Manuals+ — User Manuals Simplified.

AIM ROBOTICS FD HIGH-V FD Series Fluid Dispenser User Manual

Contents

AIM ROBOTICS FD HIGH-V FD Series Fluid Dispenser

WHAT'S IN THE BOX

D LED INDICATOR

F NPT 1/4 INLET

PUMP UNIT **C**

USB WITH URCAP

8PIN LEAD

3 X NOZZLES

6xM6 SCREW

1x ORIENTATION PIN

TECHNICAL DATA

FD HIGH-V FEATURES

- Use with external feeding system
- Recommended for single-component medium viscosity fluids

Model #   FD HIGH-V
URCap version ≥3.0
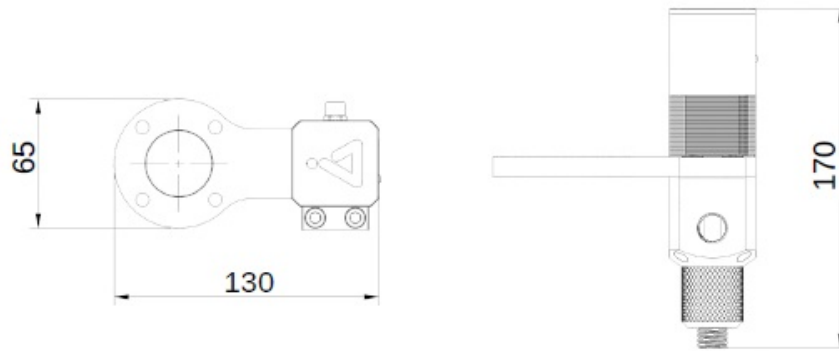
Mechanical interface: ISO 9409-1, type 50-4-M6 NPT 1/4

Electrical interface: 8-pole M8

Digital interfaces: URCap, PolyScope ≥5.5 URCap, API ≥1.8 RS485 24V I/O
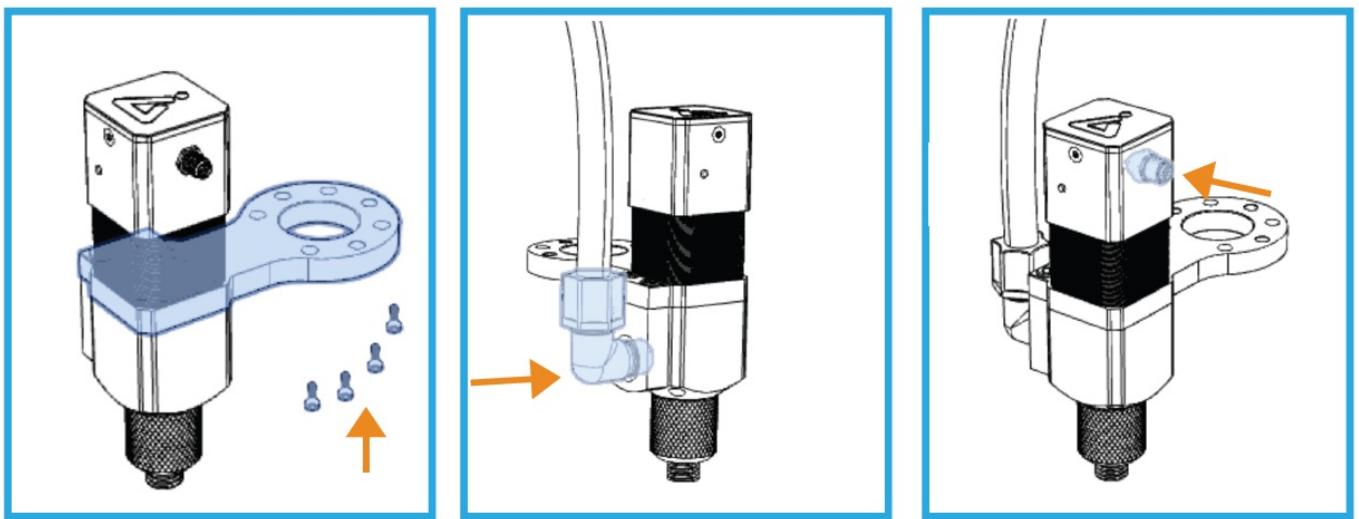
Weight: 0.8kg 1.75lbs

Dimensions: 65 x 130 x 170 mm 2.55 x 5.10 x 6.7 inch

INSTALLATION: FD HIGH-V

Assemble unit and attach to robot

- Attach unit to robot flange with 4 screws
- Attach NPT1/4″ connector with feeding line to inlet (F)
- While the robot is off or tool I/O is zero: Plug in the 8 pin connector* into unit and robot.

LED indicator (D)
The unit has a LED indicator. When the unit has power a steady light is shown.

Max Inlet Pressure

- Maximum permissible inlet pressure for FD High-V is 3 BAR 45 PSI
- Depending on the material used, it's advised to use a downstream
- pressure regulator close or next to the inlet of the FD High-V. This allows to eliminate any pressure variance within the tool improving dispensing quality.
- Exceeding this inlet pressure might lead to seal failure.

