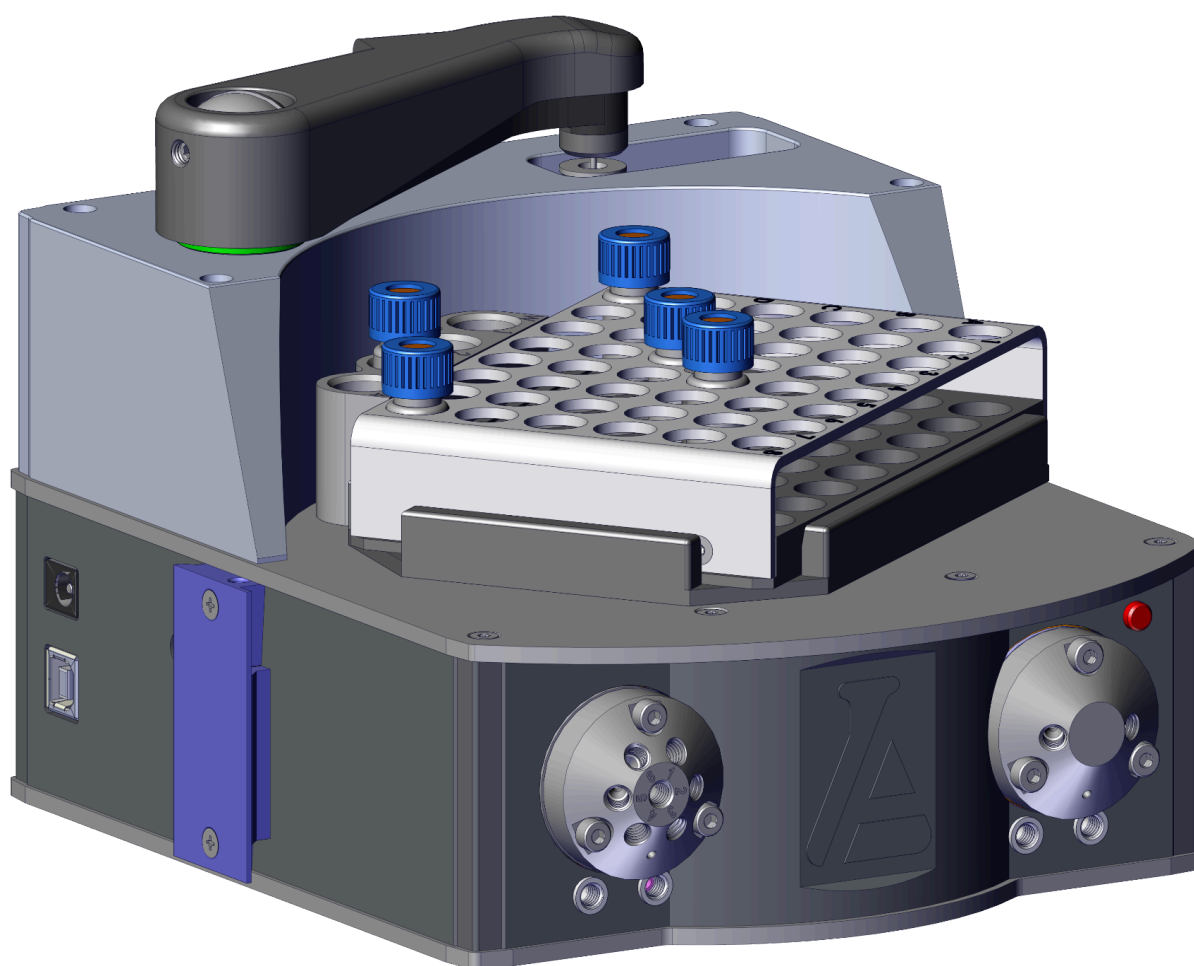


Alltesta™ Mini-Autosampler

OEM Manual

Ver 1.0



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Intended Use

The Alltesta™ Mini Autosampler, developed by SIELC Technologies, is a compact and versatile robotic device designed for automated liquid sample handling in analytical systems. Its primary purpose is to transfer liquid samples between different components of an analytical or liquid handling system with high precision and reliability.

The Alltesta™ Mini Autosampler combines compact design, lightweight construction, and flexible architecture, making it ideal for laboratories with limited bench space, mobile applications, and diverse analytical workflows. The system can accommodate a wide range of sample handling needs, from routine testing to complex analyses, while providing efficient, accurate, and reproducible results.

Key Advantages:

- Compact and space-saving – suitable for small labs or mobile setups. It is also a convenient option when a sample introduction and an analytical instrument should be in close proximity. Still another application includes placing the autosampler in a climate controlled environment where standard liquid handling devices are too big to be used.
- Customizable and flexible – hardware options such as valve configurations, tray designs, syringe volumes, needle lengths, vial types, and volumes can be tailored to specific applications.
- Integrated sample handling features – includes sample mixing, reagent addition, and precise dosing capabilities.
- Direct control and software flexibility – operated via serial commands with a comprehensive command library; open protocol allows custom software integration.
- Versatile applications – can function as a fraction collector, reactor probe sampler, sample delivery system for detectors, microfluidic device loader, and for automated seqFISH+ workflows.

The Alltesta™ Mini Autosampler is designed to support both OEM applications and standard laboratory workflows, offering reliable performance and adaptability for modern analytical needs.

Installing Cable Connection

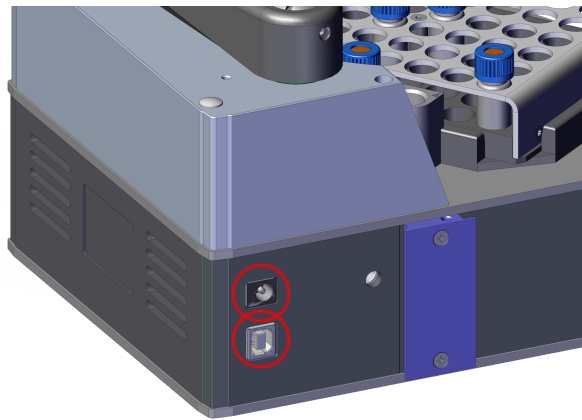
WARNING! Personal Injury

To prevent personal injury, do not place your fingers or hands near the needle area while the autosampler is in operation.

WARNING! Risk of Electrical Shock or Instrument Damage

Hazard of electrical shock or damage of your instrumentation can result, if the devices are connected to a line voltage higher than specified.

1. After unboxing, place the Mini-Autosampler on the bench
2. Connect the power cable to the power connector at the rear of the sampler.
3. Connecting the USB 2.0 cable from the Alltesta™ Mini Autosampler to one of the USB receptacles (Type A port) on the PC



CAUTION! "Defective on Arrival" Problems

If there are any signs of damage, do not attempt to install or operate the module. Inspection by SIELC Technologies is required to determine whether the instrument is in good condition or damaged.

→ Notify your [SIELC Technologies sales](#) or service representative about the damage.

Tubing Connections

Check the configuration and intended use of your Alltesta™ Mini Autosampler and connect the tubing accordingly.

Two types of tubing are used in the system. PEEK tubing is designed for high-pressure connections, while PTFE tubing is used for low-pressure liquid connections.

WARNING! Toxic, Flammable, and Hazardous Solvents, Samples, and Reagents

The handling of solvents, samples, and reagents may pose health and safety risks. When working with these substances, always follow appropriate safety procedures (for example, wear protective goggles, safety gloves, and lab clothing) as described in the material handling and safety data sheets (MSDS/SDS) provided by the supplier, and adhere to established good laboratory practices.

WARNING! Risk of Short Circuit and Instrument Damage

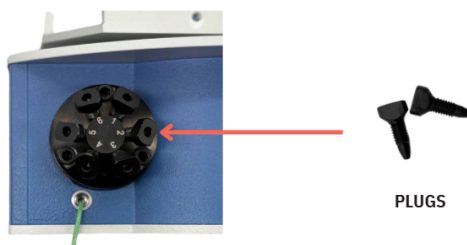
Do not allow water or other liquids to spill on or into the instrument. Contact with liquids may cause a short circuit and result in serious damage or electrical hazard.

Before you begin, ensure that when you insert the tubing into the fittings, they stick out approximately 3 mm, as shown in the image below.

- **Important Note:** The fittings must be inserted together with the capillaries. Do not insert the fittings beforehand. While inserting the fittings, gently push the capillary toward the port to ensure the end of the capillary extends beyond the fitting tip once it is installed. Tighten the fitting by hand with maximum force, but do not use any tools.



- **Important Note:** Ensure that the black plugs in the Alltesta™ Mini Autosampler and on each end of the column are removed before connecting the capillaries.



Functional Components

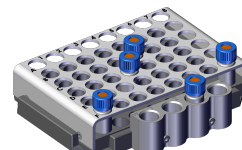
The Alltesta™ Mini Autosampler is an electromechanical device that consists of several functional components. Depending on the selected configuration, the following modules may be included:

- **Carousel (Tray)** – holds the sample containers.

Available configurations:

- 48-vial tray + 4 port washing station (optional)
- 96-well plate + 4 port washing station (optional)
- 384-well plate + 4 port washing station (optional)

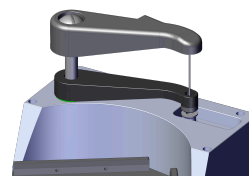
More information: [Plate Type](#)



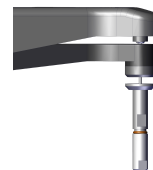
- **Arm with Needle** – performs sample aspiration and transfer. Needle options:

- Short (36 mm)
- Long (46 mm)
- Capillary (36 mm)
- Short (36 mm) Vented

More information: [Needle](#)



- **Injection Port** – interface for sample delivery to the analytical system.

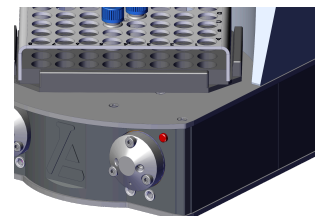


- **Syringe** – ensures precise sample dosing and injection.

Configurations include:

- None
- 4000 µL Stainless Steel (SS)
- 4000 µL Ceramic
- 120 µL High Pressure

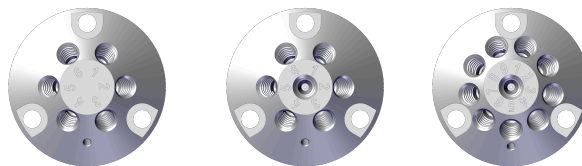
More information: [Syringe](#)



- **Valve** – directs the liquid flow depending on the application. Available configurations:

- 6×2
- 7×6
- 10×9
- Custom configurations

More information: [Valve](#)



- **Control PCB** – electronic control unit responsible for system operation and communication.

General Components Description

1. Carousel (Tray)

The tray serves the function of storing and positioning vials for the needle to access their content.

2. Arm with Needle

The needle is a hollow sharp tube that penetrates vial septa, immerses in the liquid, and aspirates the sample. After sample uptake, the needle lifts, releases the vial, and delivers the content to the injection port.

3. Injection Port

The injection port provides an interface for sample delivery to the liquid line connected either to the valve or syringe (depending on configuration).

- The needle, when engaged with the injection port, can withstand pressures up to 5000 psi when a PEEK tubing is used for liquid connections. If different material tubings are used the pressure will be limited by the tube rating.

4. Syringe

The syringe is a cylindrical chamber (ceramic or stainless steel) with a reciprocating plunger actuated by a stepper motor.

- Multiple syringe versions are available.
- The syringe is equipped with one or two liquid communication ports.
- Wetted materials may include SS316, ceramic, and PEEK.

5. Valve

The valve is electrically actuated, designed for routing liquids among multiple channels.

- Available configurations: 6x2, 7x6, 10x9.

6. Controller PCB

The controller board is a PCB-based electronic module responsible for overall device control.

- Includes:
 - Main processor.
 - Power converters (24 V supply).
 - USB communication interface.
 - Diagnostic and programming components.
- Integrated drivers: 6 stepper motor controllers.
- Sensor/encoder inputs: 6 channels.
- Additional features: programmable fan controller.
- Power input: 24 V

Table 1.

