# INTEGRΛ



**ASSIST** Operating Instructions

# Declaration of conformity

## INTEGRA Biosciences AG – 7205 Zizers, Switzerland

declares on its own responsibility that the device

| Description | Model |
|---|---|
| **ASSIST** | **4500** |

complies with:

| EU Directives | Scope | Date effective |
|---|---|---|
| 2014/35/EU | Low voltage directive (LVD) | 20.04.2016 |
| 2014/30/EU | Electromagnetic compatibility (EMC) | 20.04.2016 |
| 2014/53/EU | Radio equipment directive (RED) | 13.06.2016 |
| 2012/19/EC | Waste electrical and electronic equipment (WEEE) | 14.02.2014 |
| 2011/65/EC | Restriction of hazardous substances (RoHS) | 03.01.2013 |
| **EU Regulations** | **Scope** | **Date effective** |
| 1907/2006 | Registration, evaluation, authorisation and restriction of chemicals (REACH) | 01.06.2007 |
| 2019/1782 | External power supply efficiency | 01.04.2020 |
| **EU Standards** | **Scope** | |
| EN 9001:2015 | Quality Management | |
| EN 61010-1:2010 | Safety general laboratory equipment | |
| EN 61326-1:2013 | Electromagnetic compatibility laboratory equipment | |
| EN 61010-2-081:2015 | Safety automatic laboratory equipment | |

| GBR Regulations | Scope | Date effective |
|---|---|---|
| S.I. 2016/1101 | Electrical equipment safety | 08.12.2016 |
| S.I. 2016/1091 | Electromagnetic compatibility (EMC) | 08.12.2016 |
| S.I. 2017/1206 | Radio equipment (RED) | 26.12.2017 |
| S.I. 2013/3113 | Waste electrical and electronic equipment (WEEE) | 01.01.2019 |
| S.I. 2012/3032 | Restriction of hazardous substances (RoHS) | 02.01.2013 |
| **GBR Standards** | **Scope** | |
| BS 61010-1:2010 | Safety general laboratory equipment | |
| BS 61010-2-081:2015 | Safety automatic laboratory equipment | |
| BS 63000:2018 | Restriction of hazardous substances (RoHS) | |

| USA Regulations | Scope | |
|---|---|---|
| 47 CFR Part 15 (FCC) | Electromagnetic compatibility (EMC) | |
| 17 CFR Parts 240 & 249b Dodd frank "Conflict minerals" | | |
| 27 CCR Parts 25102-27001 | Proposition 65: The safe drinking water and toxic enforcement act | |

| USA Standards | Scope |
|---|---|
| UL 61010-1:2012 | Safety general laboratory equipment |
| UL 61010-2-081:2015 | Safety automatic laboratory equipment |

| CAN Standards | Scope |
|---|---|
| CSA-C22.2 No. 61010-1 | Safety general laboratory equipment |
| CSA C22.2 No. 61010-2-081 | Safety automatic laboratory equipment |

| CHN Regulations | Scope | Date effective |
|---|---|---|
| Order 32/2016 | Restriction of hazardous substances (RoHS) | 01.07.2016 |

| CHN Standards | Scope | |
|---|---|---|
| SJ/T 11364-2014 | Restriction of hazardous substances (RoHS) | |

| JPN Regulations | Scope | Date effective |
|---|---|---|
| PSE (Denan) Law | Electrical appliance and material safety law | 01.01.2014 |

| EAC Технический регламент Таможенного союза | |
|---|---|
| TP TC 004/2011 | О безопасности низковольтного оборудования |
| TP TC 020/2011 | Электромагнитная совместимость технических средств |

Zizers, March 29, 2021

Urs Hartmann
CEO

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## Imprint

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This operating instruction manual has part number 127950, the version is V13. It applies as of (see Toolbox - Device information):

| | |
|---|---|
| FW version VIAFLO Pipettes | 4.30 or higher |
| FW version ASSIST | 1.07 or higher |

of ASSIST until a newer revision is released.

VIAFLO, VIALINK, and GripTip are trademarks of INTEGRA Holding, Switzerland.

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**Customer service**
Please contact your local INTEGRA Biosciences representative.
To find out name and address go to www.integra-biosciences.com.

Further information and operating instructions in other languages are available on www.integra-biosciences.com or on request info@integra-biosciences.com.

# Table of Contents

# 1    Introduction

These operating instructions contain all the information required for installation, operation and maintenance of the ASSIST. This chapter informs about the symbols used in these operating instructions, the intended use of the ASSIST 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 labor-saving features.*

The device is marked with the following symbol:

*BIOHAZARD*
*The instrument can be potentially biohazardous due to the use of biozazardous substances by the operator.*

## 1.2    Intended use

This is a general-purpose laboratory instrument for use in research only. Any use of this instrument in a medical or IVD setting is the sole responsibility of the user.

This product may only be operated in a secure, protected network with validated, trustworthy clients. The operator must ensure that network security measures are always up-to-date and state-of-the-art. This product may not be directly exposed to the internet.

If the ASSIST is used in a manner not specified by INTEGRA Biosciences, the protection provided by the ASSIST may be impaired.

With a VIAFLO electronic multichannel pipette attached, ASSIST performs pipetting operations in microplates automatically.

> *NOTE*
> *Only VIAFLO multichannel pipettes (as of serial number 600 000 and firmware version 3.00 or higher) can be used with ASSIST. The VIAFLO pipette needs its own pipette communication module, which has to be ordered separately (part no. 4221).*

VIAFLO electronic pipettes are microprocessor controlled and stepper motor driven pipettes. They are used for aspirating and dispensing liquids in the volume range of 0.5–1250 µl using GripTip pipette tips. Please refer to the VIAFLO electronic pipettes operating instructions for more detailed informations on www.integra-biosciences.com.

## 1.3    Safety notes

ASSIST complies to the recognized safety regulations and is safe to operate. ASSIST can only be operated when in intact 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 ASSIST 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.

*CAUTION*

*Do not open or modify the ASSIST in any way. Repairs may only be performed by INTEGRA Biosciences AG or by an authorized after-sales service member. Parts may be replaced with original INTEGRA Biosciences parts only.*

*WARNING*

*Do not use the ASSIST 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.*

*NOTE*

*Prolonged exposure of the ASSIST to UV-light can cause discoloration and/ or yellowing. However, this will not affect the performance of the device in any way.*

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

Please visit our website www.integra-biosciences.com on a regular basis for up to date information regarding REACH classified chemicals contained in our products.