WHAT'S IN THE BOX

A ROD HANDLE
a ROD TAB
CARTRIDGE BARREL B
PUMP UNIT C
D LED INDICATOR
E FLUID FUNNEL

USB WITH URCAP
8PIN LEAD
3 X NOZZLES
6xM6 SCREW
1x ORIENTATION PIN
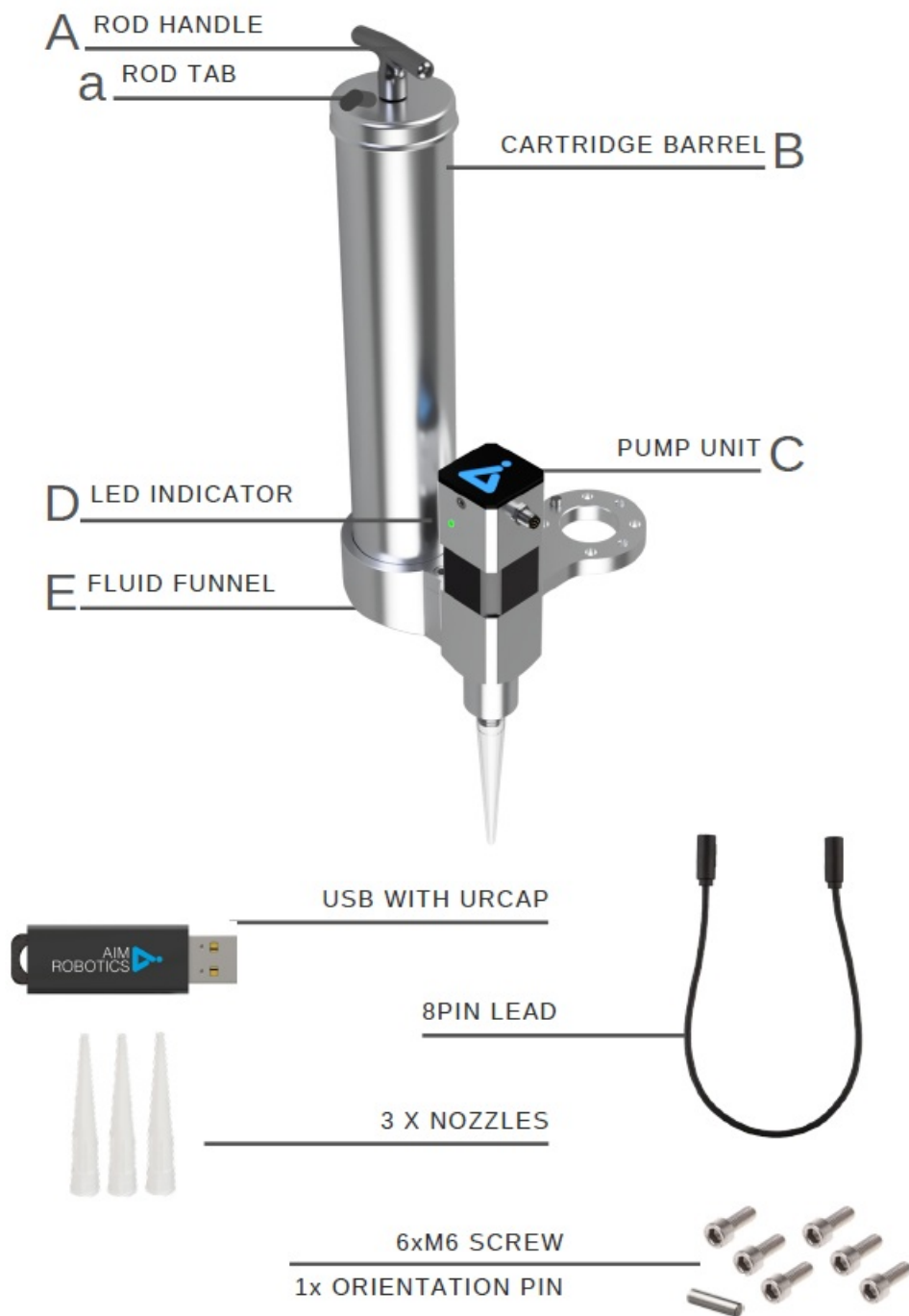
TECHNICAL DATA

FD400 FEATURES

- Airless grease cartridge dispensing with single M8 8 pin connection
- Use with 400ml cartridges DIN 1284
- Recommended for single-component medium viscosity fluids, NLGI class 2-3