Mechanical Alltesta™ Mini Autosampler devices and their motion and feedback characteristics

Device	Motion	Motion/step	Range	Max # half steps	Feedback resolution
Carouse I (tray)	Rotation	0.45 ° /step	360°	800	Encoder
Needle	Linear	0.033 mm/step	46 mm	1212	Encoder
Arm	Rotation	0.072 ° /step	100 °		
Syringe	Linear	0.025 mm/step	13.7 mm	548	-
Valve	Rotation	0.212 ° /step	360°	283	Encoder

Plate Type

Tray-48 vials

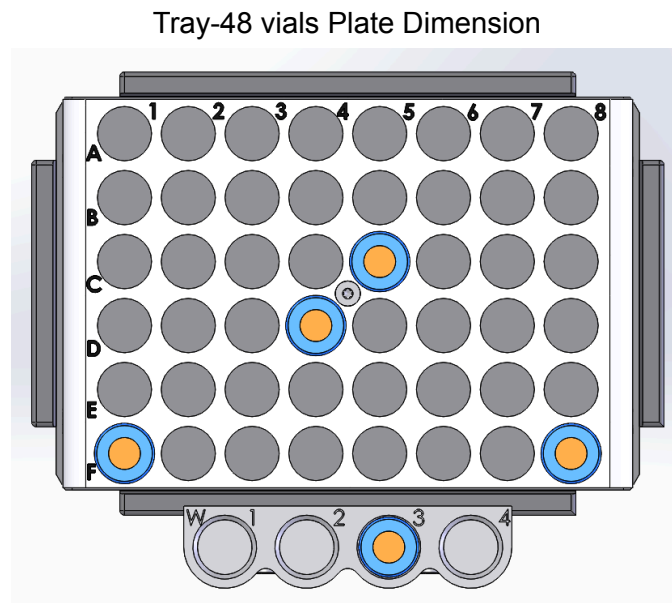


Fig. 1 48 vials tray view standard layout

User Interaction

- **Loading/unloading:** The tray allows convenient exchange of either individual vials
- **Supported formats:** Standard vial dimensions (e.g., 12×32 mm, 2 mL vials) are supported.

Needle Compatibility

The 48-vial tray is compatible with all needle configurations:

- Short (36 mm)
- Long (46 mm)
- Capillary (36 mm)
- Short (36 mm) Vented

Software Tray Control. See the procedure in [“Tray Controlling and Vial Selection”](#)

Tray-96 wells-plate

Tray-96 wells-plate dimension

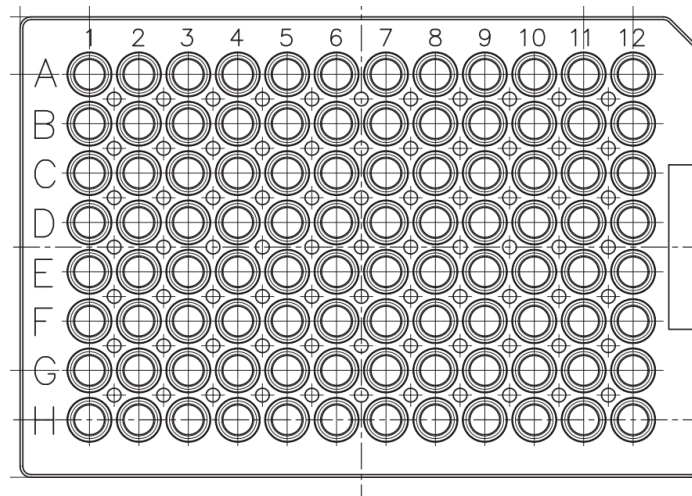


Fig. 2 96 wells tray view standard layout

User Interaction

- **Loading/unloading:** The tray allows convenient exchange of an entire well plate.
- **Supported formats:** Supports standard 96-well microplate formats

Needle Compatibility

The 96-vial tray is compatible with all needle configurations:

- Short (36 mm)
- Long (46 mm)
- Capillary (36 mm)
- Short (36 mm) Vented

Software Tray Control. See the procedure in [“Tray Controlling and Vial Selection”](#)

Tray-384 wells-plate

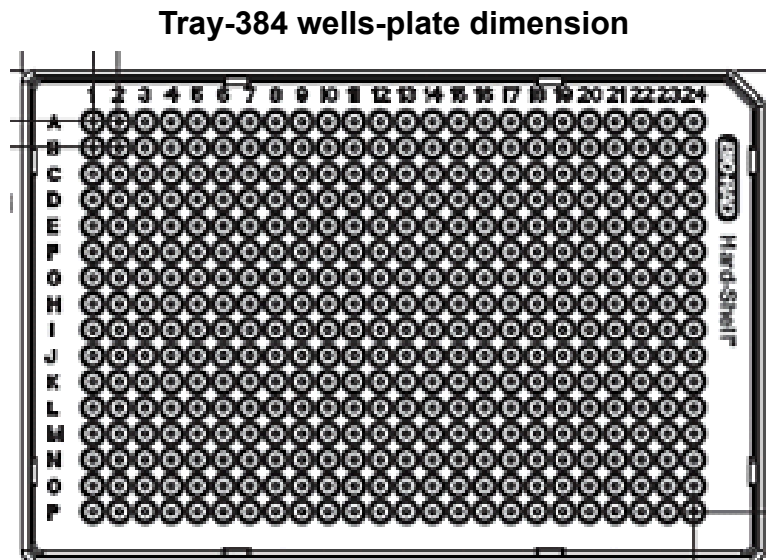


Fig. 3 384 wells tray dimensions

User Interaction

- **Loading/unloading:** The tray allows convenient exchange of an entire well plate.
- **Supported formats:** Supports standard 384-well microplate formats.

Needle Compatibility

The 384-vial tray is compatible with all needle configurations:

- Short (36 mm)
- Long (46 mm)
- Capillary (36 mm)
- Short (36 mm) Vented

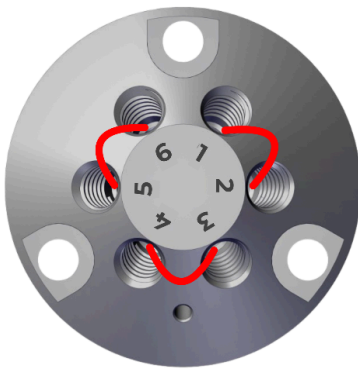
Software Tray Control. See the procedure in [“Tray Controlling and Vial Selection”](#)

Valve

The valve is responsible for directing liquid flow depending on the application. It is available in several configurations and is designed to handle high-pressure operation with precision and speed.

- Maximum Pressure: up to 5000 psi (350 bar)
- Body Material: Type 316 stainless steel
- Rotor Materials: modified PEEK
- Fitting Sizes: 0-32 UNF fitting

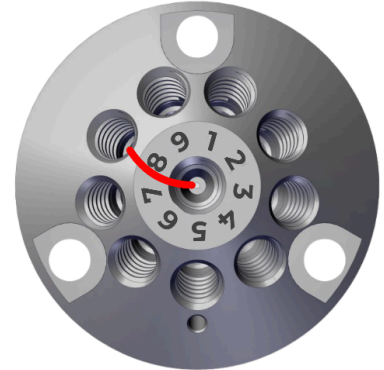
Valve configurations



6x2 VALVE



7x6 VALVE



10x9 VALVE

Fig. 4 Valve configurations

Software Valve Control. See the procedure in [“Valve Control”](#)

Needle

The needle is a hollow, sharp tube designed to penetrate vial septa, aspirate liquid samples, and deliver them to the injection port or syringe. It ensures precise, contamination-free sample handling.

Available Configurations

Depending on the Alltesta™ Mini Autosampler setup, the needle can be configured as:

- Short (36 mm)
- Long (46 mm)
- Capillary (36 mm)
- Short (36 mm) Vented

Operation

- The needle is mounted on a rotating arm capable of up to 100° rotation (typical operations require $\leq 90^\circ$).
- The needle lift mechanism is driven by a stepper motor providing travel of 0.0005 inch (0.13 mm) per step.
- Needles aspirate the sample from the vial and deliver it to the injection port, which can hold up to 5000 psi pressure (350 bar).

Needle Replacement Procedure for the Alltesta™ Mini-Autosampler. See the procedure in [Appendix 1](#).

Calibration

- Needle height, as well as the alignment of the injection port and vial (or well) positions, are preset by the manufacturer. For troubleshooting or adjustment, please contact technical support at support@sielc.com

Software Needle Control. See the procedure in “[Needle and Arm Control](#)” Maintenance. See the procedure in “[Optimization for Lowest Carry-over](#)”.

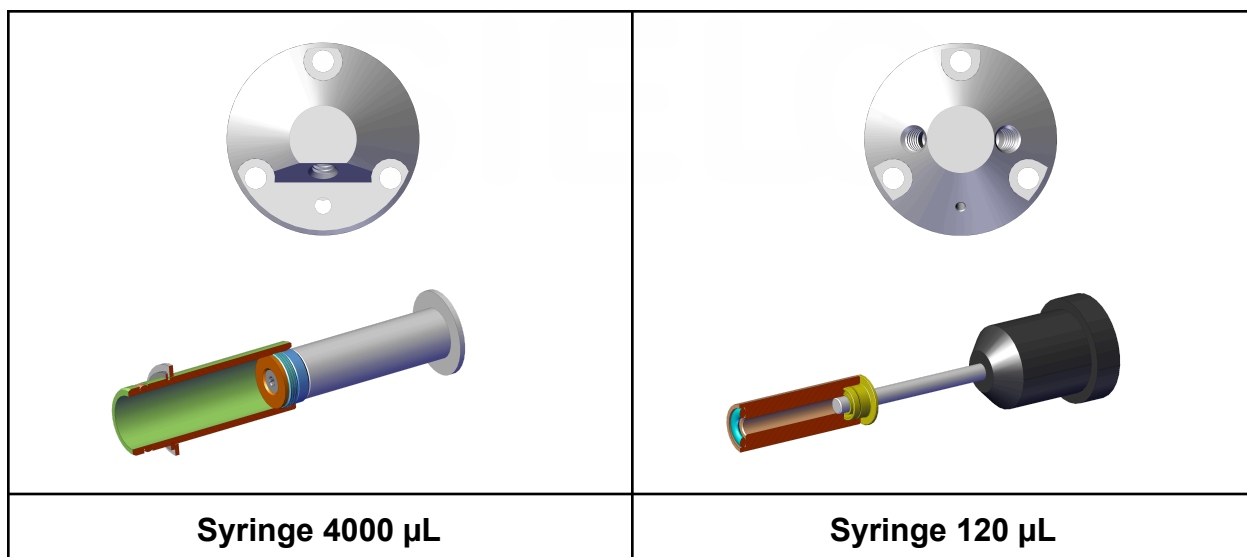
Syringe

The syringe is a precision component responsible for aspirating, dispensing, and delivering exact liquid volumes within the Alltesta™ Mini Autosampler. It ensures accurate sample handling and enables reproducible injections into the analytical system.

Available Configurations

Depending on the application, the Alltesta™ Mini Autosampler can be equipped with the following syringe types:

- None – no syringe installed, sample handling through other pathways.
- 4000 μ L Stainless Steel – high-volume, durable syringe for general-purpose applications. Maximum pressure: 300 psi.
- 4000 μ L Ceramic – high-volume, corrosion-resistant syringe for aggressive solvents. Maximum pressure: 300 psi.
- 120 μ L High-Pressure – low-volume, high-precision syringe suitable for HPLC or other high-pressure systems. Maximum pressure: 5000 psi.



Materials

- Syringe barrel and plunger materials in contact with liquid can be made from SS316, PEEK, PTFE depending on the configuration.
- All materials are selected to ensure chemical compatibility and minimal carryover.

Software Syringe Control. See the procedure in [“Syringe control”](#)

Sample Loop

The sample loop is a fixed-volume pathway that connects the piston-driven syringe to the needle and the injection port. It ensures precise and reproducible sample delivery by maintaining a defined volume between aspiration and injection. This arrangement can be modified for different applications, for example the loop can be connected to the valve port, or directly to the external device or vessel.

Flow-through design: In HPLC applications of the Alltesta™ Mini Autosampler, the loop is continuously flushed during analyses, helping to minimize carryover. For non-HPLC applications, the loop should be thoroughly flushed between samples to minimize sample-to-sample carryover.

