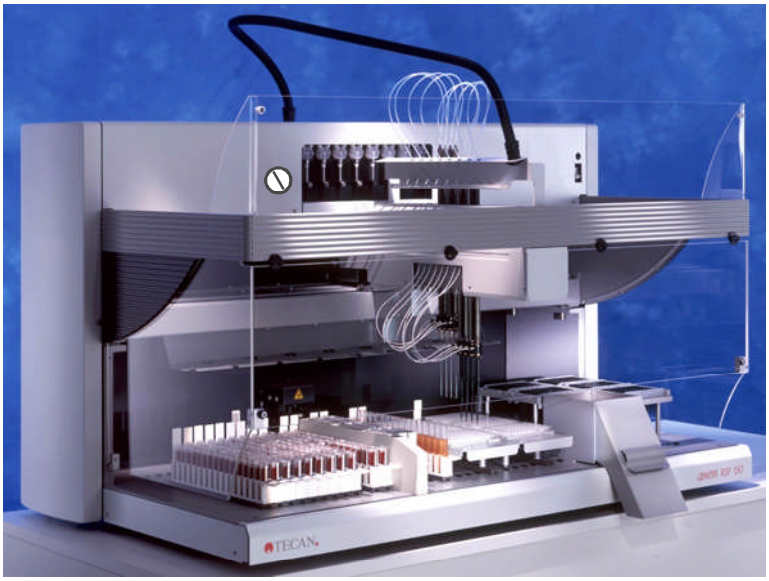
TECAN.

OPERATING MANUAL

Genesis RSP Instrument



Genesis NPS Instrument

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3.2.2 System Liquid

System Liquid refers to a liquid which fills the Liquid System and is used as wash fluid and / or can be added to several or all samples analogously to the additive.

- Standard system liquid
  - De-ionized water or aqueous buffer solution.
- Optional system liquid for life science applications, such as HTS, chemical synthesis
  - Organic solvents
- For clinical diagnostic applications, such as pooling
  - Use only degassed water as system liquid.
  - Do not use liquids with good conductivity.
- Nanopipetting system
  - Minimum HPLC-grade degassed water,
  - Recommendation add 1 % Isopropanol to the above

3.2.3 Syringe Volumes

The table below gives an overview of Genesis Instruments and preferred application of syringe volumes.

Syringe volumes	Standard volumes on Genesis RSP and Genesis NPS	Low volume option on Genesis RSP	Nanopipetting system on Genesis NPS
0.05 ml	—	—	50 µl
0.25 ml	250 µl	250 µl	—
0.50 ml	500 µl	500 µl	—
1.00 ml	1000 µl	—	—
2.50 ml	2500 µl	—	—
5.00 ml	5000 µl	—	—

3.2.4 Free Dispense

Genesis RSP Instruments

- Free Dispense volumes of 3 µl to maximum syringe volume or maximum Disposable Tip volume.
- With Low Volume option 0.5 µl to maximum syringe volume or maximum Low Volume Disposable Tip volume.

Minimum volumes in single pipetting mode with water:

Tip type		Minimal volumes
Fixed Tip standard		3 µl
Fixed Tip Low Volume with Low Volume option		0.5 µl
Disposable Tip	1000 µl	20 µl
Disposable Tip	200 µl	10 µl
Disposable Tip	10 µl	1 µl

Smaller volumes can be dispensed with tip touch.

Active Tip channels

- Free Dispense volumes between 10 nl and 700 nl.
  Volume ranges can be extended to 0.5 nl to 10 µl.

Minimum volumes in single pipetting mode with aqueous solutions:

Tip type	Active Tip channels on nanopipetting system
Active Tip	10 nl and 700 nl (0.5 nl to 10 µl)

3.2.5 Volume Precision

Based on Tecan quality control requirements, Tecan guarantees the following values for free dispense. Values are valid only if maintenance instructions and schedule have strictly been followed.

Genesis RSP Instruments

Volume range 1 µl - 100 µl precision in single pipetting mode with water:

Volume	Fixed Tip	Fixed Tip Low Volume	Disposable Tip 200 µl	Disposable Tip 10 µl Low Volume
100 µl	CV ≤ 0.5%	—	CV ≤ 0.5%	—
10 µl	CV ≤ 3%	CV ≤ 3%	CV ≤ 3%	CV ≤ 3%
1 µl	—	CV ≤ 10%	—	CV ≤ 10%

Do not use Disposable Tips 1000 µl for validation of precision data below 100 µl.

NOTE

Tip Touch significantly improves these values.

Active Tip volume precision

Volume	Liquid system	Single channel	Channels 1 - 8, over all channels
10 nl	aqueous solutions	CV < 5%	CV < 10%
50 nl	aqueous solutions	CV < 5%	CV < 10%

3.2.6 Carry over

Carry over is a phenomenon that depends on several parameters, as e.g. the type of liquid, the material and geometry of the tip, the temperature, etc., as well as how the aspirate and dispense operations are carried out (the liquid handling parameters programmed in the relevant Application Software).

In addition, the measurement of carry over is heavily dependent on the detection technique; thus, the value of carry over obtained with one method can be different from the one obtained with another.

A value of carry over that would be generally valid for and representative of every type of liquid and every application cannot be given and would be both, incorrect and misleading.

The carry over figures in the advertising material of Genesis instruments are given as an indication of the performance that can be achieved with these instruments under certain conditions. These figures shall in no way be understood as binding from Tecan towards the client's application(s).

For any application where carry over might lead to erroneous or unacceptable results, measures of the actual carry over properties using reference samples (positive and negative) shall be conducted with test conditions identical to those of the application.

The liquid handling parameters of those applications, the results of which are sensitive to carry over shall be optimized in that sense by a person having the liquid handling knowledge and having successfully attended the corresponding training proposed by Tecan .

Disposable tips with filter shall be used where no carry over is tolerable.

It is essential that the instrument's operating condition be adequately maintained (preventive maintenance and performance check at regular time intervals) to ensure the appropriate performance.

3.2.7 Liquid Detection

Each channel has an individual liquid detection. Generally, detection of conductive liquids of following volumes is possible:

- ≥ 50 µl microplates with round bottoms,
- ≥ 20 µl conductive liquid 96well round-bottom microplates,
- ≥ 20 µl conductive liquid 384well flat-bottom microplates.

Each tip is connected to an Integrated Liquid Detector module (ILID). Tips detect the surface of conductive solutions upon contact. Sensitivity can be adjusted by means of the software. However, Tecan recommends the use of the default values for safe liquid detection.

The liquid detectors operate by monitoring the capacitance between the tip and the instrument working surface. When a tip touches the liquid surface, the ILID detects the change in capacitance and triggers a detection signal.

A signal is produced both when moving into a liquid and when coming out, allowing detection of aspirated blood clots:

- The software stores the position at which the liquid detection signal did occur
- It calculates, using aspirated volume and the vial diameter, the point at which the liquid detection signal should be interrupted
- A tolerance for cohesion and hysteresis effects is taken into account. If the interruption signal occurs past this tolerance, it is assumed that a clot has been aspirated.

Advantages due to the Liquid Detection feature:

- **Minimum submerge depth** of the tip
- **Minimal tip contamination** and therefore only limited need for tip washing
- Appropriate **message if no liquid or not enough liquid available** for sampling
- Software controlled, **constant submerge depth** during aspiration and dispensing
- **Blood clot detection**.