Model #   FD400
URCap version   ≥3.0

Mechanical interface: ISO 9409-1, type 50-4-M6

Electrical interface: 8-pole M8

Digital interfaces: URCap, PolyScope ≥5.5 URCap, API ≥1.8 RS485 24V I/O

Weight (without cartridge): 1.7kg 3.75lbs

Dimensions: 135 x 145 x 390 mm 5.3 x 5.7 x 15.35 inch

INSTALLATION: FD400

Assemble unit and attach to robot

- Attach funnel (E) with 2 screws
- Attach unit to robot flange with 4 screws
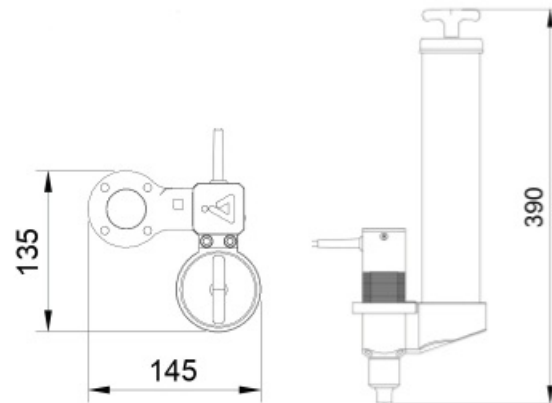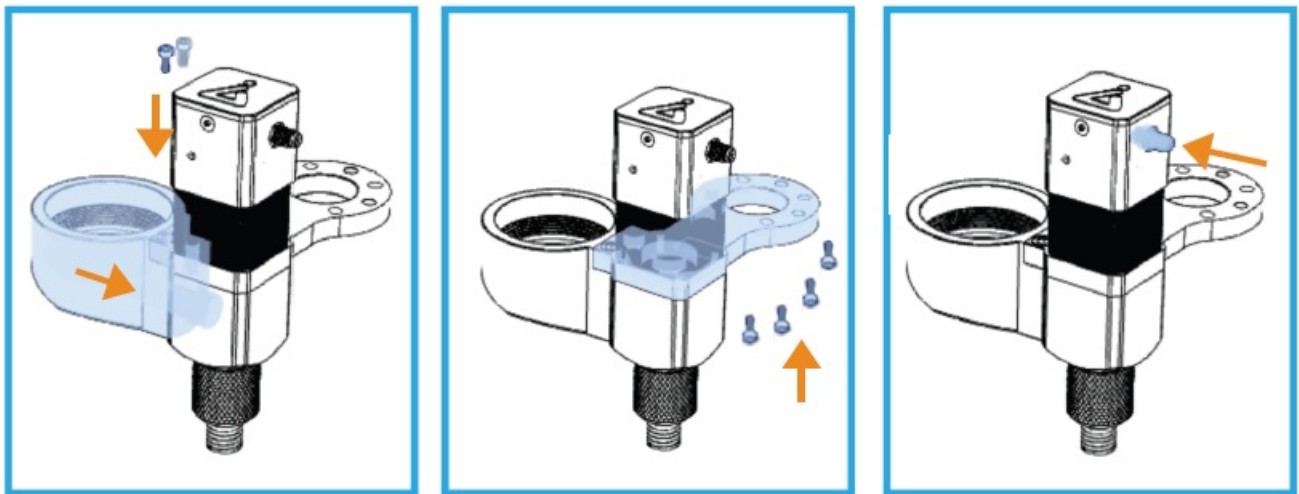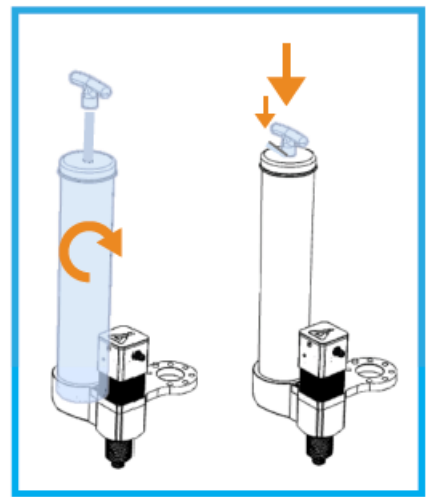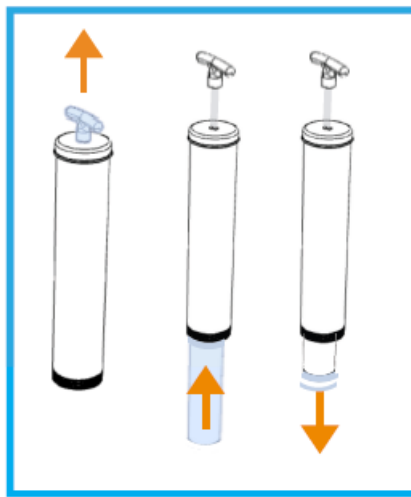- While the robot is off or tool I/O is zero: Plug in the 8 pin connector* into unit and robot.

Load cartridge
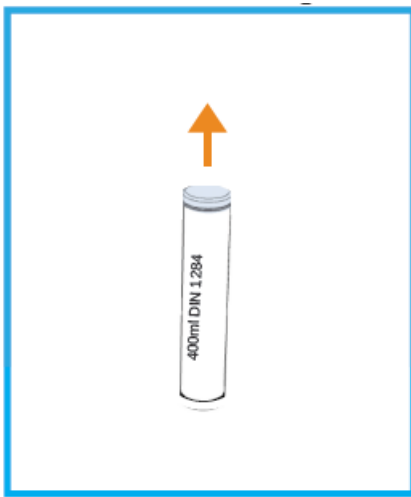
- On the cartridge remove back lid
- Pull the rod handle (A) fully back
  - Insert new cartridge
  - Remove top lid of cartridge
- Screw cartridge barrel into funnel (E)
  - Release the rod handle by pulling it back and pressing the tab (a)
  - The rod is now fully inserted into the fluid and the handle is fully against the barrel

WHAT'S IN THE BOX

PRESSURE REGULATOR A

B RETAINER CAP

C CARTRIDGE RETAINER

D LED INDICATOR

RETAINER MOUNT E

F 310 ADAPTER

PUMP UNIT G

USB WITH URCAP

8PIN LEAD

3 X NOZZLES

6xM6 SCREW

1x ORIENTATION PIN

TECHNICAL DATA

FD310 FEATURES

- Use with 290cc/300cc/310cc and 1/10th gallon cartrdiges.
- Recommended for single-component medium viscosity fluids.