# 2    Description of the device

## 2.1    Scope of delivery

- ASSIST (VIAFLO electronic pipette to be ordered separately)
- Mains adapter
- Sample pack 10 ml, 25 ml and 100 ml reagent reservoir

**STOP** *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 INTEGRA representative.*

## 2.2    Overview of the ASSIST

### 2.2.1    ASSIST device
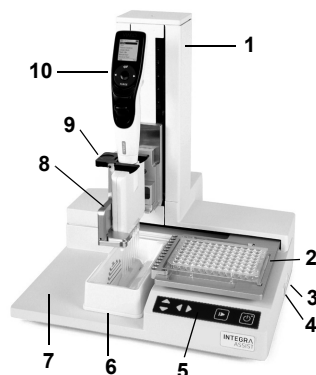
1  **Tower** with pipette arm. Arm moves in Z-direction

2  **Plate carrier,** moves in X-direction

3  **Power connection**

4  **USB port**, for firmware updates

5  **Keypad**

6  **Reservoir position**

7  **Instrument base**

8  **Pipette holder** on pipette arm with lever to shift the pipette in Y-direction

9  **Gripper**, lever to release the pipette

10  **VIAFLO electronic pipette**

### 2.2.2    Keypad
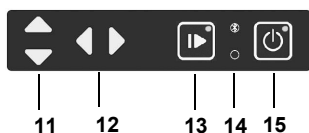
11  ▲ **up** and ▼ **down** arrow keys move the pipette along the Z-axis to teach pipetting heights.

12  ◀ **left** and ▶ **right** arrow keys move the plate carrier along the X-axis to adjust the plate carrier position.

13  **Start/pause key**, to start/stop operations.
Green LED blinks: press to start operation/homing
Green LED lights: operation performed

14  **Communication LED** (lights blue if connection is active) and **error LED** (flashes red in case of error)

15  **On/off key** (lights green if on)

## 2.3    Overview of VIAFLO electronic pipette

### 2.3.1   VIAFLO pipette parts



16  **Display**

17  **Back button**, to navigate backward

18  **Touch wheel,** spin to scroll and move the cursor

19  **OK button**, to make a selection

20  **Left and right arrow buttons**, for selections

21  **PURGE button**, to empty tips

22  **RUN button**, to start operations

23  **Tip ejector**

24  **Finger hook**, facilitates easy operation

25  **Volume indicator label**, color matches GripTip box insert.

### 2.3.2   Display

The Display shows all pipetting options.



Battery life indicator

OK - Select a program category and a program

Current category

Active step

Instruction

Volume

Options
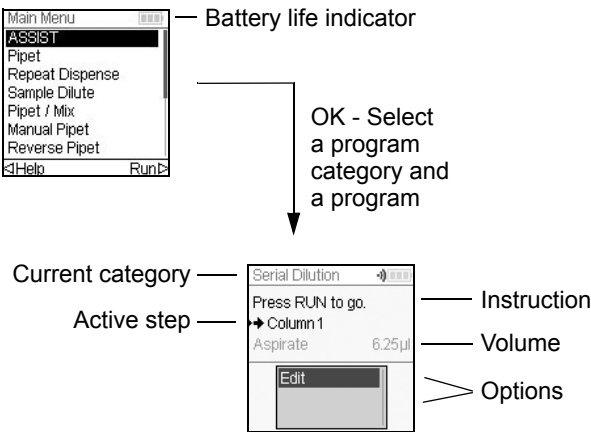
# 3       Installation

## 3.1     Operating environment

ASSIST 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 %, see "7.1 Environmental conditions" on page 31.

## 3.2     Relocating ASSIST

Before ASSIST can be relocated, clear the **instrument base** (7). Switch off the device and disconnect it from the electricity mains. Lift the ASSIST on both sides of the **instrument base**. Never lift the instrument on the **tower**.

## 3.3     Charging the battery of the VIAFLO electronic pipette

The battery indicator in the upper right corner of the pipette screen informs about the battery status. When it turns red, the pipette needs to be charged.

**STOP**    *CAUTION*
*Use only the approved INTEGRA battery, power supply or charging stand. Use of an incompatible power transformer can damage the pipette.*

The battery can be charged using either the mains adapter or a charging stand, see ("8.2 Accessories for VIAFLO electronic pipettes" on page 34).

Insert the mains adapter connector into the receptacle on the top back of the pipette. Plug the mains adapter into a wall outlet.

## 3.4     Adapting the pipette holder

The pipette holder can be adapted to the type of the VIAFLO pipette.
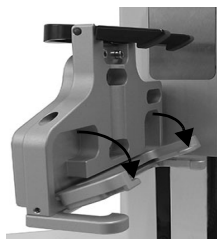
To adapt the holder for an 8- or 16-channel pipette, pull the silver lever down as shown beside.

Lift the lever up to insert a 12-channel pipette.

## 3.5    Attaching and removing a VIAFLO electronic pipette

Rotate the lower hosing of the VIAFLO pipette by 90 degrees as displayed in the picture.

To install a pipette, hold it at an angle and insert it into the pipette holder.

Then lift up until the black gripper snaps in place.

To release the VIAFLO pipette lift the black gripper by pushing down on one end.

## 3.6    Toolbox settings

### 3.6.1    Enabling ASSIST mode

The ASSIST mode is hidden from the Main Menu of the VIAFLO pipettes by default.

Use the **touch wheel** to select Toolbox from the Main Menu and press **OK**.

Select Preferences and then Main Menu. Enable the ASSIST mode by pressing **OK** (green ✓) and press ▷ to save your settings.

### 3.6.2   Overview of Toolbox for ASSIST

The Toolbox for ASSIST provides options to adapt the pipette to appropriate applications.

| Toolbox mode | Description |
| --- | --- |
| Plate Alignment | Aligns the pipette's tips along the X-axis with the center of the wells in the first row/column of a microplate. |
| Tip types | Sets the tip type standard, short or long (only where applicable). |
| Device Information | Contains information about the instrument and the software. |
| ComModule Pairing | Pairs the INTEGRA pipette and the ASSIST. |
| Move Speed | Allows to change the move speed of the pipette arm and the plate carrier. |

### 3.6.3   Device Information

This section contains information about your ASSIST, such as serial number, firmware (FW) and hardware (HW) version and error status.

### 3.6.4   Connection between ASSIST and pipette

The first time a specific VIAFLO pipette is going to be connected to the ASSIST, both instruments need to be paired. Scroll to the Toolbox and press **OK**.
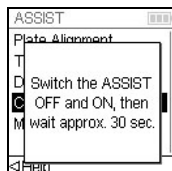


From the ASSIST option select ComModule Pairing.

