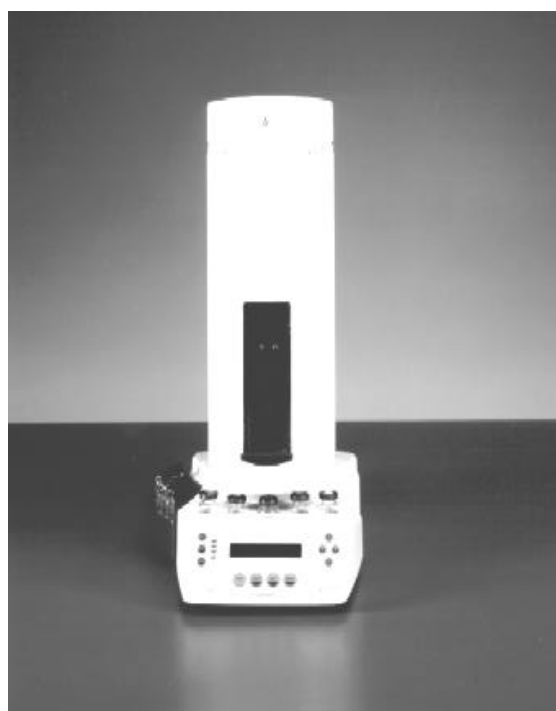# HT 300A

Liquid GC autosampler

This manual contains information about the HT300 GC autosampler for liquid samples.

The information contained in this document is subject to change without notice.

This document is for information only; the manufacturer accepts no liability for errors contained herein or for incidental or consequential damages with the furnishing, performance, or use of this material.

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Version: B	**08/09/2003**

SUMMARY

1. INTRODUCTION

Read the following warnings before unpacking or using the unit.

Warning

- See Declaration of CE Compliance enclosed with the autosampler

- Before removing the autosampler from the box please read carefully paragraphs **3.1** "**Unpacking and preliminary operations** " and **3.2** "**Autosampler assembly**" ".

- Before switching ON the autosampler check the correct voltage.

- Electrical Hazards. Every analytical instrument has specific hazards, so ensure to read and comply with the following precautions. They will help ensure the safe, long term use of your autosampler.

- Only use fuses of the type and current rating specified. Do not use repaired fuses and do not short-circuit the fuse holder.

- The supplied power cord must be inserted into a power outlet with a protective earth contact (ground). When using an extension cord, make sure that the cord also has an earth contact.

- Do not change the external or internal grounding connections. Tampering with or disconnecting these connections could endanger you and/or damage the autosampler.

- The autosampler is properly grounded in accordance with these regulations when shipped.

- You do not need to make any changes to the electrical connections or to the chassis of the autosampler to ensure safe operation.

- Do not turn the autosampler on if you suspect that it has incurred any kind of electrical damage. Instead disconnect the power cord and contact an HTA representative for a product evaluation. Do not attempt to use the autosampler until it has been evaluated. Electrical damage may have occurred if the autosampler shows visible signs of damage, or has been transported under severe stress.

- Damage can also result if the autosampler is stored for prolonged periods under unfavourable conditions (e.g. subjected to heat, water, etc.).

- Always disconnect the power cord before attempting any type of maintenance.

- Capacitors inside the autosampler may still be charged even if the autosampler is turned off.

- The autosampler includes a number of integrated circuits. These circuits may be damaged if exposed to excessive line voltage fluctuations and/or power surges.

- Never try to repair or replace any components of the autosampler that is not described in this manual without the assistance of an HTA representative.

- Syringe installation and removal operations are excluded from the above limitation.

1.1   Manual Structure

In order to use correctly this autosampler and to obtain the best results from it, read carefully this manual before using the Autosampler.

The manual is organised as follow:

1.2   Applicable rules

73/23/CEE	Low Voltage Rule
89/336/CEE	Electromagnetic Compatibility Rule
93/68	Rules modification 73/23 e 89/336 CEE

1.3   Symbols table

Please read carefully this table before using your autosampler. These symbols are used in this manual.

do not touch, action forbidden   warning, check the manual

High Voltage

1.4   General specifications

This is an autosampler for **gas chromatography**.

The **HT300A** autosampler is compatible with the majority of gas chromatographs. It allows sample introduction in both packed and capillary columns.

The unit can be installed on GC's with one or two injectors.
Fir Gas Chromatographs with two injectors your autosampler can be configured to inject automatically in one or the other injector or in both of them, in "*confirmation*" mode or in "*high throughput*" mode.

You can use vials of different volumes and interchangeable Trays with different capacity; trays can be fixed or rotating, positioned on both right or left hand side. A large number of different syringes from 1 to 500 microliters (75 ml for special versions).

The autosampler can work in many different modes: *wash with sample and/or with solvent*, *pumping to eliminate air bubbles*, *aspiration and injection speed controlled*, *use of Internal Standard.*

The sampler can use four different solvents located in four vials for the syringe wash. A large vial is dedicate for waste.

The autosampler can be controlled using a PC connected using the RS 232 interface, or using the control panel on the front.

The user interface is easy to use and has a step by step operation.

It's possible to store the most frequently used settings, in order to quickly and simply configure the unit.

1.5 Versions

L' HT300A is actually available in 3 versions: HT300A, HT300A/10 (Pocket), HT300A/LV.

HT300A (Standard Version)
It is the standard version for gas chromatography. In this version the autosampler has a rotating tray with 110 vials capacity.

HT300A/10 (Pocket Version)
The Pocket version is for gas chromatography. The only difference from the previous system is that this one has a fixed tray with 10 vials capacity.

HT300A/LV (Large Volume Version)
The Large Volume Version is again for GC. The difference with the standard version is that it has a 40 vial tray for large volume samples. It has a bigger syringe with volume from 0.1 ml to 10 ml and for special applications up to 75 ml.

1.6 Technical Specifications

HT300A technical specifications

Dimensions

Height	**520 mm**
Depth	**400 mm**
Width (Pocket version)	**270 mm**
Width (Standard version)	**420 mm**

WEIGHT

Pocket Version	**8 kg**
Standard Version	**9 kg**

ELECTRICAL SPECIFICATION

Voltage	**230/115 ±10% Vac**
Frequency	**50/60 Hz**
Power	**160 VA**

INTERFACE SPECIFICATION

To GC   **Cable or dedicated interface**

ENVIRON CONDITIONS

Temperature   **15°C - 35°C**

Humidity   **5% - 85%**

ANALITICAL PARAMETERS

Pre&Post Wash
Volume   **from 0 to 9.9 ml 0.1 ml stepwise**
                                                   from 10 to 500 ml 1 ml stepwise
Number of washes   **up to 15**
Wash mode   **each injection, each sample or sample group**

Wash with sample
Sample wash   **up to 15**
Bubble elimination   **up to 15 strokes**
Bubble elimination volume   **from 0 to 9.9 ml 0.1 ml stepwise**
                                                   from 10 to 500 ml 1 ml stepwise

Sampling withdrawal
Sample Volume   **from 0 to 9.9 ml 0.1 ml stepwise**
                                                   from 10 to 500 ml 1 ml stepwise

Air Volume   **from 0 to 9.9 ml 0.1 ml stepwise**
                                                   from 10 to 500 ml 1 ml stepwise
Aspirating speed   **from 1 to 100 ml/s**
Viscosity time   **from 0 to 15s**

Injection
Injection speed   **from 1 to 100 ml/s**
Waiting time before and after injection   **from 0 to 99 s**

Internal Std Techniques
Int. STD Volume   **0.1 ml stepwise**
Air gap Volume   **0.1 ml stepwise**
Mode   **one or two air gaps**

SOFTWARE (OPZIONAL)

HT-COMSOFT-A   **software to programming HT200A autosampler by PC**

Chapter 2

2. EQUIPEMENT DESCRIPTION

2.1 Parts Definition
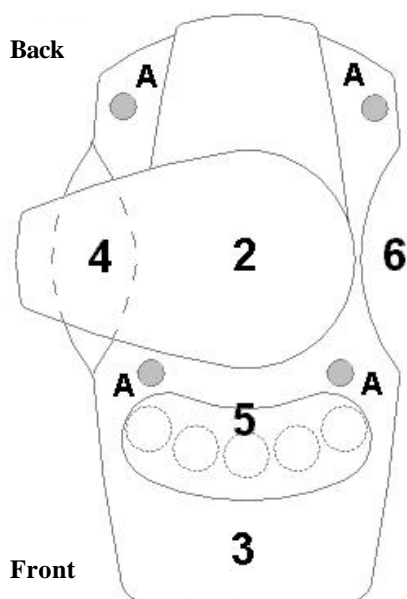
Figure 1A
AUTOSAMPLER TOP VIEW
Pocket Version
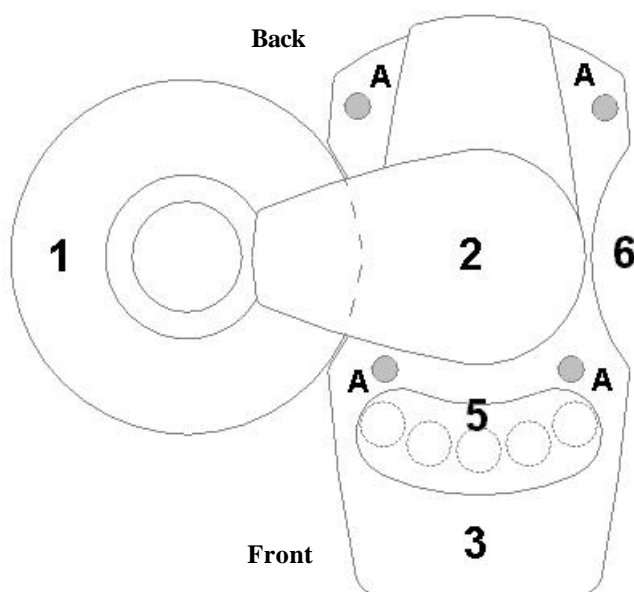
Figure 1B
AUTOSAMPLER TOP VIEW
Standard Version

1   **TRAY:** vial plate 110/40 positions

2   **TOWER:** where is located the syringe

3   **CONTROL PANEL**

4   **POCKET**

5   **WASTE VIAL**

6   **INJECTION AREA:** area where it is possible to make an injection

A   **Fixing holes** to secure the sampler to the GC (*Bracket*).).

2.1.1 Control panel

The control panel of the unit is laid out as follows.
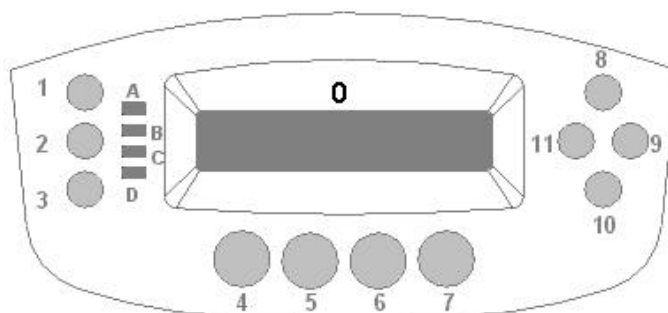
Figure 2– KEY BOARD

Display:

0	Commands are showed on an alphanumeric display VFD (*Vacuum Florescence Device*), 20 caracters/2 lines, placed in the middle.

Keys:

1	**SET:** enters the Set-up mode.
2	**MET:** enters the Method mode.
3	**SEQ:** enters the Sequence mode.
4	**STOP:** operative key
5	**START:** operative key
6	**EXIT:** operative key
7	**ENTER:** operative key
8	**⋂:** directional key (up)
9	**⮡:** directional key (right hand side)
10	**⮠:** directional key (down)
11	**⮐:** directional key (left hand side)

Led:

A	**ST-BY:** status indicator
B	**RUN:** status indicator
C	**A-INJ:** status indicator
D	**B-INJ:** status indicator
N.B.:	*For further information on the key board please refer to* ***Paragraph 2.1.2*** *"****Connection panel****".*

2.1.2 Connection panel

On the rear side of the autosampler there is the connection panel, as described in the following figure.
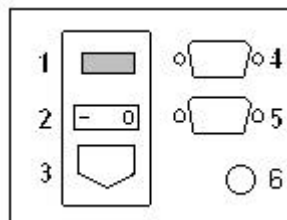
Figure   3– REAR PANEL

1   Power setting (115/230 Vac)

2   **I/O:** Power switch

Electrical Connectors:

3   Power cable plug

4   **RS232C:** serial port

5   **GC:** Other devices connection (GC, elemental analyser…)

4   Ground.

2.1.3   Solvent and waste vials

Over the Keyboard there are the solvent and waste vials.
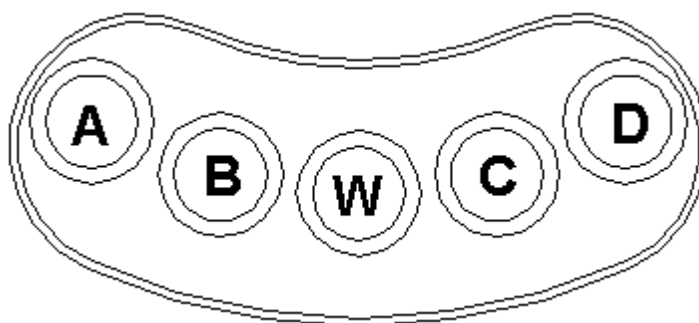
Figure   4 –SOLVENT AND WASTE VIALS

1   **A :**   solvent 'A' location.
2   **B :**   solvent 'B' location.
3   **C :**   solvent 'C' location.
4   **D :**   solvent 'D' location.
5   **W :**   waste location.

2.1.4 Autosampler base
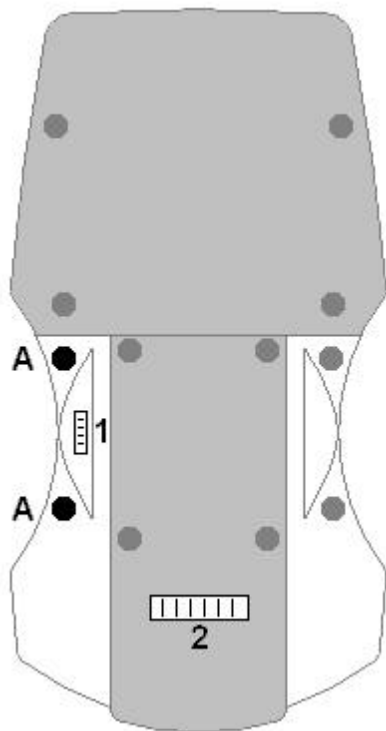
Figure 5A	Figure 5B
UNDERSIDE THE AUTOSAMPLER	UNDERSIDE THE AUTOSAMPLER
with left hand tray	with right hand tray

Screws:

A   The two screws used to fix tray bracket.

Connectors:

1   **Connector for the tray support** . (Not used in the Pocket version)

2   **Aux Connector:** to connect an integrator.

As already stated, the autosampler can be configured with the tray on the right hand side or on the left hand side. This procedure must be performed by trained personal only; users are kindly requested to check if the autosampler has the proper configuration.

To do this it is necessary to check indications contained on the Product Description supplied with the autosampler.

2.1.5   Vials location

Depending version (*see Chapter 1, par. "Versions"*), the autosampler can mount different kind of trays, fixed or rotating, with different capacities, 10, 40 or 110. The trays are always located on the side of the autosampler.

Fixed trays:

Pocket version allows the use of 10 position fixed tray.
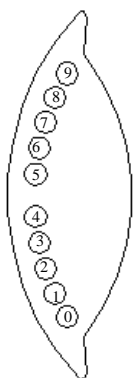
Figure 6A
Pocket installed
On the left hand side

Figure 6B
Pocket installed
On the right hand side

Each vial is identified by a number (from 0 to 9) on the pocket.