Model #   FD310
URCap version   ≥3.0

Mechanical interface: ISO 9409-1, type 50-4-M6 NPT 1/4

Electrical interface: 8-pole M8

Digital interfaces: URCap, PolyScope ≥5.5 URCap, API ≥1.8 RS485 24V I/O

Weight: 0.8kg 1.75lbs

Dimensions: 133 x 156 x 403 mm 5.25 x 6.15 x 15.85 inch

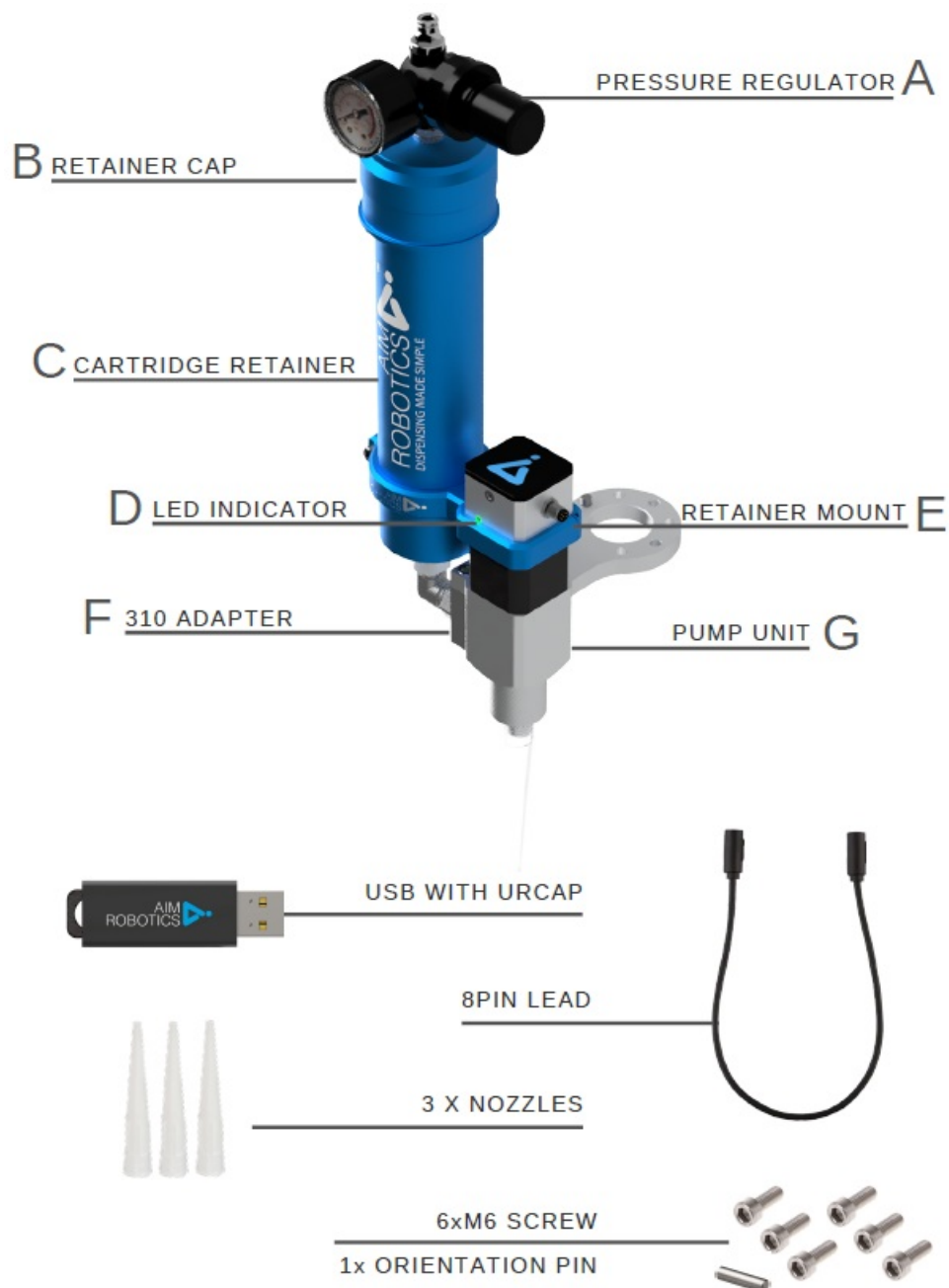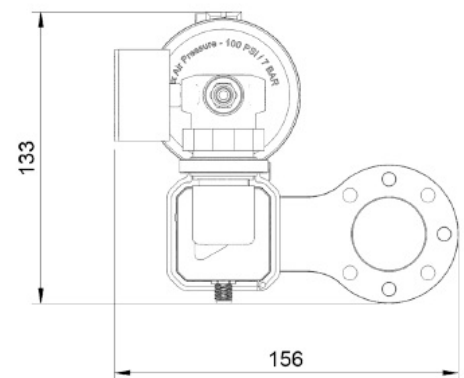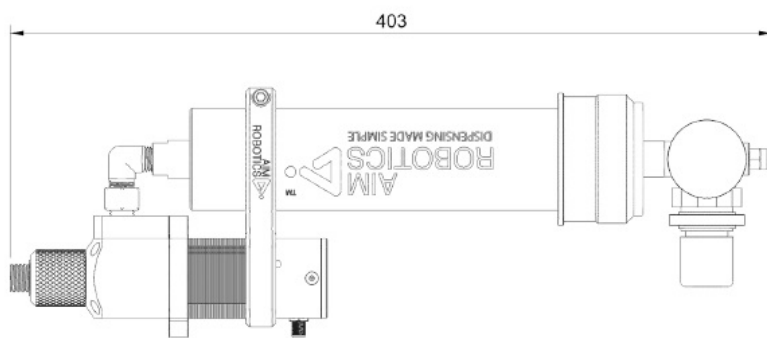## INSTALLATION: FD310