Switch OFF and ON the ASSIST device, see "4.1 Turn on/off the ASSIST device" on page 16, and wait approx. 30 sec. until the message "Pairing successful" is displayed. Press **OK**.

### 3.6.5   Setting tip type

Some pipette tips of the same volume are available in different lengths (e.g. 12.5 µl in short, standard and long version). In order to teach the correct heights for ASSIST, the used tip type must be specified. Go to the Toolbox of the VIAFLO pipette, select ASSIST and press **OK**.



Select Tip Type and press **OK**.

Use the **touch wheel** to highlight Standard or Long. Press **OK** to select the correct tip type (green ✓) and Save ▷ your settings.

### 3.6.6    Adjusting the plate alignment

The Plate Alignment option is used to align the pipette's tips along the X-axis with the center of the wells in the first row/column of a microplate (depending on plate orientation). Select ASSIST on the Toolbox and press **OK**.

| ASSIST ◀)▯▮▮▮ | Plate Alignment ◀)▯▮▮▮ |
|---|---|
| **Plate Alignment** | Wells            96 |
| Tip Type | Orientation   landscape |
| Device Information | |
| ComModule Pairing | Place pipette on ASSIST, |
| Move Speed | move to Row A / Col. 1 |
|  | and press 'Set'. |
| ◁Help | Set▷ |
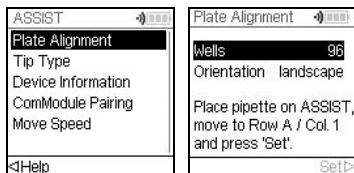
Select Plate Alignment and press **OK**.

Define the number of wells of your plate (e.g. 96 for a 96-well plate) and choose the plate orientation from either landscape or portrait. Use the **touch wheel** to select an option and press **OK**.

With GripTips attached, install the VIAFLO pipette on the ASSIST and put a plate on the plate carrier. Use the ◀ **left** arrow key to positon row A / column 1 below the tips. Press the arrow keys until the tips target the center of the wells. Press Set ▷ to save this position.



*NOTE*
*Plate alignments with 384 well plates require a 16-channel VIAFLO pipette. When working with 8- or 12-channel pipettes in a 384 well plate, the plate alignment is made on a 96-well plate nevertheless.*



a    For fine adjustment of the pipette tips along the Y-axis turn the screw on the pipette holder (a) with a flathead screw driver size 2. Turning clockwise moves the pipette to the rear, counterclockwise to the front. The maximum Y-shift is +/- 5 mm.

### 3.6.7    Move Speed

Allows to change the move speed of the pipette arm (1, Z-axis) and the plate carrier (2, X-axis) on ASSIST.

| Move Speed ◀)▯▮▮▮ |
|---|
| Set move speed: |
| X-axis        Default |
| Z-axis        Default |
| |
| |
| Save▷ |
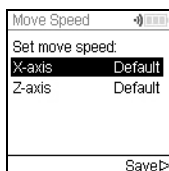
Select Move Speed and press **OK**.

Use the **touch wheel** to select Slow, Medium or Default (=fast) and press **OK**. Save ▷ your settings.

# 4    Operation

## 4.1    Turn on/off the ASSIST device

Connect ASSIST to the power supply with the supplied mains adapter. Turn on ASSIST by pressing the **on/off key** (15), which is confirmed by the green LED lighting up.

Press the **start/pause key** when it is blinking to home the ASSIST device.

*WARNING*
*Remove hands from ASSIST during homing.*

After homing the LED of the **start/pause key** will turn off.

To turn off ASSIST press the **on/off key** two seconds. It's LED switches off.

## 4.2    Turn on/off the VIAFLO electronic pipette

Press and release **RUN** (22) to turn on the pipette.

To turn off the pipette, press and hold the **back button** (17) for 3 seconds.

## 4.3    Connection via pipette communication module

Select the ASSIST mode in the Main Menu of the VIAFLO pipette and press **OK**. The pipette establishes the connection via ComModul.

When the blue communication symbol (•)) next to the battery indicator is displayed and the **communication LED** (14) alights, both instruments are connected.

If the connection fails, press ◁ to retry the connection or refer to "4.6 Troubleshooting" on page 18. Alternatively, continue Offline ▷. During offline mode ASSIST cannot be operated. It is possible to create programs, however without teaching of active heights.

## 4.4    Running a program
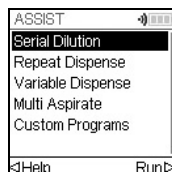
From the ASSIST menu select the program category and the stored program you want to run and press **OK**.

Press **RUN** (22).

You are prompted to place the pipette on the ASSIST device, see "3.5 Attaching and removing a VIAFLO electronic pipette" on page 13. When attached press the green blinking **start/pause key** (13) on the ASSIST device. It switches to solid green and the program will be performed automatically.

> ⚠ ***WARNING***
> *Keep hands out of area of moving ASSIST parts during the run.*

A program can be interrupted by pressing the **start/pause key** (13). Either press the **start/pause key** again to continue the program or press ◁ Abort on the pipette to abort the program.

## 4.5    Pipetting in 96 and 384 well plates

The standard option to fill a 384 well plate is to use a 16-channel pipette. To access a 384 well plate with an 8- or 12-channel pipette, the pipette needs to be shifted in Y-direction. To do so, switch the lever (a) on the pipette holder to the front or rear position. The center position is used for 96 well plates.
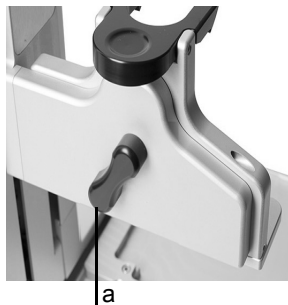


The rear position of the lever (a) moves the pipette to the rear to accommodate the rear positions of 384 well plates.
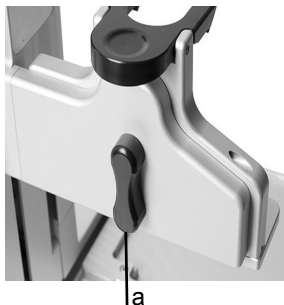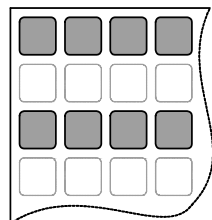


Set the lever (a) to the center to pipette in 96 well plates.
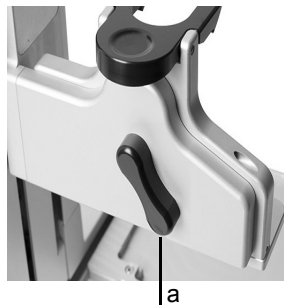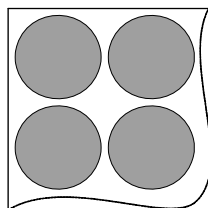