Rotating trays:
Standard version allows the use of 110 location rotating tray.
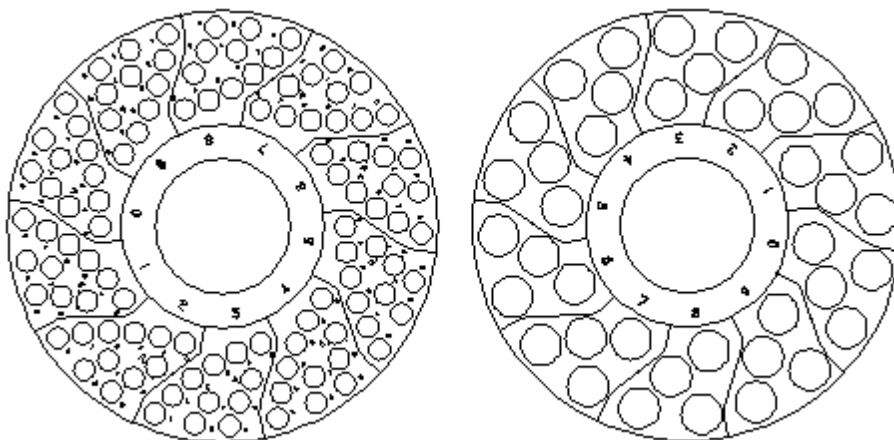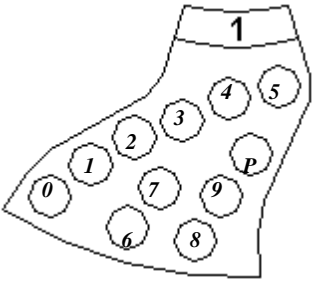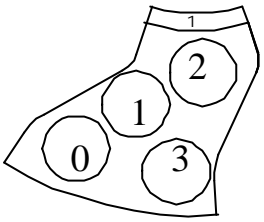
Figure 6C

Figure 6D

Vials, on the 110 locations rotating trays, are organised in 10 sectors. (*see.* Figure *6D*).

Figure 6E

Vials, on the 40 locations rotating trays, are organised in 10 sectors. (*see.* Figure *6E*).

Each vial is identified as a number of two digits.
This number is structured as follow:

The Sector number, (between 0 and 9) is written on the central part of tray. **The position number** of the vial inside a sector, is written close to vial. This number can have values 0,1,2,3,4,5,6,7,8,9 and P, for 110 vial tray, and values 0,1,2, and 3, for 40 vial tray.

2.1.6   Syringe location

The syringe location is on the tower. To access to the syringe location remove the protection screw and open the protective lid.

Figure 7A
PROTECTIVE LID DOWN
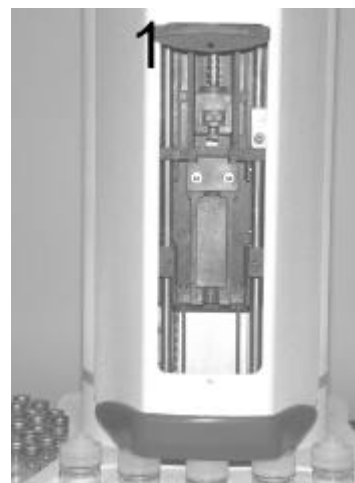
Figure 7B
PROTECTIVE LID UP

1   **Protective lid**
2   **Closing screw**

Syringe location is formed b the following parts:
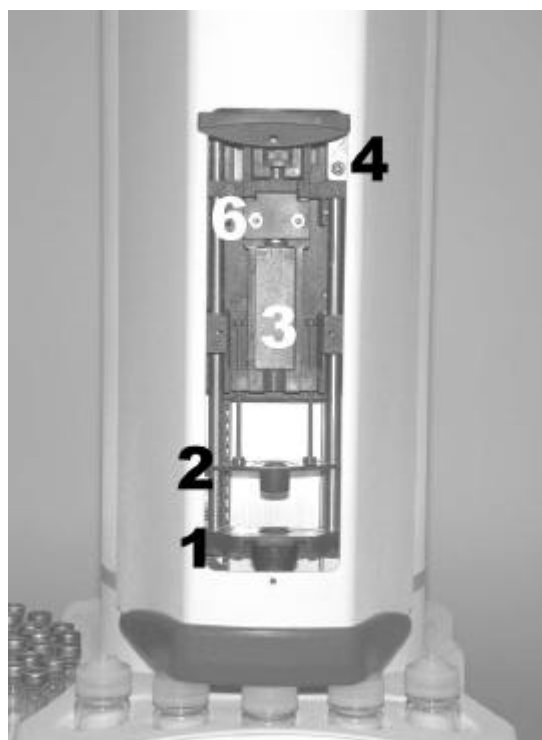
Figure 7C
SYRINGE INSTALLED
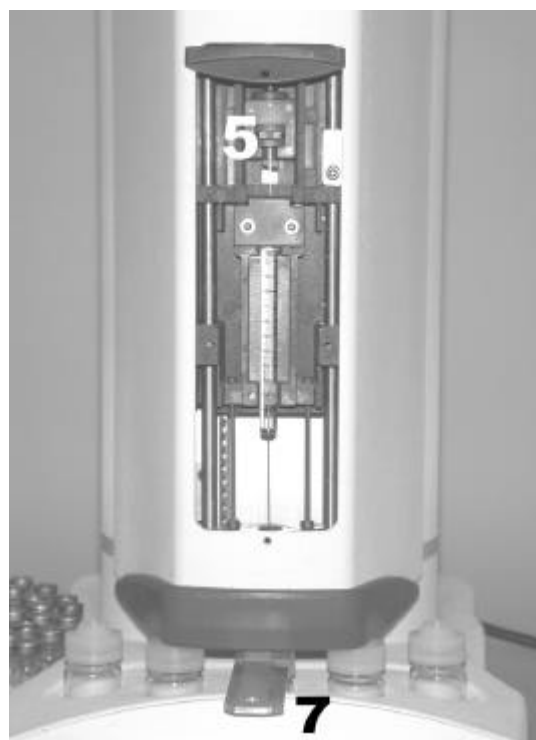
Figure 7D
SYRINGE NOT INSTALLED

1   **Needle guide**
2   **Intermediate Needle guide**
3   **Syringe location :** without syringe (7C), with syringe (7D)
4   **Needle guide regulator**
5   **Piston locker:** on (7C,7D,7E); off (7F)
6   **Syringe locker:** on (7C,7D); off (7E,7F)
7   **Syringe pointer**
8   **Piston location**
9   **Safety lock**

Figure 7E
SYRINGE LOCATION
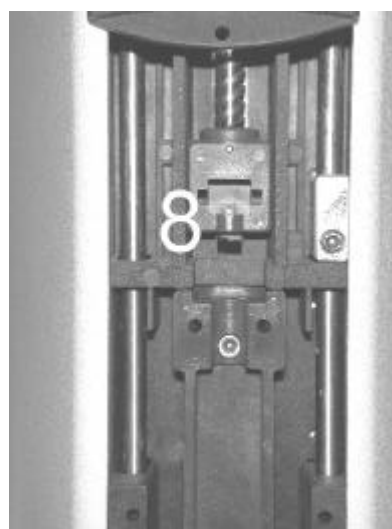
Figure 7F
SYRINGE LOCATION

The **Piston Locker** has two different faces to locate different kinds of pistons. These faces are indicated as "S side" and "B side".

Figure 7G
"S" SIDE

Figure 7H
"B" SIDE

2.2 Moving Parts

There are six moving parts:

- The rotating tray (named **TR**); can rotate about 355°.

- The tower (following identified as **Turret**, and named **TU**); can rotate ±160° respect middle position.

- The needle location (following identified as **Needle**, and named **ND**); can move vertically a maximum of 210mm

- The plunger (following identified as **Plunger**, and named **PL**); can move a maximum of 64mm inside the syringe.

Warning

If necessary, it is possible to move by hand, very carefully, each moving part but **only when the autosampler is switched off**.
Rapid movements or movements with the autosampler switched on can damage the Autosampler.

2.3 Control panel description

2.3.1 Typographic Notes

For a better understanding each screen will be schematised as follow

row 1 ①		✦
row 2 ②		✦

Screen #

Normal characters (*see.* "Line 1") identify static lines, italic characters (*see.* "*Line* 2") identify dynamic lines, that is lines that can scroll.

The symbols ①, ②, . . . indicate fields that can have different values. These can be modified when needed.

The symbols ⋂⟳⋃⟲ indicate keys 8, 9, 10, 11 that are located in the front of the autosampler (see. figure 2).

The words | SET | | MET | | SEQ | | STOP | | START | | EXIT | and | ENTER | indicate the keys that are located in the front of the autosampler and more precisely keys 1, 2, 3, 4, 5, 6 and 7 (see. figure 2).

2.3.2   Directional keys

The keys in front of the autosampler allow communication and control of the autosampler.

The autosampler display has two lines as shown in the following figure:

```
  row 1  ①          ♦
  row 2  ②          ♥
```
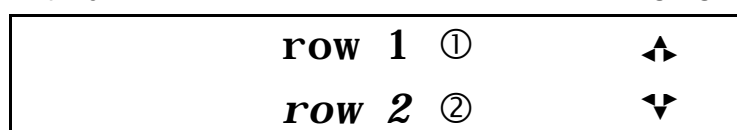
Screen #

The cursor is active in that line when it is blinking on the extreme right hand side.

To move from one line to another press ⋃ to go down, or ⋂ to go back up. These keys ⋃⋂ also move from one screen to another (from a menu to another).

Keys ⟳⟲ change the values on a specific lines. They also access secondary menus.

Directional keys (⋃⋂⟳⟲) are not active in all screens. The active keys are indicated by the icon on the extreme right hand side of the screen:

Extreme right hand side	Active	Extreme right hand side	Active
▲	⋂	►	⟳
◄	⟲	▼	⋃

The combination of more than one icon indicate that more than one directional key is active. If there is no icon then the directional keys are not active.

2.3.3   STOP, START, EXIT and ENTER keys

| EXIT | allows movement inside menus.

| EXIT | is used to go back to a previous screen from the present one. To exit from a secondary menu and go back to the main menu it is necessary to use | EXIT |.

| STOP | is used to stop the autosampler when it is moving.

When this key is used the autosampler goes from the active status (RUN) to hold (STAND BY).

START activates the autosampler.

ENTER confirms an instruction to the autosampler.

2.3.4   SET, MET and SEQ keys

SET accesses the configuration (set-up) menu of the Autosampler. MET goes to the menu that sets the injection parameters. Finally, SEQ enters the mode for defining a sequence of injections (automatic run). When the unit is in a sub menu the respective key will be lit.

To exit the menu it is necessary to press the same key that was used to access to the menu. Exit is only possible from the first screen of the menu.

2.3.5   STATUS indicators

On the command panel on the front of the autosampler, there are four lights : **ST-BY, RUN, A-INJ** and **B-INJ.**

B-INJ and **A-INJ** indicate respectively that the autosampler is in the phase before (**B**efore-**INJ**ection) or after (**A**fter-**INJ**ection) injection.

RUN indicates that the autosampler received the commands to perform one of the following actions:

- **SAMPLE WASH;**
- **SIGNLE INJECTION;**
- **AUTOMATIC RUN.**

ST-BY (**ST** and-**BY**) indicates that the autosampler has not received any commands and is ready to receive one.

During an automatic injection cycle light **ST-BY, on together with B-INJ or A-INJ,** indicate that the autosampler is waiting a confirmation to stop the procedure.

Chapter

3

3. INSTALLATION

3.1 Unpacking and preliminary operations

Take care when unpacking the unit.

Check the integrity of the box to see if it is externally damaged. If it is please inform your local dealer and keep the box as evidence.

When the autosampler has been unpacked, check the integrity of the autosampler ensure that all the accessories are provided (*compare these with the packing list enclosed*).

Ensure that everything listed in the packing list is in the box. If not, please advise your supplier

3.2 Autosampler assembly

3.2.1 Pocket version

- Place the box on a table. Open the box, then remove the upper foam packing. You will find the autosampler and every accessory provided.

- Check the product sheet to verify if the configuration is consistent with your GC, as the Tray can be installed on the right or on the left of the autosampler with reference to the front view of the autosampler (see Figure 1).

- *If the Tray is configured in the wrong way with respect to your GC specification please contact your local supplier .*

- Without extracting the autosampler from the box, but simply lifting up it you can access to the two screws that holds the Tray bracket, (*see paragraph 2.1.4 "Autosampler base": Figure 5A o 5B*).

- Remove the two screws that will fix the tray bracket. The two screws are different if the tray bracket is configured on the right or in the left side, please see the right Figure: 5A, for the right hand side, 5B, for the left hand side.
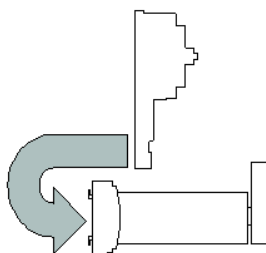
How to install the tray Bracket

- Take the tray bracket and install it on the autosampler base, then insert the two screws previously removed and screw them firmly in place.

- Extract the autosampler form the box and place it in a vertical position, with the display facing forwards.

3.2.2 Standard version

- Place the box on a table. Open the box, then remove the upper foam packing.

- Check the product sheet to verify if the configuration is consistent with your GC, this because the Tray can be installed on the right or on the left of the autosampler (see Figure 1).

- ***If the Tray is configured in the wrong way with respect to your GC specification please contact your local supplier .***

- Without extracting the autosampler from the box, but simply lifting up it you can access the two screws that hold the Tray bracket, (*see paragraph 2.1.4* "Autosampler base"*: Figure 5A o 5B*).

- Remove the two screws that will fix the tray bracket. The two screws are different if the tray bracket is configured on the right or in the left side, please see Figure: 5A, for the right hand side, 5B, for the left hand side.
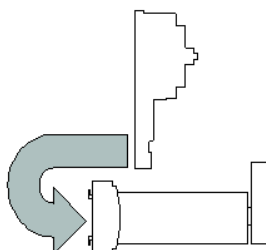
How to install the tray Bracket

- Take the tray bracket and install it on the autosampler base, then insert the two screws previously removed and screw them firmly in place.

- Connect the flat cable from the bracket to the autosampler socket, (*see Figure 5A o 5B*).

- Extract the autosampler from the box and place in a vertical position, with the display facing forwards.

Now the autosampler is ready to be installed on the GC. Take out the autosampler and its accessories from the box.

3.3   Installation

Before using the autosampler please read carefully the contents of this chapter:

1. **Ensure the correct voltage is selected (see paragraph** Errore. L'origine riferimento non è stata trovata. **"**Errore. L'origine riferimento non è stata trovata.**").**

2. **Install the autosampler on the bracket (see paragraph 3.3.2 "Installation on the bracket").**

3. **Connect cables (see paragraph 3.3.3 "**Electrical Connections**").**

4. **Install the Tray with the autosampler switched off (see paragraph** 3.3.4 **"**Tray installation with the autosampler switched OFF**".**

5. **Switch on the autosampler (see paragraph 3.3.5 "**Start Up**").**

6. **Place waste and solvent bottles (see paragraph 6.4 "**Installation and removal of solvent and waste bottles**")**

7. **Place one sample vial in position 01. (See paragraph 2.1.5 "**Vials location**")**

8. **Set correct parameters for "Vial Size" and "Vial Depth" in the menu "**Vial/Syringe Set **" (see paragraph 4.6).**

9. **Install syringe (see paragraph 4.7.1 "** First installation**").**

10. **Align the autosampler on the GC Injector(s)   (see procedure paragraph(s) 4.5.1 "**Alignment for a single injector**" ,4.5.2 "**Alignment for two injector**s".**

11. **Conclude the installation switching off the autosampler (see paragraph 3.4) or leave the set-up mode (see paragraph 4.2).**

3.3.1 Voltage modification

Ensure that autosampler is not connected to the main power.

On the back of the autosampler there is the connection panel, as reported on Figure 3. The voltage is written in white on a red background on the top left hand side.

Autosampler is normally set on 230V. It is easily possible to change it to work with either 115V or 230V .

