INTEGRA

VIAFLO 96 Operating instructions

125950_V01

INTEGRA

CE

Declaration of conformity | Konformitätserklärung | Déclaration de conformité | Declaración de conformidad | Dichiarazione di conformità

INTEGRA Biosciences AG – 7205 Zizers, Switzerland

declares on its own responsibility that the product | erklärt in alleiniger Verantwortung, dass das Produkt | déclare sous sa responsabilité exclusive, que le produit | declara bajo su propia responsabilidad que el producto | dichiara sotto la propria responsabilità che il prodotto

VIAFLO 96	**Model: 6000**

in accordance with EC directives | gemäss der EU-Richtlinien | est conforme au terme de la directives CE | de acuerdo con las directivas CE | in conformità alle direttive CE

2006/95/EC	Low voltage equipment
2004/108/EC	Electromagnetic compatibility
2002/95/EC	Restriction of Hazardous Substances
2002/96/EC	Waste Electrical and Electronic Equipment

is in compliance with the following normative documents: | mit den folgenden normativen Dokumenten übereinstimmt: | aux documents normatifs ci-après: | cumple las documentos normativos: | soddisfa le normative seguenti:

EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements.
EN 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements.

Standards for Canada and USA

CAN/CSA-C22.2 No. 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements.
UL Std. No. 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements.
FCC, Part 15, Class A	Emission

Zizers, May 10th 2012

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Imprint

This operating instruction manual has part number 125950, the version is V01. It applies to control unit firmware version 2.90 and instrument base firmware version 2.00 or higher until a newer revision is released.

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Further information and operating instructions in other languages are available from info@integra-biosciences.com.

1 Introduction

These operating instructions contain all the information required for installation, operation and maintenance of VIAFLO 96. This chapter informs about the symbols used in these operating instructions, the intended use of VIAFLO 96 and the general safety instructions.

1.1 Symbols used

The operating instructions specifically advise of residual risks with the following symbols:

WARNING

This safety symbol warns against hazards that could result in injury. It also indicates hazards for machinery, materials and the environment. It is essential that you follow the corresponding precautions.

CAUTION

This symbol cautions against potential material damage or the loss of data in a microprocessor controller. Follow the instructions.

NOTE

This symbol identifies important notes regarding the correct operation of the device and labour-saving features.

1.2 Intended use

VIAFLO 96 is an electronic 96 channel hand held pipette designed for aspirating and dispensing liquids in the volume range of 0.5 µl to 1250 µl using GripTip pipette tips. VIAFLO 96 is used like a handheld pipette. The movement and positioning of the 96 channel pipette is supported by a servo assisted steering mechanism which allows fast, precise and stress free multichannel pipetting. It shall not be used for applications other than those specified.

1.3 Safety notes

VIAFLO 96 complies to the recognized safety regulations and is safe to operate. VIAFLO 96 can only be operated when in perfect condition and while observing these operating instructions.

The device may be associated with residual risks if it is used or operated improperly by untrained personnel. Any person operating the VIAFLO 96 must have read and understood these operating instructions, and particularly, the safety notes, or must have been instructed by supervisors so that safe operation of the device is guaranteed.

Regardless of the listed safety notes, additional applicable regulations and guidelines of trade associations, health authorities, trade supervisory offices, etc. must be observed.

Do not open or modify VIAFLO 96 in any way. The sheet metal must not be removed. Repairs may only be performed by INTEGRA Biosciences AG or by an authorised after-sales service member.

Parts may be replaced with original INTEGRA Biosciences parts only.

Never insert the universal power supply (UPS) of any VIAFLO electronic hand pipette into the power connector of the control unit.

Always switch on the VIAFLO 96 and use the control unit (not the base unit) to move the pipettor sidewards.

WARNING

Do not use the VIAFLO 96 near flammable material or in explosive areas. Also, do not pipette highly flammable liquids such as acetone or ether.

When handling dangerous substances, comply with the material safety data sheet (MSDS) and with all safety guidelines such as the use of protective clothing and safety goggles.

CAUTION

Do not immerse the pipetting head in liquid. The fluid can damage internal parts. Avoid pipetting of liquids whose vapors could attack the materials PA (polyamide), POM (polyoxymethylene), FPM (fluor-rubber), NBR (nitrile-rubber), CR (chloroprene), silicone. Corrosive vapors could also damage metallic parts inside the device.

NOTE

Prolonged exposure of the VIAFLO 96 to UV-light can cause discolouration and/or yellowing of the control unit. However, this will not affect the performance of the device in any way.

2 Description of the device

2.1 Scope of delivery

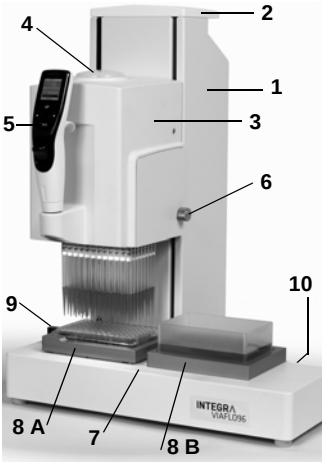
- VIAFLO 96 device
- 2 plate holders, one standard and one with slide function
- Power cable
- Operating instructions

CAUTION

Verify the scope of delivery when unpacking the device and check for potential transportation damage. Do not operate a device that is damaged, instead contact your local dealer.

2.2 Overview of VIAFLO 96

2.2.1 VIAFLO 96 overview



1 **Base unit**, to move left and right (X axis)

2 **Carrying handle** of base unit

3 **Pipetting unit**, to move up and down (Z axis)

4 **Tip load button**

5 **Control unit**, see 2.2.2

6 Knob of **Side cover**, covers the pipetting head

7 **Instrument deck**

8 **Plate holders** on **position A** and **B**

9 **Plate slider**, with front (384), zero (96) and back (384) position to index 96 or 384 well plates (Y axis)

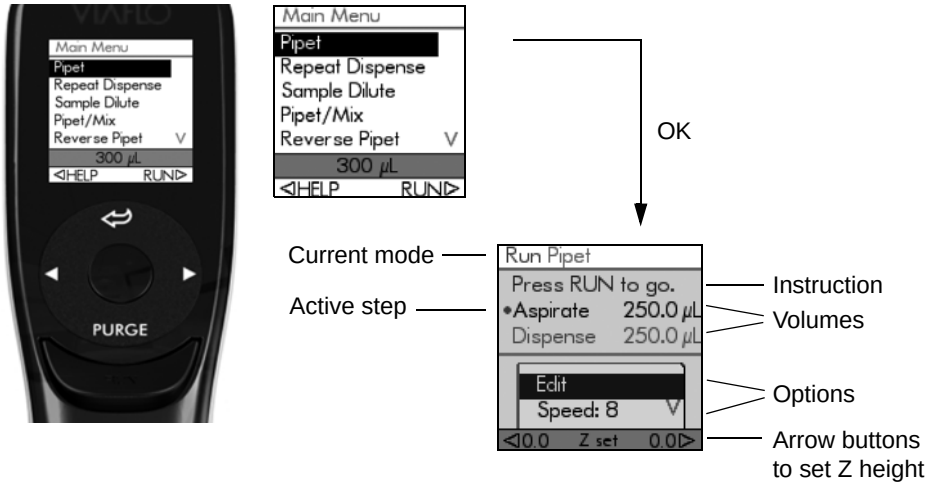
10 **Main switch**

2.2.2 VIAFLO 96 control unit

11 **Display**
12 **Back button**, to navigate backward
13 **Touch wheel,** spin to scroll and move the cursor
14 **OK button**, to make a selection
15 **Left and right arrow buttons**, for selections
16 **Purge button**, to empty tips
17 **Run key**, to start operations
18 **Tip ejector**
19 **Finger hook**, facilitates easy operation

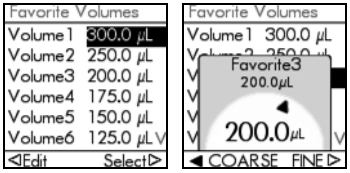
2.2.3 Display

The Display shows all pipetting options.