The front position of the lever (a) moves the pipette to the front to accommodate the front positions of 384 well plates.
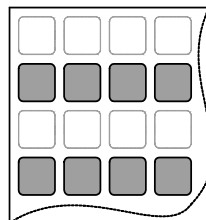
## 4.6    Troubleshooting

| Problem | Probable cause | Remedy |
|---|---|---|
| The connection between pipette and ASSIST cannot be established. | • The two instruments have not been paired or the pairing was lost. | • From the main menu of the pipette go to Toolbox -> ASSIST and select ComModule Pairing, see "3.6.4 Connection between ASSIST and pipette" on page 14. Follow the instructions on the pipette screen. |
| **Error LED** (14) blinks red | • ASSIST motor lost steps during movement.<br>• Pipetting heights were set wrong and the pipette crashed into the plate. | • Follow the instructions on the pipette display. |
| After firmware update, the **error LED** (14) blinks red and ASSIST cannot be started. | • No firmware installed. | • Contact service for VIALINK special firmware update. |
| GripTips are not aligned in X-position. | • Plate alignment not set. | • Perform plate alignment, see "3.6.6 Adjusting the plate alignment" on page 15. |
| The tip height is not correct using e.g. 12.5 µl GripTips. | • Wrong tip type set. | • Enter the tip type used, see "3.6.5 Setting tip type" on page 14. |

# 5      Programming

## 5.1     Overview program categories

The table below shows program categories which can be performed automatically in combination with ASSIST. All categories are accessed from the ASSIST Menu of a VIAFLO electronic pipette. You can create and store up to 20 different programs in each of Serial Dilution, Repeat Dispense, Variable Dispense or Multi Aspirate category and up to 40 different Custom programs.

| Program categories | Description |
|---|---|
| Serial Dilution | Allows aspirating a transfer volume followed by a mix. Columns and Mix Cycles are tracked on the display. |
| Repeat Dispense | Allows dispensing multiple aliquots of the same volume without refilling the tips after each dispense for fast microplate filling and processing. |
| Variable Dispense | Allows dispensing multiple aliquots of different volumes. |
| Multi Aspirate | Allows aspirating multiple aliquots of the same or different volumes from a microplate. |
| Custom Programs | Allows to create and store multi-stepped user-defined pipetting protocols. |

## 5.2    Setting up a program
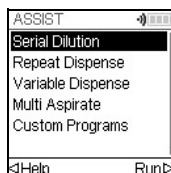
Use the **touch wheel** to scroll to your desired program category and press **OK**.

*NOTE*
*If no connection via communication module is available, you can also use the offline mode to create a new program. Live teaching of pipetting heights is not possible in offline mode.*

Press New ▷ to create a new program. You are prompted to enter a name.

Use the **touch wheel** to select characters and press **OK**. Once finished, press ▷ to save the name. The programs can later be renamed, see 5.3 "Modify existing programs" on page 20.

Define all parameters of your program and press Save ▷.

To run the program, select the stored program and press **OK** on the VIAFLO electronic pipette, see 4.4 "Running a program" on page 16.

## 5.3    Modify existing programs

At any program display, use the **touch wheel** to highlight an existing program.

Press ◁ Options, use the **touch wheel** to select an option (View/Edit, Delete, Copy, Rename) to modify the program and press **OK**.

## 5.4    Adjust heights and positions

### 5.4.1    Enter heights/positions directly

Open a predefined or a custom program and scroll to any Height setting or select any Move step and the desired position respectively. Press **OK** to display the setting dial showing the current height/position.
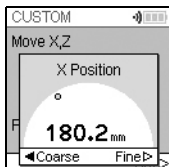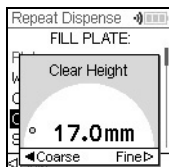


If the exact values of heights or X/Z positions are known, they can be entered directly using the Touch Wheel.

- **Reservoir** or **Tube Strip**: The height is the distance between the end of the GripTips and the **instrument base** (7).
- **Column** or **Row**: If the plate or container is located on the **plate carrier** (2), the lower point of reference is the **plate carrier** (2).

Press **OK** and Save/Set ▷ to save the settings.

### 5.4.2    Teach heights/positions on ASSIST

If height and position values are unknown, they can be set in an active teaching mode. Insert a pipette into the **Pipette holder** and establish a connection via ComModule.

*NOTE*
*Perform teaching of all position settings with GripTips attached. Do not forget to select the appropriate tip type where applicable, see 3.6.5.*

Move the GripTips in the teach position:
- **Reservoir**: move the plate carrier out of the way with the ▶ **right** arrow key of ASSIST.
- **Column** or **Row**: If the plate or container is located on the **plate carrier** (2), use the ◀ **left** and ▶ **right** arrow keys of ASSIST to move the plate carrier into position, so that the pipette tips target above the center of any wells or the container.
- When the setting dial is displayed as described above, press the ▲ **up** and ▼ **down** keys to position the GripTips at the desired height and press **OK** to save current settings.
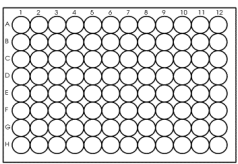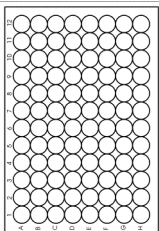
*NOTE*
*Keep the **arrow keys** (◀, ▶, ▲, ▼) pressed, if you want to increase the movement speed during position teaching. Press the **arrow keys** shortly for fine adjustment.*

## 5.5    Detailed description of program categories

Use the **touch wheel** to select an option, define the required parameters and press **OK**. Press **OK** to toggle between on (green ✓) and off (red ✘). If a parameter is out of range, the pipette beeps. Press Error ▷ to read the error message.