To change voltage proceed as follow:
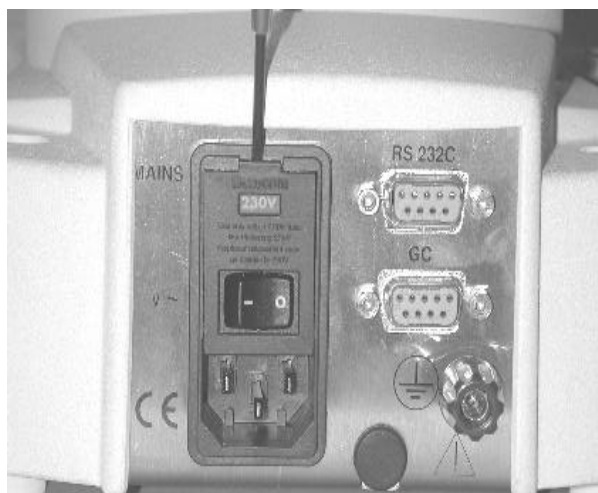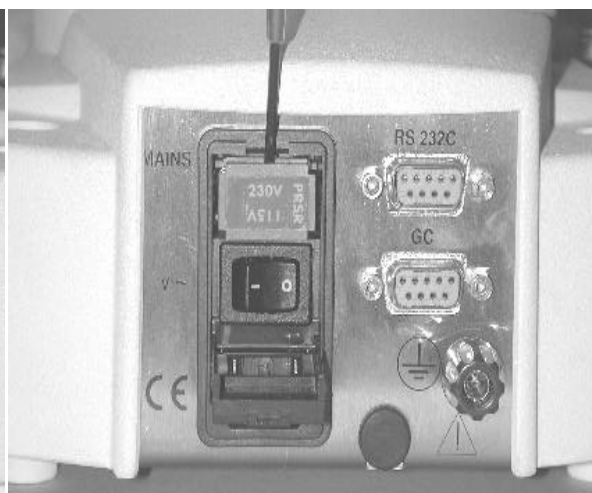
Figure 8A   Figure 8B

1.   Open fuse compartment with a screwdriver, as shown in figure 8A.

2.   With the same screwdriver, extract the fuse compartment as shown in figure 8B.

3.   Replaces the two fuses with others with the right amperage see table below.

Power voltage	Kind (EN 60127)
115v	0,8A T
230v	0,5A T

Table 1

4.   Insert the fuse compartment with the correct voltage at the top.

5.   Close the compartment by pressing gently.

6.   If the fuse compartment is correctly inserted the selected voltage can be read.

3.3.2 Installation on the bracket

Warning

Follow the instructions **with the autosampler switched off.** Moving the unit with the autosampler switched ON can cause serious damage to the autosampler

Please follow these instructions in the following order:

1. Place the auto sampler on the bracket; paying attention that the four holes identified as "A" in the figure 1A or 1B fit the bracket holes.

2. Fix the auto sampler on the bracket using the four screws and the washers supplied with the mounting kit. The two taller screws have to be fixed on the front side.

3. Screws the autosampler on the bracket leaving the 4 screws loose so the position of the autosampler can be adjusted.

4. Open the Syringe location, removing the safety screw with the supplied Allen key and open the protective lid (see figure 7A e 7B).

5. Adjust the safety lock

Warning

If you don't adjust the safety lock, the autosampler after the start up displays an error and stops (see paragraph 9 "Troubleshooting"). For an accurate "first installation" don't release the needle guide regulator (see paragraph 4.7.1 "First installation").

When shipped the autosampler has the safety lock as shown in Figure 8C.

Figure 8C
SHIPPING POSITION

Figure 8D
OPERATING POSITION

1 **Needle Guide regulator**
2 **Safety lock**
3 **Needle Guide**

6. With the Allen key supplied with the autosampler release the LEFT block (labelled 2 in Figure 8C) . The RIGHT block (needle guide regulator) is about 50mm above the left one when the unit is shipped (see Figure 8D–1). Let the syringe mechanism down so that it rests on the right block and tighten the left block (when done the left block should be slightly above the right one)

7. Setting it correctly allows the needle guide to be lifted by hand (see Figure 8C-3) to the position shown in Figure 8C

7. Gently rotate the tower manually moving it over the injector.

8. Move down the **Needle Guide** (see. figure 7C) over the injector, pressing down the **Syringe location** (see. figure 7C).

9. Adjust the sampler position. The needle must be centred on to the injector.

10. Firmly fix the autosampler by tightening the four screws.

11. Move the **Needle Guide back up** to the home position.

12. Rotate the tower back to the original position.

13. Close the protection lid.

3.3.3   Electrical Connections

Follow these instructions performing every connection:

Warning
Check that the autosampler is switched OFF

1. Connect the analyser with the 9 pin port of the autosampler using one of the cables provided with the autosampler (*see. figure 3*).

2. Plug the power cable in the autosampler and then insert it in the mains power.

3. If it is necessary to work in remote mode, plug the second cable provided with the autosampler in the port identified as RS232C (*see figure 3*) to the serial port of the PC .

4. If it's needed to use an integrator or it's necessary to use autosamplers in twin mode, refer to the **Aux connector** under the autosampler base (see paragraph 2.1.4 "Autosampler base").

3.3.4   Tray installation with the autosampler switched OFF

1. Hold firmly, with one hand, the central part of the tray.

2. Place the tray on its bracket as shown in the following figure:
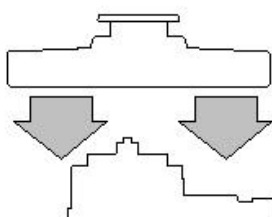
Figure 9A	Figure 9B
BEFORE INSTALLATION	AFTER INSTALLATION
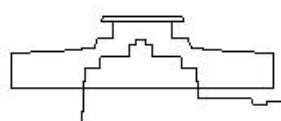
3. Gently rotate the tray clockwise until it reaches the home position. If this operation was done correctly there will be no error messages switching on the autosampler.

3.3.5 Start Up

The main switch of the autosampler is on the back of the autosampler (*see figure 3, switch 2*), switch it on ("I" position).

As soon as the autosampler is switched on the following screen will appear where ① is the software version

```
HT300A Series
Software rel.  ①
```
Screen 01

After 5 seconds, the autosampler will move the tower into the stand-by position and proceed to recognise the type of vial tray. The unit will display:

```
TRAY Identifying
PLEASE WAIT
```
Screen 02

This operation may take a few minutes.
Press EXIT to stop the tray identification procedure and confirm the tray type has not changed from the tray typed previously used (do not do this on the first run).

When the tray has been identified it will show the main menu (see paragraph 6.1).
For any problems related to tray installation or removal, refer to paragraphs 6.2 and 6.3.

3.4 Switch off

Before switching off the autosampler ensure that:

- **The unit is in the main menu (Run Time Menu)**

- **The autosampler is on stand-by status (STAND-BY)**

If the autosampler is working stop it before switching off. If it is in a menu different from the Run Time Menu, press EXIT and the relevant menu key to return to it before switching off the autosampler.

In an emergency the sampler can be switched off in any position (working status / hold) and from any position (main menu / secondary menu).

4. SET-UP

4.1 Introduction

To align the autosampler on the GC and to set the different kind of accessories (vial and syringes) it is necessary to operate in the **SET-UP Mode.**

⚠️

Warning

Set-up must be completed carefully by trained personnel to prevent damage to the syringe or to the autosampler.

If some values in the fields are incomplete or incorrect the SET led will remain light even after you exit from the Set-up menu.

4.2 Set-up Mode

The Set-up menu it is only available from the screen 01. From 03, it is possible to go back by pressing the EXIT key.

From screen 01, press the SET key to enter the set-up mode; the SET key will light and the following screen will appear:

```
  Manual  Operations     ►
  Actual  Parameters      ↓
   Injection  Setup       ↕
 Vial/Syringe  Setup      ►
```
Screen 50

Note.: rows 3 and 4 can be displayed only after pressing the ↻ key.

Screen 50 represents the main menu of the Set-up mode. The ↻↺ keys can be used to place the cursor on one of the four lines corresponding to the options

---

("Manual Operation", "Actual Parameters", "Injection Setup", "Vial/Syringe Setup"). These submenus are accessed using the ⮑ key.

"**Manual Operations**", allows manual movement of the autosampler motors (*see "Manual Operation"*).

Selecting "**Actual Parameters**", displays the parameters currently stored for injectors, vials and syringe (*see "Actual Parameters"*).

Selecting "**Injection Setup**", allows the needle speed into the injector/s to be set, and the alignment on injector/s (*see. "Injection Setup"*).

Choosing "**Vial/Syringe Setup**", sets the parameters of vials and of syringe (*see. "Vial/Syringe Setup"*).

To exit from Set-up menu, it is necessary:

- To be in the screen number 50.
- From this position press SET .

4.3   Manual Operations

The "**Manual Operation**" function is used to manually move the syringe piston, the syringe, the tower and the tray. Such operations are not used for the normal use of the autosampler but for checking the movement of the respective parts.

This menu will be automatically entered when:

- You want to install, substitute or remove the syringe.

- The autosampler detects an error in its movements. In this case after an error message has been displayed, this screen will appear automatically.

It will show a screen similar the following:

PLG	NDL	TUR	TRY	TCH
▲▼	▲▼	▲▼	▲▼	①

Screen 00

Use the ⮑ and ⮐ keys to select one of the four words "**PLG**", "**NDL**", "**TUR**" and "**TRY**". Each word correspond to one particular autosampler part:

- "**PLG**": is the syringe piston;
- "**NDL**": is the syringe holder;
- "**TUR**": is the tower;

- "**TRY**": is the tray.

The selected part will flash. The **Ʊ** and **Ω** keys move the specific part of the autosampler, specifically

- lift (**Ω**) or lower (**Ʊ**) the syringe piston;
- lift (**Ω**) or lower (**Ʊ**) the syringe holder;
- rotate tower to the right hand side (**Ω**) or to the left hand side (**Ʊ**);
- rotate tray to the right hand side (**Ω**)or to the left hand side (**Ʊ**).

If "**bsy**" appears under the moving part it indicates that an error occurred (if it disappears after the movement has stopped it is not a fault). The Error is generated if the autosampler was not able to follow the software instructions or to complete or make in the proper way a specific movement.
Finally, the symbol under the word "**TCH**" indicates the touch sensor status, this is a warning to the operator that the needle guide is touching a surface/plane.

‡	The needle guide reached the plane
=	The needle guide is not touching the plane.

Pressing the EXIT key will return to screen 50.

4.4   Actual Parameters

In this mode is possible to control set-up parameters as they were previously loaded by the operator.
The following screen will be shown:

```
Actual  Parameters
Syringe Size ① ▬L   ▼
```
<center>Screen 52</center>

Field ① displays the current value in memory of the syringe size.

Pressing **Ʊ** enters the following screen.

```
Vial  Size  ① ml     ▲
Vial  Depth ② mm     ▼
```
<center>Screen 53</center>

Field ① displays the set dimension of sample vials in ml. Field ② displays the needle draught depth inside the sample vial.
Pressing **Ʊ**:

➔ **If the autosampler is set to work with a single injector, it will display screen 54:** please consult the sub-paragraph "Visualisation of parameters for a single injector ";

➔ **If the autosampler is set to work with two injectors, it will display screen 55:** please consult the sub-paragraph "Visualisation of parameters for two injectors ".

4.4.1 Visualisation of parameters for a single injector

From screen 53 it goes to screen 54.

```
Needle in Speed ①    ▲
Injector Depth ② ㎜
```

Screen 54

Field ① will shows the injection speed into the injector. This speed is indicated with a value between 0 and 8.

Set Value	Corresponding Speed	Set Value	Corresponding Speed
0	2 mm/s	5	64 mm/s
1	4 mm/s	6	128 mm/s
2	8 mm/s	7	256 mm/s
3	16 mm/s	8	512 mm/s
4	32 mm/s		

Table 2

Field ② displays the needle's descent depth into the injector in millimetres.
Pressing EXIT at any moment it will revert to screen 50.

4.4.2 Visualisation of parameters for two injectors

From screen 53 it goes to screen 55.

```
Needle in Speed ①      ▲
Front Inj. Depth ② ㎜  ▼
```

Screen 55

Field ① displays the injection speed into the first injector. This speed is indicated by a value between 0 and 8.

Set Value	Corresponding Speed	Set Value	Corresponding Speed
0	2 mm/s	5	64 mm/s

1	4 mm/s	6	128 mm/s
2	8 mm/s	7	256 mm/s
3	16 mm/s	8	512 mm/s
4	32 mm/s		

Table 2A

Field ② displays the needle's descent depth into the first injector, indicated in millimetres.

Pressing ↻ enters the following screen.

```
   Needle in Speed ①    ▲
   Rear Inj. Depth ② mm ▼
```

Screen 56

In this screen there is information about the second injector: all notes given for the preceding screen are valid also for this one.

Pressing the ⌗EXIT⌗ in any moment, it will come back to screen 50.

4.5   Injection Set-up

Warning

It is necessary to install the syringe **before** proceeding with the operations described in this paragraph.

The following screen appears:

```
        Injection Setup
     Injectors Numbers ①  ⤩
```

Screen 57

Pressing ⤴ and ⤵ to change the number of the injectors. So field ① will have the value 1 or 2. This value will be saved at the moment of the modification.
Pressing ↻ enters the following screen.

➜   **If the autosampler is set to work with a single injector, it will show screen 58,** please consult the sub-paragraph 4.5.1 "Alignment for a single injector ".

➔ **If the autosampler is set to work with two injectors, it will show screen 61,** please consult the sub-paragraph 4.5.2 *"Alignment for two injectors"*.

4.5.1   Alignment for a single injector

From screen 57 press down to screen 58.

```
┌─────────────────────────────────┐
│   Needle in SPEED  ①   ✦         │
│   Injector Align         ▸       │
└─────────────────────────────────┘
```

Screen 58

Field ① is the descent speed of the needle into the injector. This speed is indicated by a value between 0 and 8 (*see table 2, paragraph 4.4.1 of this chapter*).

The second line of the screen (accessed by ↻, then ⊃) is the alignment mode of the autosampler on the injector. In this case, it will display screen 59;

```
┌─────────────────────────────────┐
│   Injectors Alignment            │
│  TURRET  ◂▸      ↕   NEEDLE       │
└─────────────────────────────────┘
```

Screen 59

The tower will turn, reaching the position previously stored in memory. Use ⊃ and ⊂ to turn the tower and align it on to the injector. When the tower is in the correct position, use ↻↺ to move the syringe down onto the injector. This point is defined as "touch point".

As soon as the needle touches the injector, the following screen will appear

```
┌─────────────────────────────────┐
│   Injectors Alignment            │
│  TURRET STO=✍       NEEDLE       │
└─────────────────────────────────┘
```

Screen 59A

Press ENTER to confirm (or EXIT to exit from alignment mode without saving)

The following screen will appear.

```
┌─────────────────────────────────┐
│   Injectors Alignment            │
│  STO=✍ mm DEPTH:  -  ①  ↕        │
└─────────────────────────────────┘
```

Screen 60

Move the syringe holder using ↻ and ↺ in order to insert the needle into the injector at the desired depth. Field ① displays the depth reached by the needle. This value,

---

which is variable from 0 to 99 max (according to dimensional limits) is negative, as it is calculated with respect to the touch point.

Press ENTER to confirm (or press EXIT to exit from alignment mode without saving).

The unit will revert to screen 50.

 Warning

Take care to ensure the following procedures are met. In particular, ensure that:

- The needle is aligned over the centre of the needle guide on the injector;
- The needle guide fits properly together the injector;
- The needle has to enters the injector without trouble and penetrates the diaphragm without an excessive bending: If it does not, check the injector septum, type of syringe used and needle tip type;
- when the needle is in the port ensure that it has a little further room to go down (about 1-2 millimetres). In this position, wait for about 20 seconds before pressing ENTER to memorise the position. The operation is correct if within this period of time screen 00 doesn't appear. If screen 00 is displayed the system has found anomalies. (To use *00, please go to paragraph 4.3 "*Manual Operations*")

4.5.2 Alignment for two injectors

From screen 57 it goes to screen 61.

```
Needle in SPEED ①  ✦
Front Inj. Align.   ↳
```

Screen 61

Field ① sets-up the descent speed of the needle into the first injector. The speed is indicated with a value between 0 and 8. (*see table 2A, paragraph 4.4.2 of this chapter*).

Press ↻, then ⟳ to enter the alignment mode on to the front injection port. Screen 63 will be displayed; Pressing EXIT will revert to the preceding screen (screen 61) saving the modification made.

```
Front Inj. Alignment
```

```
┌──────────────────────────────────────────┐
│   TURRET  ◄►        ↕      NEEDLE         │
└──────────────────────────────────────────┘
```

Screen 63

The tower will turn, reaching the position previously stored in memory. Using the ➲ and ➫ keys to align it on the injector. When the tower is in the correct position use the ↻↺ keys to lower the syringe onto the injector. This point is defined as "touch point".
As soon as the needle touches the injector screen 63A appears.

```
┌──────────────────────────────────────────┐
│        Front Inj. Alignment              │
│        TURRET STO=⏎     NEEDLE           │
└──────────────────────────────────────────┘
```

Screen 63A

Press ⌈EXIT⌉ to exit alignment mode without saving. Press ⌈ENTER⌉ to confirm.
In this case, screen 64 will be displayed.

```
┌──────────────────────────────────────────┐
│        Front Inj. Alignment              │
│        STO=⏎ mm DEPTH:  - ①  ↕          │
└──────────────────────────────────────────┘
```

Screen 64

Move the syringe holder using the keys ↻ and ↺ in order to insert the needle into the injector at the desired depth. Field ① displays the depth reached by the needle. This value is variable from 0 to 99 max (according to dimensional limits) and is negative, as it is calculated with respect to the touch point.

Press ⌈EXIT⌉ to exit alignment mode without saving. Press ⌈ENTER⌉ to confirm.