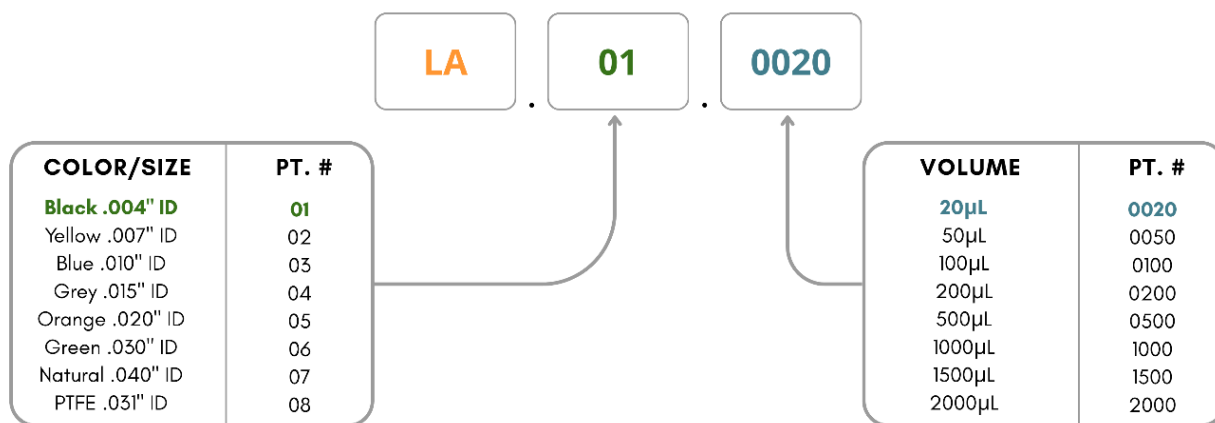
Compatibility: Works with all syringe and valve configurations of the Alltesta™ Mini Autosampler.

Maintenance: Regular flushing or automated needle wash ensures the loop remains clean and free of residual sample, preserving accuracy and preventing cross-contamination.

Material: Regular flushing or automated needle wash ensures the loop remains clean and free of residual sample, preserving accuracy and preventing cross-contamination.

Loop Replacement Procedure for Alltesta™ Mini-Autosampler. See the procedure in [Appendix 2](#).

Available Configurations



Software

The Alltesta™ Mini Autosampler can be operated Direct Serial Commands

For a full command list, see “[Alltesta™ Mini Autosampler Serial Protocol](#)”.

See the procedure in “[Installing FTDI driver and identifying the COM port](#)”.

- The Alltesta™ Mini Autosampler supports direct control via the Serial Alltesta™ Protocol.

Using this protocol, you can manage the analyzer efficiently by sending serial commands.

Recommended Terminal Tools

You can use free terminal emulators to access the CLI (Command-Line Interface):

- PuTTY – A widely used, open-source terminal emulator. Serves as a terminal interface only; sequences of operations must be programmed separately.

See the procedure in “[PuTTY](#)”.

- DOMP Browser– A serial command emulator designed to help you understand and interact with the Alltesta™ Mini Autosampler.

See the procedure in “[DOMP Browser](#)”.

DOMP Browser

1. Install the FTDI Driver

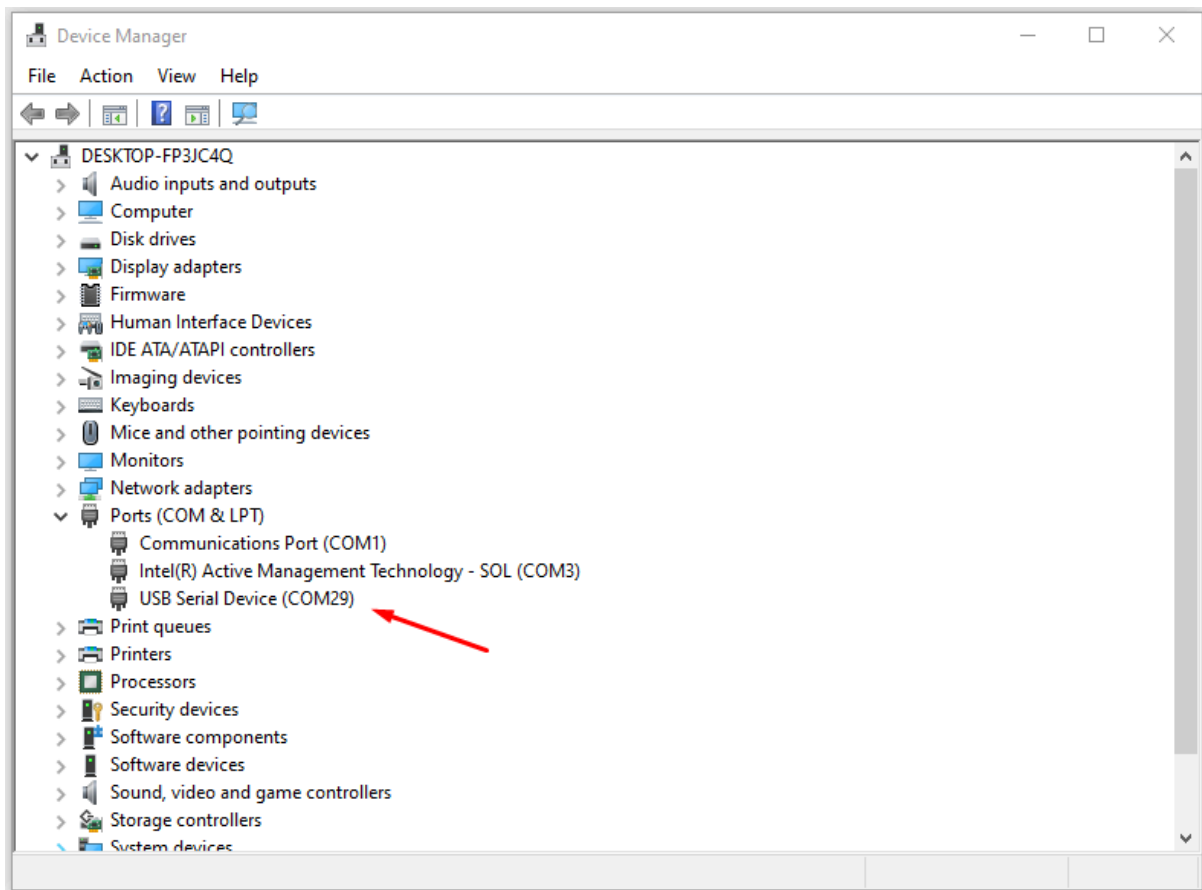
- Ensure the FTDI driver is installed on your computer.

<https://ftdichip.com/drivers/>

See the procedure in “[Installing FTDI driver and identifying the COM port](#)”

2. Determine the COM Port

- Open Device Manager (or use the command prompt) and locate the COM port to which your Alltesta™ Mini Autosampler is connected.

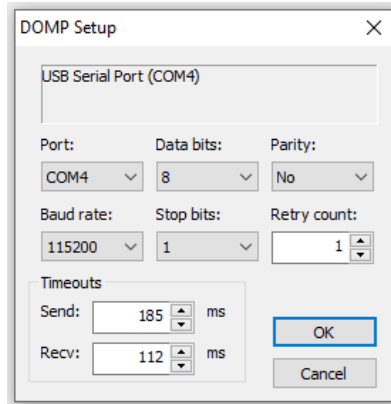


3. Launch DOMP Browser

- Open the BrowserDOMP application.

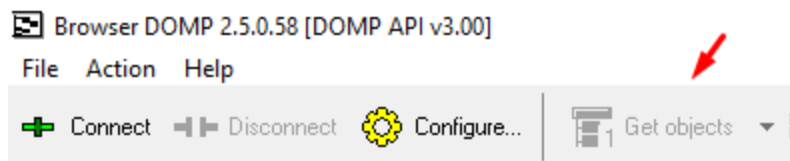
4. Select the Correct Port

- In DOMP Browser, select the COM port corresponding to your Alltesta™ Mini Autosampler.
- Connect to COM port with the following settings



5. Read Serial Commands

- Use the “Get Object” function to read commands from the serial port.



- This allows you to see which commands are available for controlling the unit.
- Full command descriptions are listed in the Serial Protocol document, which enables creating more complex control sequences.

PuTTY

1. Ensure the FTDI driver is installed on your computer.
 - <https://ftdichip.com/drivers/>See the procedure in “[Installing FTDI driver and identifying the COM port](#)”
2. Determine the COM Port
 - Open Device Manager (or use the command prompt) and locate the COM port to which your Alltesta™ Mini Autosampler is connected.
3. To download and install PuTTY on Windows, first navigate to the official PuTTY website and download the appropriate installer for your system (usually 64-bit x86). Then, run the installer and follow the on-screen instructions, accepting the default settings unless you have specific needs. Finally, verify the installation by launching PuTTY from the Start menu or by searching for it.

Installing FTDI driver and identifying the COM port

Before using the instrument, ensure that the FTDI Virtual COM Port (VCP) driver is installed.

Download the latest driver from: <https://ftdichip.com/drivers/vcp-drivers/>

After installation, reconnect the instrument and verify that a new COM port appears in Device Manager (Ports (COM & LPT) → **USB Serial Port (COMx)**).

Virtual COM Port Drivers

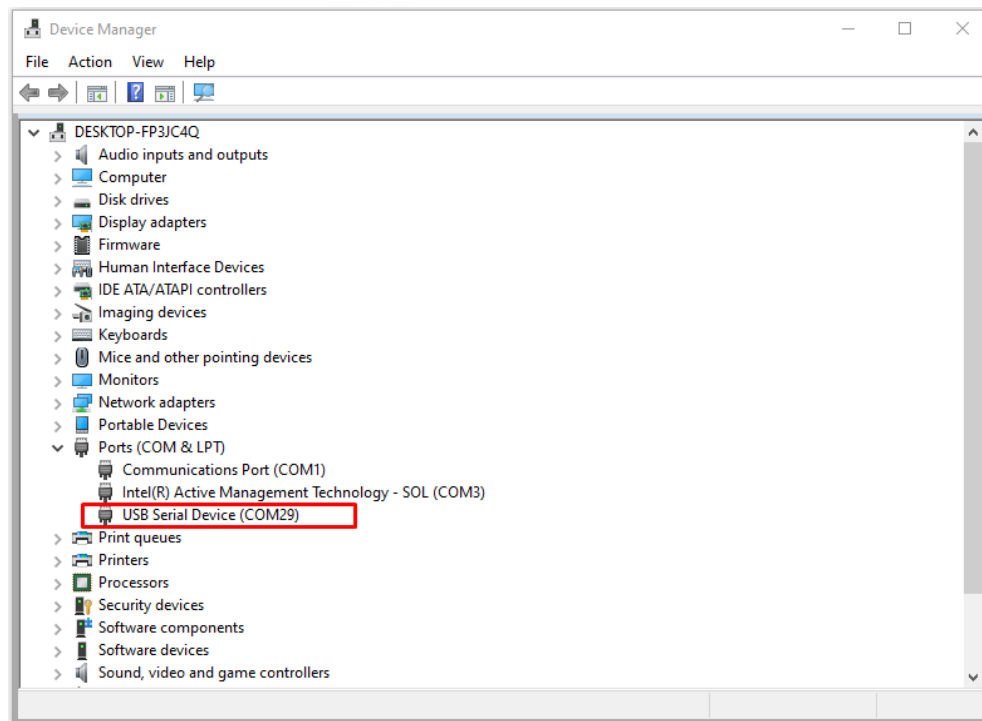
This page contains the VCP drivers currently available for FTDI devices.

Virtual COM port (VCP) drivers cause the USB device to appear as an additional COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port.

Click [here](#) to download the Windows 10, Windows 11 and Windows Server (see note * below) driver installer (setup executable) for ease of installation. The Windows driver installer contains both VCP and D2XX drivers. This installer is not available for ARM64..

For D2XX Direct drivers, please [click here](#).

Installation guides are available from the [Installation Guides page](#) of the [Documents](#) section of this site for selected operating systems.



Needle and Arm Control

The following applies to all needle configurations.

Important notes before operating the needle and arm

There are several points to review before operating the needle and arm. The needle assembly is the most delicate component and is less tolerant of operator error than other modules. Always check clearances: do not let the needle contact the instrument body while lowering; ensure the needle is fully raised before rotating the arm to a certain angle; and position the arm directly above the selected vial before lowering the needle into it. Although the instrument is supplied with factory-preset motion limits and alignment parameters (e.g., mapped arm/tray positions for each vial), use caution during manual control.

In case needle replacement is necessary, see Appendix 1: [“Appendix 1. Needle Replacement Procedure for Alltesta™ Mini-Autosampler”](#) for detailed instructions.

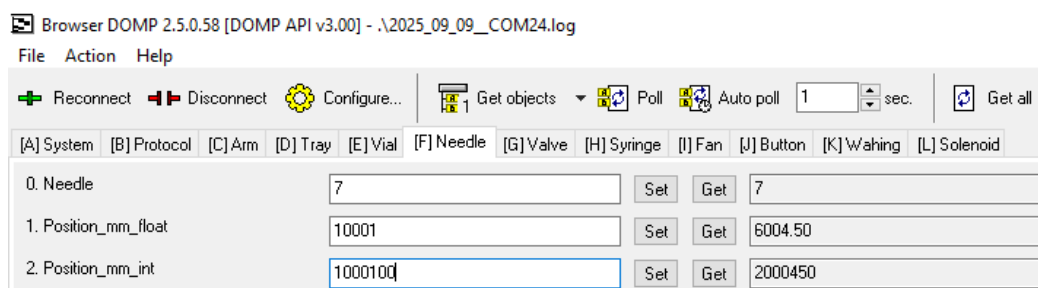
Needle and Arm Initialization

For needle lifting, open the F section in the DOMP browser (see procedure in [“DOMP Browser”](#)). To control the needle you will only need either F1 (float), or F2 (integer). Do **not** change other fields — undocumented changes may impair operation and can void the warranty.