Assemble unit and attach to robot

- Attach retainer mount (F) with 2x M6x12 screws.
- Attach retainer mount (F) with 2x M6x12 screws.
- Mount tool to robot using included M6x12 bolts and orientation pin.
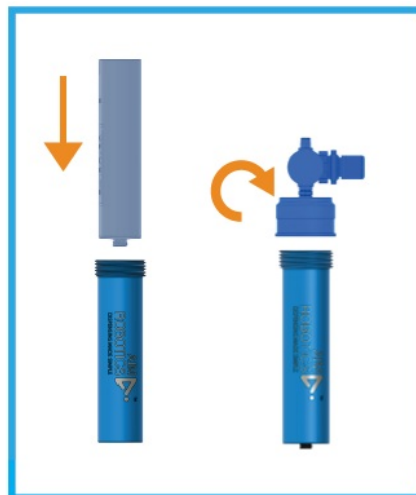
- On the cartridge remove back lid

- Insert new cartridge in retainer and secure cap.
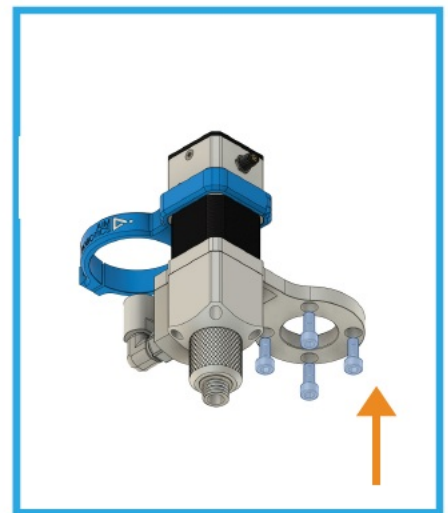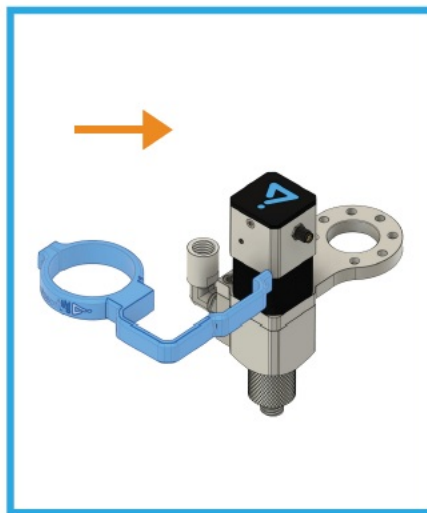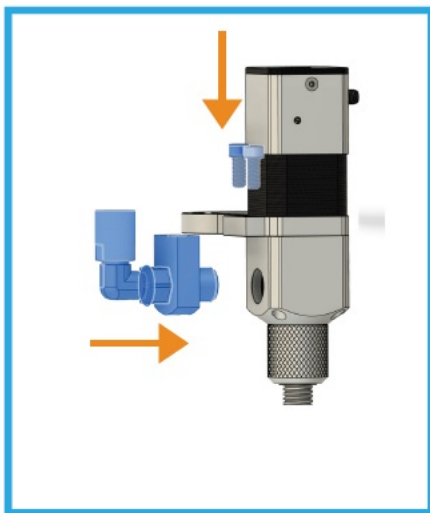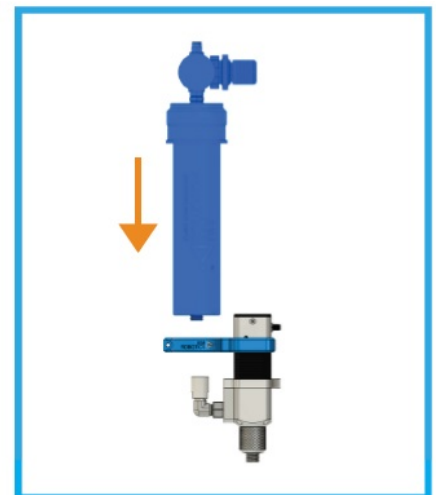- Install cartridge retainer assembly on the tool and tighten M5 bolt.
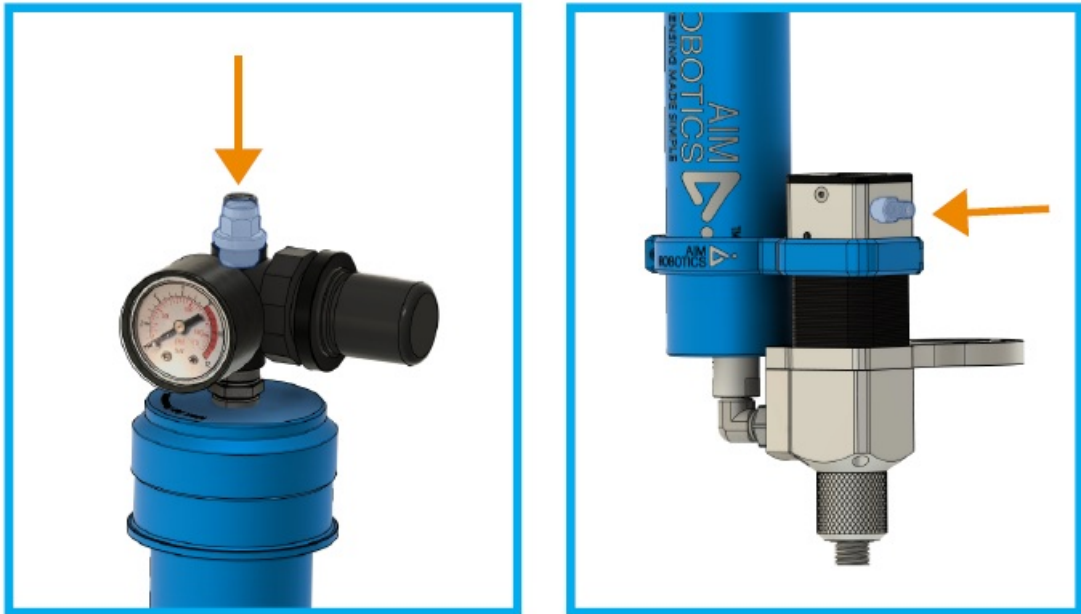
- Install pressurized air hose and adjust pressure. (4BAR MAX)
- Turn off robot power and connect the M8 8-pin cable.