⚠️ **Warning**

Take care to ensure the following procedures are met. In particular, ensure that:

- The needle is aligned over the centre of the needle guide on the injector;
- The needle guide fits properly together the injector;
- The needle has to enters the injector without trouble and penetrates the diaphragm without an excessive bending: If it does not, check the injector septum, type of syringe used and needle tip type;
- when the needle is in the port ensure that it has a little further room to go down (about 1-2 millimetres). In this position, wait for about 20 seconds before pressing ⌈ENTER⌉ to memorise the position. The operation is correct if within this period of time screen 00 doesn't appear. If screen 00 is displayed the system has found anomalies. (To use *00, please go to paragraph 4.3 "Manual Operations"*)

The operator will be brought back to screen 61. From screen 61.

Pressing ↻ enters the following screen.

```
Needle in SPEED ①  ↴
Rear Inj. Align.      ▸
```

Screen 62

The screen 62 is similar to screen 61. The only difference is that this is for the second (rear) injector. The instructions for screen 61 should be followed.
Pressing ↻ enters the following screen.

```
Rear Inj. Alignment
TURRET ◂▸      ↕   NEEDLE
```

Screen 65

```
Rear Inj. Alignment
TURRET STO=↵      NEEDLE
```

Screen 65A

```
Rear Inj. Alignment
STO=↵  ①  DEPTH:  ②
```

Screen 66

For the description of the screens 65, 65A and 66 please refer to screens 63, 63A and 64 respectively; please note that the screens 65, 65A and 66 define the set-up of the second injector.
From screen 61, press ⌐EXIT⌐ to revert to screen 50.

⚠ **Warning**

Take care to ensure the following procedures are met. In particular, ensure that:
- The needle is aligned over the centre of the needle guide on the injector;
- The needle guide fits properly together the injector;
- The needle has to enters the injector without trouble and penetrates the diaphragm without an excessive bending: If it does not, check the injector septum, type of syringe used and needle tip type;
- when the needle is in the port ensure that it has a little further room to go down (about 1-2 millimetres). In this position, wait for about 20 seconds

---

before pressing ENTER to memorise the position. The operation is correct if within this period of time screen 00 doesn't appear. If screen 00 is displayed the system has found anomalies. (To use *00, please go to paragraph 4.3* "Manual Operations")

4.6 Vial/Syringe Set-up

The following screen will be displayed:

```
Vial Size  ml  ①    ◄►
Vial Depth mm  ②    ◄▾
```

Screen 67

Field ① displays the capacity of the installed vial, indicated in millilitres. This can be modified using ➲ or ➾ and can be set to 2, 2.5 or 10 (last value can only be selected if there is a 40-position tray installed).

Field ②, displays the depth the needle penetrates into the sample vial to remove the sample. This field may have values between 0mm and a value relating to the dimensions of the vial installed (see below). Press ➲ and ➾ to increase (➲) or to decrease (➾) this value in steps of 1 mm.

Vial Size	Max Vial Depth
2 ml	30 mm
2,5 ml	39 mm
10 ml	42 mm

Table 3

Press the EXIT key, to go back to Screen 50 saving changes.
Pressing ↻ enters the following screen.

```
Syringe Size ①  ▂L  ◄▸
Syringe Install       ►
```

Screen 68

Field ① displays the syringe nominal value indicated in microliters. Press ➲ and ➾ to change this value – it can be 10, 25, 50, 100, 250 or 500.

Press ↻ twice to enter the following screen.

```
Syringe Install       ◄▸
Touch&Plunger Zero    ►
```

Screen 69

Press ↻ and ➲ to start the syringe installation mode (see paragraph 4.7 " Syringe Installation") and to set:

- The **ZERO POINT** for syringe plunger.
- The **TOUCH POINT** over the waste bottle.
- The **TOUCH POINT** over the vial 1 of the tray.

The following screen will appear.

```
ZERO  PLUNGER

WAIT  RUNNING
```

Screen 70

The plunger reaches the "calibration position", then displays the following screen.

```
AUTOMATIC=START
MANUAL= ⬍    STO=↵
```

Screen 71

Press the START key to start the automatic procedures (these do not require any user intervention).

```
ZERO  PLUNGER

WAIT  RUNNING
```

Screen 72

The units then sets the plunger ZERO point....

```
WASTE  TOUCH

WAIT  RUNNING
```

Screen 73

and the **TOUCH POINT** on the waste bottle...

```
VIAL  1  TOUCH

WAIT  RUNNING
```

Screen 74

And finally the **TOUCH POINT** on vial 1 of the rotating tray.

At the end of this procedure the unit lifts the plunger (**PLG**) to the nominal syringe volume.

Check that the bottom of the plunger is level with the top of the syringe scale. If it is not ensure the syringe volume set in memory matches the syringe used. If the error persists please contact your local supplier.

At the end of the procedure the autosampler will go automatically back to screen 50.

To manually set the <u>TOUCH POINT for the plunger</u>, press ⋒ and ⋓ keys to move the plunger toward the "**ZERO PLUNGER**" position. When it has reached the position, wait at least 20 seconds, then press the ENTER key.

If the "ZERO PLUNGER" position set-up is defined correctly, screen 73 will be shown, if not an acoustic signal will be emitted and screen 71 remains displayed.

From screen 73 the manual and automatic procedures are the same.

Note : If the autosampler doesn't locate the waste vial or the vial in tray position 1 it will generate an error message.

4.7   Syringe Installation

In order to avoid damaging the syringe, the autosampler and/or to the user when **installing, removing or replacing** the syringe, it is necessary to follow with care the following operations;

4.7.1   First installation

1. Be sure that the autosampler is in standby status.
2. Open the syringe location by removing the safety screw and lifting up the protective lid.
3. Enter Set-up mode (*refer to chapter 4*); select the row "*Vial/Syringe Setup*" (see paragraph 4.6 "Vial/Syringe Set").
4. If needed change the "*Syringe Size*" and "*Vial Depth*" depending on the syringe about to be install (see paragraph 4.6).
5. Use ⋓ and ⮌ to enter the syringe installation mode.
6. Screen 00 (please refer to paragraph 4.3) should be displayed.
7. Move plunger by using the command **PLG** to its lowest position.
8. Lower the **Syringe location** (**NDL**) about 50 mm from its highest point.
9. Loosen the **Needle guide regulator** block, allowing it to slide freely.

10. Remove the **syringe locker** by using the screwdriver provided (see figure 7C e 7D).

11. Remove the **piston locker** pulling it out by hand or with tweezers.

12. Lift the **Syringe location** close to its highest point.

13. Check the **Syringe location** matches the syringe (see appendix B).

> Ensure the correct Syringe location is installed for that type of syringe (see. Appendix B). The autosampler has two different syringe holders that are suitable for various syringe types as described in appendix B. Check that the appropriate syringe holder is installed before mounting. If the syringe holder is wrong it will be impossible to insert the syringe or it will not sit properly in the unit. To change the syringe holder refer to paragraph 4.7.4.

14. Take the **Syringe pointer** supplied with the autosampler. This tool has to be installed by leaning it on the waste bottle, so that it fits with the waste. In this way, the Syringe positioning sensor will be interposed between the waste and the needle guide (see. Figure 7D)

15. Insert the needle into the **intermediate needle guide** and then into the **needle guide**; insert the syringe body into the holder and lastly position the plunger into its lodging.

16. Replace the **Syringe locker** tightening the two screws carefully.

17. Lower the syringe lodging (**NDL**) until it touches **Syringe pointer**. As soon as it happens, the needle starts to bend slightly

18. Shut the **Needle guide regulator** block previously loosened. **This operation assures that the needle point remains perfectly aligned with the needle guide and that the needle doesn't protrude out of needle guide. This is necessary to prevent damage to the needle.**

19. Tighten the **Safety lock.** For correct use this has to be lifted up about 10 mm higher than the needle guide regulator, in order to work as a safety stopper.

20. Check, moving by hand, that the **Needle guide** slides freely in the position described in Figure 8C.

21. Raise the plunger (**PLG**) and insert the **Piston locker** ensuring that the appropriate face is used for the syringe type (if in doubt see Appendix B).

22. Raise the syringe lodging (**NDL**) to the top.

23. Remove the **Syringe pointer**.

24. Check that syringe needle is correctly aligned, as per the following illustration.

NO   SI'   NO
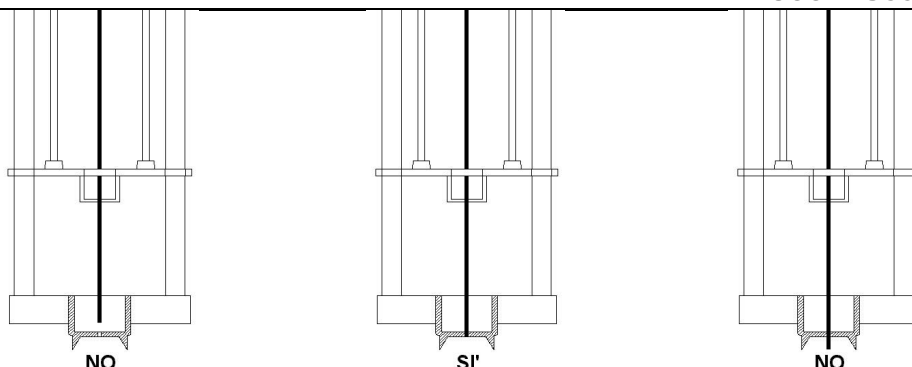
25.   Press EXIT to exit from 00. The unit will display screen 69.

26. Run the "Vial /Syringe Setup" procedure (see paragraph "*Touch&Plunger Zero*" see paragraph 4.6).

27. Close the **Syringe location** pulling down the lid and tightening the screw (see Figure 7A and 7B).

28. Perform the "Injection Setup" routine *(see paragraph 4.5).*

29. When this procedure has been completed to exit from Set-up mode, (screen 50) press the SET key.

4.7.2   Removal

1.   Check that autosampler is in standby status.

2.   Ensure the tower in the stand-by position (see screen 03, paragraph 6.1).

3.   Open the Syringe Compartment, removing the safety screw with the Allen key supplied. Open the protective lid (see figure 7A and 7B).

4.   Enter the SET-UP Mode *(refer to chapter* 4 paragraph 4.6)*;* and select "*Vial/Syringe Setup*".

5.   Use ↻ and ↺ to enter the syringe installation mode. Screen 00 will now appear (see paragraph 4.3 for instructions).

6.   Lower the plunger (**PLG**) to the lowest possible position.

7.   Lower about 50 mm of the **Syringe location** (**NDL**), from its highest position.

8.   Loosen the **safety lock** block, allowing it to slide freely.

9.   Remove the **Piston locker** pulling with 2 fingers.

10.   Remove the **syringe locker** using the Allen key supplied.

11.   Return the **Syringe location** (**NDL**) to its highest position.

12.   Extract the syringe with care.

4.7.3   Replacement

If the syringe to be installed is identical to the one that has just been removed, go to point 14.

If the syringe to be installed is different from the one that has just been removed follow the instructions as if it was the first syringe installation (see paragraph 4.7.1, from point 13).

13. Locate the Syringe pointer supplied with the autosampler.
14. Install the pointer by resting it on the waste bottle, so that it fits the waste cap. In this way the Syringe positioning sensor will be between the waste bottle and the needle guide (see figure 7D).
15. Insert the new syringe.
16. Insert the needle into the **intermediate needle guide** and then into the **needle guide**; insert the syringe body into the holder, finally place the plunger into its lodging.
17. Replace the **Syringe locker** tightening the two screws carefully.

18. Insert the **piston locker** ensure it is lodged the correct way with respect to the syringe type (refer to Appendix B).

19. Check that the installation is correct by ensuring that the needle guide moves freely. To do this, lower the lodging (**NDL**) slowly and carefully until 2-3 cm of the needle protrudes into the waste vial. The needle should not bend. If the needle guide doesn't move correctly and the needle bends then repeat the installation procedure, (paragraph 4.7.1.)
20. Press EXIT to exit screen 00. The will go to screen 69.
21. Select "Vial/Syringe Set " then "*Touch&Plunger Zero*".
22. Run "Injection Setup" *(see paragraph 4.5).*
23. Complete the procedure and exit from Set-up mode. From screen 50 press SET .
24. Close the **Syringe Lodging**, lowering the lid and locking with the protective screw using the key supplied (see figures 7A and 7B).

4.7.4   Replacement of the syringe lodging

To replace the syringe lodging:
- **The syringe lodging has to be empty;**
- **Remove syringe block;**
- **Remove the piston block.**

1. Using the screwdriver supplied with the autosampler, unscrew the central positioning screw of the syringe lodging.
2. Remove the syringe lodging.
3. Insert the new syringe lodging, checking that the intermediate needle guide is in the correct position and is inside its guide.
4. Shut the central position screw of the syringe lodging.

5.   **PROGRAMING**

5.1   **Method Mode**

To enter the method mode press the ☐MET☐ key on the front left side of the unit. This mode displays, creates or modifies a method.

Each **method** is a **list of parameters** that define each **analytical parameter** involved in the injection. The autosampler can store up to 10 methods: each method has a number between 0 and 9.

Methods can be stored by editing a generic configuration, which are different from the one used during the normal run, (*for instance, with a different syringe volume*). However, if the method is not compatible with the configuration stored (such as trying to inject a volume larger than the stated syringe size), the system will give an error. To proceed, it will be necessary to change the installed configuration (*e.g. : to replace the syringe with another one with a greater volume)*, or to change the method itself.

5.2   **Creating a method**

Press the ☐ MET ☐ key to enter the method mode: The ☐ MET ☐ key will light, and the unit will display the following screen:

```
┌─────────────────────────────────┐
│  Method Number  ①      ✦         │
│  Internal Std ②        ✦         │
└─────────────────────────────────┘
```

Screen 20

The field ① identifies the method number and can be changed using ➲ and ➳. It must have a value between 0 and 9. Changing this field recalls the set-up information previously stored in memory for this position.

The second line (to get it press ↻) authorises the use of an Internal Standard (use ➲ and ➳ to set between Yes/No). This can have the following values:

YES	Internal Standard Techniques are authorised.
NO	Internal Standard Techniques are not authorised.

Press ↻ enters the following screen.

```
Pre Wash #  ①      ⬌
Volume ▬ℓ  ②      ⬍
```

Screen 21

Field ① selects the number of prewashes. This number can be changed and may have a value between 0 and 15. Press ➲ and ➲ to increase (➲) or to decrease (➲) this value in steps of 1 unit.

Press ↻ to select the second line to set-up the quantity (volume) of solvent to use for each pre-washing operation. Field ② **may** have a value between 0 μl and 500 μl. Press ➲ and ➲ to increase (➲) or to decrease (➲) this value in steps of 0.1 μl (or in steps of 1μl for values higher than 10μl).

NOTE. If the set number of pre-washes is 0, it will not be possible to change field ②; so it will have the default value "---".

Pressing ↻ enters the following screen.

```
Post Wash #  ①      ⬌
Volume ▬ℓ  ②      ⬍
```

Screen 22

This screen is similar to screen 21 and refers to the number of post-washes and the volume of solvent to use for each post-washing operation. Screen 21 instructions are valid also for screen 22.
Press ↻ to set the Pre and Post-Washing modes.

```
Pre Wash Mode  ①      ⬌
Post Wash Mode  ②      ⬍
```

Screen 23

Field ①, can be changed using the keys ➲ and ➲, may have the following values:

Injec	Pre-washing is made for each new injection.
Sample	Pre-washing is made for each new vial. *Pre-washing operation is not made during the repetitions of the same vial.*
Step	Pre-washing is made for each new step of the sequence.

Field ②, can be changed using the keys ➲ and ➾, may have the same values of field ① shown above:

If the set number of post-washes is 0, it will not be possible to change the pre-washing mode. Field ① will have the default value "------".

Press ↻ to set the quantity of sample and air to aspire:

```
┌─────────────────────────────────────┐
│   Sample Vol ▄ ①        ✦           │
│   Air Vol ▄ ②           ✦           │
└─────────────────────────────────────┘
```
Screen 24

Field ① defines **the volume of sample** to aspire by the syringe **to make the analysis**. Field ① may have a value between 0 µl and 500 µl. Press ➲ and ➾ to increase (➲) or to decrease (➾) this value in steps of 0.1 µl (or in steps of 1µl for values higher than 10µl).

Press ↻ to select the second line that sets the quantity (volume) of air to aspire after the sample. Field ② **may** have a value between 0 µl and 500 µl. Press ➲ and ➾ to increase (➲) or to decrease (➾) this value in steps of 0.1 µl (or in steps of 1µl for values higher than 10µl).