All Alltesta™ Mini Autosampler modules use the command ***10001*** for initialization.

Enter the command and execute:

- Using **F1 (float)**: enter **10001**, then click **Set**.
- Using **F2 (integer)**: enter **1000100** (value scaled ×100), then click **Set**.



The needle and arm will re-initialize and move to their reference (home) positions.

Note All Alltesta™ Mini Autosampler components initialize automatically at power-up.

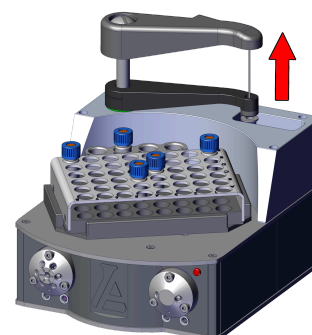
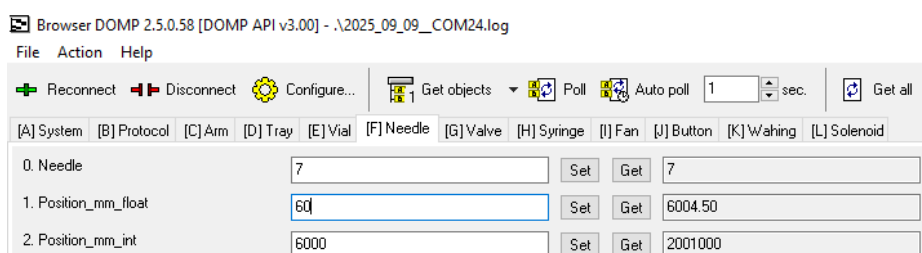
Needle Z-axis Control (Raise/Lower)

The typical needle travel is ~ 37 mm for the standard/vented needle and ~ 47 mm for the optional long needle. The controller clamps any target above the maximum to the upper limit. To raise the needle to its maximum height:

For raising the needle at its maximum height, enter command and execute:

- Using **F1 (float)**: enter **60**, then click **Set**.
- Using **F2 (integer)**: enter **6000** (value scaled $\times 100$), then click **Set**.
-

Note Values greater than the maximum are saturated to the limit.



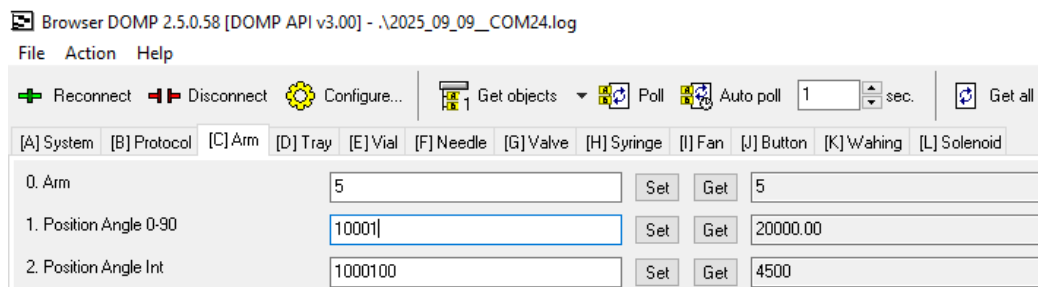
The Alltesta™ Mini Autosampler needle is now in the upper position.

Arm Initialization

Arm initialization can be performed **only when the needle is fully raised**. Needle homing executed from the **F** tab homes **both** the needle and the arm. The arm can also be homed **separately** from the **C** tab.

For initialize the arm raise the needle to its upper position, enter command and execute:

- Using **C1 (float)**: enter **10001**, then click **Set**.
- Using **C2 (integer)**: enter **1000100** (value scaled $\times 100$), then click **Set**.



The arm will move to its reference position at the Mini-Autosampler's injection port.

Note All Alltesta™ Mini Autosampler components initialize automatically at power-up.

Arm Positioning to Target Angles

Manual arm positioning is usually not required because the arm and tray positions for each vial are factory-mapped; however, it may be useful for specific applications. During any arm movement, ensure the needle is fully raised. Before lowering the needle, confirm the arm is above the selected vial and that the needle will not contact the instrument frame.

The value entered in C1 or C2 specifies the arm's target angle (in degrees).

For position the arm raise the needle to its upper position, enter command and execute:

- Using **C1 (float)**: enter **the angle as is (e.g., 45)**, then click **Set**.
- Using **C2 (integer)**: enter **the angle x100 (e.g., 45.00° → 4500)**, then click **Set**.

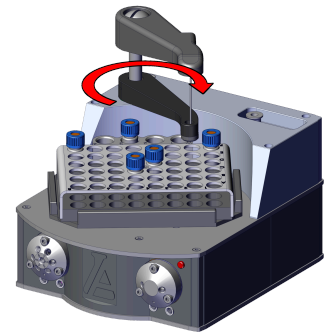
Browser DOMP 2.5.0.58 [DOMP API v3.00] - .\2025_09_09_COM24.log

File Action Help

Reconnect Disconnect Configure... Get objects Poll Auto poll 1 sec. Get all

[A] System [B] Protocol [C] Arm [D] Tray [E] Vial [F] Needle [G] Valve [H] Syringe [I] Fan [J] Button [K] Washing [L] Solenoid

0. Arm	5	Set	Get	5
1. Position Angle 0-90	45	Set	Get	20000.00
2. Position Angle Int	4500	Set	Get	4500



Note The arm's rotation range is limited to ~80°. In most setups the usable range does not exceed ~70°. Because all vial angles are pre-mapped on the **E** tab, use the **E** tab for arm positioning (See the procedure in "[Vial Selection](#)")

Tray Controlling and Vial Selection

The following applies to all needle configurations.

Important notes before operating the tray

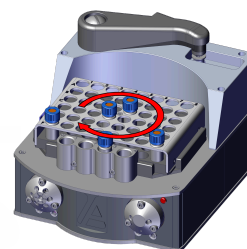
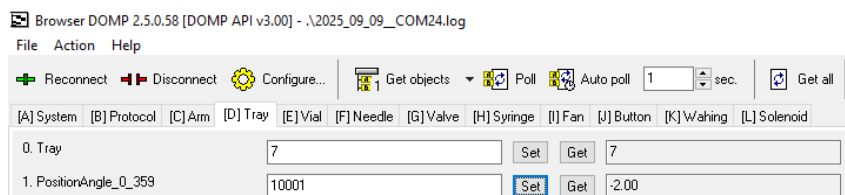
Before rotating the tray, always ensure the needle is in the upper position. Do not rotate the tray with the needle lowered - this may damage the instrument, require repair, and void the warranty.

Tray Initialization

Tray initialization can be performed *only when the needle is fully raised or parked at home position sitting in the injection port*. Otherwise the tray will not rotate due to its internal collision protection. Tray rotation can be performed in the D tab. For rotation you will only need D1 (integer) which specifies the rotation angle.

For tray initialization, enter command and execute:

- **D1 (integer):** enter **10001**, then click **Set**.



Note All Alltesta™ Mini Autosampler components initialize automatically at power-up. By default, the tray home position is set to 270° for better access to vials.

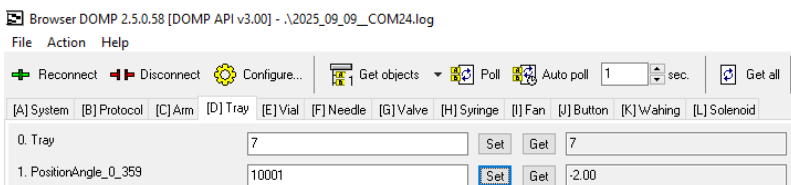
Tray Rotation to Target Angle

Tray rotation can be performed *only when the needle is fully raised or parked at home position sitting in the injection port*. Otherwise the tray will not rotate due to its internal collision protection.

Note Because all vial angles are pre-mapped by the manufacturer, manual tray rotation is rarely required; use the **E** tab for vial selection (See the procedure in [“Vial Selection”](#)).

For tray initialization, enter command and execute:

- **D1 (integer):** enter **the angle as is (e.g., 0)**, then click **Set**.



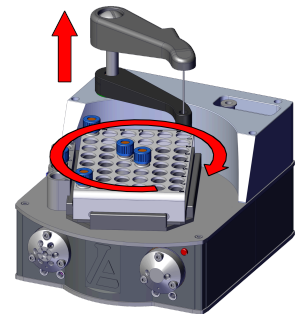
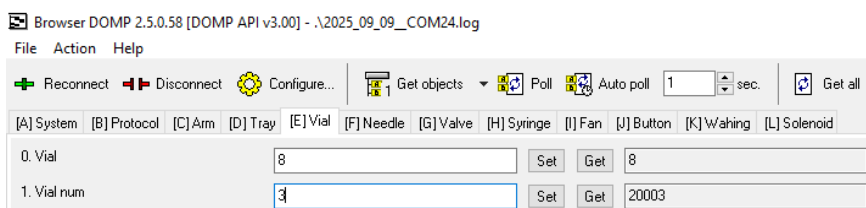
Note The figure shows the tray at 0°.

Vial Selection

Vial selection can be performed *only when the needle is fully raised*. If this condition is not met, the tray will not rotate due to collision-protection logic. Use the **E** tab; in most cases only **E1 (vial number)** is required. Do **not** change other fields—undocumented changes may impair operation and can void the warranty.

For vial selection, enter command and execute:

- **E1 (integer)**: enter the vial number (e.g., 3), then click **Set**.



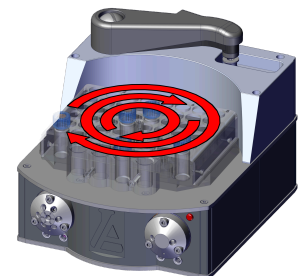
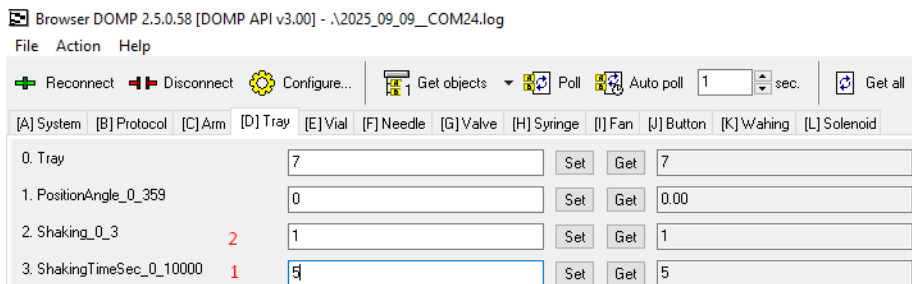
Note When the needle is fully raised, the arm and tray move simultaneously and stop above **vial #3**.

Tray Shaking Mode

Tray shaking can be performed *only when the needle is fully raised or parked at home position sitting in the injection port*. Otherwise, shaking is disabled by the collision-protection logic. There are **three** shaking modes. To enable shaking: first set **D3** (shaking time, in seconds), then select **D2** (mode 1–3) and click **Set**. **Mode 1** is the most commonly used.

For setting shaking time, enter command and execute:

- **D3 (integer)**: enter the duration in second (e.g., 5), then click **Set**.
- **D2 (integer)**: enter the shaking mode (e.g., 1), then click **Set**.



Note Set the shaking parameters in **this order**—first **D3** (time), then **D2** (mode). After the shaking cycle completes, **D3** is automatically reset to **0**; to run another cycle, re-enter **D3** and reselect **D2**.