2.2.4 Touch wheel

The **Touch wheel** is fully operational with only one hand. Rotational finger movements translate into up and down cursor movement on the display. The **Touch wheel** is fully functional with the use of latex gloves.



Move finger on the **Touch wheel** to choose (and highlight) an option on the display. Press **OK** (14) to make the selection.

When a setting dial is displayed, spin the **Touch wheel** to change the value and press **OK**.

2.2.5 Purge button

During pipetting, you can interrupt the current pipetting protocol and purge all remaining liquid currently in the GripTips. To do so, press **Purge** (16).

The pipette will display a prompt:

To proceed, press and release the **Run key** (17). Upon completion of the dispense, the first step in the current program will be displayed.

3 Installation

3.1 Operating environment

VIAFLO 96 has been designed for use in a laboratory. It shall be operated in a dry and dust-free location with a temperature of 5–40 °C and a maximal (non-condensing) relative humidity of 80 %.

3.2 Assembling the instrument

Only use a 3 core mains cable with protective earth to connect VIAFLO 96 with the power source. The socket is located on the reverse side of the instrument.

Put the **Plate holders** (8) on the **Instrument deck** (7) on **Position A** and/or **B**. They can both be placed on either side. Move the **Plate holder** from left to right until the two bolts click into the two holes.

3.3 Setting up VIAFLO 96

Turn on VIAFLO 96 (see "Turn on/off the device" on page 20). To adapt the device to the appropriate applications, select the following functions of the Toolbox menu in this order:

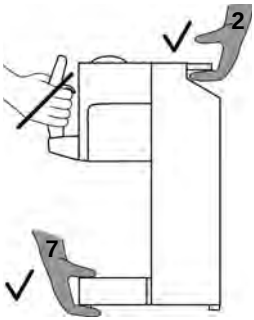
- **Change head**: Select the toolbox menu “Change head” and insert the appropriate pipetting head, see "Change head" on page 14.
- **Load 96 GripTips**, see "Attaching and removing GripTips" on page 20
- **Position settings - Head alignment**: Define the center of the wells of a 96 well plate, see "Position Settings" on page 15.
- **Position settings - Tip align**: VIAFLO 96 base unit can be moved left and right (X direction). Tip align helps to guide the tips into the wells of a microplate.
- **Z-Height**: VIAFLO 96 pipetting unit can be moved up and down (Z direction). A minimum height can be defined in every pipetting mode, e. g. to set optimal tip immersion depth, see “4.3.2 Set Z-Position” on page 21.
- **Preferences**: Define system parameters, see "Preferences" on page 15.

3.4 Relocating VIAFLO 96

Before VIAFLO 96 can be relocated, the pipetting and base unit must be fixed. Select “Park Head” from “Calibration & Service” of the Toolbox menu, see “3.5.4 Calibration & Services” on page 17. Make sure GripTips have been ejected, clear the **Instrument deck** (7) and press the **Tip ejector** (18) to start the park routine. The unit moves to the park position and is anchored on the base with a bolt. Switch off VIAFLO 96 and disconnect it from the electricity mains.

WARNING

VIAFLO 96 must be secured for transport with the option “Park Head” before carrying. The device must not be carried on the control unit, because it will be damaged.



Hold the **Carrying handle** (2) and the **Instrument deck** (7) to lift VIAFLO 96.

3.5 Toolbox - adapt your VIAFLO 96

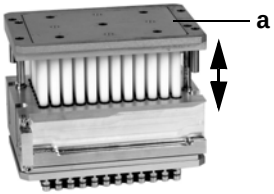
The Toolbox provides options to adapt the device to appropriate applications, setting personal preferences, calibration, computer connectivity and storing owner information.

Toolbox mode	Description
Change Head	Allows to change the pipetting head.
Position Settings	Sets the tip alignment and head alignment.
Preferences	Customizes the system parameters.
Calibration & Service	Sets calibration and service history options and parks the head.
Communications	Enables communication between your VIAFLO 96 and a PC.
Owner Information	View your pipette’s serial number and set a personal ID.
Write Protect	Protects programs or menu options from modification.
Password Key	Displays the encrypted password.

3.5.1 Change head

VIAFLO 96 supports 4 different pipetting heads:

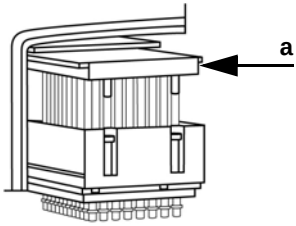
Pipetting head	Volume Range of GripTips
12.5 µl	0.5–12.5 µl
125 µl	5–125 µl
300 µl	10–300 µl
1250 µl	50–1250 µl



Remove the pipetting head from the case.

Pull apart the **Piston plate** (a) on the top of the pipetting head as far as possible.

To install the appropriate pipetting head select the Toolbox option “Change Head”.



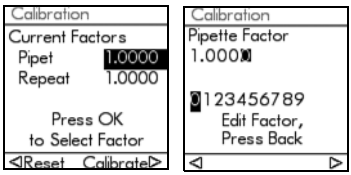
Loosen the knob and remove the **Side cover** (6).

Remove the existing head, if installed.

Push the appropriate pipetting head into the slide block and make sure the **Piston plate** (a) slides onto the brazen rails.

Mount the **Side cover**, screw the knob tightly and press **OK** to continue.

Check whether the Pipet factor on the display corresponds to the Pipet factor labeled on the side of the head itself or indicated in the latest calibration certificate. Accept if the factors coincide. If they don't, click ◁ No.



Select “Pipet” and click Calibrate ▷ to change the Pipet factor accordingly. The correct Pipet factor is then applied to the instrument.

Changing the Repeat factor is only necessary under special circumstances. Refer to the calibration document (PROTO_VIAFLO96_calibration), available on request.

3.5.2 Position Settings

Position settings contains options that help to find correct pipetting positions. These settings are uniquely stored for every size of pipetting head. Perform these alignments with GripTips attached, see “4.2 Attaching and removing GripTips” on page 20.

Position settings	Description	Range
Tip Align	Optimally aligns the tips to target the center of the wells on a 96 well plate. • Select **Position A** or **B** and press **OK** to activate the tip alignment. • **Column align** activates column positions of a plate on **Position A** or **B**, e. g. for serial dilutions. Press **OK**. • Highlight the **Strength** option and press **OK**. Set alignment support strength 1 (low) to 3 (high). Press **OK**. • Press ▷ to save.	On/Off A/B/Off 1-3
Head Alignment	Use a 96 well plate to define the center of the wells. This setting is required only once per pipetting head. Move the unit to position A or B until the selected position, e.g. A, is displayed. • Move the unit down and align the tips to the center of the wells. Select “Set” with ▷ to save this position. • Repeat at position B.	-

3.5.3 Preferences

Preferences customizes your system parameters. Select a preference and press **OK** to access.

Preference	Description	Range
Deck Brightness	Sets brightness of deck illumination. • Use the **Touch wheel** to change the brightness: 1 (off), 2 (weak) to 10 (bright). Press **OK**.	1=Off 2-10
Handle Sensitivity	Sets the sensitivity of the control unit to move the pipetting unit and base unit. • Use the **Touch wheel** to set a sensitivity 1 (low) to 9 (high). Press **OK**.	1-9

Sound	Select an option and press **OK** to change the status of the beep tone between On and Off: • **Step complete**: at the end of a program step • **Program complete**: at program completion • **Purge key**: when Purge is pressed. • **Error message**: when an error message appears or when illegal data entry is attempted. • **Spinner**: When spinning the **Touch wheel**. • **Last dispense**: before the last dispense in Repeat Dispense and Variable Dispense.	On/Off
Main Menu	Select a function to be hidden from the main menu (Off) and press **OK**: • Pipet, Repeat Dispense, Dilute, Pipet/Mix, etc. • The Automatic mode is by default deactivated. To activate it, change the status to “On”. See section 5.3.3 for a description of the Automatic mode.	On/Off
Spinner	Adjust your **Touch wheel** spin sensitivity.	Low, Medium, High
Pipetting	Select an option and press **OK**. • **Purge key speed**: Choose the desired purge speed. • **Extend volume** (not available for 12.5 µl pipetting head): For pipetting below the volume range specified, e.g. extend the minimal pipetting volume on a 125 µl head from 5 µl to 2 µl. • **Delayed blowin**: Choose a timed delay between the blowout and the blowin at the end of a dispense, if no two step blowout is performed, see "Pipetting" on page 21.	1-10 On/Off 0/0.5/1/1.5 s
Help Language	You can choose the language in which all help screens are displayed.	-

After changing desired settings, press ▷ to Save.