➔ **If a method includes the use of Internal Standard, pressing ↻ will not display screen 25, but screen 26. Please refer to sub-paragraph 5.2.1 "Use of internal standard".**

➔ If the method DOESN'T include the use of Internal Standard, pressing ↻ the autosampler will display screen 25.

```
┌─────────────────────────────────────┐
│   Fill Vol ▄ ①          ✦           │
│   Fill Spd ▄ s ②        ✦           │
└─────────────────────────────────────┘
```
Screen 25

Field ① defines **the volume of sample** to aspire by the syringe **for washing with sample**. This field may have a value between 0 µl and 500 µl. Press ➲ and ➾ to increase (➲) or to decrease (➾) this value in steps of 0.1 µl (or in steps of 1µl for value higher than 10µl).

Press ↻ to select field ② to change, using the keys ➲ and ➾, the syringe aspiration speed – indicated in µl/s. The aspiration speed has to be between 200ms (minimum of checked time) and 200s (max time). So, the range of values that field ② will have is function of the set volumes, and it will be between a min. speed and a max speed.

$$\textbf{Min Speed} = \frac{\text{Vol. to aspire}}{200 \text{ s}}$$

$$\textbf{Max Speed} = \frac{\text{Vol. to aspire}}{0,2 \text{ s}}$$

To inject in the quickest time possible (about 80ms), set the speed to "high".

Pressing ↻ enters the following screen.

```
  Sample Washes ①    ↔
  Pullup Strokes ②   ↕
```

Screen 28

Field ① defines the number of washes to make with the sample. It may have a value between 0 and 15.
Press ↻ to select field ②. This is the rapid up and down movements for the plunger to eliminate air bubbles from the syringe. Field ② may have a value from 0 to 15.

Pressing ↻ enters the following screen.

```
  Visc. Dly sec ①    ↔
  Inj. Spd. ◼ls ②    ↕
```

Screen 29

Field ① sets the waiting time at the end of the aspiration procedure. It can be set from 0 to 15 sec.

Field ② indicates the speed (in µl/s) which the syringe injects. This must be between 200ms (min checked time) and 200s (max time). The values that field ② has is a function of the set volumes, and it will be between a minimum speed and a maximum speed.

$$\textbf{Min. Speed} = \frac{\text{Vol. to inject}}{200 \text{ s}}$$

$$\textbf{Max Speed} = \frac{\text{Vol. to inject}}{0,2 \text{ s}}$$

To inject in the quickest time possible (about 80ms), set the speed to "high".

Pressing ⏻ enters the following screen.

```
┌─────────────────────────────────┐
│    Pre inj. Dwl sec ①  ✦        │
│    Post inj. Dwl sec ② ✦        │
└─────────────────────────────────┘
```

Screen 30

Field ① sets the standing time of the syringe needle inside the injector before making the injection. Field ② sets the standing time of the syringe needle inside the injector after the injection (this allows the temperature of the syringe to equilibrate with the temperature of the GC port.
Both field ① and field ② may have a value between 0 and 99 seconds.

5.2.1   Use of internal standard

If the method uses an Internal Standard technique, the autosampler will display screens 26 and 27 rather than screen 25.

Screen 26 is shown below:

```
┌─────────────────────────────────┐
│    Fill Spd ▄s ①       ✦        │
│    IntStd Vol ▄  ②      ✦       │
└─────────────────────────────────┘
```

Screen 26

Field ① is the aspiration speed of the syringe (in µl/s). The aspiration speed has to be between 200ms (minimum time) and 200s (maximum time). So, the range of values that the field ② may have is function of the volume and it will be between a min. speed and a max speed of.

Min. Speed = $\dfrac{\text{Vol. to aspire}}{200 \text{ s}}$	**Max Speed** = $\dfrac{\text{Vol. to aspire}}{0,2 \text{ s}}$

To inject in the quickest time possible (about 80ms), set the speed to "high".

Press ⏻ to select field ②. This is the quantity of internal standard – indicated in µl – to collect. This value is variable from 0 to 500 µl.

Pressing ⏻ enters the following screen.

```
┌─────────────────────────────────┐
│    AirGap Mode ①       ✦        │
│    AirGap ▄  ②          ✦       │
└─────────────────────────────────┘
```

Screen 27

Field ① selects the Air Gap Mode (*see Glossary*). It may have the following values:

Post	AirGap is exclusively interposed between the Internal Standard and the Sample
Double	There are two AirGaps, the first one before the sample, the second one after the sample.

Field ② selects the volume of the AirGap (in µl). It may have a value between 0 and 500 µl. Press ➲ and ➾, to increase (➲) or to decrease (➾) this value in steps of 0.1 µl (or in steps of 1µl for values higher than 10µl).

Press ↻ to go to screen 28. From this point on the displayed screens are the same as those where an Internal Standard is not used.

5.2.2   Exit from method mode

➔   **Exit with SAVING:**

- It is necessary to reach screen 30 (press ❂❂) or press EXIT . Screen 30 will be displayed as below:

```
┌─────────────────────────────────┐
│  Press  ENTER to save   ▲       │
│  Copy Method ① as ②   ✦          │
└─────────────────────────────────┘
```

Screen 31

Field ① will show the method in use or the method that has been modified. Field ② shows the position to write the new method – it can be written over the old file or press ➲ or ➾ to save it under another number.

This feature allows to the user to cut and paste some parts of the method.

- Pressing ENTER displays screen 20..

- ***To exit,*** press the MET key. This will display the main menu page, *Run Time Menu.*

➔ **EXIT without SAVING:**

- Reach screen 31, pressing the ❂❂ keys, or by pressing EXIT twice.

- Press MET key. Then will display main menu page, *Run Time Menu..*

5.3   Sequence Mode

Sequence mode is the Menu page where to edit a sample list or a sample batch. To reach the sequence mode press the ⌐SEQ⌐ key on the control panel. This mode can be used to display, change or edit up to 16 sequences.

The **sequence** is a **program** (a list of instructions) that defines an automatic injection cycle (Automatic Run). The program is divided in 16 steps identified by a number (from 1 to 16). A step defines the **geometric parameters** involved in the injection cycle; (i.e. Vial position and the method).

Each step can works alone as a program (see paragraph 7.3 "Automatic Run"), or can be used with other steps (*see Screen 11*).

5.4   Creating a step

Press ⌐ SEQ ⌐ on the control panel to enter the sequence mode. The ⌐ SEQ ⌐ key will light, and the following screen will be displayed:

```
┌──────────────────────────────────┐
│  Sequence Step  ①       ✦        │
│  Tray Configur  ②       ✦        │
└──────────────────────────────────┘
```

Screen 32

The first row show the number of the selected step. Press ⊃ and ⊂ to change this field, between 1 to 16.

The second row defines the type of tray to use. This may to be different from the one currently installed.
Field ② can have the following values:

10	Fixed tray of 10 positions (POCKET)
10H	Fixed tray of 5x2 positions (Highthroughput)
40	40 position Tray for 10 ml vials
40H	20x2 positions (Highthroughput) Tray for 10 ml vial
110	110 position Tray for 2-2,5 ml vial
110H	55x2 positions (Highthroughput) tray for 2-2,5 ml vials

NOTE. It is always possible to come back to screen 32 from any other screen of the sequence mode by pressing ⌐ EXIT ⌐.

Pressing ↻ enters the following screen.

```
┌─────────────────────────────────────────┐
│   Tray Configur  ①     ✦                  │
│   Method Number  ②     ✦                  │
└─────────────────────────────────────────┘
```

Screen 33

The first line is the same as the preceding one.

Press ⏻ to select the second line, which is displays the identifying number of the method to use for the step. Field ②, (modify with using ➲ and ➾), will have a value between 0 and 9.

Pressing ⏻ enters the following screen.

```
┌─────────────────────────────────────────┐
│   First Sample  ①     ✦                   │
│   Last Sample  ②     ✦                    │
└─────────────────────────────────────────┘
```

Screen 34

Field ①, to selects the first sample vial to run. Field ②, selects the last sample vial.

These fields will have the values 00, 01... 99 and than the value 0P, 1P... 9P., corresponding to the identifying letters of the selected vial. (see paragraph 2.1.5)

NOTE. The selected vial has to be availble on the installed vial tray (for example selecting vial numbers above 0 on the pocket will produce an error).

Pressing ⏻ enters the following screen.

```
┌─────────────────────────────────────────┐
│   Int.Std/Solvent  ①     ✦                │
│   Sample Repeat.  ②     ✦                 │
└─────────────────────────────────────────┘
```

Screen 35

Field ① selects the vial (or solvent bottle) to use as the Internal Standard. If the chosen method doesn't include the Internal Standard, field ① is not enabled and it will display "--". If a standard is selected then this field can have a value of 00, 01... 99, 0P, 1P... 9P., corresponding to the identifying letters of the vial to select or A,B,C,D corresponding to the identifying letters of the solvent bottles. (see paragraph 2.1.3 and 2.1.5).

Field ② selects the number of times that the same sample has to be analysed. This quantity is modifiable and it may have a value between 1 and 9. Press ➲ and ➾ to increase (➲) or to decrease (➾) this value.

Pressing ⏻ enters the following screen.

```
┌─────────────────────────────────────────┐
│   Pre Wash Solvent  ①   ⬍                │
│   PostWash Solvent  ②   ⬎                │
└─────────────────────────────────────────┘
```

Screen 36

The first line selects the pre-washing solvent. Field ① may have the values 'A', 'B', 'C' or 'D' corresponding to the two bottles positioned on the left and right side of the waste bottle. (*see figure 4*)

The second line, selects the solvent used for the post-washing operations. As with the prewash field ② may have the values 'A', 'B', 'C' or 'D' corresponding to the two bottles positioned on the left and right side of the waste bottle. (see paragraph 2.1.3)

➔ **If you DON'T want to make further changes to the step just modified or to other steps in the sequence, it is possible to EXIT with SAVING the modifications by following this procedure:**

- Go to screen 32, (press ⮃, or press EXIT).

- Press SEQ . The unit will go to the *Run Time Menu.*

NOTE. Every step modification in a sequence will have immediate validity and will be automatically saved. It is not possible to exit from this mode without saving the modifications.

➔ **If you wish to make further modifications to this step or to other steps in the sequence it is possible by: Enter screen 37 (press ⬇ key from screen 33–34-35-36).**

```
┌─────────────────────────────────────────┐
│   Sequence Saving (①)                    │
│           NXT INS DEL END                │
└─────────────────────────────────────────┘
```

Screen 37

Field ① displays the number of the step that is currently being modified.

In this screen, press ⟳ and ⟲ to select one of the four options, these are "NXT", "INS", "DEL" and "END": the selected option will flash. Press ENTER to execute the option. The meaning of the four options is explained in the following table:

NXT	This goes to the next step. In this case, the unit reverts to screen 32.
INS	Option INS inserts a method similar to using COPY and PASTE; this inserts a new identical step, next to the displayed one. Step # 16 of the sequence will be replaced from the new one now inserted.
DEL	This deletes the displayed step. All the following steps will be drop one position (e.g.*: eliminating the step 1, step 16 will be 15 and step 15 will be 14 etc*).
END	This erases all the steps above the displayed one.

6. **UTILITY FUNCTION**

6.1 Run Time Menu

After the START UP procedure, the autosampler will move the tower to the central position above the oven and the following screen will appear:

```
TRAY MODEL  ①
TURRET ON  ②          ⬍
```

Screen 03

Field ①, displays the tray type :

110	110 positions for 2 and 2,5 ml vials.
40	40 position tray for 10 ml vials.
10	The fixed tray 10 positions for vials 2 and 2,5 ml **or** the base of the tray is disconnected.

NOTE. The system recognises the tray automatically. There is no possibility to manually change it.

Field②, displays the turret position. The turret can be moved using ⮌⮎ to the following positions:

Waste	The column is aligned in the central position over the waste vial.
Tray	The column is aligned on the sample tray - this will be on the left or the right according to the sampler configuration.

If the system is configured with a single injector, field ② can have also the following value:

Injec	The column is aligned on the injector.

If the system is configured with two injectors, field ② will have also the following values:

Front	The column is positioned on the first injector.
Rear	The column is positioned on the second injector.

Pressing ↻ goes to the following screen.

```
╔═══════════════════════════════════════╗
║   INJ. SYNCRO  ①      ✦              ║
║   INJ. MODE  ②        ✦              ║
╚═══════════════════════════════════════╝
```

Screen 04

The first row there is the ***synchronism type*** to use, that is the timing of the signal emitted upon injection (SMP Instant). Field ① may have the following values:

Type of synchronism	Emission SMP Instant (Output to analyser)	Start Injection (signal from the analyser)
Normal	At the beginning of the syringe plunger movement.	At the reception of the signal *GC Ready*.
Trigger	At the beginning of the syringe plunger movement.	At the reception of the signal *GC Ready* it starts the collecting; then, it waits for an external synchronism (SYNC-IN) to continue with the injection.
A-start	In the moment it touches the injector.	At the reception of the signal *GC Ready*.
Delayed	At the end of the movement of the syringe plunger.	At the reception of the signal *GC Ready*.
EA	At the beginning of the movement of the syringe plunger.	At the contemporaneous reception of the signals *GC Ready* and *SYNC-IN*.

The second row (press ↻ to access) displays the operation mode of the autosampler. Field ②, which can be changed using ➲ and ⊆ , may have the following values:

Front	It injects only in first injector.
Rear	It injects only in second injector.
Confirm	It injects the same sample in both injectors. *For use in Confirmation Mode (see. Glossary chapter 11)*
Hithrou	It injects different samples in both injectors. *To use in Highthroughput Mode (see. paragraph 8.1)*

NOTE. Field ② is modifiable only if the system is configured for two injectors. If the system is configured for only one injector, it will be show the **default option, 'Normal' and it will not be possible to change it.**

Press ↻ to display the following screen.

```
    SYRINGE WASH        ↖
    SINGLE INJECTION    ↙
```

Screen 05

Press ↻ it goes to the following screen.

```
    SINGLE INJECTION    ↖
    AUTOMATIC RUN        ▸
```

Screen 06

Position the cursor (use ↻↺) on one of the three options (SYRINGE WASH, SINGLE INJECTION, AUTOMATIC RUN) and press ⤵ to enter the respective submenu (see chapter 7 "BASIC FUNCTIONS")

6.2 Tray installation with the autosampler ON

If the tray is missing or not properly installed it will generate the following error message:

```
    TRAY ① Removed
    Waiting Tray
```
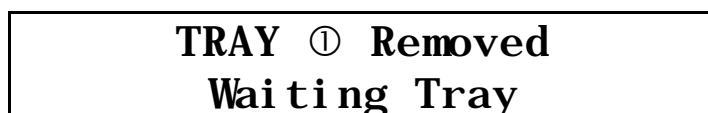
Screen E01

Field ①, displays the type of tray previously installed, .

110	110 position rotating tray for 2 and 2,5 ml vials.
40	40 positions rotating tray for 10ml vials.

To install the tray when the autosampler is ON follow these instructions:

1. Hold firmly the middle part of the tray.

2. Place the tray on the bracket, as shown in the Figures below:
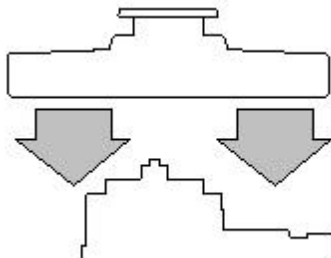
Figure 9C	Figure 9D
Before Installation	After installation
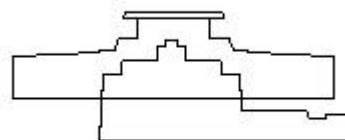
3. Gently rotate the tray clockwise until it reaches the insertion point. As soon as the Autosampler detects the tray it will display following screen:

```
TRAY ① installed
Press "START" to continue
```
Screen E02

4. Field ① displays "XXX".

5. Press START

6. Wait until the autosampler detects the tray - this operation can take a few minutes.

7. During this operation the following message will be displayed:

```
TRAY IDENTIFYNG
PLEASE WAIT
```
Screen 02

8. If the tray typed is Not detected an error message will be displayed (refer to chapter 9, "Troubleshooting"). Remove the tray and restart from point 1

9. If a 40 or 110 position tray is detected from the Autosampler, screen E02 (see above) will show "40" or "110" in field ①.