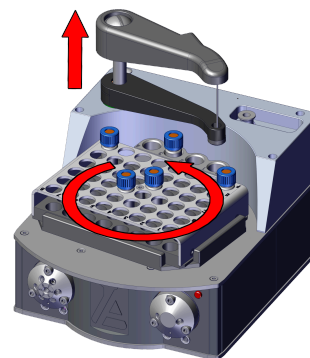
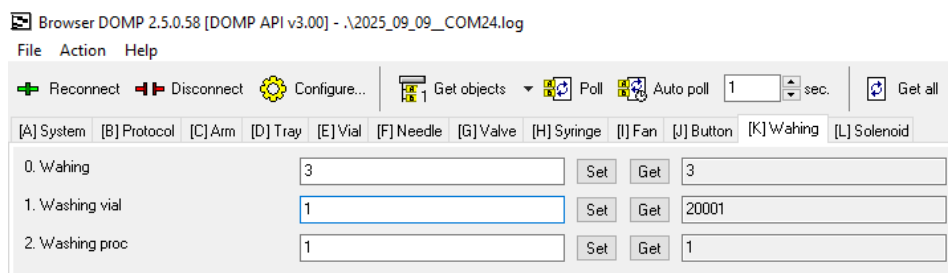
Needle Washing (Manual Mode)

A separate manual needle wash mode is available *only if the washing station* is installed on the tray. The station provides **four** wash ports that the arm can be positioned over. For all moves, the *needle must be fully raised*.

In manual mode, the arm and tray angles are mapped the same way as in vial-selection mode. “Manual” means each step performed by the operator: raising the needle, positioning over the selected wash port, lowering the needle into well, optionally enabling tray shaking, and then raising the needle again. Use the **K** tab for needle washing.

To move the arm to wash port, enter command and execute:

- **K1 (integer)**: enter **the wash vial number (e.g., 1)**, then click **Set**.

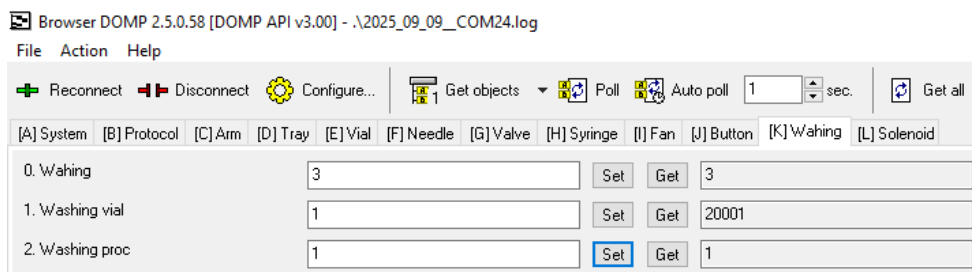


Needle Washing (Automatic Mode)

In addition to manual mode, an automatic wash cycle is available. It runs the following sequence for each wash port: **raise the needle** → **move to the wash port** → **lower the needle** → **shake** → **raise the needle**. The cycle proceeds through all four wash vials and, upon completion, returns the needle to the fully raised position.

To enable automatic wash sequence, enter command and execute:

- **K2 (integer)**: enter **1**, then click **Set**.



Valve Control

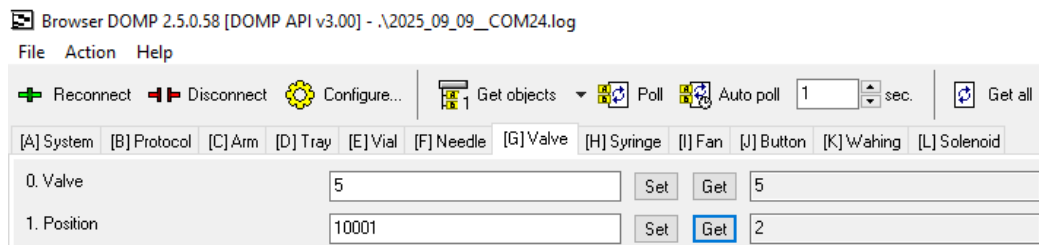
The following applies to all needle configurations.

Valve Initialization

In most cases, valve initialization is not required because the valve homes to its reference position at power-up. However, after service operations—e.g., **valve rotor or stator replacement**—you must re-initialize the valve. Use the **G** tab; for initialization and positioning only **G1 (valve position)** is required. Do **not** change other fields—undocumented changes may impair operation and can void the warranty.

To initialize the valve, enter command and execute:

- **G1 (integer)**: enter **10001**, then click **Set**.



Note At power-up, the valve **initializes to the manufacturer-defined reference position** (preset). For example, for a **7×6 valve**, the reference position is **port 1**.

Valve positioning and Types

Each valve has a fixed range of selectable positions determined by its configuration. Examples:

- **7×6 with stator** — 6 positions (position **#1** shown below)



Fig 5. 7×6 Valve with Stator

- **6×2 with stator** — 2 positions (position #2 shown below)

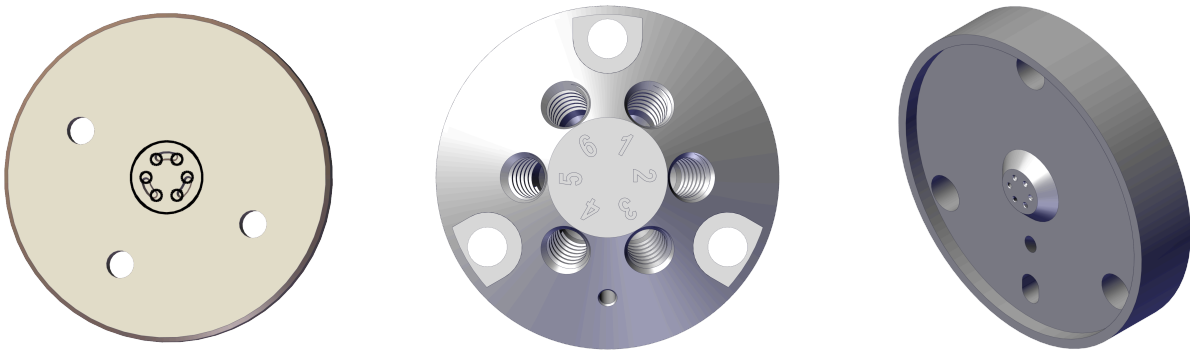


Fig 6. 6×2 Valve with Stator

- **10×9 with stator** — 9 positions (position #1 shown below)

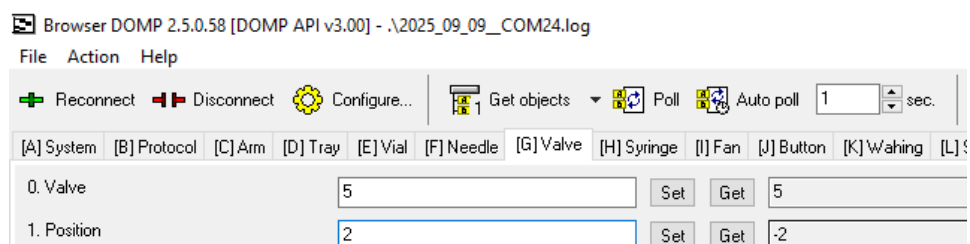


Fig 7. 10×9 Valve with Stator

Use only positions within the supported range; values outside the range are ignored or clamped by the controller.

To position the valve, enter command and execute:

- **G1 (integer):** enter **position #**, for example **2**, then click **Set**.



Syringe Control

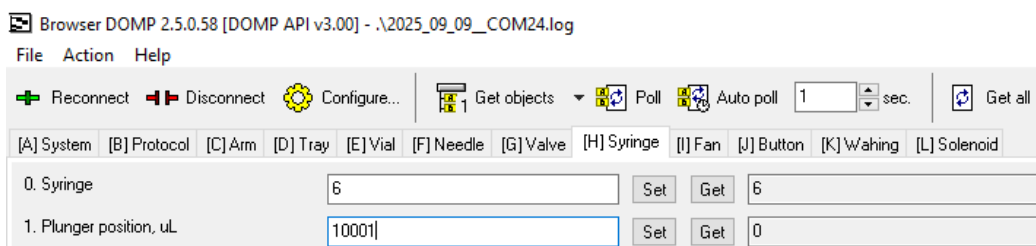
The following applies to all needle configurations.

Syringe Initialization

In most cases, syringe initialization is not required because the syringe **initializes to its reference position at power-up**. However, after service operations (e.g., **plunger-seal** or **O-ring** replacement), you must re-initialize the syringe. Use the **H** tab; for initialization and positioning only **H1 (valve position)** is required.

To initialize the syringe, enter command and execute:

- **H1 (integer)**: enter **10001**, then click **Set**.



Note At power-up, the syringe initializes to the **manufacturer-defined reference position** (factory preset). For example, for a **4000 μL** stainless-steel syringe the reference position is **0 μL** (empty). This behavior **applies to all syringe types**.

Syringe Refill and Dispense

Use **H1** to set the syringe's **target volume**. The controller moves the plunger until the syringe contains that volume; if the target is above the current volume it **refills**, if below—it **dispenses**.

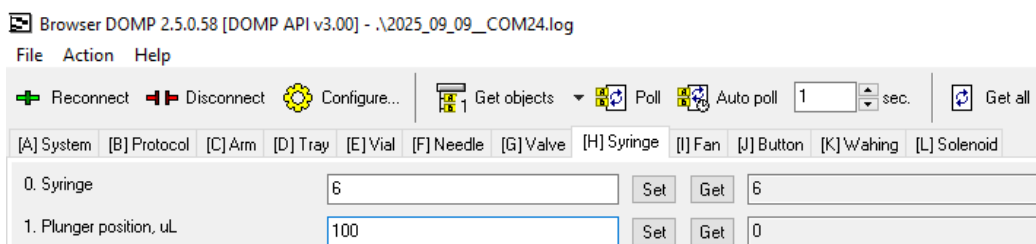
Example 1: current volume **0 μL** , **H1 = 100** → the syringe refills to **100 μL** .

Example 2: current volume **100 μL** , **H1 = 50** → **50 μL** is dispensed and **50 μL** remains in the syringe.

Note Values outside the valid range [0,syringe capacity] are ignored or clamped to the limit.

To move syringe plunger, enter command and execute:

- **H1 (integer)**: enter, for example **100**, then click **Set**.



Syringe Refill and Dispense Speeds

Refill and dispense speeds are controlled by **H2** and **H3**. Each syringe size has a specific maximum (firmware-enforced):

- **4000 μ L syringe:** max **10,000 μ L/min** (selected by default)
- **120 μ L syringe:** max **1,000 μ L/min** (selected by default)

To set syringe refill speed, enter command and execute:

- **H2 (integer):** enter a value in the range **1–[maximum for the selected syringe]** (μ L/min), then click **Set**.

To set syringe dispense speed, enter command and execute:

- **H3 (integer):** enter a value in the range **1–[maximum for the selected syringe]** (μ L/min), then click **Set**.

How to Read Component's Parameters (Example)

The example below uses the needle to illustrate how to read component parameters.

For the complete command set and guidance on interpreting parameter values, see the [Alltesta™ Mini Autosampler Serial Protocol](#)

Needle Status Readout (F tab)

Open the F tab. The needle has several states: idle (parked at the injection port), moving up, moving down, upper limit, or stopped at an intermediate height.

To read the current state/position, click **F1** → **GET**.

The returned value encodes **status + Z-position (mm)**:

Readout (F1)	Meaning	Example
60**. **	Idle, parked at the injection port	6004.50
1. Position_mm_float 10001 Set Get 6004.50		
70**. **	Upper limit (fully raised)	7036.99
1. Position_mm_float 60 Set Get 7036.99		
200**. **	Moving up	20025.63
1. Position_mm_float 60 Set Get 20025.63		
300**. **	Moving down	30022.14
1. Position_mm_float 0 Set Get 30022.14		
** . **	Stopped at lower/intermediate height; value is current Z in mm	0.00
1. Position_mm_float 0 Set Get 0.00		

Maintenance

Cleaning the Module

Wipe the module case with a soft cloth slightly dampened with water or a mild detergent solution.

Warning: Do not allow liquids to enter the electronic compartment, as this can cause shock hazards or damage the module.

Optimization for Lowest Carry-over

The Mini-Autosampler's continuous flow-through design ensures that the sample loop, needle, seat capillary, and injection valve mainpass are continuously flushed during both isocratic and gradient analyses.

Residual samples on the needle surface can contribute to carry-over, especially with small injection volumes or low-concentration samples following high-concentration samples.

Automated Needle Wash

- The automated needle wash can be programmed as part of the injection process or included in the injector program.
- After drawing a sample, the needle moves into a wash vial to immediately remove residual sample from its surface.
- For optimal results, the wash vial should contain a solvent in which the sample components are soluble and should not be capped, to prevent residual sample on the septum from contaminating the next injection.