### 5.5.1    Serial Dilution program

**Application:** Use this program to perform serial dilutions. It enables aspiration of a specific volume followed by a dispense and mix.

| Options | Steps | Description of Serial Dilution |
|---|---|---|
| Plate | Wells | Sets the type of well plate (6 to 384) to be used as (source)/ target. |
| | Orientation | Sets the orientation of the plate (landscape, portrait).<br><br><br><br>Landscape Pipette Columns     Portrait Pipette Rows<br><br>Note: Switching to portrait requires to adapt default parameters of "Count" and "First Row/Column". |
| | Clear Height | Sets the travel height at which the GripTips move above the plate(s). |
| Source | Location | Sets the source container where the initial sample is aspirated from:<br>• **Reservoir**: reagent reservoir<br>• **Tube Strip**: for PCR tubes<br>• **Tip**: samples can be aspirated before the automatic program is started.<br>• **Column 1-24** or **Row A-P**: the sample is in the selected column/row of the plate. |
| | Height | Sets the sample aspiration height of the source container. |
| | Aspirate | Sets the sample volume that will be transferred from well to well. |
| | Asp Speed | Sets speed uniquely for aspiration (1 = low, 10 = fast). |
| | Mixing | Mixes the sample in the source container before the first aspiration.<br>If activated, define Mix volume, Mix Speed and number of Mix Cycles. |

| Options | Steps | Description of Serial Dilution |
|---------|-------|--------------------------------|
| Target | First Column or First Row | Sets the destination for the first transfer of the serial dilution (column 1-24 or row A-P). |
| | Columns or Rows | Sets the number of columns or rows to dilute (1-n, including the first column/row). |
| | Height | This is the dispense, mix and aspiration height in the target container. If Tip Travel is enabled, this height is used as base from which the tip travel starts, see 7.6 "Tip travel distances" on page 33. |
| | Mix | Sets the mixing volume after dispensing. It does not affect the transfer volume. |
| | Mix Speed | Sets the mixing speed (1 = low, 10 = fast). |
| | Mix Cycles | Sets the number of mixes per well (1-30). |
| Last Aspirate | Location | Choose the destination where the last aspiration should be purged:<br>• **Reservoir**: the reagent reservoir serves as waste position<br>• **Tube Strip**: for PCR tubes<br>• **Tip**: last aspiration remains in the GripTips and is purged manually<br>• **Column 1-24** or **Row A-P**: the last aspiration is dispensed in the selected column/ row of the plate. |
| | Disp. Speed | Sets speed uniquely for last dispense (1 = low, 10 = fast). |
| | BlowOut at | The BlowOut is following the last dispense and expels extra air to discharge residual liquid from the tips. Adjust the blow out height, see 5.4 "Adjust heights and positions" on page 21. |
| Advanced | Tip Travel | Defines the distance which the tips move during an aspiration, dispense and mix step to artificially track the liquid level, see 7.6 "Tip travel distances" on page 33.<br>• **Source Asp**: moves the set distance down during aspiration in the source location.<br>• **Source Mix**: moves the set distance down and up during mixing in the source location.<br>• **Target Disp**: moves the set distance up during dispensing in the target location. The same distance is used to move down during aspiration in the target location.<br>• **Target Mix**: moves the set distance down and up during mixing in the target location. |

Press ▷ to save your settings. This will return you to the list of Serial Dilution programs.

### 5.5.2   Repeat/Variable dispense programs

**Application:** These programs can be used for fast reagent addition to microplates from one source container.

The settings for Variable dispense are identical to Repeat dispense except the dispense steps in the target can have different volumes.

| Options | Steps | Description of Repeat/Variable Dispense |
|---------|-------|------------------------------------------|
| Plate | Wells | Sets the type of well plate (6 to 384) to be used as (source)/ target. |
| | Orientation | Sets the orientation of the plate (landscape, portrait). Note: Switching to portrait requires to adapt default parameters of "Count" and "First Row/Column"". |
| | Clear Height | Sets the travel height at which the GripTips move above the plate(s). |
| Source | Location | Sets the source container where the initial sample is aspirated from: <br>• **Reservoir**: reagent reservoir <br>• **Tube Strip**: for PCR tubes <br>• **Tip**: samples can be aspirated before the automatic program is started. <br>• **Column 1-24** or **Row A-P**: the sample is in the selected column/row of the plate. |
| | Tracking | If Reservoir is selected and Tracking is active, the pipette automatically adjusts the pipetting height according to the defined tip immersion depth. Set the: <br>• **Plate count**: the total number of target plates (1-9) used in the current run <br>• **Reservoir type**, only INTEGRA reservoirs, see 8.3. <br>• **Start volume**: the filling volume that is currently in the INTEGRA reagent reservoir. <br>• **Tip immersion**: the approx. immersion depth of the pipette tips (2-3 mm are recommended). |
| | Start Height | The height where aspiration starts. The ASSIST will automatically refill the GripTips if the total dispense volume required for the target exceeds the maximum volume of the pipette. The first aspiration will be at the start height and for consecutive aspiration steps the pipette will go lower until it reaches the end height. <br>Note: only visible if Tracking is switched off. |
| | End Height | Sets the height for the last aspiration step. |

| Options | Steps | Description of Repeat/Variable Dispense |
|---------|-------|------------------------------------------|
| Source | Asp Speed | Sets speed uniquely for aspiration (1 = low, 10 = fast). |
| | Mixing | Mixes the sample in the source container before each aspiration.<br>If on, define Mix volume, Mix Speed and number of Mix Cycles. |
| Dispense | Pre-Dispense | A Pre-Dispense volume can be selected independently, which is discarded back to the source immediately after aspiration, to improve accuracy and precision.<br>If on, define the Pre-Dispense volume. Suggested: at least 4% of the pipette's maximum volume. |
| | Count | Sets the total number of dispensing steps. |
| | First Column or First Row | Sets the column/row where dispensing of the first dispense should be started (column 1-24 or row A-P). |
| | Dispense | **Only Repeat dispense:**<br>Sets the volume to be dispensed in each well. The total aspiration volume is calculated automatically. The pipette cannot be overfilled. |
| | Dispense 1 to n | **Only Variable dispense:**<br>Set the different dispense volumes for every variable dispense step. |
| | Disp. Speed | Sets speed of all dispensing steps (1 = low, 10 = fast). |
| | Height | Sets the height for the dispensing steps. |
| | TipTouch | It is highly recommended to activate a tip touch after a dispensing step to remove drops that may cling to the pipette tips.<br>• Sets where the tip touch should be performed.<br>  "Liquid": the tips will dip into the center of the wells.<br>  "Side": the tips will touch to the side of the wells.<br>• Defines the height for the tip touch ("TipTouch at"). |

| Options | Steps | Description of Repeat/Variable Dispense |
|---------|-------|------------------------------------------|
| Dispense | Post-Dispense | A Post-Dispense volume can be selected independently, which is discarded, to improve accuracy and precision. If on, define:<br>• the location where the Post-Dispense should be discarded (Source or Tip) and<br>• the Post-Dispense volume. Suggested: 12.5 µl: 1 µl (= 8 %), 50 µl: 2 µl (= 4 %), 125 µl: 5 µl (= 4 %), 300 µl: 15 µl (= 5 %), 1250 µl: 50 µl (= 4 %). |
| | Reuse Post-Disp. | **Only Repeat dispense:**<br>If on, at the end of the program the post-dispense remains in the tip, while the pipette is ready to aspirate a new volume to start the next repeat dispense run. |

Press ▷ to save your settings. This will return you to the list of Repeat/Variable Dispense programs.