CABLE ORIENTATION

The 8 pin connector lead

- Ensure Tool IO voltage is set to 'zero' or robot is off before attaching tool. Refer to the 'How to' page for guidance.
    - If robot shows error after attaching tool – restart the robot to reset.
- Position the lead from the unit to the robot so that it does not create a risk.
- The pin can be inserted for orientation.
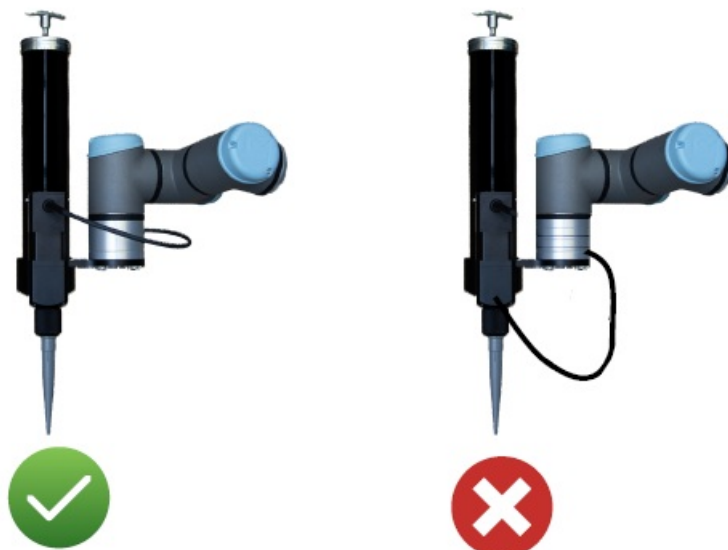
SOFTWARE CONFIGURATION

1. Install URCap

- If password protected:
  - Enter Manual Mode: Press ⊚ and select ✋ manual
  - Enter Password
- If not protected by password:
  - Press ≡ and select Settings > System > URCaps
  - Press **+** symbol to add a new URCap: Navigate to a USB device and select Aim URCap
    Accept when the robot prompts to restart before continuing.

2. Payload and TCP

   Select the Installation tab for Payload select General > TCP: Payload and Centre of Gravity and press the wizard button

   To define Tool Centre Point, TCP select General > TCP: Tool Center Point and press the wizard button
   - This feature will guide you through the setup of the Tool Centre Point

     Multiple URCaps
   - If multiple URCaps are installed the tool might not perform as intended.
   - Some tools are programmed to take over and control the Tool IO and will not allow the Aim URCap to change the Tool IO.
   - It is recommended to remove all other tool URCaps to avoid this OR ensure that Tool IO is controlled by the user and input manually entered as described in point 3. Installation of FD unit.
   - If multiple URCaps are required, please use our Aim USB2RS485 kit.