See the procedure in "[Needle Washing \(Manual Mode\)](#)"

See the procedure in "[Needle Washing \(Automatic Mode\)](#)"

Technical Specification

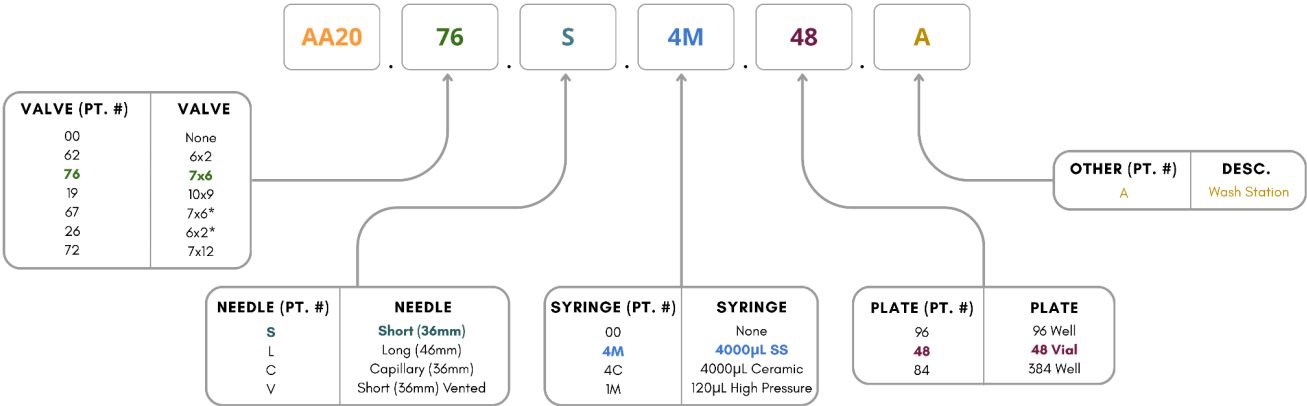
Parameters	Alltesta™ Mini-Autosampler (Standard configuration)	Alltesta™ Mini-Autosampler (Customizable configuration)
Dimensions (WHL)	160 x 145 x 195 mm / 6.3 x 5.71 x 7.68 in	depends on configuration
Weight	3 kg / 6.6 lb	depends on configuration
Power	24 V	24 V
Plate	48 vials	• 48 vials • 96-well plate • 384-well plate
Pressure	Up to 5000 psi (345 bar)	depends on configuration
Syringe Capacity	4000 µL low-pressure stainless	• 120 µL high-pressure • 4000 µL low-pressure stainless • 4000 µL low-pressure ceramic
Valve options	6x2	• 6×2 • 7×6 • 10×9 • 7×6* • 6×2*
Needle	Short (36mm)	• Short (36 mm) • Long (46 mm) • Capillary metal ceramic • Short (36mm) Vented
Miscellaneous	Wash Station	None Wash Station
Volume Accuracy	0.1 µL	depends on configuration
Materials	in contact with liquid SS316, PTFE, PEEK	in contact with liquid SS316, PTFE, PEEK

Communication	The primary method of communication with the device is via a UART interface using an FTDI driver, as the device incorporates an FTDI chip.	The primary method of communication with the device is via a UART interface using an FTDI driver, as the device incorporates an FTDI chip.
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*other rotor

Part Number Generation

Create a Alltesta™ Mini-Autosampler Part Number Using the Chart Below

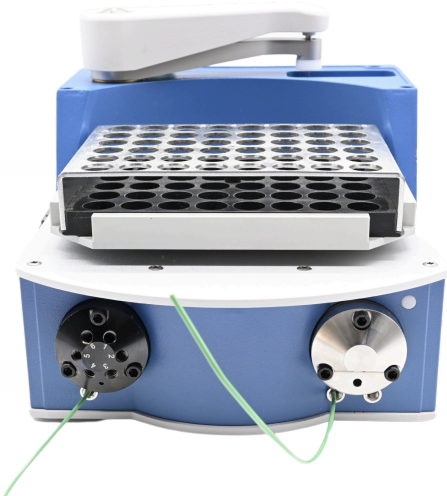


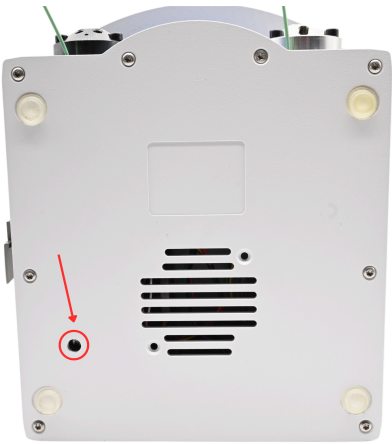
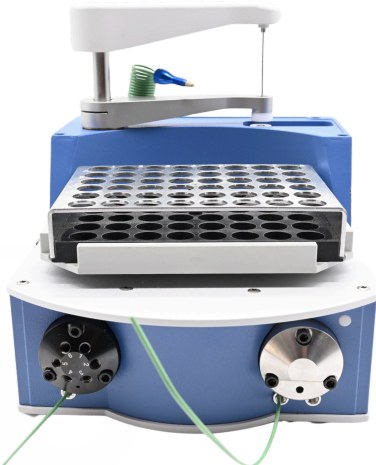
Appendix 1. Needle Replacement Procedure for Alltesta™ Mini-Autosampler

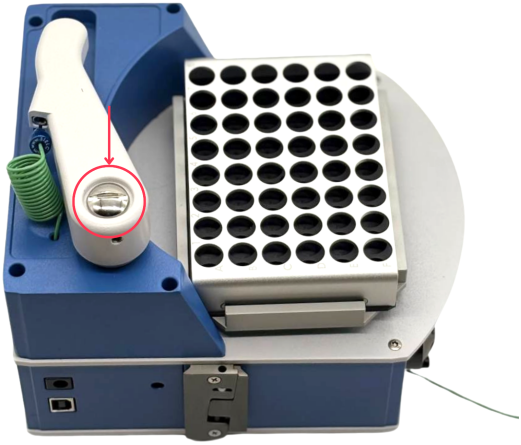
Required Tools:

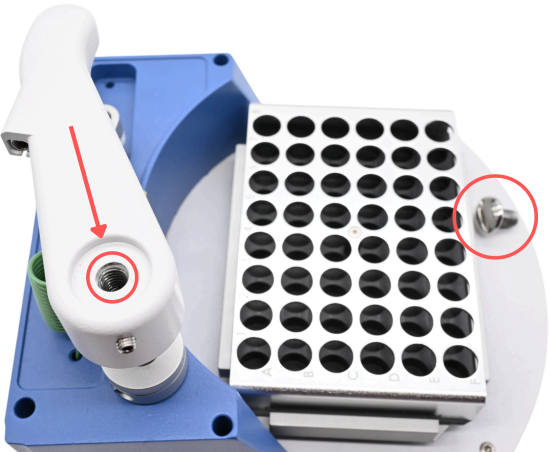
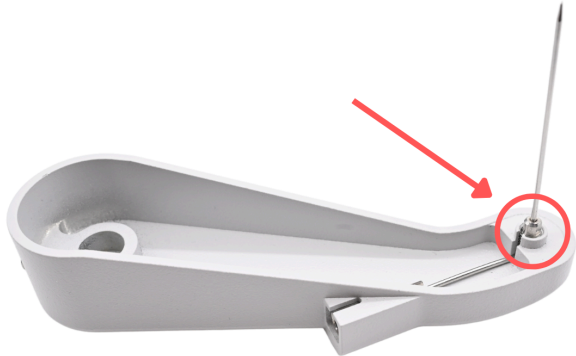
1. Large flat-head screwdriver
2. Medium flat-head Screwdriver
3. Wrench 1/8 in
4. Allen key 1/32 in

Disassembly

No	Description	Picture
1.	Alltesta™ Mini-Autosampler in the starting (front-facing) position.	
2.	Position the Alltesta™ Mini-Autosampler with its back facing you and unscrew the fitting.	

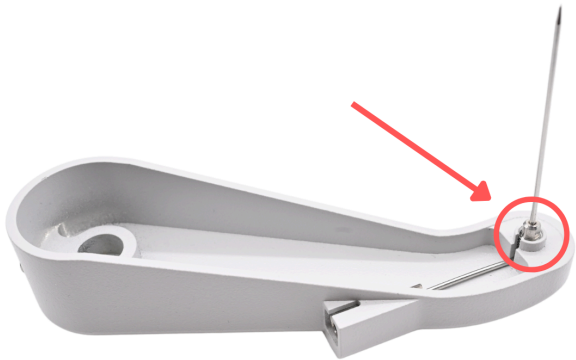
3.	Turn the autosampler onto its side. On the bottom panel, locate the needle motor shaft. Use a flathead screwdriver to turn the needle motor shaft (counter-clockwise) until you feel resistance then stop. As a result, the needle will be in its top most position.	 The image shows the back of a white autosampler unit. A red circle highlights a small black dot on the lower left side of the back panel, with a red arrow pointing to it. This dot is the needle motor shaft. The back panel also features a central ventilation grille and four yellow circular feet at the corners.
4.	Return the autosampler to its upright (front-facing) position.	 The image shows the front of the autosampler, which is blue and white. It has a large sample tray with many wells. A white arm with a green brush is positioned above the tray. Two green cables are plugged into the front panel. The unit is shown in its upright, front-facing position.

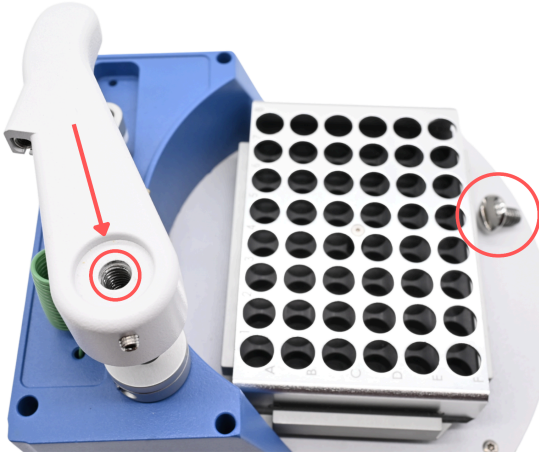
5.	Rotate it so the left side is facing you. You will see a set screw on the side of the arm needle holder (needle holder assembly). Loosen the screw using the 3/32 inch Allen key.	 A photograph of a blue and white laboratory instrument. A red circle and arrow point to a small set screw on the side of a white arm assembly. A green coiled cable is visible on the left side of the instrument.
6.	Unscrew the top screw (with a large flat head screwdriver) on the arm needle holder (needle holder assembly) and remove it completely. This will release the upper part of the arm assembly.	<u>Before</u>  <u>After</u> A photograph of the same instrument from a different angle. A red circle and arrow point to a large flat-head screw on the top of the white arm assembly. The image is split into two parts: 'Before' (top) and 'After' (bottom), showing the state of the instrument before and after the screw is removed.

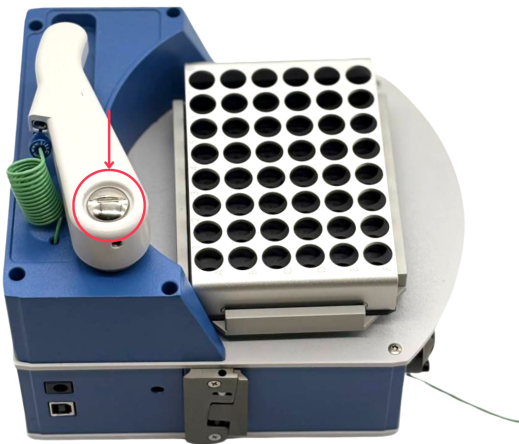
		
7.	Remove the arm needle holder (needle holder assembly). The needle will remain inside—handle with care to avoid damaging it.	
8.	Unscrew the needle holder using the 1/8 inch wrench, and set it aside.	

9.	Gently pull the needle out from the arm needle holder (needle holder assembly) by pressing on the needle base.	
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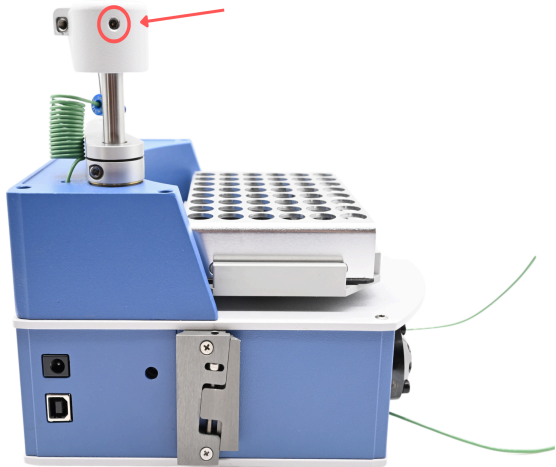
Assembly

No	Description	Picture
1.	Take a new needle compatible with the Alltesta™ Mini-Autosampler.	
2.	Insert the needle carefully into the arm needle holder (needle holder assembly) by guiding it in from the top. Handle with care to avoid bending or damaging the needle.	
3.	Secure the needle holder by tightening it with the 1/8 inch wrench.	
4.	Attach the arm needle holder (needle holder assembly) back into position.	