3.5.4 Calibration & Services

These options enable you to set calibration features, review service history and move the pipetting head into the parking position.

Calibration & Services	Description	Range
Calibration	Allows for re-calibration of VIAFLO 96 to restore accuracy. The calibration factors for Pipet and Repeat type are displayed. To edit the calibration volumes, press ◁. • **Target Volume**: This is the volume you are interested in using for the calibration. • **Actual Volume**: This is the measured volume obtained when dispensing the target volume. • **Factory Reset**: Resets the correction factor back to the original factory setting. Press ▷ to apply the factory setting. • **Current Factor**: Displays the factor currently in use. This factor should be the same as specified on the head or the latest calibration certificate.	-
Calibration Reminder Time or Cycles	Sets a calibration reminder based on a specified time frame or number of pipetting cycles. When the calibration reminder is displayed, press any key to confirm. However, the reminder will reappear every time the pipette is turned on until you change the reminder time or use the reset option. • **Timer**: Press **OK** to turn the reminder timer On or Off. • **Remind in**: Use the **Touch wheel** to set a reminder interval for calibration (time in months or in thousands of cycles). • **Reset**: Resets the timer to the defined calibration interval. With this option highlighted, press **OK** and ▷ Save to enable.	On/Off 1 -12 months or 10k - 240k cycles
Service History	Displays notes of any service that took place on the VIAFLO 96 listed newest entry first.	-
Park Head	Fixes the pipetting and base unit for safe transportation. • Make sure GripTips are ejected, clear the deck and press the **Tip ejector** to start the park routine. The pipette moves to park position and can then be turned off.	-

After changing desired settings, press ▷ to Save.

3.5.5 Communications

VIAFLO 96 can be programmed from a PC via USB communication cable (type A to B).

Communi-cations	Description	Range
Serial	Connect the USB cable betweenVIAFLO 96 and a PC. Turn serial communication mode “On” to begin bi-directional communication. To exit the communications mode turn off VIAFLO 96.	On/Off

3.5.6 Owner Information

Owner Information	Description	Range
INTEGRA	The first line is highlighted. Press ▷ to enter personal information for your VIAFLO 96. • Use the **Touch wheel** to highlight a character and press **OK**. You can press ◁ to Delete the last character entered. After entering the desired text, press ▷ to Save.	-

In addition, information about your VIAFLO 96, such as serial number (SN), the firmware version of the control unit and of the base unit are displayed.

3.5.7 Write protect

Select this option to protect programs and menu options from inadvertent modification. The pipetting programs can still be used.

Write protect	Description	Range
	Select an option and press **OK** to switch protection On or Off: • **Standard programs** • **Custom programs** • **Calibration** • **Toolbox** • **Password protect**: Protect the access to the write protect menu by selecting “On”. • **Edit password**, if password protect is “On”. To enter a password use the **Touch wheel** to highlight a character and press OK. Press ▷ to save the password. The password must be entered before you can access the write protect menu.	On/Off

Keep the password in a safe place.

3.5.8 Password key

This menu displays the encrypted password, if set. Should you lose your password, contact INTEGRA Biosciences Corp. to retrieve your password using these numbers.

4 Operation

4.1 Turn on/off the device

Turn on:

CAUTION

*Remove hands from **Control unit** (5) at switch on and during homing.*

When VIAFLO 96 is turned on by the **Main switch** (10), you are prompted to press and release the **Run key** (17) to perform a vertical and horizontal homing routine.

Press the **Run key** for pipette homing. If filled tips are still on the device, put a basin below the pipetting head. After homing the Main menu is displayed.

Turn off:

To turn off VIAFLO 96, press the Main switch (10).

NOTE

*VIAFLO 96 will stand-by automatically after 30 minutes of inactivity. Press **OK** to continue.*

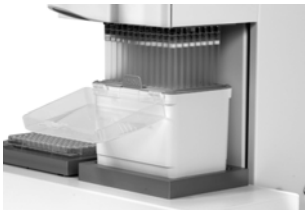
4.2 Attaching and removing GripTips

CAUTION

To ensure optimal performance of your VIAFLO 96, use only GripTips designated for use with VIAFLO 96, see "8 Accessories and consumables" on page 49. To prevent contamination of VIAFLO 96 pipetting heads, it is recommended to use filtered GripTips only.

NOTE

*When using 12.5 µl or 125 µl GripTips, put the tip box on a **Plate holder** with slide function and move the **Plate slider** (9) to the back (384) position, see "4.2 Attaching and removing GripTips" on page 20.*



Put a tip box either on the left or right position of the **Plate holders** (8). Hold the **Control unit** (5) and lower the pipetting head down onto the tip box until the **Tip load button** (4) flashes.

When prompted push the **Tip load button** and at the same time push down the **Control unit**. When the tips are loaded, the **Tip load button** lights up.

Move the **Pipetting unit** (3) up until the light of the **Tip load button** turns off.

CAUTION

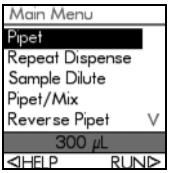
*If only one tip column should be loaded, reduced loading forces are required. When prompted to push the **Tip load button** press **OK** (14) to switch to "low power" loading mode and load tips as described above.*

Discard your used tips:
If liquid is in the tips, empty them by pressing the **Purge button** (16). Tips are removed by pressing the **Tip ejector** (18). Confirm ejection by pressing the **Tip ejector** a second time.

4.3 Start pipetting

4.3.1 Pipetting

Use the **Touch wheel** (13) to scroll to your desired pipetting mode and press **OK** (14). Actions you are about to perform will be displayed on the Run screen.



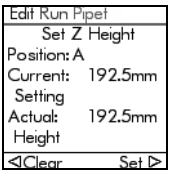
Insert the tips into the liquid to be transferred. Press and release the **Run key** (17) to aspirate the volume selected in the first step of your protocol (shown on the Run screen).

To execute subsequent steps, press the **Run key**.

For a detailed description of all pipetting modes see “5.2 Detailed description of pipetting modes” on page 29. You can change the parameters of your pipetting mode at any time, see the following sections.

4.3.2 Set Z-Position

To define the optimal tip immersion depth, press ◁ or ▷ to access the Z-position screen and move the pipetting unit to position A or B, until the position with the actual Z height and the current setting are displayed.



- Move the unit down to the maximal desired tip immersion depth, e.g. 32 mm. Select ▷ Set to enter this position and save your setting.
- Repeat this procedure with position B.

4.3.3 Blowout modes

During the last dispense of a program, a blowout is performed. Liquid may be aspirated back into the tips when the pistons move back to the home position, a process called blowin. There are two ways to start the blowin:

- **Automatic blowout**: Pressing (and releasing) the **Run key** starts the dispense with blowout and automatic blowin. You can choose a timed delay between the blowout and the blowin, see “Pipetting - Delayed blowin” under “3.5.3 Preferences” on page 15.
- **Two-step blowout**: Perform a two-step blowout to manually delay the blowin:
  - Press and hold the **Run key** to start dispense with blowout.
  - Remove the tips from the target vessel.
  - Release the **Run key** to start blowin.

4.3.4 Recommendations for pipetting

INTEGRA Biosciences recommends the following techniques for enhancing pipetting results. These techniques are consistent with ISO standard 8655-2.