3. Unit Installation

   The Tool IO can be controlled by the Aim URCap
   - Select the Installation tab and select General > Tool IO
   - The IO interface control, section use a pull-down menu to select Aim URCap

The Tool IO can be controlled by the user and manually entered

- The IO interface control, section use a pull-down menu to select User.
- Change Tool Output Voltage to 24

You are now ready to start programming your unit to start dispensing.

PROGRAMMING

FD Setup node in Installation / Purge cycle
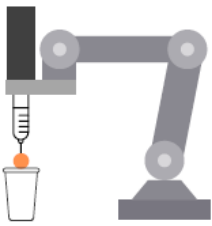
- **Activate Purge Cycle:** Disabled by default, allows to purge material when in purge point. Useful to ensure material does not cure in the needle when idle.
- **Purge Speed:** Dispensing Speed in microliters when purging
- **Purging Duration:** Time in seconds to dispense at Purge Speed
- **Set Purge Pos.:** Used for defining the Purge position/Point in space
- **Move to Purge Pos.:** AUTO drive robot to the Purge Position.
- **Tool Connection Status:** Green or Red circle indicating tool connection status. Green = connection between

robot and tool is stable. Red = robot to tool connection is bad.

- **Scan for tool:** Actively checks Tool Connection Status once clicked.
- **Disable/Enable URCap:** Allows for simple reset or disabling of Aim URCap. Useful when troubleshooting or switching between tool manufacturers.
- **Enable USB/Disable USB:** used when 8-pin M8 tool connection is used by another manufacturers tool, and SD is connected to robot control box using Aim USB2RS485 connection kit. Allows to combine Aim Robotics tools with other manufacturer tools. OnRobot Eyes or Robotiq Grippers for instance.
- **Tool Power:** select between Max Power (1200mA RMS) or Reduced Power (600mA RMS) modes. Max Power mode reduces likelihood of stall.

Example

PROGRAMMING

FD Toolbar
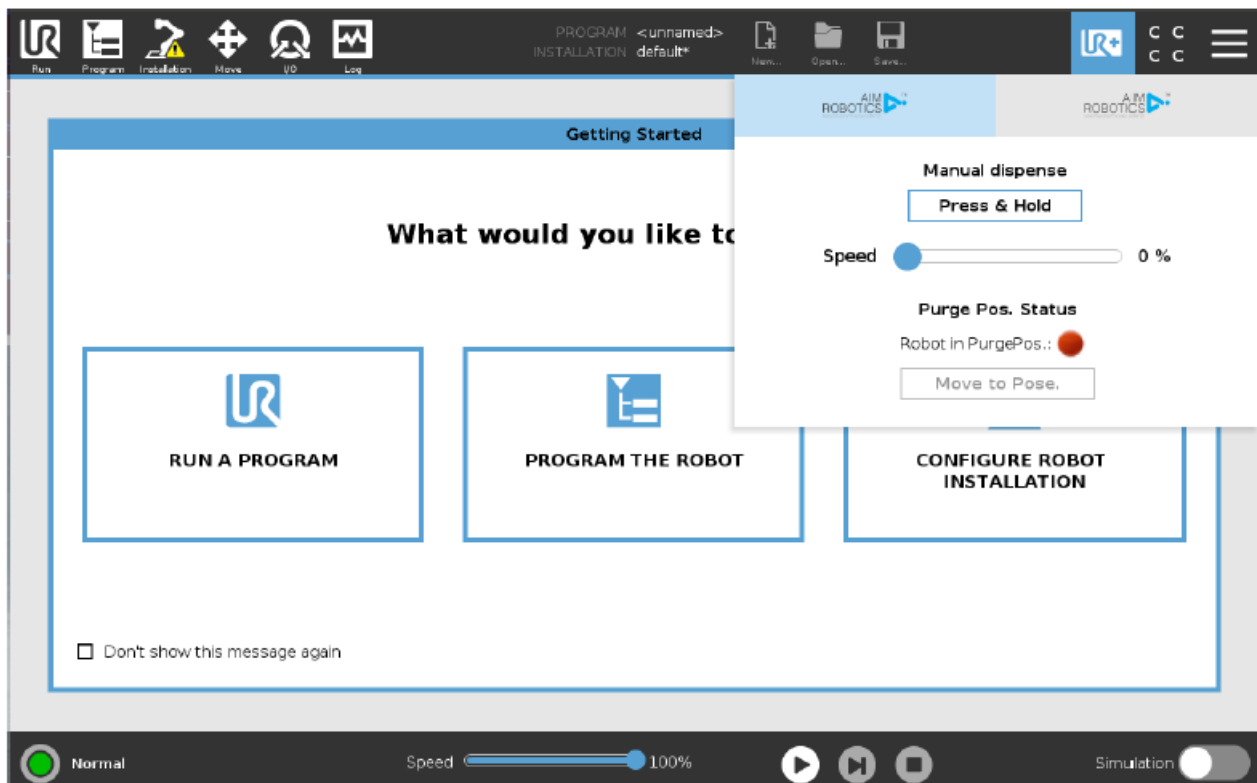
- **Press & Hold:** dispenses at the chosen speed while depressed