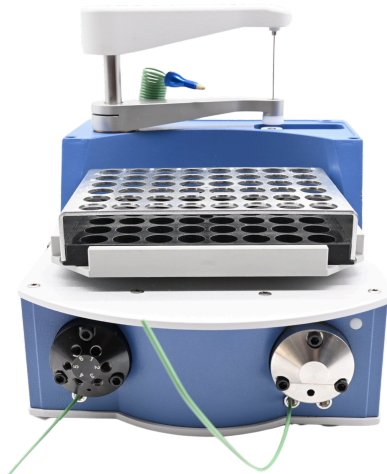
5.	Before installing the arm needle holder (needle holder assembly), make sure all parts are correctly aligned. Carefully inspect the opening—ensure all components are properly aligned, the guides are clean, and nothing obstructs the needle's seating in the injection port.	
6.	Reinstall the top screw on the arm needle holder (needle holder assembly) and tighten it fully. This will secure the upper part of the assembly.	<u>Before</u>  <u>After</u>



7. Tighten the set screw on the side of the arm needle holder using the 3/32 inch Allen key.



8. Return the autosampler to an upright position with the back facing you.



9.	Reconnect and tighten the fitting at the back of the unit.	
10.	Final Check Connect the USB cable and perform a final system check to ensure proper installation and functionality. After reassembly, it is recommended to run a calibration cycle or perform a test sample draw to confirm proper needle installation. See details in the Needle Alignment Process.	

Appendix 2. Loop Replacement Procedure for Alltesta™ Mini-Autosampler.

Required Tools:

No tools required.

Disassembly

1. Locate the fitting on the arm needle holder (needle holder assembly).
2. Unscrew the fitting completely.



3. Gently pull the loop until it is fully removed.



4. Detach the fitting from the loop.

Assembly

1. Attach the fitting to one end of the new loop.

2. Insert the opposite end of the loop into the loop hole-1 (entry port). Continue feeding the loop through until it exits from the loop hole-2 (exit port) with approximately 5 inches (12 cm) of tubing extending out.



The loop hole-1 (entry port)



The loop hole-2 (exit port)

3. Screw the fitting with the loop back into the arm needle holder (needle holder assembly) until fully secured

Autosampler serial protocol Rev. 124

Serial port settings:

- 115200 baud rate
- 8 data bits
- no parity
- 1 stop bit
- no handshaking

DOMP - Serial communication protocol

Autosampler's protocol is based on **DOMP** (Device Object Manager Protocol).

According to DOMP, serial device has a set of variables named with one letter and one number, example: B4, B5, D1. Each variable may be written or read. Some write operations may not succeed, so you'll receive an error message. Each variable corresponds to a particular function or state or parameter.

To update (write) parameters use command pattern

Send	>1 [letter][number:int]=[value:int]
Receive on success	<1 [letter][number:int]=[value:int]

Send	>1 [letter][number:int]=[value:int]
Receive on error	<1 [letter][number:int]![error:str]

Ex:

>1 B4=21	// Send to specify <u>Vial = 21</u>
<1 B4=21	// Autosampler will answer to confirm
>1 B5=3	// Send to specify <u>Amount = 3</u>
<1 B5=3	// Autosampler will answer to confirm
>1 B3=1	// Send to start <u>injection</u>
<1 B3=1	// Autosampler will answer to confirm if <u>State == 0</u>
>1 B3=1	// Send to start <u>injection</u>
<1 B3!NotReady	// Autosampler will decline if <u>State != 0</u>
>1 B3=0	// Send to <u>abort and get ready</u>
<1 B3=0	// Autosampler will answer to confirm abortion

To read information parameters use command pattern

Send	>1 [letter][number:int]?
------	--------------------------

Receive <1 [letter][number:int]=[value:int]

Ex:

```
>1 B1?           // Send to request state value
<1 B1=0          // Autosampler is ready

>1 B1?           // Send to request state value
<1 B1=15         // Injection start state

>1 B1?           // Send to request state value
<1 B1=100        // Error occurred

>1 B2?           // Send to request error value
<1 B2=00000110   // Errors: tray rotation error & arm rotation blocked

>1 B2?           // Send to request error value
<1 B2=0          // No error
```


Set operation

Get operation

System - “A”

General information about autosampler

Variable	Name	Type	Units	Description
A1	Reset_MCU	int	-	Reset main MCU
35886791	- Magic const to reset MCU			
0	- MCU not reset			
1	- MCU reset			

Variable	Name	Type	Units	Description
A2	Object_qty	int	-	Total object quantity
-	- READ ONLY			
10	- DOMP object quantity (system DOMP variable, number of tabs in BrowserDOMP).			

Variable	Name	Type	Units	Description
A3	Firmware_ver	int	-	Firmware version
-	- READ ONLY			
1.10	- Firmware version			

Variable	Name	Type	Units	Description
A4	Protocol_ver	int	-	Protocol version
-	- READ ONLY			
108	- Protocol version			

Variable	Name	Type	Units	Description
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A5	Device_UID_96bit	HEX string		Unique identifier for the device.
-	- READ ONLY			
3430353235374715003C003D	- Device UID 96bit			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
A6	PCB_ver	string	-	PCB version
-	- READ ONLY			
7P0010d	- PCB version			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
A7	Compil_date	string	-	Firmware compilation date
-	- READ ONLY			
Jan 13 2020	- Firmware compilation date			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
A8	Compil_time	string	-	Firmware compilation time
-	- READ ONLY			
16:43:08	- Firmware compilation time			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
A9	Modification	string	-	Device modification
-	- READ ONLY			
LOW_PRESSURE HIGH_PRESSURE	- Device modification "low pressure" - Device modification "high pressure"			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
A10	Serial_num	string	-	Device serial number
-	- READ ONLY			

A42201024	- Device serial number
-----------	------------------------

Variable	Name	Type	Units	Description
A11	Tick counter, mS	int	mS	System tick counter
-	- READ ONLY			
xxxx	- System tick counter			

Protocol- “B”

Variable	Name	Type	Units	Description
B1	Command_state	int	-	Controls an autosampler
0	- Command “Getting ready”			
1	- Command “Injection”			
2	- Command “Washing”			
3	- Command “Shaking”			
6	- Command “Loop wash”			
0	- State “Ready”			
1	- State “Injection”			
2	- State “Washing”			
3	- State “Shaking”			
4	- State “Getting Ready”			
5	- State “Error”			
6	- State “Loop wash”			

Variable	Name	Type	Units	Description
B2	Error_Code	string	-	Autosampler errors
-	- READ ONLY			
00000	- No error			
00001	- Syringe error			
00002	- Syringe in the process of calibration.			
00010	- Needle error			
00020	- Needle in the process of calibration.			
00100	- Valve error			

00200	- Valve in the process of calibration.
01000	- Tray error
02000	- Tray in the process of calibration.
10000	- Arm error
20000	- Arm in the process of calibration.
11111	- Error of all blocks

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B3	Injection_flag	int	-	Injection of the liquid started (valve rotated)
0	- Reset flag			
0	- Neutral			
1	- Injection occurred			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B4	Vial_num	int	-	Vial number
1-48	- Vial number			
1-96	- Vial number			
5001-5004	- Washing vial number (1-4)			
1-48	- Vial number			
1-96	- Vial number			
5001-5004	- Washing vial number (1-4)			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B5	Amount_uL	int	μL	Amount of sample to get from a vial
1-65000	- Amount of sample in microliters			
1-65000	- Amount of sample in microliters			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
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B6	VialDepth_mm	float string	mm	Needle position, 0 - button of vial
0-30	- Needle depth			
0-30	- Needle depth			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B7	Syringe_refill_speed_uLM	int	µL/Min	Syringe refill speed, 10 - 48000
10-48000	- Syringe refill speed			
10-48000	- Syringe refill speed			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B8	Syringe_draw_speed_uLM	int	µL/Min	Syringe draw speed, 10 - 48000
10-48000	- Syringe draw speed			
10-48000	- Syringe draw speed			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B9	ValveTime_ms	int	ms	How long to wait for sample injection. Max 50min
10-3000000	- ValveTime			
10-3000000	- ValveTime			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B10	WashCycles_num	int	-	Number of cycles
10-48000	- Number of cycles			
10-48000	- Number of cycles			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
B11	ShakingMode__0_3	int	-	Shaking mode number
1-3	- Shaking mode			

1-3	- Shaking mode
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Variable	Name	Type	Units	Description
B12	ShakingTime_Sec	int	Sec	Shaking Duration
1-65000	- Duration			
1-65000	- Duration			

Variable	Name	Type	Units	Description
B13	Viscosity_0_100_Cp	int	Centipoise	Sample viscosity
0-100	- Viscosity			
0-100	- Viscosity			

Arm - “C”

Variable	Name	Type	Units	Description
C1	PositionAngle_0to90	float string	Degrees	Arm position, angle of rotation
0.00-90.00 0 10001 10002	- Angle of rotation - Injection port. - Recalibrate - Abort			
0.00-90.00 200XX.XX 300XX.XX -1 -2	- Not moving and position is 0-90° - Moving to 90 (increasing number), where XX.XX real arm position - Moving to 0 (decreasing number), where XX.XX real arm position - Position unknown - Find a position (in progress)			

Variable	Name	Type	Units	Description
C2	PositionAngleInt	int	Degrees*100	Arm position, angle of rotation
0-9000 0 1000100 1000200	- Angle of rotation - Injection port. - Recalibrate - Abort			
000-9000 200XXXX	- Not moving and position is 0-90° - Moving to 90 (increasing number), where XXXX real arm position			

300XXXX -100 -200	- Moving to 0 (decreasing number), where XXXX real arm position - Position unknown - Find a position (in progress)
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Variable	Name	Type	Units	Description
C3	Movement speed	string	-	Arm movement speed
	- READ ONLY			
Standard High Speed	- Arm movement speed - Arm movement speed			

Variable	Name	Type	Units	Description
C4	Movement speed, index EEPROM	string	index	The variable is stored in EEPROM
	- READ ONLY			
0 1	- Standard - High Speed			

Tray - “D”

Variable	Name	Type	Units	Description
D1	PositionAngle_0_359	float string	Degrees	Tray position, angle
0.00 - 359.99 10001 10002	- Destination angle in degrees - Recalibrate - Abort			
0.00 - 359.99 20XXX.XX -1 -2 -3	- Position in degrees - Moving to position, where XXX.XX real tray position - Lost tray position - Find a position (in progress) - Shaking			

Variable	Name	Type	Units	Description
D2	Shaking_0_3	int	-	Shaking mode
0	- No shaking - Enable shaking mode 1 - Enable shaking mode 2 - Enable shaking mode 3			
1				
2				
3				
0-3	- Current shaking mode			

Variable	Name	Type	Units	Description
D3	ShakingTimeSec_0_10000	int	Sec	Shaking time
0-10000	- Shaking time			
0-10000	- Shaking time			

Variable	Name	Type	Units	Description
D4	PositionAngleInt_0_359	int	Degrees	Tray position, angle*100
0 - 35999	- Destination angle in degrees - Recalibrate - Abort			
1000100				
1000200				
0 - 35999	- Position in degrees - Moving to position, where XXXXX real tray position - Lost tray position - Find a position (in progress) - Shaking			
20XXXXX				
-100				
-200				
-300				

Variable	Name	Type	Units	Description
D5	Movement speed	string	-	Arm movement speed
	- READ ONLY			
Standard	- Arm movement speed - Arm movement speed			
High Speed				

Variable	Name	Type	Units	Description
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D6	Movement speed, index EEPROM	string	index	The variable is stored in EEPROM
	- READ ONLY			
0	- Standard			
1	- High Speed			

Vial (Arm & Tray) - “E”

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
E1	Vial num	int	-	Move tray and arm
0	- Go home (Injection port)			
X	- Go to vial num X			
500X	- Go to washing vial num X (where X - 1-4)			
0	- Not moving at home			
X	- Not moving and vial is X			
200XX	- Moving home or to vial 1-XX, where XX destination vial number			
2500X	- Moving to washing vial X, where X destination washing vial number			
-1	- Vial positioning error			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
E2	Tray type, eeprom	int	-	Select Tray type, safed after power off
0	- Select 48 vials tray			
1	- Select 96 vials tray			
2	- Select 384 vials tray			
0	- Selected 48 vials tray			
1	- Selected 96 vials tray			
2	- Selected 384 vials tray			

Variable	Name	Type	Units	Description
E3	Tray name	string	-	Tray name
-	- READ ONLY			
48_6x8 96_8x12 384_16x24	- Selected 48 vials tray, related to “0” tray type - Selected 96 vials tray, related to “1” tray type - Selected 384 vials tray, related to “2” tray type			

Variable	Name	Type	Units	Description
E4	ToF Board FW Ver	string	-	Time of Flight sensors Board FW Ver
-	- READ ONLY			
x.yz -1	- Firmware version of Time of Flight sensors board - Time of Flight sensors board not present			

Variable	Name	Type	Units	Description
E5	ToF Check Vial	int	-	Check if a vial is present
x	- Vial number (1-48)			
2000x 1 0	- In progress; where x - vial - Vial resent - Vial not present			

Variable	Name	Type	Units	Description
E6	ToF Check Tray	int	-	Check entire tray for vials
1	- Start checking			
2000x x	- In progress; where x - number of vials found at this moment - Number of vials found (0-48)			

Variable	Name	Type	Units	Description
E7	ToF Vial present	string	-	Check entire tray for vials

1	- READ ONLY
FF,FF,FF,FF,FF,FF	- String of 6 bytes indicating which vials are present.