10. If the tray type or the vial size are changed, it's necessary to change the set-up parameters (see paragraphs 4.2 and 4.6)

6.3 Removing a Tray

To remove a tray:

1. Ensure that the turret is not over the tray; if not move the turret in another position (to move the turret please refer to screen 03 paragraph 6.1);

2. Firmly hold the middle part of the tray;

3. Pull up the tray from its holder.

This procedure can be done with the autosampler on or off. If the autosampler is on, please take care that it is in stand by status, if not wait for the end of run or press STOP to abort it. If the tray is removed when the autosampler ON see paragraph 6.2 screen E01.

6.4 Installation and removal of solvent and waste bottles

To **install, remove, replace, fill up, empty out or clean** the Solvent vials (*see Figure 4*) and/or the waste vial perform the following operations in the given sequence:

1. Go to screen 03 (see paragraph 6.1).
2. *Change the option "**TURRET ON**", to "**Tray**" for easy access to the vials. For further information on this operation, refer to paragraph "Run Time Menu", of this chapter.*

Removing the vials

• To remove the waste bottle or a solvent vial, raise and extract it with care.

Cleaning the vials

• Remove the vial(s).
• Carefully remove the plastic cap.
• Empty and wash the glass vial(s) and the plastic cap(s) .
• Refit the cap.

Installation

• Put back the vial in its original place.

To Fill the Solvent Vial(s)

• Remove the vial(s) from its position and clean it.
• Fill the vial with the solvent.

7. BASIC FUNCTIONS

7.1 Syringe Washing

Position the cursor on the "Syringe Wash" line (see screen 05 paragraph 6.1). Press ➲ to enter the submenu.

7.1.1 Set-up

The following screen will appear:

```
WASH  SET  UP
Solvent  ①               ⌄
```

Screen 07

Use ➲ and ➲ to select the correct solvent to wash the vial. This may be 'A', 'B', 'C' or 'D' corresponding to the two solvent bottles situated either side of the waste bottle (*see figure 4*)

Press ↻ to enter the following screen.

```
Volume  ▮L  ①               ↕
Wash  Repeat  #  ②          ◄►
```

Screen 08

Field ① corresponds to the quantity of solvent that has to be used. It may have a value between 0.1 µl and nominal value of the syringe installed. Press ➲ and ➲ to increase (➲) or to decrease (➲) this value in steps of 0.1 µl.

Field ② corresponds to the number of washes to make. This may be between 1 and 15. Press ➲ and ➲ to increase (➲) or to decrease (➲) this value.
Pressing EXIT at any moment will go back to the main menu ("Run Time Menu") without saving the changes.

7.1.2   Run

Press START from screen 07 or 08 to start the syringe washing procedure. During this procedure, the display will be alternate between screens 07 and 08. The number of washes to be made will be displayed.

NOTE. To stop the washing procedure in any moment press STOP

As soon as the injection procedure is finished, the unit will revert to screen 05 (see paragraph 6.1).

7.2   Single Injection

Position the cursor on the "Single Injection" line (screens 05 - 06 paragraph 6.1) and press ➲ to enter the submenu relative to single injection.

7.2.1   Set-up

The following screen will appear:

```
SINGLE INJECTION
Method Number  ①      ▼
```

Screen 09

Use ➲ and ➳ to select the method. This can be between 0 and 9.
Press ◗ to show the following screen.

```
Sample number  ①      ▲
Int. Std/Solvent  ②    ▼
```

Screen 10

Field ① is the sample vial from which to make the injection. This field may have the values 00, 01... 99, 0P, 1P... 9P., corresponding to the identification of the vial. (*see figures 6A, 6B, 6C, 6D)*

Field ② is enabled only if the method (see screen 7) uses an Internal Standard otherwise it will display as default "--".

When enabled it may be 00, 01... 99, 0P, 1P... 9P. or   A,B,C or,D, if one of the solvent vials is needed

Press ↻ to the following screen.

```
┌─────────────────────────────────────┐
│  Pre Wash Solvent  ①   ↥             │
│  Post Wash Solvent ②  ↤►             │
└─────────────────────────────────────┘
```

Screen 11

Select using ↻ and ↺, the pre and post-wash solvent (field ②). These may have values 'A', 'B', 'C' or 'D' corresponding to the two bottles either side of the waste vial (it is possible to use the same solvent for each wash)

Pressing EXIT will revert to the Main Menu ("Run Time Menu"), without making the injection but with saving the modifications.

7.2.2   Run

Press START from screen 9, 10 or 11 to will start the single injection procedure, according to the set parameters. During this procedure, the display will cycle through screens 9, 10 and 11.

Press the STOP key to stop the injection at any time.

As soon as the injection procedure is finished, the unit will revert to screen 05 (see paragraph 6.1).

7.3   Automatic Run

Position the cursor on "Automatic Run" (see screen 6 paragraph 6.1) and press ↻ to enter the submenu.

7.3.1   Set-up

The following screen will appear:

```
┌─────────────────────────────────────┐
│       First Step  ①        ↤►        │
└─────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│          Last Step  ②              ▼             │
└─────────────────────────────────────────────────┘
```

Screen 12

Press ➲ and ➾ to select the first step of the sequence (to set-up or modify a sequence please refer to paragraph 5.3). Field ① may have values between 1 and 16.

To change field ②, press ✺. This selects the last step of the sequence. Field ② may have a value between 1 and 16 (the Last Step must to be the same or more than the First Step).

NOTE.   It is only possible to select existing steps: numbers corresponding to non-existent steps will not be displayed;

Press ✺ to enter the following screen.

```
┌─────────────────────────────────────────────────┐
│      End seq. Output  ①      ◂▸                  │
│      PowerOn Restart  ②      ◂▸                  │
└─────────────────────────────────────────────────┘
```

Screen 13

Field ① manages the END Sequence output.

Press ➲ and ➾, to select either:

YES	The sampler emits a signal from the GC and AUX connecters at the end of a sample sequence.
NO	The sampler does not emit a signal from the GC and AUX connecters at the end of a sample sequence.

Field ② may assume the following values:

YES	If the power is lost during a run the sampler restarts the injection cycle from the point of interruption.
NO	If the power is lost during a run the sampler does not re-start the injection cycle from the point of interruption.

Press ⎡EXIT⎤ at any time to revert to the main menu ("Run Time Menu") annulling the operations made.

Press ↻ to the following screen.

```
╔════════════════════════════════════════╗
║  PowerOn Restart  ①  ↭                   ║
║  Empty pos .Sync. ②  ◂▸                  ║
╚════════════════════════════════════════╝
```

Screen 13A

Field ① is explained above

Field ② handles a missing vial in a sequence. It may have the following values:

YES	If a vial is missing, the sampler **emits the sample instant signal** to the analyser "as if the vial was present".
NO	If a vial is missing, the sampler **doesn't emit a sample instant** signal to the analyser and skips directly on to the next vial.

7.3.2 Run

Press START from screen 12,13 or 13A to start the automatic injection cycle. During this procedure, the following screen will be displayed:

```
╔════════════════════════════════════════╗
║  Stp Met Smp Rpt Pri   ▶                ║
║   ①   ②   ③   ④   ⑤    ↕                 ║
╚════════════════════════════════════════╝
```

Screen 14

Fields ①, ②, ③ and ④ are automatically updated by the autosampler. Field ⑤ is the priority injection mode.

Fields ①, ②, ③ and ④ provide information on;

- **The running step of the sequence (①);**
- **The method in use for the current sample (②);**
- **The vial position currently running (③);**
- **The residual number of analysis repetitions of the same vial (④).**

Field ⑤ displays "NO" as default. Change this to "YES" (using ↻↺) to activate a priority injection, with reference to the running injection cycle. For further details on the set-up of a priority injection, please refer to the next chapter.

Press the ↺ key to display the type of synchronism and the mode in which the autosampler is working:

```
 INJ. SYNC  ①
 INJ. MODE  ②
```

<div align="center">Screen 04</div>

After 3 seconds the sampler reverts to screen 14.

Press the ↻ key to display the number of injections made by the autosampler in Autorun Mode (priority injections are not counted).

```
 Injections
 Carried out  :  ①
```

<div align="center">Screen 14A</div>

After 5 seconds the unit reverts to screen 14. When the injection cycle is finished, the sampler displays the following screen:

```
 END SEQUENCE
 Total Injections  ①
```

<div align="center">Screen 19</div>

Field ① displays the number of injections performed. This value does not included the injection(s) made in priority mode; injections requiring using both injectors (*Confirmation or High throughput Mode*) are counted only once and not as double. Press EXIT to go to the Main Menu (see screen 5 paragraph 6.1).

7.3.3   Interrupting an injection

To interrupt the automatic injection sequence at any moment press the STOP key. The following screen will appear:

```
 EXIT → ABORT AUTORUN
 START → CONTINUE
```

<div align="center">Screen 18</div>

To re-start the injection cycle from the interruption point press START or to confirm that the sequence should be stopped press EXIT .

The sampler will discharge the syringe to waste if full and returns the turret to its initial position. During this operation, "*Abort Autorun*" will flash on the screen.

As soon as the autosampler is in its central position, the display shows the following:

```
 END SEQUENCE
 Total Injections  ①
```

<div align="center">Screen 19</div>

Field ① displays the number of injections (parts of the cycle) made. This value does not included priority injections – any injections made using both ports (*Confirmation or High throughput Mode*) are counted only once and not as tow separate injections.

Press EXIT to revert to the main menu (see screen 5/6 paragraph 6.1).

7.4 Priority Injection

Priority Injection is used to make a single injection at the first available moment during the middle of a sequence of injections. This injection can be any vial and use any injection method.

When an injection cycle is running the following screen is displayed.

```
 Stp  Met  Smp  Rpt  Pri  ▶
  ①    ②    ③    ④    ⑤   ▲▼
```

Screen 14

To make a priority injection,

1.   Set the parameters for the priority injection (selecting the method, the sample vial, the solvent for Internal Standard – if used –, the solvent for pre-washing and post-washing).
2.   Activate the priority injection procedure (changing in YES field ⑤).

POINT 1

If the parameters for the priority injection are the same as for the sequence that is currently being made then go to point 2.

If it is necessary to check or to change the injection parameters, then press ➲ to go to the following screen:

```
 PRIORITY INJECTION
 Method Number  ①     ❤
```

Screen 15

Press ➲ and ᴄ to set the method number. Then press down to set the other parameters;

```
 Sample number  ①     ⬥
```

```
┌─────────────────────────────────────────┐
│        Int. Std/Solvent  ②     ▼        │
└─────────────────────────────────────────┘
```

Screen 10

```
┌─────────────────────────────────────────┐
│      Pre  Wash  Solvent  ①   ♦          │
│      Post  Wash  Solvent  ②  ◄►         │
└─────────────────────────────────────────┘
```

Screen 11

Please refer to the **"Single Injection"** of this chapter for definitions of these screens
After setting the correct parameters go to point 2.

Press ⌐EXIT⌐ at any moment to go back to screen 14, without executing the priority injection but saving the modifications made.

POINT 2

To activate a **Priority Injection** it is necessary to change field 5 of screen 14.

```
┌─────────────────────────────────────────┐
│      Stp  Met  Smp  Rpt  Pri    ►       │
│       ①    ②    ③    ④    ⑤     ⁞       │
└─────────────────────────────────────────┘
```

Screen 14

Field ⑤ displays as default "NO". Change this to "YES" (using ↻↺) to activate the priority injection.

Priority injections are automatically made once the current (running) injection has finished. During the priority injection screens 15, 10 and 11 will cycle as per the single injection.

Pressing STOP at any time will stop the process and the autosampler will empty the syringe if full and return to its central position.

Once the priority injection has been made the autosampler will display screen 14 and start automatic injection procedure from the point of interruption.

8. ADVANCED FUNCTIONS

8.1   High Throughput Mode

8.1.1   DESCRIPTION

High Throughput Mode will only work on GCs that have two injection ports. In this mode two different samples are injected into the two injectors. The tray is divided in to two parts - the first half is *associated to the Front Injector*, and the second half is *associated to the Rear Injector*. The first half and second half have corresponding positions, these are;

Fixed tray (POCKET Version):
*   Vial position 0, is associated with vial position 5;
*   Vial position 1, is associated with position 6;
*   Vial position 2, is associated with position 7;
*   Vial position 3, is associated with position 8;
*   Vial position 4, is associated with position 9.

Rotating tray (STANDARD Version):
*   Vial positions in sector 0, are associated with vials of 5;
*   Vial positions in sector 1, are associated with vials of 6;
*   Vial positions in sector 2, are associated with vials of 7;
*   Vial positions in sector 3, are associated with vials of 8;
*   Vial positions in sector 4, are associated with vials of 9.

Example:
Vial 01 (sector 0, position 1) is associated the vial 51 (sector 5, position 1);
Vial 29 (sector 2, position 9) is associated the vial 79 (sector 7, position 9);

8.1.2   Use in a single injection procedure

To use this mode of operation is necessary to **authorise the use of High Throughput Mode:** that is, in screen 04, to set-up as "*Inj. Mode*" the value **Hithrou**.

8.1.3   Using Hithrouput in an automatic injection procedure

In order to use this Mode it is necessary to:

1. **Set this mode in a sequence step.** To do this set, (screen 32) the *"Tray Configur"* value to one of the following : **10H**, **40H** or **110H**.

NOTE. When configuring a step it is necessary to define the first and the last vials to analyse (see screen 34). In the High Throughput Mode, the first and the last vials must be from the first half of the vial tray. The autosampler will automatically select the vials to make injections from the second half of the tray.

2. **Authorise the use of High Throughput Mode.** It is necessary to set as *"Inj. Mode"* the value **Hithrou** in screen 04

It is possible to use the High Throughput Mode only if both points 1 and 2 are followed. If either of the conditions are not met the following events happen:

- **No point is verified.**

The autosampler will work normally according to the parameters set.

- **Point 1 is NOT verified.**

This generates an error message, indicating the tray is incorrectly set up. (see screen E20, paragraph 9.7.1)

- **Point 2 is NOT verified.**

If *Inj. Mode* a value different from **Hithrou**, the autosampler will work in the following way:

Front	It injects ONLY into the <u>first injector</u> ONLY the <u>first half</u> of samples.
Rear	It injects ONLY into the <u>second injector</u> ONLY the <u>first half</u> of samples.
Confirm	It injects in both the injectors the same sample. It on injects the samples from the first half.

9. Troubleshooting

9.1 Introduction

The list of the possible errors generated by the autosampler are summarised in this chapter. If the solutions indicated do not solve the problem, please contact your Supplier or the Technical Assistance Centre.
Before calling the Technical Assistance Centre, please check that:

- **all instructions were carefully followed;**
- **all the options listed were tried;**
- **all cables are connected correctly.**

9.2 Touch Sensor Problems

```
*WARNING*

Check "Touch Sensor"!
```

Screen E12

Causes:

- Injection sensor is not working correctly. It is possible that there are mechanical problems.

Solution:

- Press EXIT. The autosampler will enter in the screen 00, from there it is possible to move the needle assembly and tower to try to unblock the system and to solve the problem (*see chapter 4*).
- When manual control is finished, press EXIT. If the problem is solved, the sampler will re-start the Autorun procedure from the point of interruption.

9.3 Tray removal

```
TRAY ① Removed
Waiting Tray
```

Screen E01

Causes:

- The tray has been removed from its seat.

Solution:

- Re-seat the removed tray (or replace with another one). It is necessary to wait for the autosampler to complete its identification procedure. Do not press EXIT during this procedure (see. paragraph 6.2).

```
┌─────────────────────────────────────────────┐
│       TRAY ① not Identified                   │
│           Waiting Tray                        │
└─────────────────────────────────────────────┘
```

Screen E04

Causes:
- The type of the tray installed is not recognised.
- The tray is not installed correctly.
- The tray identification procedure has been interrupted.

Solution:
- Press ⬚EXIT⬚. Remove the installed tray and repeat the tray installation procedure. It is necessary to wait for the autosampler to complete the identification procedure. Do not press ⬚EXIT⬚ during this procedure.

9.4 Obstacles

```
┌─────────────────────────────────────────────┐
│                 *WARNING*                     │
│                                               │
│  Obstacle found, press "EXIT" then remove     │
└─────────────────────────────────────────────┘
```

Screen E13

Causes:
- The autosampler has found an obstacle on the waste.
- The autosampler has found an obstacle on a vial.
- The autosampler has found an obstacle on an injector.

Solution:
- Remove the obstacle. Then, press ⬚EXIT⬚ to re-start the running operation.

9.5 Set-up errors

9.5.1 Lack of waste bottle

```
┌─────────────────────────────────────────────┐
│                  *WASTE*                      │
│                                               │
│  Waste absence. Put in then press "START"     │
└─────────────────────────────────────────────┘
```

Screen E05

Causes:
- The waste bottle is missing.

