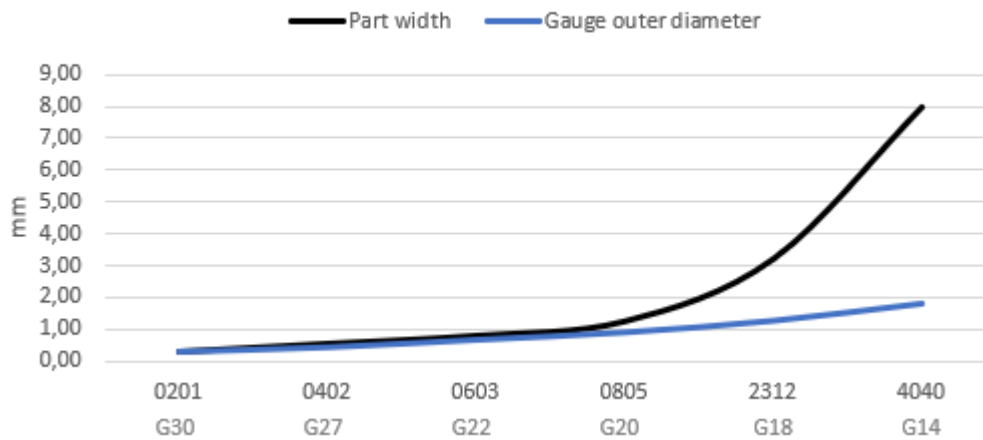
Slidable hand rest

Cable 230V/110V with connector for specific customer country

Adapter for Pick & Place Tips

Pick & Place Tip (included in the Main Device)

Recommended outer diameter of Pick&Place tip vs. Part Size

Gauge	Outer diameter	Inner diameter	Tip length	ESD type & color	Suitable for Part	Option or included
G30	0.31 mm 0.012"	0.16 mm 0.006 "	6.35 mm 0.25 "	YES Black	0201/ 0402	3 x Included in main Device
G27	0.41 mm 0.016 "	0.21 mm 0.008 "	6.35 mm 0.25"	YES Black	0402	2 x Included in main Device
G22	0.71 mm 0.027 "	0.41 mm 0.016 "	12.7 mm 0.5 "	YES Black	0603	1 x Included in main Device
G20	0.91 mm 0.035 "	0.60 mm 0.023 "	12.7 mm 0.5 "	YES Black	0805/ 1206	1 x Included in main Device
G18	1.27 mm 0.05 "	0.84 mm 0.033 "	12.7 mm 0.5 "	YES Black	1206/ 2312	1 x Included in main Device
G14	1.80 mm 0.071 "	1.60 mm 0.062 "	12.7 mm 0.5 "	YES Black	2312/ 4040	1 x Included in main Device

Additional Details of the delivery content of the MPLII

	Gauge	Outer diameter	Inner diameter	Tip length	ESD type & color	Suitable for Part	Option or included
	G30	0.31 mm 0.012"	0.16 mm 0.006 "	12.7 mm 0.5 "	YES Black	0201/ 0402	3 x Included in main Device
	G27	0.41 mm 0.016 "	0.21 mm 0.008 "	12.7 mm 0.5"	YES Black	0402	2 x Included in main Device

Pick & Place tip
OD 4 mm, ID 3 mm

Pick & Place tip
OD 10 mm, ID 8 mm

Part placer to pick part with MPL II

Additional Details of the SW

	SW of Main Device	full SW package
Camera on cartesian arm head and 10" touch screen	●	●
Automatic vacuum control based on pick & place recognition	●	●
Supported x-y-z blocking system	●[8]	●[8]
Auto-z function on cartesian head with z-blocking. The nozzle will place the part automatically on the fine adjusted x-y position	●[9]	●[9]
Control of the dispensing functions (Pedal & Dispensing Dose)	●[10]	●[10]
Control of motorized turn table with button on cartesian arm head	●[11]	●[11]
Support of Micro-placer Optics onto 10" Display and motorization of MPL II	●[12]	●[12]
Support of external Monitor via HDMI	●[13]	●[13]
Referencing the PCB position for SW aided correct part placement. The SW will control the if the correct part is correctly placed and visually guide and control on the 10" display.		●
Direct import of part lists and layout from the PCBA design tool via USB stick.		●
Import circuit board images to support visual guidance.		●
Create and store feeder inventory. The tables and trays can then be re-activated for consecutive projects.		●
Create your own feeders and their inventory.		●
Create assembly projects for single PCBs or panels with repetitive PCB pattern.		●
Automatic calibration feature to ensure placement accuracy quality at all times.		●
Multiple identical PCBA assemblies at the same time		●
Part limitation (max 20 Parts)	Limitation to 20	No limitation

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[8] This SW function is activated with the option x-y-z cartesian blocking system (CLB)
[9] Standard function
[10] This SW function is activated with the dispensing option (UP5001 II)
[11] This SW function is activated with the motorized turn table option (EXP520-24VDC)
[12] This SW function is activated with the MPL II option (MPL II)
[13] This SW function is activated with the external Monitor (VS705-LCD)

Specification

Panel size and workable pick and place area	up to 450 x 250 mm
PCB thickness	0.5 up to 5 mm
	Flex PCB and special materials on request
Part size	From 0201
Part height	Up to 10 mm, up to 16mm with special needle
QFP pitch	From 0.3 mm with MPL
Double side assembly	Possible with part height up to 35mm
Cartesian lever position sensor accuracy	0.05 mm in horizontal directions
Fine pitch table adjuster accuracy	0.03 mm in horizontal directions
Width	760 mm, with MPL 930
	Width increases with some feeder options
Depth	800 mm, 1110 mm incl. outreach
Height	420 mm
Weight	16kg, with MPL 23 kg
Main power	110-240 VAC, 50/60 Hz
Rated power consumption	51 W
Compressed air	6 mm tube
	5-6 bar
	oil-free, dry and clean
Vacuum	no external vacuum needed
Internal display	10.1'' touch display 1920 x 1080 px, laterally movable
Display output	HDMI type A
Network	RJ45, TCP/IP
Peripherals	2x USB type A for mouse and keyboard

Manufacturer

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Name: Expert II-M-MPL
Power: 100-240VAC, 50-60Hz
SN: 01-001
CE
swiss made

Engineered and manufactured
in Switzerland