Needle - “F”

Variable	Name	Type	Units	Description
F1	Position_mm_float	float string	mm	Control needle Y position
0.00 - 50.00 10001 10002	- Move needle 0.00 mm - bottom of vial, top position is undefined, set 50 for upper position. The top position is approximately 38mm. - Recalibrate - Abort			
0-50.00 200XX.XX 300XX.XX 60XX.XX 70XX.XX -1 -2	- Not moving and position is 0-50.00 - Moving up, XX.XX current position - Moving down, XX.XX current position - In injection port position - In upper position - Position unknown - Finding a sensor (in progress)			

Variable	Name	Type	Units	Description
F2	Position_mm_int	int	mm	Control needle Y position (mm*100)
0 - 5000 1000100 1000200	- Move needle 0.00 mm - bottom of vial, top position is undefined, set 5000 for upper position. The top position is approximately 38mm. - Recalibrate - Abort			
0-5000 200XXXX 300XXXX 60XXXX 70XXXX -100 -200	- Not moving and position is 0-5000 - Moving up, XX.XX current position - Moving down, XX.XX current position - In injection port position - In upper position - Position unknown - Finding a sensor (in progress)			

Variable	Name	Type	Units	Description
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F3	Injection port level, mm EEPROM	float string	mm	Injection port level adjustment
-	- READ ONLY			
5	Injection port level			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
F4	Movement speed	string	-	Arm movement speed
	- READ ONLY			
Standard High Speed	- Arm movement speed - Arm movement speed			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
F5	Movement speed, index EEPROM	string	index	The variable is stored in EEPROM
	- READ ONLY			
0 1	- Standard - High Speed			

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
F6	Injection counter	int	qty	Injection counter
	- READ ONLY			
X	The number of injections made.			

Valve - “G”

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
G1	Position	int	-	Number of valve position

1-X 10001 10002	- Move to position - Recalibrate - Abort
1-X 2000X -1 -2 -3	- Not moving and valve position is 1-X - Moving to position, where X destination position - Position unknown - Finding a sensor (in progress) - Valve not installed

Variable	Name	Type	Units	Description
G2	PositionAngle	float string	Degrees	Shaking mode
0.00 - 359.99 10001 10002	- Destination angle in degrees - Recalibrate - Abort			
0.00 - 359.99 20XXX.XX -1 -2 -3	- Position in degrees - Moving to position, where XXX.XX real valve position - Lost tray position - Find a position (in progress) - Valve not installed			

Variable	Name	Type	Units	Description
G3	Type, name	string	-	Type, name
-	- READ ONLY			
6H_3G_2P 6H_C_1G_5P 7H_C_1G_6P 10H_C_1G_9P Not installed 7_C_2G_6P	- 6 holes, 3 groves, 2 positions - 6 holes, 1 groves, 5 positions - 7 holes, 1 groves, 6 positions - 10 holes, 1 groves, 9 positions - Valve not installed - 7 holes, Central_hole, 2 groves, 6 positions			

Variable	Name	Type	Units	Description
G4	Type, #, EEPROM	string	-	Type, #, EEPROM
0 1 2 3 4	- 6H_3G_2P - 6H_C_1G_5P - 7_C_1G_6P - 10H_C_1G_9P - Not installed			

5	- 7_C_2G_6P (7 holes, Central_hole, 2 groves, 6 positions)
0	- 6H_3G_2P
1	- 6H_C_1G_5P
2	- 7_C_1G_6P
3	- 10H_C_1G_9P
4	- Not installed
5	- 7_C_2G_6P

Syringe - “H”

Variable	Name	Type	Units	Description
H1	Plunger position, uL	int	µL	Plunger Position
0-4000	- Go to amount 0-4000 ul in case of big syringe (low pressure)			
0-120	- Go to amount 0-120 ul in case of small syringe (high pressure)			
0-3000	- Go to amount 0-3000 ul in case of glass syringe (low pressure)			
10001	- Recalibrate zero (go to find zero, position will be 0)			
10002	- Abort (Stop doing anything with syringe)			
10005	- Just stop plunger			
0-x	- Current plunger position			
2XXXX	- Refilling to 0-4000 (1,2,3...)			
3XXXX	- Drawing to 0-4000 (3,2,1...)			
-1	- Unknown plunger position and not moving			
-2	- Unknown plunger position and calibrating			
-3	- Syringe not installed			

Variable	Name	Type	Units	Description
H2	Draw Speed uL/M	int	µL/Min	Draw Speed
10 - 48000	- Draw flow rate in case of big syringe (low pressure)			
10 - 1000	- Draw flow rate in case of small syringe (high pressure)			
10 - 40000	- Draw flow rate in case of glass syringe (low pressure)			
10 - 48000	- Draw flow rate			
10 - 1000				
10 - 40000				

Variable	Name	Type	Units	Description
H3	Refill Speed uL/M	int	µL/Min	Refill Speed

10 - 48000	- Refill flow rate in case of big syringe (low pressure)
10 - 1000	- Refill flow rate in case of small syringe (high pressure)
10 - 40000	- Refill flow rate in case of glass syringe (low pressure)
10 - 48000	- Refill flow rate
10 - 1000	
10 - 40000	

Variable	Name	Type	Units	Description
H4	Type, name	-	-	Syringe type
-	- READ ONLY			
4000 uL Metal, NDV High Pressure 120 uL Low Pressure 3000 uL, Glass Not installed 4000 uL, Metal 4000 uL, Ceramic 4000 uL, Ceramic, NDV	- Type, name			

Variable	Name	Type	Units	Description
H5	Type, #, EEPROM	-	-	Type, # ;Safe in EEPROM
0	- 4000 uL, Metal, NDV			
1	- High Pressure 120 uL			
2	- Low Pressure 3000 uL, Glass			
3	- Not installed			
4	- 4000 uL, Metal			
5	- 4000 uL, Ceramic			
6	- 4000 uL, Ceramic, NDV			
0	- 4000 uL, Metal, NDV			
1	- High Pressure 120 uL			
2	- Low Pressure 3000 uL, Glass			
3	- Not installed			
4	- 4000 uL, Metal			
5	- 4000 uL, Ceramic			
6	- 4000 uL, Ceramic, NDV			

Fan - “I”

Variable	Name	Type	Units	Description
I1	Percent_0_100	int	%	Internal fan speed
0-100	- Fan speed in percent. It is better to use a range of 20-100%			
0-100	- Current Fan speed			

Variable	Name	Type	Units	Description
I2	Temperature, °C	float string	°C	Internal fan speed
-	- READ ONLY			
36.25	- Current Temperature			

Variable	Name	Type	Units	Description
I3	Fan On temperature, °C ,EEPROM	float string	°C	When this temperature is reached, the fan starts. If 0 - automatic fan control is disabled.
36.25	- temperature			
36.25	- temperature			

Variable	Name	Type	Units	Description
I4	Fan Off temperature, °C ,EEPROM	float string	°C	When this temperature is reached, the fan stops. If 0 -

				automatic fan control is disabled.
30.25	- temperature			
30.25	- temperature			

Button - “J”

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
J1	Led	HEX string	%	Led mode/color
0xMMRRGGBB	- MM - mode. 0x41000000 - BLINK_SMOOTH_SLOW 0x4F000000 - BLINK_SMOOTH_FAST 0x85000000 - BLINK_FAST - RRGGBB - color. 0x00F10000 - COLOR_RED 0x00E0F000 - COLOR_YELLOW 0x0000F000 - COLOR_GREEN 0x000000F0 - COLOR_BLUE 0x00E000F0 - COLOR_PURPLE 0x00A0F0F0 - COLOR_WHITE Example: 0x4100F000 - BLINK_SMOOTH_SLOW_GREEN			
0xMMRRGGBB	- Current mode/color			

Washing- “K”

<i>Variable</i>	<i>Name</i>	<i>Type</i>	<i>Units</i>	<i>Description</i>
K1	Washing vial	int	-	Select washing vial
1-4	- Select washing vial			

1-4	- Current vial
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Variable	Name	Type	Units	Description
K2	Washing proc	int	-	Start washing process
1 10002	- Start washing - Abort			
1 0	- Washing process in progress - Washing done			

Probe 1 - “L”

Variable	Name	Type	Units	Description
L1	UID 48bit (eeprom)	string	-	Unique serial number
-	- READ ONLY			
00:00:00:00:00:00 xx:xx:xx:xx:xx:xx	- If the probe is not connected. - Unique serial number (read from probe EEPROM)			

Variable	Name	Type	Units	Description
L2	Name (eeprom)	string	-	Probe name
-	- READ ONLY			
MT SIELC not connected	- For Mettler Toledo probe - For Sielc probe - If the probe is not connected			

Variable	Name	Type	Units	Description
L3	Control	int	-	Probe control
0 1	- Pull in the trunk. - Pull out the trunk.			
-1 -2 -3 -4 -5 0 1 100 101	- Error - Motor driver overcurrent (>1.5A) - Error - Overcurrent (current is higher than expected) - Error - Undercurrent (current is less than expected) - Error - Probe not connected (check 1-wire eeprom) - Error - Motor timeout (the motor rotates without resistance for more than 5 seconds) (only for MT) - The trunk is pulled in - The trunk is pulled out - The trunk is pull in in progress (only for MT) - The trunk is pull out in progress (only for MT)			

Probe 2 - “M”

Variable	Name	Type	Units	Description
M1	UID 48bit (eeprom)	string	-	Unique serial number
-	- READ ONLY			
00:00:00:00:00:00 xx:xx:xx:xx:xx:xx	- If the probe is not connected. - Unique serial number (read from probe EEPROM)			

Variable	Name	Type	Units	Description
M2	Name (eeprom)	string	-	Probe name
-	- READ ONLY			
MT SIELC not connected	- For Mettler Toledo probe - For Sielc probe - If the probe is not connected			

Variable	Name	Type	Units	Description
M3	Control	int	-	Probe control
0	- Pull in the trunk. - Pull out the trunk.			
1				
-1	- Error - Motor driver overcurrent (>1.5A) - Error - Overcurrent (current is higher than expected) - Error - Undercurrent (current is less than expected) - Error - Probe not connected (check 1-wire eeprom) - Error - Motor timeout (the motor rotates without resistance for more than 5 seconds) (only for MT) - The trunk is pulled in - The trunk is pulled out - The trunk is pull in in progress (only for MT) - The trunk is pull out in progress (only for MT)			
-2				
-3				
-4				
-5				
0				
1				
100				
101				

Syringe Ex:

```

>1 H2=1000           // To specify Draw Speed = 1000
<1 H2=1000           // Autosampler will answer to confirm
>1 H3=20000          // To specify Refill Speed = 20000
<1 H3=20000          // Autosampler will answer to confirm

>1 H1=3000           // To move syringe to Position = 3000
<1 H1!NotCalibrated

>1 H1?               // Check position
<1 H1=-1             // Position unknown

>1 H1=10001          // To calibrate syringe zero, use Position = 10001
<1 H1=-2             // Autosampler will answer it's moving and searching zero

>1 H1=3000           // To move syringe to Position = 3000
<1 H1=21325          // Autosampler will answer it's moving (2xxxx) and current Position =

1325
>1 H1?               // Request state
<1 H1=22653          // Autosampler will answer it's moving and current Position = 2653
>1 H1?               // Request state

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<1 H1=3000

// Autosampler will answer it stopped and current Position = 3000

