

PowerScanner™

Specifications & typical values



General recommendations for achieving consistently optimal experiment performance – platform independent:

- Always follow SOPs and in all details (operation and maintenance). Microarray experiments are extremely sensitive to minor process changes.
- Include appropriate technical and experimental quality control steps. Analysis of technical and experimental quality requires software and sometimes additional tools. Image analysis requires stats applied to a vast amount of individual data points.
- Establish automated experimental workflow infrastructure and reduce human factor (no manual steps).
- Standard lab bench top.
- Appropriate particle-filtered environment.
- Appropriate constant temperature and humidity.
- Appropriate active carbon filtered air (oxidization reduction).
- Block ambient light at 635/20 and 540/20 nm range with special filtered lab illumination.

Fully loaded system

2 lasers/2 PMT, PC/Monitor, BCR, Autoloader, single license image analysis.

Substrate compatibility

Open platform:

Glass substrates, standard transparent, 3D gel or nitrocellulose coatings, gold or mirrored (reflective) surfaces from major brands of microarray slide products.

Slide Dimensions

75 mm to 76.5 mm x 24.6 mm to 26 mm x 0.9 mm to 1.1 mm

Autoloader

- Compact hand-held 48-slide-magazine
- No slide adapters required, fast and easy slide handling (Optional: second back-up magazine for easy and fast magazine switching)
- Sensor for automatic slide position detection
- Fast and easy random access protocol definition for multi-project scan sessions

Ozone blocking

- Integrated cartridge set to protect microarrays in the autoloading compartment from degradation of dyes at low ozone concentration in the lab.
- Cartridge set can be replaced easily in seconds.

Barcode reader

- Supports all major brands of microarray slide products, incl. code 128, 39, 93
- Real open platform

Array-type, -size and -pattern compatibility

Open array platform for nucleic acids, proteins and tissues, no scan restrictions to any type and pattern on 3 x 1 inch glass slide.

Feature size

Regular or even ultra high density microarrays (> 10 µm feature size).

Scan area dimension

- Max 75 x 22 mm size
- Easy and intuitive graphical definition of scan areas can be done directly in pre-scan images or in default slide graphic of the GUI
- Multiple scan areas for multi-pack-array slides can be defined for breaking down individual assays into small individual images for storage and analysis

Detection mode

- Dual and single dye fluorescence scan
- Always direct-read on surface (from top)

Resolution (Pixel Size)

- A-type system*: 2, 4, 5, 10, 20, 40 µm
 - B-type system*: 4, 5, 10, 20, 40 µm
- *(can be upgraded in field)

Detection limit

- For discussions about appropriate calibration methods talk to Tecan.
- Scanner-to-scanner evaluation requires side-by-side comparison of signal-to-background-noise by scanning the same sample subsequently on two scanners and in addition in reversed order to calibrate for any bleaching/degradation effects.

Scan time (incl. required calibration steps and slide traffic)

- 7 min at 10 µm
- 12 min at 5 µm
- 24 min at 2 µm

Dynamic range

- Real 16 bit TIFF images
- Signal-to-Noise ratio at 2 µm pixel size on 20 x 20 µm feature area > 2 x 10⁵
- Average spatial crosstalk between spots
 - < 3 % on high density arrays
 - < 0.1 % on regular density arrays
- Increase dynamic by normalizing on two gain levels

Rotational Uniformity

< 4 % CV global non-uniformity

Autofocus

Surface-modelling-autofocus and dynamic real-time focus adjustment.

Pixel placement error

< 2 µm along full slide length achieved by patent pending LRC process and ILC calibration.

PMT gain

- Linear adjustment of signal levels from 0.01 % to 1000 %.
- Online adjustable
- Autogain function
- Subsequent high and low gain scanning

Lasers

- Red 25 mW 635 nm to 638 nm diode laser
- Green 20 mW 532 nm solid state laser

Laser transmission attenuation

100 %, 75 %, 50 %, 25 %, 10 % and 1 % neutral density filtering

Laser saver (automatic switch off)

- User defined time idle for automatic switch off (to increase laser lifetime)
- 10 min warm up time for lasers after switching on

Dye compatibility

Cy3™, Cy5™ or Alexa® 555, 647 (660) or similar.

Emission filter wheel with

- 676/37 nm filter
- 579/42 nm filter
- 2 additional free positions for customer defined filters

Image compatibility for image analysis

- 16 bit single and multi-TIFF images
- Open to all major brands of microarray image analysis products

For details talk to Tecan.

Scan and image view

- Online display of array image during scan.
- Online gain adjustment
- Any PowerScanner image can be used interactively for optimization of parameter settings.

Software package

PowerScanner GUI

Optional: Array-Pro™ 6.3 extraction and array quality reporting.

Optional license of an open image analysis tool – Array-Pro 6.3

Compatibility of Array-Pro Analyzer:

- Array types from 3 x 1 inch open-slide-array providers
- 16 bit TIFF images
- < 1.6 GB and < 2.2 Mio features
- Grids of orange packed, staggered or interstitial pattern
- Gal file import for automatic gridding and spot annotation
- Single-channel and two-channel-ratio analysis
- Single channel normalization (average intensity, reference spots, spike-in dilution series)
- Dual cross-channel (LOESS, first and second pass) normalization
- High dynamic range data analysis when using high and low gain scans
- User-defined threshold and flagging rules for user-defined acceptance criteria.
- GPR layout of data table results (TXT ASCII format)
- Template based experiment definition and processing
- Batch capability for multiple experiments
- Image and array quality reports in Excel® or Word® format

Experiment analysis – *Not provided by Tecan!*

- Please contact your microarray providers, to determine which analysis software packages they recommend.

System calibration: IQ/OQ

Automatic ILC function (patent pending integrated LaserCheck™) can be activated by the user for complete system function check.

Scanner dimension & weight

H 47 cm x W 60 cm x D 62 cm, 38 kg, vibration-free

Power consumption

< 150 VA, 50/60 Hz, 100 to 120 V (AC) and 220 to 240 V (AC) autosensing

Operating humidity

20 % to 80 %, non-condensing

Temperature

Operating temperature:
+18 °C to +28 °C (air condition recommended)
Transport temperature:
–20 °C to +60 °C

Conformity/Classification

CE (EMV, LV), NRTL, CDR Laser product class I, recycling of packaging

Required PC and operating system

- Minimum QuadCore 8 GB RAM, Vista 64 bit
- Ethernet, 1 GBit

Support, maintenance and service

Recommended:

- Maintenance every 12 months, or 1,000 (internally counted) working hours of the scanner module (whichever is reached first)
- ILC-routine started by user (once every month, depending on workload)
- FTP image file server support
- Remote tech support and web conferencing
- Refresher trainings on site, web-meetings or at Tecan training center

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