- It is the best to immerse the GripTip just enough in liquid to allow the desired volume to be aspirated.
- Always prewet GripTips. After loading tips onto your pipette, aspirate and dispense the desired liquid 2-3 times to coat the inside of pipet tips. Pre-wetting ensures that the liquid and air inside the tips are at equal temperature and the dead air space is humidified.
- VIAFLO 96 is an air displacement pipette. It requires to touch the GripTips against the side of the well or dip them into the liquid after a dispense. This process is referred to as “touching off” or “tip touch” and prevents liquid from clinging to the pipette tips.
- In programs such as Repeat Dispense, a first and last dispense can be programmed. These two dispenses are not used and are dispensed into the waste as they contain the accumulated pipetting errors. Using a first and last dispense is recommended if accuracy and precision are of high importance.
- Viscous samples should be aspirated and dispensed at the slowest speeds to ensure accurate pipetting. In addition, the pipetting mode “Reverse pipet” can be used to optimize pipetting results with viscous samples.
- For pipetting liquids with high vapor pressures (such as alcohol, methanol, or ethanol), use relatively fast pipetting speeds and avoid prolonged pauses after aspiration.
- Calibrate based on fluid type. VIAFLO 96 is tested and calibrated at the factory for use with distilled water at room temperature. It may be necessary to re-calibrate your VIAFLO 96 if the liquid to be used has different physical properties (specific gravity and vapor pressure) than water. Calibration mode can be accessed in the Toolbox menu.

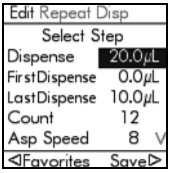
WARNING

Avoid pipetting for extended periods. To minimize the risk of repetitive injury, include regular pauses of several minutes.

4.4 Pipetting options and settings

4.4.1 Edit option

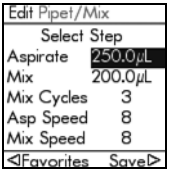
The Edit option is available for each mode. It enables you to access the variables that you can adjust for a pipetting mode. These variables include Speed, Volume, Pace, Count, Mix Cycles, Rows and Direction. Additional steps include first dispense, last dispense, air gap, aspirate speed, dispense speed, etc..



Select a pipetting mode. Then, select Edit on the list of options and press **OK**. A list of associated steps is displayed. For example, if selecting Edit on the Repeat Dispense screen, the modifiable steps associated with Repeat Dispense are displayed.

4.4.2 Volume selection

To change a volume select the Edit option and press **OK**. The adjustable volumes are displayed.



Use the **Touch wheel** to highlight the volume you want to change (Aspirate, Dispense, Mix, or Air Gap).

Press **OK** and a Volume setting “dial” is displayed.

Use the **Touch wheel** to change the volume. Press **OK** to confirm your volume selection and ▷ to save.

NOTE

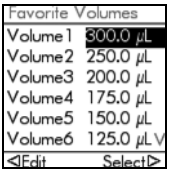
Use the navigation buttons to change the volume in coarse or fine increments. Select COARSE (with ◁) to change the volume in larger increments. Select FINE (with ▷) to change the volume in smaller increments. The increment sizes vary based on the pipetting head, as shown under "Pipetting" on page 48.

Define and select favorite volumes

You can define, save, and select up to ten favorite volumes for quick access. These volumes can only be within the pipetting head volume range.

There are two ways to access and customize the list of favorite volumes:

- When in Pipet mode, use the **Touch wheel** to highlight Favorites and press **OK**.
- When in other modes, select the Edit option and press **OK**. The steps with volumes to be adjusted are displayed. Use the **Touch wheel** to highlight the desired volume and press ◁ Favorites to display the list of favorite volumes.



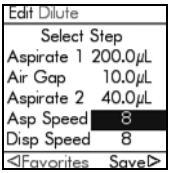
Use the **Touch wheel** to highlight the desired volume and press ▷ Select. Alternatively, modify a volume by pressing ◁ Edit.

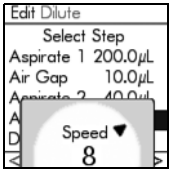
Save your setting ▷.

4.4.3 Speed selection

The speed option controls the speed at which liquid is aspirated, dispensed, or mixed in each mode. Speed can be set as a value from 1 (slowest) to 10 (fastest).

When in any pipetting mode, use the **Touch wheel** to highlight the Speed option and press **OK**. Select the speed and press **OK** to save your setting.





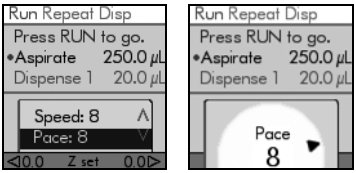
Speed may be changed in most Edit menus. Scroll to the Speed and press **OK**. Choose the speed, press **OK**, and press ▷ to save your selection.

The speeds selected in each mode (i.e., Pipet, Repeat Dispense, etc.) are stored for that mode only.

Speeds can be set independently for each operation (Aspirate, Dispense, Mix).

4.4.4 Pace

The Pace option sets the time gap between dispenses in repeat pipetting. Pace is used in the Repeat Dispense and Variable Dispense modes. While you press and hold the **Run key**, the pipette will dispense multiple programmed volumes with the selected pace. Release the **Run key** to stop the paced dispense. Press **Run** to continue dispensing.



Use the **Touch wheel** to select the desired Pace option and press **OK**.
Select the pace, from None, 1 (slowest) to 9 (fastest).
Press **OK** to save your setting.

4.4.5 Count, Mix Cycle and Columns

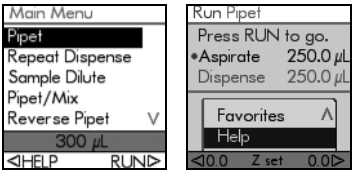
The Count, Mix Cycle, and Columns steps are used in various modes, see "5.2 Detailed description of pipetting modes" on page 29. Each is accessed with the Edit option. Use the **Touch wheel** to highlight the step and press **OK**.

Count sets the number of dispensing steps. Mix Cycle sets the number of mixes. In serial dilution mode, Columns sets the number of columns. A column indicator will notify the number of dilutions performed. Columns (first number) and Mix Cycles (second number) are tracked on the display. Mix Cycles are shown in red when mixing. A green dot on the column number indicates the active program step.

Select a desired value. Press **OK** and then press ▷ to save your setting(s).

4.4.6 Help

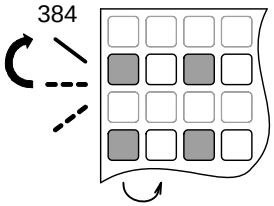
The Help information available for each mode describes the mode operation. You can select Help in two ways:



- While in the Main menu, highlight a pipet mode, then press ◁ to select the Help option.
- While in a pipet mode, find the Help option from the list and press **OK**.

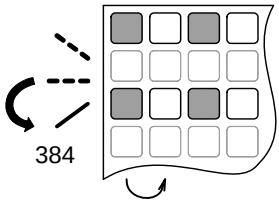
4.4.7 Pipetting between 96 and 384 well plates

For fast and simple reformatting between 96 and 384 well microplates and for loading of 12.5 or 125 µl GripTips, one of the **Plate holders** features a slide function to shift the microplate in Y-direction beneath the pipetting head. Put this **Plate holder**, accommodating the 384 well plate, either on **Position A** or **B** (8). Move the **Plate slider** (9) to one of the following 3 positions:



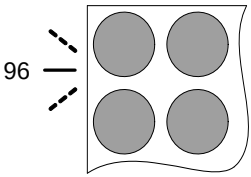
The back position of the **Plate slider** is used to accommodate the front positions of 384 well plates.

For pipetting the second columns move the pipetting head one well to the right, or left respectively.



The front position of the **Plate slider** accommodates the back positions of 384 well plates.

For pipetting the second columns move the pipetting head one well to the right, or left respectively.



Set the **Plate slider** to the middle to pipet 96 well plates.

4.5 Troubleshooting/FAQ

Problem	Probable cause	Remedy
Base unit is drifting sidewards.	Control unit was touched at switch on.	Do not touch the control unit when switching on the VIAFLO 96. Restart VIAFLO 96 to initiate new homing routine.
Touch wheel does not work properly.	Control unit was touched during homing.	Do not touch the control unit during homing. Restart VIAFLO 96 to initiate new homing routine.
Menu options not selectable (greyed).	No pipetting head installed.	Install the pipetting head.
Pipetting not possible.	Side cover missing or pipetting head not correctly installed.	Ensure pipetting head is installed correctly. Mount the side cover and screw the knob tightly.
Tips cannot be loaded.	Z height defined too high above the top of the box.	Exit the pipetting mode. Alternatively clear Z height setting on position where tips are loaded.
Tips are not centered in the wells, although tip alignment is activated.	Head alignment was not performed yet.	Perform head alignment for every pipetting head.
Droplets on the tips.	Temperature of liquid differs from that of air inside the tips.	Pre-wet tips up to 3 times.
	Liquid of low viscosity and high vapor pressure.	Increase dispensing speed.
Obstruction error.	Base unit moved in X direction by hand.	Always hold the control unit to move the pipettor sidewards.
	Tips hit an obstacle during X movement, e.g. box, container.	Move the tips upwards to a height that clears the tip rack out.
	Guide rail soiled.	Clean the guide rail.
	Other causes.	Switch the device off and on.