Solutions:
- Insert a waste bottle into its seat.
- Press ⬚START⬚.

9.5.2 Vial with wrong dimensions

```
┌─────────────────────────────────────────┐
│         Vial size mismatch                │
│    Check vial on tray, then "START"       │
└─────────────────────────────────────────┘
```

Screen E06

Causes:

- Vial dimension set doesn't coincide with the real dimension of the vial (such as having a 2ml vial on the tray but the system setup for 2.5ml).

Solutions:

- Replace the vial and press │ START │.
- Press │ EXIT │. Modify the set-up of vial dimensions in set up.

9.6 Autorun errors

9.6.1 Lack of waste bottle

```
┌─────────────────────────────────────────┐
│                *WARNING*                  │
│   WasteFail: START→Continue; EXIT→abort.  │
└─────────────────────────────────────────┘
```

Screen E10

Causes:

- The waste bottle is missing.

Solutions:

- Insert a waste bottle and press │ START │.
- Press │ EXIT │ to exit and to interrupt the Autorun procedure

9.6.2 Lack of solvent bottle

```
┌─────────────────────────────────────────┐
│                *WARNING*                  │
│    Vial absence: press "EXIT" then fixup  │
└─────────────────────────────────────────┘
```

Screen E11

Causes:

- The solvent vial selected for pre-washing or post-washing is missing (*see figure 4*).

Solution:

- Press │ EXIT │. The autosampler will enter screen 00 so the tower can be moved manually. Insert the missing solvent vial(s). Press │EXIT│. The sampler will re-start the Autorun procedure from the point of interruption.

9.7   Programming Errors

The errors listed in this paragraph may happen during either single injection or Automatic Run. The display differs slightly in the top line but the lower line is the same:

```
Met:  ①      Stp:  ②        NXT
```

Next to the word "Met" (field ①), is the identifying number of the method in which the error occurred. Next the word "Stp" (field ②) is the number of the sequence step in which the error occurred.
Pressing ∩ will display other errors if present.
Press EXIT to return to screen 5. From here correct the parameter(s) causing error message.

9.7.1   SURVEY

```
       Tray range mismatch
Met:  ①      Stp:  ②        NXT
```

Screen E20

Causes:

- The type of tray in the method doesn't correspond to installed tray. (Example: The method has been set to use a 40 position but a 110 position is installed).
- High Throughput Injection Mode has been chosen (see screen 4), but the tray type doesn't support this mode. (E.g.: the tray is defined as 110 instead of 110H).

Solutions:

- Press EXIT and install a different type of tray.
- Press EXIT and change the set-up information defined in sequence step indicated (see paragraph 5.4).
- Press EXIT ; set-up the sequence in a way to avoid steps requiring a tray different from that installed.
- Select a type of tray able to support the High Throughput Mode (see paragraph 5.4; see paragraph 8.1)

```
       Pre-solv vol.> max
Met:  ①      Stp:  ②        NXT
```

Screen E21

Cause:

- The set value for **Pre Volume** (volume of solvent used for pre-washing operations) of the syringe is higher than the nominal volume set for the syringe.

Solution:

- Press EXIT and replace the syringe with one syringe with a higher capacity.
- Press EXIT and change the set volume for the syringe in Set-up, if this is wrong.
- Press EXIT and lower the pre-Volume in the method

```
┌──────────────────────────────────┐
│        Post-solv vol.> max        │
│  Met:  ①     Stp:  ②      NXT     │
└──────────────────────────────────┘
```

Screen E22

Cause:

- Value set for **Post Volume** (volume of solvent used for post-washing operations) of the syringe is higher than nominal volume set for the syringe.

Solution:

- Press EXIT and change set volume for post-washing.
- Press EXIT and replace the syringe with one having a larger capacity.
- Press EXIT and change set volume for the syringe in Set-up, if this is wrong with reference to nominal volume of the syringe.

```
┌──────────────────────────────────┐
│        Filling volume> max        │
│  Met:  ①     Stp:  ②      NXT     │
└──────────────────────────────────┘
```

Screen E23

Cause:

- Set value for **Fill Volume** (volume of sample used for washing with sample procedure) is higher than the nominal volume set for the syringe.

Solution:

- Press EXIT and reduce the Fill Volume value.
- Press EXIT and replace the syringe with one having a higher capacity.
- Press EXIT and change the volume set for the syringe in Set-up, if this is wrong with reference to the nominal volume of the syringe.

```
┌──────────────────────────────────┐
│        Sample volume> max         │
│  Met:  ①     Stp:  ②      NXT     │
└──────────────────────────────────┘
```

Screen E24

Cause:

- The value set for **Sample Volume** (volume of sample used for the analysis) is higher than nominal volume set for the syringe.

Solution:
- Press EXIT and reduce the value set for **Sample Volume**.
- Press EXIT and replace the syringe with one having a higher capacity.
- Press EXIT and change set volume for the syringe in Set-up, if this is wrong with reference to nominal volume of the syringe.

```
Sample+Air vol.> max
Met:  ①    Stp:  ②      NXT
```
Screen E25

Cause:
- The sum of the value set for **Sample Volume** (volume of sample used for the analysis) plus the value set for **Air Volume** (volume of air used) is higher than nominal volume set for the syringe.

Solution:
- Press EXIT and reduce the set value of **Sample Volume** and/or **Air Volume**.
- Press EXIT and replace the syringe with one having a higher capacity.
- Press EXIT and change the value set for the syringe in Set-up, if this is wrong with reference to nominal volume of the syringe.

```
SMP+IS/SLV vol.> max
Met:  ①    Stp:  ②      NXT
```
Screen E26

Cause:
- The sum of the value set for **Sample Volume** (volume of solvent used for the analysis) plus the **IntStd Vol Volume** (volume of Internal Standard) is higher than nominal volume set for the syringe.

Solution:
- Press EXIT and reduce set value of **Sample Volume** and/or set value of **IntStd Vol**.
- Press EXIT and replace the syringe with one having a higher capacity.
- Press EXIT and change set volume for the syringe in Set-up, if this is wrong with reference to nominal syringe of the syringe.

```
Wrong IS/SLV Range
Met:  ①    Stp:  ②      NXT
```
Screen E27

Causes:
- The vial chosen as Internal Standard is not valid. (E.g.: Vial 99 has been chosen, but the 40 position tray is installed).

Solution:
- Choose another vial or bottle as Internal Standard.
- Replace installed tray with the required one.

9.8   Mechanical Errors

If the autosampler can not correctly complete a movement within 12 seconds of the command being made it will give an error message and re-align the motors: the display will revert to screen 00. The letters "**Bsy"** will appear under the part that is not moving correctly.

PLG	NDL	TUR	TRY	TCH
bsy	▲▼	▲▼	▲▼	①

PLG	NDL	TUR	TRY	TCH
▲▼	bsy	▲▼	▲▼	①

PLG	NDL	TUR	TRY	TCH
▲▼	▲▼	bsy	▲▼	①

PLG	NDL	TUR	TRY	TCH
▲▼	▲▼	▲▼	bsy	①

Check the unit for obstacles and remove if necessary.

Use ➲ ➾, to select the part to move, and ↻ and ↺ to move the part that is blocked. For further details on manual movements, please refer to paragraph *4.3 "*Manual Operations*"*, where you will find the description of screen 00.

9.9   Damage to syringe needle

Damaged syringe needles are normally symptoms of a problem relating to the type of vials, syringe, needle or type of injector septum used; they may also be caused by the an incorrect syringe installation/configuration.

It is recommended :

1. **Try to identify the cause of the damage and the position in which the damage happened.** Ensure the alignment on the sample vials and on the injector(s) (see paragraphs 4.4 and 4.5) were made correctly. To check

this examine the septa of the sample vials and injector are correctly perforated.

2. **Check that syringe was installed correct way, as indicated in paragraph 4.7, and ensure that all instructions and notes were followed.** In particular, check that the needle guide was correctly aligned with needle tip, as indicated in following figure:
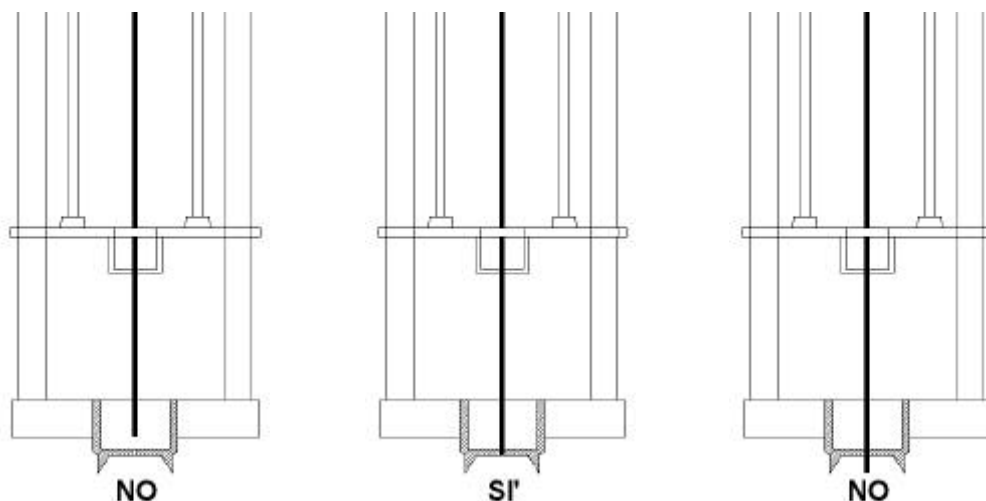
3. **Verify the specifications of the syringe with that supplied in Appendix B "Consumables".** In particular, check that the needle used has a tip suitable for the septum to pierce.

4. **Verify suitable septa were used.**

5. **Check that there are no obstacles inside the vial(s) (such as an insert).**

10. MAINTENANCE

10.1 Ordinary Maintenance

The autosampler doesn't require periodical maintenance, except for emptying of the waste vial and the cleaning of the tray and tower.

Cleaning the waste bottle:
- Go to screen 3.
- Change the indication "**TURRET ON**", setting it to " **Tray** " to easily access the waste bottle. *For further information on this operation, please refer to chapter 6.*
- To remove the waste bottle, raise by hand and remove with care (if caustic substances have been used wear appropriate hand protection.
- Remove off the plastic lid.
- Empty then wash the glass container and its plastic lid.
- Remount the lid and replace onto its original seat (the same septa can be reused or replaced).

Cleaning of vial tray:
- Remove the tray from its seat (*see paragraph 6.3 " Removing a Tray"*).
- Clean it with care, do not use an abrasive detergent solution.
- Dry with a dry cloth.

External Cleaning of cabinet:
- Switch OFF the autosampler.
- Remove the power cable from the rear.
- Pay particular attention to the display, the command keys and to fragile parts. For their cleaning, use only a damp cloth.
- Clean the cabinet using a non abrasive detergent solution.
- Dry with a dry cloth.

Do NOT use solvents, detergents or spray on electrical parts.
.

10.2 Extraordinary Maintenance

For any other maintenance operation not indicated in this manual, please, contact your Supplier or Technical Assistance Centre.

11. GLOSSARY

Air Gap

Am air gap is a "cushion" used for Internal Standard Techniques. It may be interposed between Internal Standard and the sample (*mode "post"*), or it may follow both Internal Standard or the sample (*mode "double"*).

Dual injection modes
(Confirmation Mode, High throughput Mode)

High throughput mode is a high productivity technique which injects different samples into two separate injection ports.
Confirmation Mode Technique injects the same sample into two injectors to confirm the analysis.

Internal Standard

This is an analytical technique that injects sample and a reference standard at the same time. The reference is drawn in first to the high part of the syringe, with the sample in the lower part.

Injection sensor

"Injection sensor" is also called the **Touch sensor**. It's used by the autosampler to detect when the transport/needle guide locator have touch a surface (or obstacle).

12. CONSUMABLES

12.1 Syringe

The following table indicates the dimensions of the syringe and the reference number of the syringe as coded by Hamilton, corresponding type of lodging of the syringe, and the corresponding position of piston block.

Syringe Size (ml)	Hamilton Type	Syringe Lodging	Position piston block (*)
1	7001	2	B
5	75	1	S
10	701	1	S
25	702	2	B
50	705	2	B
100	710	2	B
250	725	2	B
500	750	2	B

(*) By "B" and "S" are indicated the two faces of piston block. These sides are illustrated in paragraph 2.1.6, figures 7G e 7H.

For the use of different syringes, please check that their specifications are corresponding to that indicated in above table.

12.2 Vial, Solvent bottles, waste

For best results use Sun-Sri vials and caps. These are available from your HTA supplier

Appendix

C

ta

hi-tech applications

13.   Appendix C
FLOW DIAGRAMS

13.1 Set-up mode

HT300A Series Software Rel X.Y	[SET]	Manual Operation

PLG	NDL	TUR	TRY	TCH
▲▼	▲▼	▲▼	▲▼	‡

[EXIT]

Actual Parameters

Syringe size Vial Size Vial Depth
 Needle in injector: Speed, Depth
For 2 injectors:
Needle in Front: Speed ,Depth
Needle in Rear: Speed ,Depth
These parameters are view only, not settable

[EXIT]

Injection Set up

Injection Setup
Injectors Numbers (1 or 2)

Needle in   Speed
Injector ◄► ▲Align ▼

Move the injector head over the top of the injection port until it touches and the display reads

Injector   Alignment (2)
TURRET ◄► ▲ NEEDLE ▼

For 1 inijector
(1) Injector
(2) Front Inj. , Rear Inj
For 2 inijectors
(1) Injector
(2) Front Inj , Rear Inj.

Injector   Alignment (2)
TURRET STO=↵ NEEDLE

press ENTER to store the position in memory

Injector   Alignment (2)
TURRET STO=↵ DEPTH

Set the height of the needle to the correct depth, then press ENTER to store the position.

Vial Syringe setup

Vial Size	⬍
Vial Depth	⬍
Syringe Size	⬍
Syringe install	
Touch/Zero Plunger	

PLG	NDL	TUR	TRY	TCH
▲▼	▲▼	▲▼	▲▼	‡

AUTOMATIC=START

MANUAL = ▼ STO=↵

AUTOMATIC TESTS
- ZERO PLUNGER
- OVEN TOUCH
- VIAL 1 TOUCH

Flow Diagram of the SETUP mode

13.2 Sequence mode

Select the sample list or a sample batch for automatic run.

Sequence Step	Select the sequence step to edit. You can not add steps to the sequence with this command.
Method Number (0-9)	Set the method number that is required for this step
First Sample	Choose the first sample to be injected
Last Sample	Choose the last sample to be injected
Int.Std/Solvent	Set the internal standard or solvent to be injected into the sample vial if an internal standard technique is used
Sample Repeat (0-9)	Set the number of times each sample should be injected
Pre wash solvent (A,B,C,D)	Select the solvent for the prewash (if used)
Post wash solvent (A,B,C,D)	Select the solvent for the postwash (if used)
Sequence Step NXT INS DEL END	• (NXT) **Next**: add a new step to the end of the sequence regardless of which step is being edited. • (INS) **Insert**: insert a new step Selecting insert will insert a step below the one you are editing. • (DEL) **Delete**: delete a step from the sequence. • (END) **Terminate**: will end the sequence at this step and delete any higher steps.
EXIT	

Flow Diagram of the SEQUENCE mode

13.3 Method mode

Defines analytical parameters associated to each sample.

| Method Number (0-9)
Internal standard   Yes or No | • Choose the method number to edit
• Enable the use of the internal standard technique |

| Pre Wash #   (0-15)
      Volume μl   (0-500) | Set the number of solvent flushes an the volume of the syringe to be performed **before** the injection |

| Post Wash #   (0-15)
      Volume μl   (0-500) | Set the number of solvent flush and the volume of the syringe to be performed **after** the injection |

| Pre Wash Mode (Injec,Sample,Step)
Post Wash Mode (Injec,Sample,Step) | Set the mode for the pre/post washes. Inj washes after every injection, Sample washes after every sample(if there are multiple injections from one vial it will only flush at the end of the last one), Step washes at the end of every step |

| Sample Vol   μl   (0-500)
Air   Vol   μl   (0-500) | Set the sample volume to inject.
Set the air volume inserted into the syringe under the sample |

Se Intstd=No

Se Intstd=Yes

| Fill   Vol μl   (0-500)
Fill   Spd μls   (1-100) |

| Fill   Spd μls   (1-100)
IntStd   Vol μl   (0-500) | The Filling Speed is the sampling speed. The IntStd Volume is the volume of the Internal Standard sample used in the sample preparation. |

The Fill Vol is the volume used in the clean with sample cycle and in the bubble elimination (pull-up strokes) cycle
The Filling Speed is the sampling speed.

| Air Gap Mode (Post,Double)
Air Gap μl   (0-500) |

The Air gap Mode defines the sequence batch in the sample preparation.
The Air Gap is the volume inserted between sample and the IntStd sample as forward defined .
The sample sequence into the syringe will be:

DOUBLE   POST
Air Gap Vol[1]   IntStd   Vol
IntStd   Vol   Air Gap Vol[1]
Air Gap Vol[1]   Sample Vol
Sample Vol   Air   Vol.[1]
Air   Vol.[1]   (1) withdrawing under septum

| Sample Washes   (0-15)
Pullup Strokes   (0-15) | Set the number of times the system should be flushed with sample.
Set the number of pullup strokes to use to remove air bubbles from the syringe. Set the volume for each |

| Visc. Dly   sec   (0-15)
Inj. Spd   μls   (1-100) | Set the time that the syringe stays in the sample after the plunger has been raised to allow for viscous samples.
Also set the injection speed – when it is set to maximum it will read HIGH |

| Pre Inj Dwl   sec   (0-99)
Post Inj Dwl sec   (0-99) | Set the wait time **before** and **after** the **injection** with the needle in the injector. |

| Press   ENTER   to   save
Copy   Method   x   as   y | Saves the method to memory (press ENTER). It will save the method you are currently editing (X) to position (Y) in memory. |

EXIT

Flow Diagram of the METHOD mode

13.4 Runtime mode

TRAY MODEL (110,40,10)
TURRET ON (Tray,Waste,Inject)

Display the type of tray identifiedby the autosampler
Moves the turret of the sampler over the waste bottle/vial tray/Injector(s).