### 5.5.3   Multi Aspirate program

**Application:** This program can be used for pooling applications or removal of supernatants.

| Options | Steps | Description of Multi aspirate |
|---|---|---|
| Plate | Wells | Sets the type of well plate (6 to 384) to be used as source/ (target). |
| | Orientation | Sets the orientation of the plate (landscape, portrait). Note: Switching to portrait requires to adapt default parameters of "Count" and "First Row/Column". |
| | Clear Height | Sets the travel height at which the GripTips move above the plates. |
| Aspirate | Count | Sets the total number of aspiration steps. |
| | First Column or First Row | Define the column/row where the first volume should be aspirated from. |
| | Repeat Volume | If activated, identical volumes are aspirated. If off, define the different volumes for aspiration. |
| | Aspirate (1 to n) | Set the volume(s) to be aspirated (for every aspirate step). |
| | Asp Speed | Sets speed uniquely for aspiration (1 = low, 10 = fast). |
| | Height | Set the (start) Height for all aspiration (and mixing) steps. |
| | Mixing | Mixes the sample in the source container before each aspiration. If on, define Mix volume, Mix Speed and number of Mix Cycles. |
| Dispense | Location | Sets the target container where the sample is dispensed: • **Reservoir**: reagent reservoir • **Tube Strip**: for PCR tubes • **Column 1-24** or **Row A-P**: dispense to the selected column/row of the current plate. |
| | Disp. Speed | Sets speed of all dispensing steps (1 = low, 10 = fast). |
| | Height | Sets the height for the dispensing steps. |
| Advanced | Tip Travel | Defines the distance which the tips move during an aspiration, dispense and mix step to artificially track the liquid level, see 7.6 "Tip travel distances" on page 33. • **Source Asp**: moves the set distance down during aspiration in the source location. • **Source Mix**: moves the set distance down and up during mixing in the source location. |

Press ▷ to save your settings. This will return you to the list of Multi Aspirate programs.

### 5.5.4    Custom programs

A custom program uses a step based operating technique. Each pipetting step is entered separately in the sequence in which they will be performed. Custom programs can contain up to 98 steps.

From the ASSIST Menu select "Custom", press **OK** and New ▷. Define and save a name of your program.
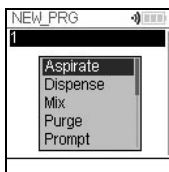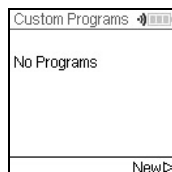
The first line is highlighted. Press **OK**.

Use the **touch wheel** to select a first step from the menu. Press **OK**, define the required parameters and press **OK** to add the step.

After adding the first step, the selection should now be on the second line. Press **OK** again to define the second step. Continue adding steps until your entire pipetting protocol is defined.The individual steps based upon the following basic operations:

| Step | Description of Custom Program |
| --- | --- |
| Aspirate | Sets an aspiration volume, Tip Travel distance (↓)[1] and pipetting speed. |
| Dispense | Sets a dispense volume, Tip Travel distance (↑)[1] and pipetting speed. |
| Mix | Performs a mixing cycle. Defines the number of cycles, mixing volume, Tip Travel distance (↕)[1] and mix speed. |
| Purge | Purges all remaining liquid currently in the GripTips with the selected purge speed. |
| Prompt | Pauses the program and displays a message. Three lines with 12 characters each are available. To continue the program, press **RUN**. |
| Move X,Z | Moves the pipette in Z direction and the plate carrier in X direction to the selected coordinates. Use the **arrow keys** on ASSIST to teach the position or enter the coordinates manually on the pipette's screen. To show the actual coordinates, tap any of the **arrow keys** on the ASSIST device. Click ▷ on the pipette to set the coordinates. |
| Move X | The plate carrier travels the set distance in X-direction relative to the current position by X mm. Setting a negative value (mm) moves it to the left, setting a positive value (mm) moves it to the right. The distance from well to well for a 96 well plate is 9 mm and for a 384 well plate 4.5 mm. |

1.  Tip Travel distance: the distance the pipette automatically follows during aspirating, dispensing or mixing allowing to optimize tip immersion depth, see 7.6.

| Step | Description of Custom Program |
|------|-------------------------------|
| Move Z | Moves the pipette in Z direction to the selected coordinates. Use the **arrow keys** on ASSIST to teach the position or dial the height manually on the pipette's screen. Press **OK** on the pipette to accept the settings. |
| BlowOut | Performs a blow out. A blow out needs to be performed after the last dispense to remove liquid that may cling to the tips.<br>Note: When using "Purge" to empty the tips, a blowout/blowin is performed automatically and does not need to be programmed. |
| BlowIn | After a blow out, a blow in has to follow at some point. It does not have to follow immediately and can have steps in between. E.g. after the blow out a move step can be programmed to move the tips out of the liquid, and is then followed by the blow in. |
| Delay | A delay is a pause between the last and the next step. Define a delay time (in seconds) or a manual input (pressing **RUN**) to continue. |
| Loop | A loop repeats the steps between the selected step and the loop command as many times as defined. E.g. if the program reaches the loop step, it goes back to step 3 and repeats the steps until there 2 times.<br>The number of program steps can often be shortened by adding a loop. |
| Call | Calls another custom program to run as subprogram in the current program. This can be utilized to run frequently used sequences, e.g. a tip touch after a dispense, without programming the individual steps every time. A custom program can have a maximum of 10 Call steps. |
| Beep | Sets a beep. The sound is only active, if under Preferences - Sounds the option Messages is set to On. |

When finished, press ▷ to save the Custom program. To run the program, press **OK**.

# 6      Maintenance

⚠️ ***WARNING***
*Always turn off power and disconnect the ASSIST from the mains when carrying out maintenance work.*

## 6.1      Cleaning

The materials used on the exterior of the ASSIST support regular cleaning intervals. Clean the external components 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.

## 6.2      Decontamination

From regular use ASSIST should not come into direct contact with liquids. If aerosols or biohazardous fluids splash on the surfaces, they must be decontaminated in accordance to good laboratory practice. Wipe the clean surface with a lint-free cloth, lightly soaked e. g. with the following disinfectants:

• Ethanol 70 %
• Microcide SQ 1:64
• Glutaraldehyde solution 4 %
• Virkon solution 1-3 %

Follow the instructions provided with the disinfectants.

The device may be decontaminated with $H_2O_2$ gas (maximal concentration 35 %) for 60 minutes.