5 Pipetting modes

This chapter describes how to program the VIAFLO 96 in two ways:

- **Function-based pipetting modes**: You can select from ten predefined pipetting modes that you can quickly and easily edit and execute. They are described in the following sections.
- **Custom step-based programming mode**: You can create and store up to twenty multi-stepped pipetting protocols on the pipettor using the five basic functions of “Aspirate, Mix, Dispense, Purge and Prompt” presented in "Detailed description of pipetting modes" on page 29. The custom programming mode is described in "Custom step-based programming mode" on page 38

5.1 Overview pipetting modes

The table below provides an overview of the selectable pipetting modes. All modes are accessed from the Main Menu. Use the **Touch wheel** to scroll to your desired pipetting mode.

Pipetting mode	Description
Pipet	Allows liquid transfers when aspirate and dispense volumes are equal.
Repeat Dispense	Allows dispensing multiple aliquots of the same volume without refilling the tips after each dispense for fast microplate filling and processing.
Sample Dilute	Allows aspirating of sample and diluent divided by a defined air gap into one tip, followed by a complete dispense.
Pipet/Mix	Allows multiple mixing by aspiration and dispensing of defined volume for automatic re-suspension of pellets.
Manual Pipet	Allows the operator to control the aspiration and dispensing up to the set volume.
Reverse Pipet	Allows liquid transfers of viscous or high vapor pressure liquids by preventing introduction of any air into the sample. The aspiration volume is higher than the volume to be dispensed.
Variable Dispense	Allows dispensing multiple aliquots of different volumes.
Variable Aspirate	Allows aspirating multiple aliquots of different volumes.
Sample Dilute/Mix	Allows aspirating two liquids separated by an air gap followed by a complete dispense and Mix step.
Serial Dilution	Allows aspirating a transfer volume followed by a mix. Columns and Mix Cycles are tracked on the display.
Custom	Allows to create and store of up to 20 multi-stepped pipetting protocols.

Press the **OK** to access the pipetting mode and to start defining parameters.

5.2 Detailed description of pipetting modes

VIAFLO 96 offers ten predefined pipetting modes. Most liquid handling protocols can be easily accommodated using one or more of these modes. The options and steps of the different pipetting modes are described in the following subsections.

5.2.1 Pipet mode

Application: Use this mode for quick transfer of liquid to or from microplates.

Options	Steps	Description
Edit	Aspirate	Sets the aspiration volume that is equal to the dispense volume.
Speed		Sets speed for the current pipetting step (1 = low, 10 = fast).
Favorites		Defines up to 10 favorite volumes
Help		Help information is available for each mode.

Operation:

- With the tip(s) in liquid, press and release the **Run key** to aspirate.
- With the tip(s) in the destination plate, press and hold the **Run key** to execute the dispense and perform a two-step blowout, see "Blowout modes" on page 21.
- When the tips are removed from the target plate, release the **Run key**.

5.2.2 Repeat dispense mode

Application: This mode can be used for fast reagent addition to microplates from one source container. You can dispense a large aspirated volume of liquid in multiple aliquots to multiple targets.

Options	Steps	Description
Edit	Dispense	Sets the volume for repetitive dispensing. The aspirated volume is calculated automatically.
	First Dispense	A pre-dispense volume can be selected independently to improve accuracy and precision. The dispense is discarded.
	Last Dispense	A last-dispense volume can be selected independently to improve accuracy and precision. The dispense is discarded.
	Count	The maximum number of dispenses possible (count) is calculated automatically. This count may be reduced to the desired number.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Disp. Speed	Sets speed uniquely for dispensing (1 = low, 10 = fast).
Speed		Sets speed of the current pipetting step.
Pace		Sets the time duration between dispenses, if keeping **Run key** pressed.
Help		Help information is available for each mode.

Operation:

- With the tip(s) in liquid, press and release the **Run key** to initiate the aspirate step.
- Press and release the **Run key** for every dispense. Alternatively, press and hold **Run** to execute paced dispenses. The dispense number is shown on the display.
- The pipette will stop paced dispenses when it reaches the Last Dispense. This aliquot contains the accumulated error from all prior dispenses. You can choose to use this Last Dispense or discard it. During the Last dispense, press and hold the **Run key** to perform a two-step blowout.

5.2.3 Sample dilute mode

Application: Accomplish accurate sample dilutions by using diluent to “chase” small sample volumes from the pipet tips. An air gap keeps liquid separated in the tips and helps to minimize carryover of diluent when aspirating the sample.

Options	Steps	Description
Edit	Aspirate 1	Sets the volume of the diluent aspirated first in the tip.
	Air Gap	Sets the volume of the air gap to keep both liquids separated.
	Aspirate 2	Sets the volume of the sample in the tip.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Disp. Speed	Sets speed uniquely for dispensing (1 = low, 10 = fast).
Speed		Sets speed of the current pipetting step.
Help		Help information is available for each mode.

Operation:

- Press and release the **Run key** to initiate each aspiration (remove tips from liquid for air-gap aspiration).
- Press and hold the **Run key** to perform a two-step blowout. The entire tip contents will be dispensed together.

5.2.4 Pipet/mix mode

Application: Use this mode when mixing is required immediately after transfer of liquid. This mode saves a programming step by incorporating the mix option after dispensing.

Options	Steps	Description
Edit	Aspirate	Sets the aspiration volume that is equal to the dispense volume.
	Mix	Sets the mixing volume after dispensing.
	Mix Cycles	Sets the number of mix cycles.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Mix Speed	Sets speed uniquely for mixing (1 = low, 10 = fast).
Speed		Sets speed of the current pipetting step.
Help		Help information is available for each mode.

Operation:

- Press and release the **Run key** to initiate the aspiration.
- Press and release the **Run key** to dispense. Mixing occurs automatically after the dispense step.
- Upon completing the desired number of mixes, a blowout is initiated automatically prompting you to remove the tip(s) from the liquid and press **Run** to complete the blowout.

5.2.5 Manual pipet mode

Application: This mode can be used when the aspiration volume is not defined or unknown. You have control over the aspiration and dispense steps and can view the display to confirm how much liquid has been aspirated or dispensed. Manual control over the dispense steps is perfect for performing titrations or for controlling the loading of samples in gel lanes.

Options	Steps	Description
Edit	Aspirate	Sets the aspiration or dispensing volume. Toggle between Aspirate and Dispense using the Direction menu option.
Speed		Sets speed of the current pipetting step (1 = low, 10 = fast).
Direction		Changes the direction of pipetting between aspiration and dispensing.
Favorites		Defines up to 10 favorite volumes
Help		Help information is available for each mode.

Operation:

- When aspirating, the motor will stop when you release the **Run key** or when the programmed aspirate volume is reached.
- You can change pipetting direction at any time even if aspiration volume is not reached. Change the direction of pipetting by pressing **OK** on the Direction option. The notation on the display changes between △ (Aspirate) and ▽ (Dispense).
- The volume remaining in the tip(s) is displayed.

NOTE

Use slower pipetting speeds (1-5) for better control and resolution.

5.2.6 Reverse pipet mode

Application: Use this mode when performing reagent addition where a blowout is not desired when dispensing, e.g. for solutions with high viscosity or tendency to foam. The dispense method used in this mode, prevents introduction of any air into the sample.

Options	Steps	Description
Edit	Aspirate	Sets the aspiration and dispense volume.
	Last Dispense	Sets the volume to leave in the tip until final blowout.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Disp. Speed	Sets speed uniquely for dispensing (1 = low, 10 = fast).
Speed		Sets speed of the current pipetting step.
Help		Help information is available for each mode.

