



## Dispensing Solution for Microfluidic Point of Care Device Manufacturing

### Introduction

Ginolis has developed an elegant and cost efficient dispensing solution for microfluidic devices using the Delilah™ robotic platform and piezo motor actuated bellows pumps, Ginolis PMB™.

The dispensing solution with Ginolis PMB™ pumps and Delilah™ robotic platform satisfies even the most demanding manufacturing requirements in terms of dispensing speed and precision. Our PMB™ pumps are equipped with solenoid valves in order to reach 2 nl aliquots with less than 7% CV – all this 50 times in a second!

### The Solution Setup



Picture 1. Dispensing solution for PoC device manufacturing (a larger volume solution)

The carriers for microfluidic devices are loaded on the Ginolis Rotary Table that is easily customizable for different carriers or the microfluidic devices themselves. The loading can happen manually or automatically. In Picture 1, loading on the Ginolis Rotary Table (the first module on the left) happens manually and unloading after dispensing and drying (the last module on the right) manually as well. The rotation table moves the carrier plates with a customised gripper that is the only customised part together with the carrier plate's adapter plate. The rotary table uses a vacuum gripper for secure contact with the carrier plate and moves the plate onto a specified position on the deck of the Ginolis Delilah™ robotic platform.

Utilizing the same Ginolis Rotary Table for loading and unloading is proof of the functional advantages of Ginolis's modular platform approach.

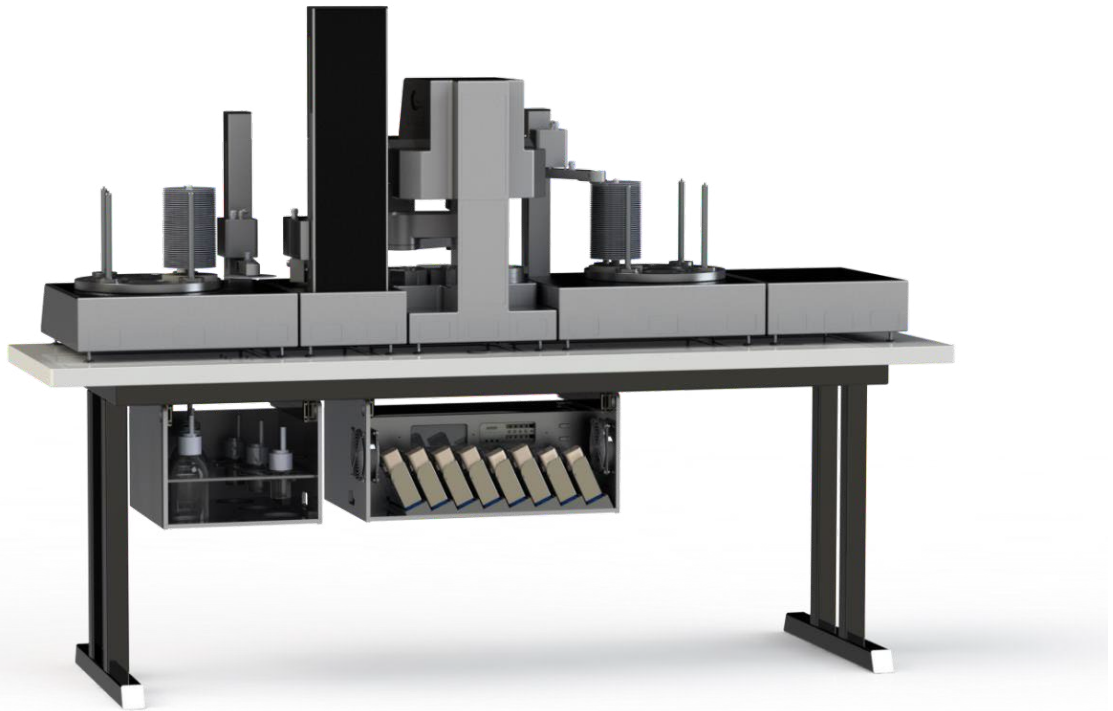


*Picture 2. Dispensing solution for PoC device manufacturing (a single-Delilah solution)*

The Ginolis Delilah™ robotic platform is equipped with a machine vision system, and in this case with two cameras for exact dispensing positioning, quality control and storing of individual microfluidic device ID's. The role of these platforms is to take the carrier plate (with microfluidic devices) from the position where it's been moved by the rotation table, move the microfluidic devices (on the carrier plate) under the stationary dispensing tip for dispensing and move them to the drying station for the drying sequence before another dispensing sequence takes place.

After the required dispensing sequence is completed the Ginolis Delilah™ robot moves carrier plates onto desk for the gripper of the Ginolis Rotary Table to pick up and stack (last unit on the right hand site). After stacking the plates are manually collected by an operator.

In the system described in Picture 1, two identical Ginolis Delilah™ robotic platforms are used for increased production capacity. The Ginolis's modular platform approach supports a build as you go strategy. Picture 2 below shows the same functionality but with only one Ginolis Delilah™ robotic platform, dispensing unit and drying station. The dispensing pumps including the complete liquid path can be chosen according to need.



Picture 3. Racks for pumps

The dispensing solution is shown from the backside in picture 3. The peristaltic pumps are used for tip washing and waste removal. The dispensing pumps are modular units that are placed on a specific rack. The rack supports the “build as you go” approach i.e. it’s possible to add new pumps according to need.

Picture 3 displays Ginolis PMB™ pumps that are especially designed for low volume dispensing as stated in the first paragraph of this white paper. Naturally it’s possible to use other pumps, e.g. Ginolis EMB™ 50 and 150 (Picture 4), if the dispensing volumes require it. Additionally it’s possible to have a mix of pumps in case the needed dispensing volumes differ greatly from each other.



Picture 4. Ginolis EMB Dispensing Pump

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