## 6.3      Servicing

For any service or repairs, please contact your local service technician.

⚠️ ***WARNING***
*ASSIST needs to be cleaned before sending it to service. The declaration on the absence of health hazards must be signed. This is necessary to protect service personnel.*

## 6.4      Equipment disposal

The ASSIST must not be disposed of with unsorted municipal waste.

Dispose the ASSIST in accordance with the laws and regulations in your area governing disposal of devices. In certain regions and countries, e.g. in all EU member states, the distributor is obliged to take back this product free of charge at the end of life. Please contact your local distributor for more details.

# 7　Technical Data

## 7.1　Environmental conditions

|  | **Operation** |
|---|---|
| Temperature range operation | 5 – 40 °C |
| Temperature range storage | -10 – 50 °C |
| Humidity range | Max. rel. humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % rel. humidity at 40 °C. |
| Altitude | 0 – 2000 m AMSL |
| Pollution degree 2 | According to IEC EN/UL 61010-1, i.e. non-conductive pollution only. |
| Operation | Indoor use only. |

## 7.2　Specification of the device

| | |
|---|---|
| Electricity supply | Mains adapter input: 100 – 240 VAC, 50/60 Hz<br>Device input: 22.8 – 25.2 VDC, 70 W |
| Dimensions (H x D x W) | 400 mm x 360 mm x 340 mm<br>(with pipette attached: height 510 mm) |
| Weight | 10 kg |
| Material of surfaces | Polyurethane (Housing)<br>Stainless steel (painted or blank)<br>Aluminium |

## 7.3　Intellectual property

The ASSIST is covered under the following patents:

| Patent Number | Country | Title | Apply to |
|---|---|---|---|
| 9,321,048 | USA | Sample Distribution System And Process | ASSIST |

## 7.4    Compatible pipettes

The following INTEGRA pipettes are compatible with ASSIST:

| Pipette | Firmware | Serial No. |
|---------|----------|------------|
| VIAFLO | 3.xx | 6xxxxxx |
| VIAFLO | 4.xx | 7xxxxxx |
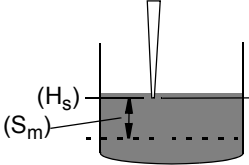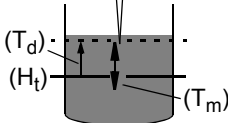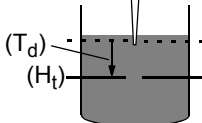
## 7.5    Maximum labware height on plate carrier

Maximum distance (in mm) between pipette tip end and plate carrier.

| Tip volume | SHORT tips | Standard tips | LONG tips |
|------------|------------|---------------|-----------|
| 12.5 µl | 129.9 | 121.3 | 112.5 |
| 50/125 µl | - | 101.3 | - |
| 300 µl | - | 96.0 | 54.8 |
| 1250 µl | 71.7 | 54.1 | - |

## 7.6    Tip travel distances

The Tip Travel defines the distance which the tips move during an aspiration, dispense and mix step to artificially track the liquid level. The Tip Travel starts from a user defined height as shown below.

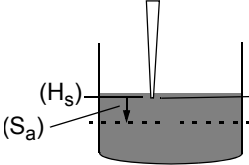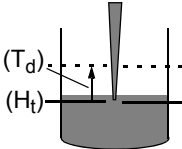| Section | Steps and parameters | | |
|---------|---------|---------|---------|
| Source | **Source Mix** ($\updownarrow$):<br><br>$(H_s)$<br>$(S_m)$<br><br>Tip Travel starts from **Height** ($H_s$). Moves the **Source Mix** ($S_m$) distance down and up. | **Source Asp.** ($\downarrow$):<br><br>$(H_s)$<br>$(S_a)$<br><br>Tip Travel starts from **Height/Start Height** ($H_s$). Moves the **Source Asp.** ($S_a$) distance down. | |
| Target | **Target Disp.** ($\uparrow$):<br><br>$(T_d)$<br>$(H_t)$<br><br>Tip Travel starts from Height ($H_t$). Moves the set **Target Disp.** ($T_d$) distance up. | **Target Mix** ($\updownarrow$):<br><br>$(T_d)$<br>$(H_t)$<br>$(T_m)$<br><br>Tip Travel starts after dispense from the Height ($H_t$) plus **Target Disp.** ($T_d$). Moves the **Target Mix** ($T_m$) distance down and up. | Target Asp. ($\downarrow$):<br><br>$(T_d)$<br>$(H_t)$<br><br>Tip Travel starts from Height ($H_t$) plus **Target Disp.** ($T_d$) distance. Moves the **Target Disp.** ($T_d$) distance down. |

# 8 Accessories

## 8.1 Accessories for ASSIST

| VIAFLO electronic pipettes | Part No. |
|---|---|
| 8-channel pipette, 0.5 – 12.5 µl | 4621 |
| 8-channel pipette, 2 – 50 µl | 4626 |
| 8-channel pipette, 5 – 125 µl | 4622 |
| 8-channel pipette, 10 – 300 µl | 4623 |
| 8-channel pipette, 50 – 1250 µl | 4624 |
| 12-channel pipette, 0.5 – 12.5 µl | 4631 |
| 12-channel pipette, 2 – 50 µl | 4636 |
| 12-channel pipette, 5 – 125 µl | 4632 |
| 12-channel pipette, 10 – 300 µl | 4633 |
| 12-channel pipette, 50 – 1250 µl | 4634 |
| 16-channel pipette, 0.5 – 12.5 µl | 4641 |
| 16-channel pipette, 2 – 50 µl | 4646 |
| 16-channel pipette, 5 – 125 µl | 4642 |

## 8.2 Accessories for VIAFLO electronic pipettes

| Charging options and communication | Part No. |
|---|---|
| Short linear stand, holds 2 charging stations | 3214 |
| Linear stand, holds up to 4 charging stations | 3215 |
| Mains adapter for linear stand and carousel charging stand | 3216 |
| Charging station for linear stand, incl. connection cable | 3217 |
| Charging/communication station for linear stand, incl. connection cable and USB cable | 3218 |
| Mains adapter for electronic pipette | 4200 |
| Li-ion battery for pipette | 4205 |
| Charging stand for 1 pipette, incl. mains adapter | 4210 |
| Charging/communication stand for 1 pipette, incl. mains adapter and USB cable | 4211 |
| Carousel charging stand for 4 pipettes, incl. mains adapter | 4215 |
| Pipette communication module | 4221 |