Operation:

- Press and release the **Run key** to initiate the aspiration. The total volume aspirated is the sum of desired dispense volume and last dispense volume.
- Depending on whether you press and release or hold the **Run key** at the start of a dispense step, you can repeat the aspirate and dispense process:
  - **Press and hold the Run key**: Dispense the programmed volume without a blowout, keeping the Last Dispense volume in the tip. Upon release of the **Run key**, you can aspirate the programmed volume again and repeat the dispense process as many times as needed.
  - **Press and release the Run key**: Finish the aspirate and dispense process. The programmed volume will be dispensed. Last Dispense is the next active step.
- To purge the Last Dispense volume with a two-step blowout, press and hold the **Run key**.

5.2.7 Variable dispense mode

Application: Use this mode when differing dispense volumes are required. This mode could be used to quickly set up a dilution series in plates or for feeding similar samples to different assay plates where different sample volumes are needed.

Options	Steps	Description
Edit	Count	Sets the total number of dispensing steps.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Disp. Speed	Sets speed uniquely for dispensing (1 = low, 10 = fast).
	Dispense 1...5	Sets up to 5 different volumes for repeated dispensing. The total volume is automatically calculated.
Speed		Sets speed of the current pipetting step.
Pace		Sets the time interval between dispenses in repeat pipetting (1 = long, 9 = short).
Help		Help information is available for each mode.

Operation:

- Press and release the **Run key** to initiate the aspiration of total volume.
- Press and release the **Run key** to initiate each subsequent dispense. The pipette stops and beeps when ready for the Last Dispense step, i.e. to purge the calculated waste volume amount.
- Alternatively, press and hold the **Run key** to execute paced dispenses. The pipette stops paced dispensing when it reaches the Last Dispense. This aliquot contains the accumulated error from all prior dispenses. You can choose to use this Last Dispense or discard it.
- During the Last dispense, press and hold the **Run key** to perform a two-step blowout.

5.2.8 Variable aspirate mode

Application: This mode can be used for a variety of collection applications where the aspiration volume is well known. This mode is also suited for supernatant collection in microplates.

Options	Steps	Description
Edit	Count	Sets the total number of aspirating steps.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Disp. Speed	Sets speed uniquely for dispensing (1 = low, 10 = fast).
	Aspirate 1...5	Sets up to 5 different volumes used for sequentially aspirating (in the same tip) followed by a single dispense.
Speed		Sets speed of the current pipetting step.
Help		Help information is available for each mode.

Operation:

- With the tip(s) in liquid, press and release the **Run key** to initiate the first aspiration volume. Again in liquid, press and release the **Run key** to initiate the second aspiration volume, etc.
- Press and hold the **Run key** to start Dispense and perform a two-step blowout.

5.2.9 Sample dilute/mix mode

Application: Use this mode to perform sample dilutions where mixing of sample and diluent is required. This mode could also be used to introduce and mix diluent and sample to the first column of a serial dilution plate.

Options	Steps	Description
Edit	Aspirate 1	Sets the volume of the sample aspirated first in the tip.
	Air Gap	Sets the volume of the air gap to keep both liquids separated.
	Aspirate 2	Sets the volume of the diluent in the tip.
	Mix	Sets the mixing volume after dispensing.
	Mix Cycles	Sets the number of mix cycles.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Mix Speed	Sets speed uniquely for mixing (1 = low, 10 = fast).
Speed		Sets speed of the current pipetting step.
Help		Help information is available for each mode.

Operation:

- With the tip(s) in liquid, press and release the **Run key** to initiate aspiration 1. With the tip(s) out of the liquid, press and release the **Run key** for the Air Gap. Again in liquid, press and release the **Run key** to initiate aspiration 2.
- Press and release the **Run key** to dispense the entire tip contents and begin the mixing routine. Upon completing the desired number of mixes, a blowout occurs automatically. Remove tips from liquid and press and release the **Run key** to complete the blowout.

5.2.10 Serial dilution mode

Application: Use this mode to perform serial dilutions. The Serial Dilution mode enables aspiration of a specific volume followed by a mix sequence and ending with the original aspiration volume in the tips.

Options	Steps	Description
Edit	Aspirate	Sets the aspiration volume that is identical to the dispense volume.
	Mix	Sets the mixing volume after dispensing.
	Mix Cycles	Sets the number of mix cycles.
	Columns	Sets the number of columns. A column indicator will notify the number of dilutions performed.
	Asp. Speed	Sets speed uniquely for aspirating (1 = low, 10 = fast).
	Mix Speed	Sets speed uniquely for mixing (1 = low, 10 = fast).
	Disp. Speed	Sets speed uniquely for dispensing (1 = low, 10 = fast).
Speed		Sets speed of the current pipetting step.
Help		Help information is available for each mode.

NOTE

For serial dilutions it is helpful to switch column align on, e.g. for position B, see "Tip Align" under "Position Settings" on page 15.

Operation:

- Attach 8 GripTips on the leftmost column by lowering the **Pipetting unit** onto the tips.

CAUTION

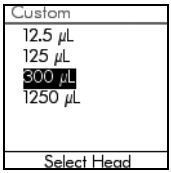
*When prompted to push the **Tip load button** press **OK** (14) to switch to "low power" loading mode. Press the **Tip load button** and at the same time push down the **Control unit** to load the tips with reduced forces.*

- Replace the tip box with the microplate and put the reagent container on the other position, e. g. position A. Press and release the **Run key** to initiate the aspiration of the reagent.
- Start dispensing on the leftmost column of the plate, moving to the right. Press and release the **Run key** to start the dispense and mix sequence. Proceed with the rest of the columns.
- Columns (first number) and Mix Cycles (second number) are tracked on the display. Mix Cycles are shown in red when mixing. A green dot on the column number indicates the active program step.

5.3 Custom step-based programming mode

Application: Use the Custom program mode to create personalized pipetting tasks. Up to twenty programs can be stored.

Select “Custom” to create a personalized protocol. Programs can contain up to 98 individual steps based upon the following basic operations: Aspirate, Dispense, Mix, Purge, Prompt, Set Z Height and Tip Align.



Press ▷ to create a new program. The program is assigned a name automatically (e. g. Custom 1). The custom programs can later be renamed with alphanumeric characters.

Select the pipetting head and the type of the new custom program, e. g. Manual.

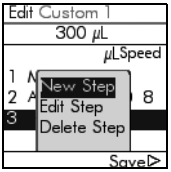
NOTE

The program type can only be selected if “Automatic” is switched on under Toolbox - Preferences - Main Menu, see “3.5.3 Preferences” on page 15.
We recommend creating manual and automatic custom programs on a PC with the VIALINK software, see also “5.4 VIALINK” on page 43.

5.3.1 Manual custom program

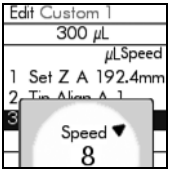
Define step by step a new custom program.

Step	Description
Tip Align	Within a custom program, you can switch the tip alignment ON or OFF, if required. Use the **Touch wheel** to select Tip Align and press **OK**, Select **Position A** or **B** and press **OK** to toggle between On and Off, see also “3.5.3 Preferences” on page 15. The tip align setting applies to the subsequent steps of the custom program.
Mix	Sets the mixing volume after dispensing.
Purge	Purges all remaining liquid currently in the GripTips. A “Purge” step is automatically integrated at the end of a program if the last programming step leaves liquid in the tips.
Prompt	Use the **Touch wheel** to select one of 3 lines and press **OK**. Highlight a character that you want to use and press **OK**. After you enter the desired text, press ▷ to Save.



Select “New step” and press **OK**.

Use the **Touch wheel** to select the position where the new step should be inserted, press **OK** and select an operation, e. g. Aspirate.



Set the volume value and press **OK**.

Set the speed for that step and press **OK**.

When starting with an “Aspirate” step followed by a “Mix” step, the tips contain the aspirate volume after completing the last mix cycle. When starting with a “Mix” step, the tips are emptied upon completion of the last mixing cycle.

To save and store a Custom program, press ▷ Save.