INJ.SYNCRO

Use the ↔ to switch the Injection synchronisation

Premere EXIT per ritornare al menu

SYRINGE WASH

Wash solvent	(A-D)	*Select the solvent to wash with*
Wash Repeat	(1-15)	*Select the number of washes*
Volume µL		*Volume of solvent for each wash (from 0.1 µL to installed syringe nominal volume)*

Press "START" to run wash cycle

WASH

Press "EXIT" to return to menu

SINGLE INJECTION

Method Number	(0-9)	*Select method*
Sample Number	(any)	*Select sample to inject*
Int.Std/Solvent[1]	(any vial)	*Select Internal Standard if used*
PreWash Solvent	(A-D)	*Solvent to wash syringe before injection*
Post Wash Solvent	(A-D)	Solvent to wash syringe after injection

Press "START" to run single injection cycle

INJECT

Press "EXIT" to return to menu

AUTOMATIC RUN

First Step Set First step of the sequence to run

Last Step Set Lastt step of the sequence to run

End Seq Output (Yes/No)
Sends a signal on completion of the whole sequence

PowerOn Restart (Yes/No)
Continue with run after a power failure

Empty Pos.Sync. (Yes/No)
If vial is absent emits sample instant signal or continue

Press "START" any time to run automatic injection cycle

Run an injections sequence

Flow Diagram of the RUNTIME mode

Appendix
D

14. Appendix D
SCREENS LIST

14.1 Start Up

```
        HT300A Series
      Software rel.  ①
```
Screen 01

```
      TRAY IDENTIFYNG
       PLEASE WAIT
```
Screen 02

14.2 Run Time Menu

```
      TRAY MODEL  ①
      TURRET ON  ②          ⬍
```
Screen 03

```
      INJ. SYNC  ①          ⬍
      INJ. MODE  ②          ⬍
```
Screen 04

```
      SYRINGE WASH          ⬍
      SINGLE INJECTION      ⬍
```
Screen 05

```
      SINGLE INJECTION      ⬍
      AUTOMATIC RUN         ▸
```
Screen 06

14.3 Syringe Washing

```
        WASH SET UP
         Solvent  ①          ⬍
```
Screen 07

```
      Volume mL  ①          ⬍
      Wash Repeat #  ②      ◂▸
```
Screen 08

14.4 Single Injection

```
┌─────────────────────────────────────┐
│        SINGLE INJECTION             │
│        Method Number  ①      ▼      │
└─────────────────────────────────────┘
```
Screen 09

```
┌─────────────────────────────────────┐
│      Sample number  ①      ✛       │
│      Int.Std/Solvent  ②    ✛       │
└─────────────────────────────────────┘
```
Screen 10

```
┌─────────────────────────────────────┐
│    Pre Wash Solvent  ①     ✛       │
│    Post Wash Solvent  ②    ◂▸      │
└─────────────────────────────────────┘
```
Screen 11

14.5 Automatic Run

```
┌─────────────────────────────────────┐
│       First Step  ①      ◂▸        │
│       Last Step  ②       ✛        │
└─────────────────────────────────────┘
```
Screen 12

```
┌─────────────────────────────────────┐
│    End seq. Output  ①      ✛       │
│    PowerOn Restart  ②      ◂▸      │
└─────────────────────────────────────┘
```
Screen 13

```
┌─────────────────────────────────────┐
│    PowerOn Restart  ①      ✛       │
│    Empty pos .Sync.  ②     ◂▸      │
└─────────────────────────────────────┘
```
Screen 13A

```
┌─────────────────────────────────────┐
│    Stp Met Smp Rpt Pri    ▶        │
│     ①   ②   ③   ④   ⑤    ▴▾       │
└─────────────────────────────────────┘
```
Screen 14

```
┌─────────────────────────────────────┐
│ Injections                          │
│    Carried out   :  ①              │
└─────────────────────────────────────┘
```
Screen 14A

```
┌─────────────────────────────────────┐
│   EXIT → ABORT AUTORUN              │
│   START → CONTINUE                  │
└─────────────────────────────────────┘
```
Screen 18

```
┌─────────────────────────────────────┐
│      END SEQUENCE                   │
│   Total Injections  ①              │
└─────────────────────────────────────┘
```
Screen 19

14.6 Priority Injection

```
┌─────────────────────────────────────┐
│    PRIORITY INJECTION                │
│    Method Number  ①        ▼         │
└─────────────────────────────────────┘
```
Screen 15

```
┌─────────────────────────────────────┐
│    Sample number  ①        ✦         │
│    Int.Std/Solvent  ②      ▼         │
└─────────────────────────────────────┘
```
Screen 10

```
┌─────────────────────────────────────┐
│    Pre Wash Solvent  ①     ✦         │
│    Post Wash Solvent  ②    ◂▸        │
└─────────────────────────────────────┘
```
Screen 11

14.7 Set-up

```
┌─────────────────────────────────────┐
│    Manual  Operations      ▸         │
│    Actual  Parameters      ✦         │
│    Injection  Setup        ✦         │
│    Vial/Syringe  Setup     ▸         │
└─────────────────────────────────────┘
```
Screen 50

```
┌─────────────────────────────────────┐
│ PLG   NDL   TUR   TRY     TCH        │
│ ▲▼    ▲▼    ▲▼    ▲▼       ①         │
└─────────────────────────────────────┘
```
Screen 00

```
┌─────────────────────────────────────┐
│    Actual  Parameters                │
│    Syringe Size  ① ml      ▼         │
└─────────────────────────────────────┘
```
Screen 52

```
┌─────────────────────────────────────┐
│    Vial Size  ① ml         ▲         │
│    Vial Depth  ② mm        ▼         │
└─────────────────────────────────────┘
```
Screen 53

```
┌─────────────────────────────────────┐
│    Needle in Speed  ①      ▲         │
│    Injector Depth  ② mm              │
└─────────────────────────────────────┘
```
Screen 54

```
┌─────────────────────────────────────┐
│    Needle in Speed  ①      ▲         │
│    Front Inj. Depth  ② mm▼           │
└─────────────────────────────────────┘
```
Screen 55

```
┌─────────────────────────────────────┐
│    Needle in Speed  ①      ▲         │
│    Rear Inj. Depth  ② mm▼            │
└─────────────────────────────────────┘
```
Screen 56

```
┌─────────────────────────────────────┐
│          Injection Setup            │
│       Injectors Numbers  ①  ⤵       │
└─────────────────────────────────────┘
```
Screen 57

```
┌─────────────────────────────────────┐
│      Needle in SPEED  ①    ⤧        │
│       Injector Align         ▸      │
└─────────────────────────────────────┘
```
Screen 58

```
┌─────────────────────────────────────┐
│      Injectors Alignment            │
│   TURRET ◂▸        ↕    NEEDLE      │
└─────────────────────────────────────┘
```
Screen 59

```
┌─────────────────────────────────────┐
│      Injectors Alignment            │
│   TURRET STO=⤵       NEEDLE         │
└─────────────────────────────────────┘
```
Screen 59A

```
┌─────────────────────────────────────┐
│      Injectors Alignment            │
│   STO=⤵ mm DEPTH:  -  ①    ↕       │
└─────────────────────────────────────┘
```
Screen 60

```
┌─────────────────────────────────────┐
│      Needle in SPEED  ①    ⤧        │
│       Front Inj. Align.    ↳        │
└─────────────────────────────────────┘
```
Screen 61

```
┌─────────────────────────────────────┐
│      Front Inj. Alignment           │
│   TURRET ◂▸        ↕    NEEDLE      │
└─────────────────────────────────────┘
```
Screen 63

```
┌─────────────────────────────────────┐
│      Front Inj. Alignment           │
│   TURRET STO=⤵       NEEDLE         │
└─────────────────────────────────────┘
```
Screen 63A

```
┌─────────────────────────────────────┐
│      Front Inj. Alignment           │
│   STO=⤵ mm DEPTH:  -  ①    ↕       │
└─────────────────────────────────────┘
```
Screen 64

```
┌─────────────────────────────────────┐
│      Needle in SPEED  ①    ⤧        │
│       Rear Inj. Align.      ▸       │
└─────────────────────────────────────┘
```
Screen 62

```
┌─────────────────────────────────────┐
│      Rear Inj. Alignment            │
│   TURRET ◂▸        ↕    NEEDLE      │
└─────────────────────────────────────┘
```
Screen 65

```
  Rear Inj. Alignment
 TURRET STO=⏃      NEEDLE
```
Screen 65A

```
  Rear Inj. Alignment
 STO=⏃  ① DEPTH:  ②
```
Screen 66

```
 Vial Size   ml  ①    ◂▸
 Vial Depth mm  ②    ⬍
```
Screen 67

```
 Syringe Size ① ▄L    ⬍
    Syringe Install    ↘
```
Screen 68

```
   Syringe Install     ▴
 Touch&Plunger Zero     ▸
```
Screen 69

```
     ZERO PLUNGER
     WAIT RUNNING
```
Screen 70

```
    AUTOMATIC=START
  MANUAL=⬍ STO=⏃
```
Screen 71

```
     ZERO PLUNGER
     WAIT RUNNING
```
Screen 72

```
     WASTE TOUCH
     WAIT RUNNING
```
Screen 73

```
    VIAL 1 TOUCH
     WAIT RUNNING
```
Screen 74

14.8 Method Mode

```
   Method Number  ①    ⬍
    Internal Std  ②    ⬍
```
Screen 20

```
┌─────────────────────────────────┐
│   Pre Wash #  ①          ✦       │
│   Volume ▬l  ②           ✦       │
└─────────────────────────────────┘
```
Screen 21

```
┌─────────────────────────────────┐
│   Post Wash #  ①         ✦       │
│   Volume ▬l  ②           ✦       │
└─────────────────────────────────┘
```
Screen 22

```
┌─────────────────────────────────┐
│   Pre Wash Mode ①        ✦       │
│   Post Wash Mode ②       ✦       │
└─────────────────────────────────┘
```
Screen 23

```
┌─────────────────────────────────┐
│   Sample Vol ▬l ①        ✦       │
│   Air Vol ▬l ②           ✦       │
└─────────────────────────────────┘
```
Screen 24

```
┌─────────────────────────────────┐
│   Fill Vol ▬l ①          ✦       │
│   Fill Spd ▬ls ②         ✦       │
└─────────────────────────────────┘
```
Screen 25

```
┌─────────────────────────────────┐
│   Sample Washes ①        ✦       │
│   Pullup Strokes ②       ✦       │
└─────────────────────────────────┘
```
Screen 28

```
┌─────────────────────────────────┐
│   Visc. Dly sec ①        ✦       │
│   Inj. Spd. ▬ls ②        ✦       │
└─────────────────────────────────┘
```
Screen 29

```
┌─────────────────────────────────┐
│   Pre inj. Dwl sec ①     ✦       │
│   Post inj. Dwl sec ②    ✦       │
└─────────────────────────────────┘
```
Screen 30

```
┌─────────────────────────────────┐
│   Fill Spd ▬ls ①         ✦       │
│   IntStd Vol ▬l ②        ✦       │
└─────────────────────────────────┘
```
Screen 26

```
┌─────────────────────────────────┐
│   AirGap Mode ①          ✦       │
│   AirGap ▬l ②            ✦       │
└─────────────────────────────────┘
```
Screen 27

```
┌─────────────────────────────────┐
│   Press ENTER to save    ▲       │
│   Copy Method ① as ②     ✦       │
└─────────────────────────────────┘
```
Screen 31

14.9 Sequence Mode

```
┌─────────────────────────────────┐
│  Sequence Step  ①        ✦      │
│  Tray Configur  ②        ✦      │
└─────────────────────────────────┘
           Screen 32
┌─────────────────────────────────┐
│  Tray Configur  ①        ✦      │
│  Method Number  ②        ✦      │
└─────────────────────────────────┘
           Screen 33
┌─────────────────────────────────┐
│  First Sample  ①         ✦      │
│  Last Sample   ②         ✦      │
└─────────────────────────────────┘
           Screen 34
┌─────────────────────────────────┐
│  Int.Std/Solvent  ①      ✦      │
│  Sample Repeat.   ②      ✦      │
└─────────────────────────────────┘
           Screen 35
┌─────────────────────────────────┐
│  Pre Wash Solvent  ①     ✦      │
│  PostWash Solvent  ②     ✦      │
└─────────────────────────────────┘
           Screen 36
┌─────────────────────────────────┐
│  Sequence Saving (①)            │
│  NXT INS DEL END                │
└─────────────────────────────────┘
           Screen 37
```

14.10 Error Messages

```
┌─────────────────────────────────┐
│  TRAY ① Removed                 │
│  Waiting Tray                   │
└─────────────────────────────────┘
           Screen E01
┌─────────────────────────────────┐
│  TRAY ① installed               │
│  Press "START" to continue      │
└─────────────────────────────────┘
           Screen E01
┌─────────────────────────────────┐
│  TRAY not Identified            │
│  Waiting Tray                   │
└─────────────────────────────────┘
           Screen E04
┌─────────────────────────────────┐
│  *WASTE*                        │
│  Waste absence. Put in then press "START"│
└─────────────────────────────────┘
           Screen E05
┌─────────────────────────────────┐
│  Vial size mismatch             │
│  Check vial on tray, then "START"│
└─────────────────────────────────┘
           Screen E06
```

```
┌────────────────────────────────────────────────┐
│                *WARNING*                         │
│ WasteFail:  START→Continue; EXIT→abort.          │
└────────────────────────────────────────────────┘
```
Screen E10

```
┌────────────────────────────────────────────────┐
│                *WARNING*                         │
│ Vial absence:  press "EXIT" then fixup           │
└────────────────────────────────────────────────┘
```
Screen E11

```
┌────────────────────────────────────────────────┐
│                *WARNING*                         │
│ Check "Touch Sensor"!                            │
└────────────────────────────────────────────────┘
```
Screen E12

```
┌────────────────────────────────────────────────┐
│                *WARNING*                         │
│ Obstacle found, press "EXIT" then remove         │
└────────────────────────────────────────────────┘
```
Screen E13

```
┌────────────────────────────────────────────────┐
│            Tray range mismatch                   │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E20

```
┌────────────────────────────────────────────────┐
│            Pre-solv vol.> max                    │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E21

```
┌────────────────────────────────────────────────┐
│            Post-solv vol.> max                   │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E22

```
┌────────────────────────────────────────────────┐
│            Filling volume> max                   │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E23

```
┌────────────────────────────────────────────────┐
│            Sample volume> max                    │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E24

```
┌────────────────────────────────────────────────┐
│            Sample+Air vol.> max                  │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E25

```
┌────────────────────────────────────────────────┐
│            SMP+IS/SLV vol.> max                  │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E26

```
┌────────────────────────────────────────────────┐
│            Wrong IS/SLV Range                    │
│ Met:  ①      Stp:  ②        NXT                  │
└────────────────────────────────────────────────┘
```
Screen E27

SCREENS AND FIGURES INDEX