## 8.3    Consumables

**10 ml disposable reagent reservoirs for multichannel pipettes**          **Part No.**

| | | |
|---|---|---|
|  | 10 ml reservoir base, 10 pack | 4306 |
| Polystyrene, SureFlo™ | Trial pack (1 base and 3 reservoirs), sterile | 4370 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4371 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4372 |
| Polystyrene | Trial pack (1 base and 3 reservoirs), sterile | 4330 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4331 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4332 |
| Polypropylene | Trial pack (1 base and 3 reservoirs), sterile | 4335 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4336 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4337 |

• SureFlo™ = anti-sealing array

**25 ml disposable reagent reservoirs for multichannel pipettes**     **Part No.**

| | 25 ml reservoir base, 10 pack | 4304 |
|---|---|---|
| Polystyrene, SureFlo™ | Trial pack (1 base and 3 reservoirs), sterile | 4380 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4381 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4382 |
| Polystyrene, SureFlo™, divided (5 ml + 10 ml) | Trial pack, sterile | 4350 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4351 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4352 |
| Polystyrene | Trial pack (1 base and 3 reservoirs), sterile | 4310 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4311 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4312 |
| Polypropylene, SureFlo™, divided (5 ml + 10 ml) | Trial pack (1 base and 3 reservoirs), sterile | 4355 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4356 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4357 |
| Polypropylene | Trial pack (1 base and 3 reservoirs), sterile | 4315 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4316 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4317 |

• SureFlo™ = anti-sealing array

**12 well reagent reservoirs**     **Part No.**

| | Twelve 3 ml compartments with 9 mm well spacing | |
|---|---|---|
| Polystyrene, SureFlo™, 12 well | Trial pack (1 base and 3 reservoirs), sterile | 4360 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4361 |
| Polypropylene, SureFlo™, 12 well | Trial pack (1 base and 3 reservoirs), sterile | 4365 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4366 |

**100 ml disposable reagent reservoirs for multichannel pipettes**       **Part No.**

| | 100 ml reservoir base, 10 pack | 4305 |
|---|---|---|
| Polystyrene, SureFlo™ | Trial pack (1 base and 3 reservoirs), sterile | 4390 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4391 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4392 |
| Polystyrene | Trial pack (1 base and 3 reservoirs), sterile | 4320 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4321 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4322 |
| Polypropylene | Trial pack (1 base and 3 reservoirs), sterile | 4325 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4326 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4327 |

• SureFlo™ = anti-sealing array

**25 ml Disposable Reagent Reservoirs for multichannel pipettes**      **Part No.**

| | | |
|---|---|---|
|  | 25 ml Reservoir Base, 10 pack | 4304 |
| Polystyrene | Trial pack (1 base and 3 reservoirs), sterile | 4310 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4311 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4312 |
| Polystyrene, SureFlo™ | Trial pack (1 base and 3 reservoirs), sterile | 4380 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4381 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4382 |
| Polystyrene, SureFlo™, divided (5 ml + 10 ml) | Trial pack (1 base and 3 reservoirs), sterile | 4350 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4351 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4352 |
| Polystyrene, SureFlo™, 12 well | Trial pack (1 base and 3 reservoirs), sterile | 4360 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4361 |
| Polypropylene | Trial pack (1 base and 3 reservoirs), sterile | 4315 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4316 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4317 |
| Polypropylene, SureFlo™, divided (5 ml + 10 ml) | Trial pack (1 base and 3 reservoirs), sterile | 4355 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4356 |
| | Four sleeves of 50 reservoirs, sterile, 200 reservoirs and 1 base per case | 4357 |
| Polypropylene, SureFlo™, 12 well | Trial pack (1 base and 3 reservoirs), sterile | 4365 |
| | 30 reservoirs individually sealed, sterile, 1 base per case | 4366 |

SureFlo™ = anti-sealing array

## 8.4    GripTips

INTEGRA offers a wide range of GripTips in the volume ranges from 12.5 µl – 5000 µl.

Visit the GripTip Selector Guide (www.integra-biosciences.com/griptips) to find the correct GripTips and set a filter by available volumes, packaging and properties.

### 8.4.1    INTEGRA pipette or pipetting device

The GripTips selection depends on which pipette or which pipetting device you work with.

| GripTips for handheld pipettes | Automation GripTips |
|---|---|
| EVOLVE, VIAFLO, VOYAGER, ASSIST | MINI 96, VIAFLO 96/384, ASSIST PLUS |
| ECO Racks (3xxx series) GREEN CHOICE (44xx series) | Automation friendly racks (6xxx series) GREEN CHOICE (64xx series) |

- **GripTips for handheld pipettes**: for EVOLVE, VIAFLO, VOYAGER and ASSIST
- **Automation GripTips**: for MINI 96, VIAFLO 96, VIAFLO 384 and ASSIST PLUS. These GripTips have undergone straightness testing and were engineered to resist the shear forces of automated tip loading on SBS designed racks. For 384 configuration GripTips, extra sturdy antistatic XYZ-racks are used.

> *NOTE*
> *Autoclaving of Automation GripTips is not recommended as they may warp during the process, which can lead to incorrect tip loading and obstruct precise well targeting.*

### 8.4.2    Package options

- **ECO Racks**: lightweight PET racks, environmentally friendly with 60% less plastic. They have a carbon footprint half the amount of standard racks. Most convenient experience when paired with the reusable PopTop Base.
- **GREEN CHOICE**: environmentally friendly refills allowing the reuse of existing racks and thus reduces plastic waste.
- **Automation friendly racks**: for automated tip loading, refillable with GREEN CHOICE inserts.
- **Bulk packs**: tips in a resealable bag for hand loading.

If recycling is available in your region, fill the outer carton in which your GripTips are delivered with the empty racks for pickup by a parcel service.

### 8.4.3　GripTip properties

According to our cleanroom standards, all GripTips (non-sterile, pre-sterilized and sterile) comply with our VIAPURE claims. This states that all product are RNAse, DNAse, Endotoxin and Pyrogenic free.

- **Sterile/pre-sterilized** products are gamma irradiated within the minimum and maximum dosage range specified for INTEGRA sterile products. Racks are individually vacuum sealed in a bag and are considered sterile until opened. Pre-sterilized ECO Racks are individually latched and sealed with a heat shrink band. The entire case of 5 pre-sterilized GREEN CHOICE inserts are sealed.
- **Non-sterile** items are manufactured in the same cleanroom and packed in a carton case.
- **LONG**: longer design allows easy access into deep laboratory vessels
- **SHORT**: shorter design allows easy access in 1536 well plates or improves ergonomics
- **WIDE BORE**: large opening at the tip end, reduces shear forces
- **Low retention**: low liquid retention, for liquids with low surface tension