Example of manual custom program

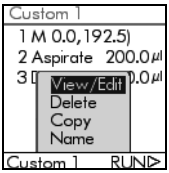
The task is to combine 2 different liquids in a 96 well plate for a kinetic assay and then mixing it to achieve a homogenous solution. The microplate should then be incubated for 5 minutes and the content is then distributed to a 384 well plate. The custom program would be set up as followed:

Program step	**Action**
1) Aspirate liquid 1: 160 µl (e.g. diluent)	With tips in liquid 1 press **Run key**.
2) Aspirate air: 20 µl	Move tips out of liquid and press **Run key.**
3) Aspirate liquid 2: 50 µl (e.g. reagent)	With the tips in liquid 2 press **Run key.**
4) Dispense: 230 µl	Press and hold **Run key** until liquid is dispensed and tips are removed from the liquid (two-step blowout).
5) Mix 3x: 200 µl	Press **Run key**.
6) Prompt: Incubate 5 min	No action.
7) Aspirate: 210 µl	With tips in the 96 well plate, press **Run key**.
8) Dispense: 50 µl	Move the **Plate slider** to the front and press **Run key** to dispense the back positions of the 384 well plate.
9) Dispense: 50 µl	Move the pipetting head one well to the right and press **Run key** to dispense the second columns.

10) Dispense: 50 µl	Move the **Plate slider** to the back and press **Run key** to dispense the front positions of the 384 well plate.
11) Dispense: 50 µl	Move the pipetting head to the left and press **Run key** to dispense the first columns.
12) Purge	Purge (does not need to be programmed). The residual liquid is dispensed into the waste container. Press and hold **Run key** until liquid is purged and tips are removed from the liquid (two-step blowout), see "4.3.3 Blowout modes" on page 21.

5.3.2 Modify existing programs

You have the option of adding a new step, editing a step, or deleting a step.



At the Custom program display, use the **Touch wheel** to highlight an existing program. Press the OK button to select it. Select an option (View/Edit, Delete, Copy, Name) to modify the program.

Press Back to return to the list of Custom programs. To run the program, press ▷.

5.3.3 Automatic custom program

The Automatic Mode performs automatically a defined series of liquid handling operations. This mode is by default inactive and has to be manually enabled, see "3.5.3 Preferences" on page 15.

An automatic Program always starts with a Move (X/Z) step to define the starting position.

Step	Description
Move (X/Z)	Teach the unit by moving the pipetting unit to the desired position. Current Setting is the position to be used by the program and Actual Position indicates the momentary position. Move the pipetting head to the desired position and press Set ▷ to adapt the Current Setting to the Actual Position.

Step	Description
Move Z	Use the **Touch wheel** to select “Move Z” and press **OK**. Teach the Z height by moving the pipetting unit to the desired height. Current Setting is the position to be used by the program and Actual Position indicates the momentary position. Move the pipetting head to the desired position and press Set ▷ to adapt the Current Setting to the Actual Position. The pipetting unit moves to the defined absolute Z height.
Move X	Use the **Touch wheel** to select “Move X” and press **OK**. This command travels the set distance in X-direction relative to the actual position. Setting a negative value (mm) moves the unit to the left, setting a positive value (mm) moves the unit to the right. Use the **Touch wheel** to enter the desired value and press **OK**.

CAUTION

Always ensure that the pipetting head is at a clear height for a movement beside.

Step	Description
Blowout / Blowin	In automatic mode, the blowout and blowin need to be programmed after the last dispense. After a blowout, a blowin has to follow at some point. It does not have to follow immediately and can have steps in between. E.g. after the blowout a move step can be programmed to move the tips out of the liquid, and is then followed by the blowin. Note: When using “Purge” to empty the tips, a blowout/blowin is performed automatically and does not need to be programmed.
Delay	A delay is a pause between the last and the next step. If it is set to 0.0 s, pressing the run button is required to trigger the next step.
Loop	A loop repeats the steps between the selected step and the loop command. Chose to which step the loop directs and how many times the loop should be performed. The number of steps can often be shortened by adding a loop. Note: Nested loops (loops inside loops) are not allowed.

As manual custom programs, automatic programs can be created using the control unit of VIAFLO 96. However, we strongly recommend using the VIALINK software to set up automatic custom programs, see *"5.4 VIALINK" on page 43*.

Example of automatic custom program

The task is to perform a seral dilution over the entire 96 well plate. The concentrated sample is in column 1. The custom program would be set up as followed (note that position values might slightly differ when adapting the protocol on a different unit):

Program step	Action
1) Move (X,Z): X -18.5 mm, Z 131,5 mm	The pipetting head moves to a save start position (clear height). Check, if everything is prepared.
2) Move (X,Z): X -16.6 mm, Z 30,1 mm	Sets the start position to aspirate the sample in the first column.
3) Aspirate liquid: 100 µl	The concentrated sample is aspirated.
4) Mix: 2x 100 µl	The sample is re-suspended during mixing. The aspiration volume of 100 µl remains in the tips after mixing.
5) Move Z: 40.8 mm	The pipetting head moves upwards.
6) Move X: 9.0 mm	The pipetting head moves to the next column on the right.
7) Move Z: 30.0 mm	The pipetting head moves down into the well.
8) Mix 3x: 150 µl	During mixing the sample is diluted, 100 µl remain in the tips after mixing.
9) Loop: Step 5, Count 11	Continue serial dilution in the next wells (repeats steps 5-8 eleven times).
10) Move Z: 80.7 mm	The pipetting head moves upwards.
11) Move (X,Z): X -75.8 mm, Z 52.6 mm	The pipetting head moves to the waste container.
12) Purge: Speed 8	The residual liquid is dispensed into the waste container.

NOTE

GripTips cannot be attached automatically. Load the tips before starting the program.

5.4 VIALINK

VIALINK is a pipette management software for the PC and is used to manage VIAFLO 96 and VIAFLO electronic hand held pipettes. It allows to create custom programs, manage a library of custom programs, establish a service history and more.

To establish a connection between computer and VIAFLO 96, a standard USB cable (type A to B) is required.

The software VIALINK can be downloaded from the INTEGRA website in the product section and is free of charge for all VIAFLO 96 customers. A detailed description of the software, along with the operating instructions, can be found on the website as well.

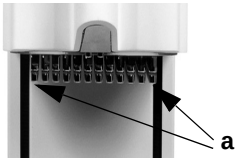
6 Maintenance

6.1 Cleaning

WARNING

Always turn off power and disconnect the VIAFLO 96 from the mains when carrying out maintenance work.

The VIAFLO 96 requires very little routine maintenance. If the external components get soiled, clean them with a lint-free cloth lightly soaked with mild soap solution in distilled water or with a 70 % dilution of Isopropyl or Ethanol. Never use acetone or other solvents. Ensure that the guide rails of the base unit are clean, greasing is not required.



Regularly clean the 96 tip fittings (a) of the pipetting head with a moist lint-free cloth lightly soaked in distilled water or 70 % Ethanol.

It is recommended to perform a leak test every 3 months or when errors occur.

Leak test:

Leak test may be done on half of the head at a time or column by column for a better view of the liquid levels (load 8 GripTips with reduced forces as described under operation of "5.2.10 Serial dilution mode" on page 37.)

1) Pre-wet new unused GripTips three times prior to starting the test.
   a) In the Pipet mode, program the VIAFLO 96 to aspirate full volume. Set aspirating speed at 6.
   b) Fill a reservoir with distilled water (add some food coloring for better visibility). Pre-wetting is done by aspirating full volume and purging the liquid out of the GripTips.
2) In the Pipet/Mix mode, program the VIAFLO 96 to aspirate full volume at speed 6 and mix at full volume. Set to mix to 6 cycles and set mixing speed at 6.
3) Start the program and after the liquid has been aspirated, leave the tips immersed in the liquid for 10 seconds. The liquid levels in the tips should not decrease in that time.
4) Raise head to remove GripTips from distilled water and observe for approximately 20 seconds.
   a) Observe whether liquid droplets are forming at the end of the GripTips.
   b) Verify liquid level is even across all channels.
5) Immerse GripTips approx. 2 mm into distilled water and press **Run key** to start mix cycle.
   a) Observe whether air bubbles are forming when dispensing.
   b) Check whether the levels stay approximately on the same level across all channels.
   c) At the end of a last dispense it is normal to have air bubbles because a blowout is performed.

6) Carry out steps 1-5 two times with new GripTips.

Signs indicating a leak

1) During the mix cycle in the leak test, the liquid level of 1 or more channels is decreasing.

NOTE
A decreasing liquid level at aspiration could be an indication of a slow leak. Performing a retest at 10 mixes may help identify a slow leak.

2) Liquid is left in a tip after the last dispense during the leak test.
3) One or more channels show air bubbles during the mix cycle in the leak test.
4) Droplets are forming when holding the tips in the air for 20 seconds, even if a pre-wet was performed.
5) The liquid levels are not equal on all channels after aspiration.

If a leaking channel is identified, change the red O-ring on that specific tip fitting (see 6.2.2) or contact your service technician.

6.2 Servicing

WARNING
If liquid ever enters the internals of VIAFLO 96 or the pipetting heads, please contact your service technician.

Pipetting heads need to be serviced by INTEGRA in the following cases:
• Liquid has entered the pipetting head
• The pipetting head had to be autoclaved for decontamination
• One or more channels did not pass the leak test
• The pipetting head was damaged

WARNING
If working with infectious materials, e. g. human pathogens, the pipetting heads need to be autoclaved or gas sterilized to decontaminate before sending them to service. The declaration on the absence of health hazards must be signed to confirm that the equipment has not been exposed to biohazards or radioactive materials and was appropriately decontaminated. This is necessary to protect service personnel.

6.2.1 Blocked pipetting unit

If the control unit is defect or the pipetting unit parks in down position and the pipetting head can not be removed, start the following procedure:

1) Turn off the VIAFLO 96 and turn it on again while pressing the **Tip load button** (4) for approx. 5 sec. until the **Tip load button** lights up permanently.
2) Release the **Tip load button**, The button flashes, the pipetting unit moves up and the removal of the pipetting head will be enabled. (Ignore any display messages of the control unit.)
3) As soon as the button lights permanently, you can remove the pipetting head.
4) Press the **Tip load button** for approx. 5 sec. until the button flashes. The pipetting unit moves into the park position.
5) When the light of the **Tip load button** is off, turn off the VIAFLO 96.

6.2.2 Changing O-rings of tip fittings

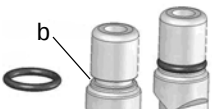
300 µl and 1250 µl pipetting heads feature tip fittings with red O-rings to seal against the inside wall of GripTips, providing optimal sealing.

O-rings are made of durable silicone. If necessary, e.g. in case of a leakage due to damaged O-rings, you can replace these O-rings. A set of spare O-rings and an O-ring removal tool are included with each 300 µl and 1250 µl pipetting head, but can also be ordered separately, see “8 Accessories and consumables” on page 49.

WARNING

Avoid mechanical damage of the tip fittings.

Choose the side of the O-ring removal tool corresponding to the size of the pipetting head (300 µl or 1250 µl). Slide the O-Ring removal tool sidewards onto the tip fitting until the O-ring (a) builds a loop. Cut the O-ring with a fine scissor and remove it.



Slide a new O-ring over the tip fitting (b).

6.3 Calibration

VIAFLO 96 can be calibrated by adjusting a correction factor in the software. The correction factor is determined by a nominal volume and the measured volume. To assess the accuracy and precision of VIAFLO 96 pipetting heads, different methods can be used:

- Measure one or more channels gravimetrically and then all other channel by photometry. Compare the photometrically determined channels relative to the gravimetrically measured channels. Contact INTEGRA for a detailed protocol.
- By photometry only.
- Using commercially available systems (e.g. ARTEL MVS).

6.4 Equipment disposal

The VIAFLO 96 is labelled with the “crossed-out wheeled bin” symbol to indicate that this device must not be disposed of with unsorted municipal waste. Instead, it is your responsibility to correctly dispose of your waste equipment by handing it over to an authorised facility for separate collection and recycling. It is also your responsibility to decontaminate the device in case of biological, chemical, and/or radiological contamination so as to protect from health hazards the persons involved in the disposal and recycling of equipment.

For more information about where you can drop off your waste equipment for recycling, please contact your local dealer from whom you originally purchased the product or your local council.

By doing so, you will help conserve natural resources and you will ensure that your waste equipment is recycled in a manner that protects human health and the environment. Thank you!

7 Technical Data

7.1 Environmental conditions

	Operation
Temperature range	5–40 °C
Humidity range	< 85 % RH non-condensing
Altitude range	< 2000 m

7.2 Specification of the device

Dimensions (W x D x H)	42 cm x 30 cm x 54 cm (17” x 12“ x 21“)
Weight incl. pipetting head	25.7 kg (56.7 lbs)
Power Requirements	100–240 VAC, 50/60 Hz
Pipetting channels	96, individual
Pipetting speed	10 steps
Compatible plate formats	96 and 384 wells, shallow and deep well
Plate positions	2
Pipetting technology	Air displacement
User interface	Touch wheel, color display

7.3 Pipetting

Volume range	**0.5–12.5 µl**	**(2 µl–)[1] 5–125 µl**	**(5 µl–)[1] 10–300 µl**	**(25 µl–)[1] 50–1250 µl**
Accuracy	±2% or 0.2 µl	±2% or 0.5 µl	±2% or 1 µl	±2% or 5 µl
Precision	±1.5% or 0.12 µl	±1.5% or 0.25 µl	±1.5% or 0.75 µl	±1.5% or 2.5 µl
Min. scrolling volume increment	0.01 µl	0.1 µl	0.5 µl	1.0 µl

1. The volumes in brackets refer to extended volumes, see “Pipetting” under “3.5.3 Preferences” on page 15. For the extended range different specifications apply.

8 Accessories and consumables

8.1 Accessories

Pipetting heads		Part No.
96 channel pipetting heads	0.5–12.5 µl	6101
	5–125 µl	6102
	10–300 µl	6103
	50–1250 µl	6104

General	Part No.
Standard plate holder (for 96 well plate)	6205
Plate holder with slide function (for 96/384 well plate)	6210
Spring loaded plate holder A with slide function	6215
Spring loaded plate holder B with slide function	6220
PCR 96 well cooling plate	6250
PCR 384 well cooling plate	6255
O-ring removal tool (for 6103 and 6104)	130-00731-00

8.2 Consumables

GripTips for VIAFLO 96		Part No.
12.5 µl GripTips	5 inserts of 384 tips, non-sterile, GREEN CHOICE	6412
	5 boxes of 384 tips, non-sterile	6413
	5 boxes of 384 tips, sterile	6414
	5 boxes of 384 tips, sterile, with filter	6415
125 µl GripTips	5 inserts of 384 tips, non-sterile, GREEN CHOICE	6422
	5 boxes of 384 tips, non-sterile	6423
	5 boxes of 384 tips, sterile	6424
	5 boxes of 384 tips, sterile, with filter	6425
300 µl GripTips	5 inserts of 96 tips, non-sterile, GREEN CHOICE	6432
	5 boxes of 96 tips, non-sterile	6433
	5 boxes of 96 tips, sterile	6434
	5 boxes of 96 tips, sterile, with filter	6435
1250 µl GripTips	5 inserts of 96 tips, non-sterile, GREEN CHOICE	6442
	5 boxes of 96 tips, non-sterile	6443
	5 boxes of 96 tips, sterile	6444
	5 boxes of 96 tips, sterile, with filter	6445

VIAFLO 96 reservoirs		Part No.
Reservoir base	for VIAFLO 96 (10 bases per case)	6300
Disposable reagent reservoirs (incl. 2 bases)	100 ml, sterile, individually sealed, 30 reservoirs per case	6311
	100 ml, sterile, bulk, 200 reservoirs per case	6312
	300 ml, sterile, individually sealed, 30 reservoirs per case	6321
	300 ml, sterile, bulk, 200 reservoirs per case	6322

O-rings for tip fittings		Part No.
300 µl	Replacement kit 24/pack	100-00027-50
1250 µl	Replacement kit 24/pack	100-00028-50