- **Speed:** sets the dispensing speed to use while Press & Hold is depressed Purge Pos. Status: shows if the robot is at purge position. Red = not in purge position. Green = in purge position.
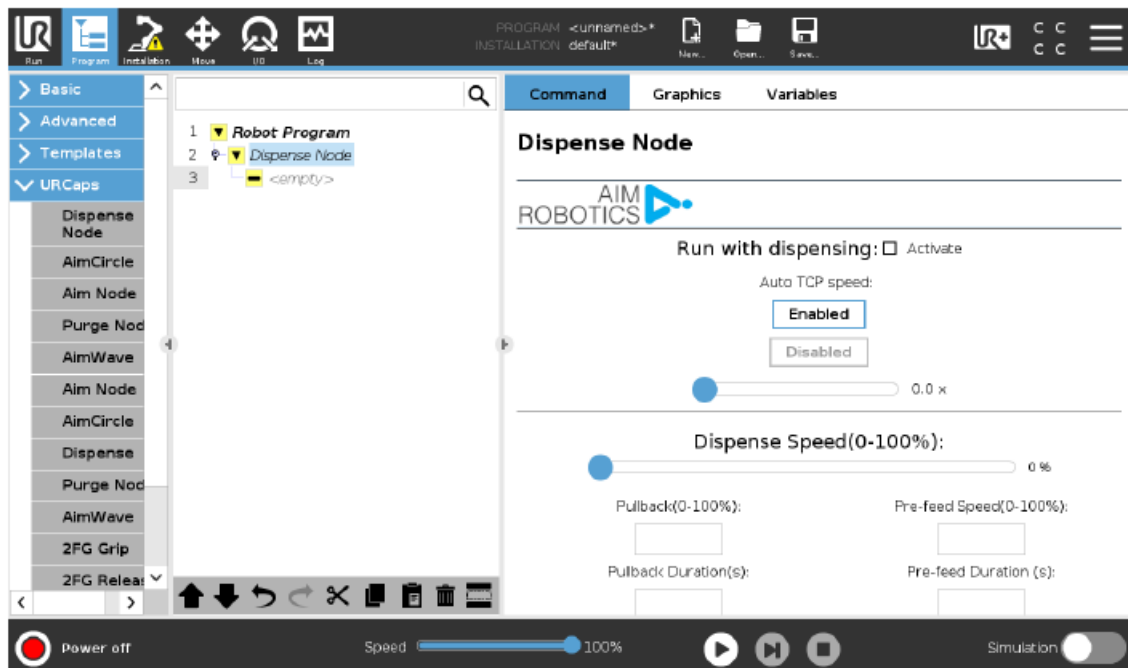- **Move to Pose:** drives robot to Purge position.

FD Dispense Node

- **Run with Dispensing:** Disabled by default, allows to run the path without dispensing. When enabled, runs the path with dispensing.
- **Auto TCP speed:** Uses robot TCP speed and a multiplier to set dispensing speed. This ensures constant dispensing amount in corners. Recommended to use with robot speeds under 75mm/s for most fluids.
- **Dispense Speed(0-100%):** Set's dispensing speed in % of maximum rotational speed. Use 15-25% for medium-high viscosity fluid, 30+% for low-medium viscosity fluids. Be mindful to not overspeed your dispenser as this might result in cavitation. Pullback Speed (%): speed at which dispenser runs at the end of dispense node for amount of time set in Pullback Duration. Allows to suck-back material into the nozzle, reducing stringing, blobbing, leaking. Almost always should match with Prefeed (steps). Most cases should match dispensing speed.
- **Pullback Duration (s):** time for which Pullback Speed is being executed.
- **Pre-feed Speed (%):** speed at which dispenser runs at the start of dispense node for amount of time set in Pre-feed Duration. Allows to suck-back material into the nozzle, reducing stringing, blobbing, leaking. Almost always should match with Prefeed
  (steps). Most cases should match dispensing speed.
- **Pre-feed Duration (s):** time for which Pre-feed Speed is being executed.

Programming CIRCLES

- To program circles select the ⬚ button.
  - In the Program tree the Set Circle move has been inserted.
- Enter Circle Radius and select Center Point to define the center of the circle.

- After entering the Robot speed and Robot Acceleration press Move to start. This will be the point where the robots starts dispensing the circle. Consider the run-up to this point when programming.
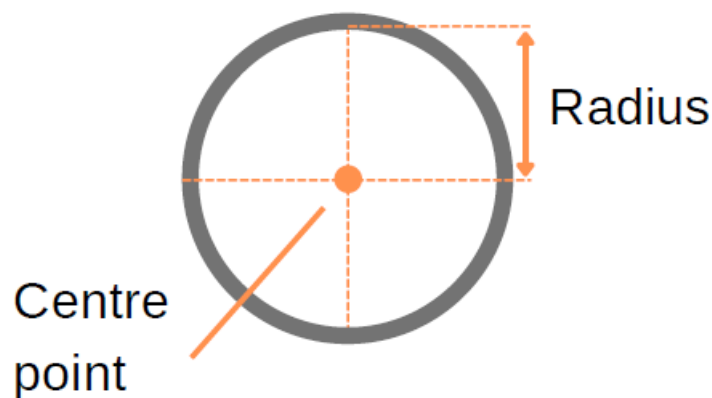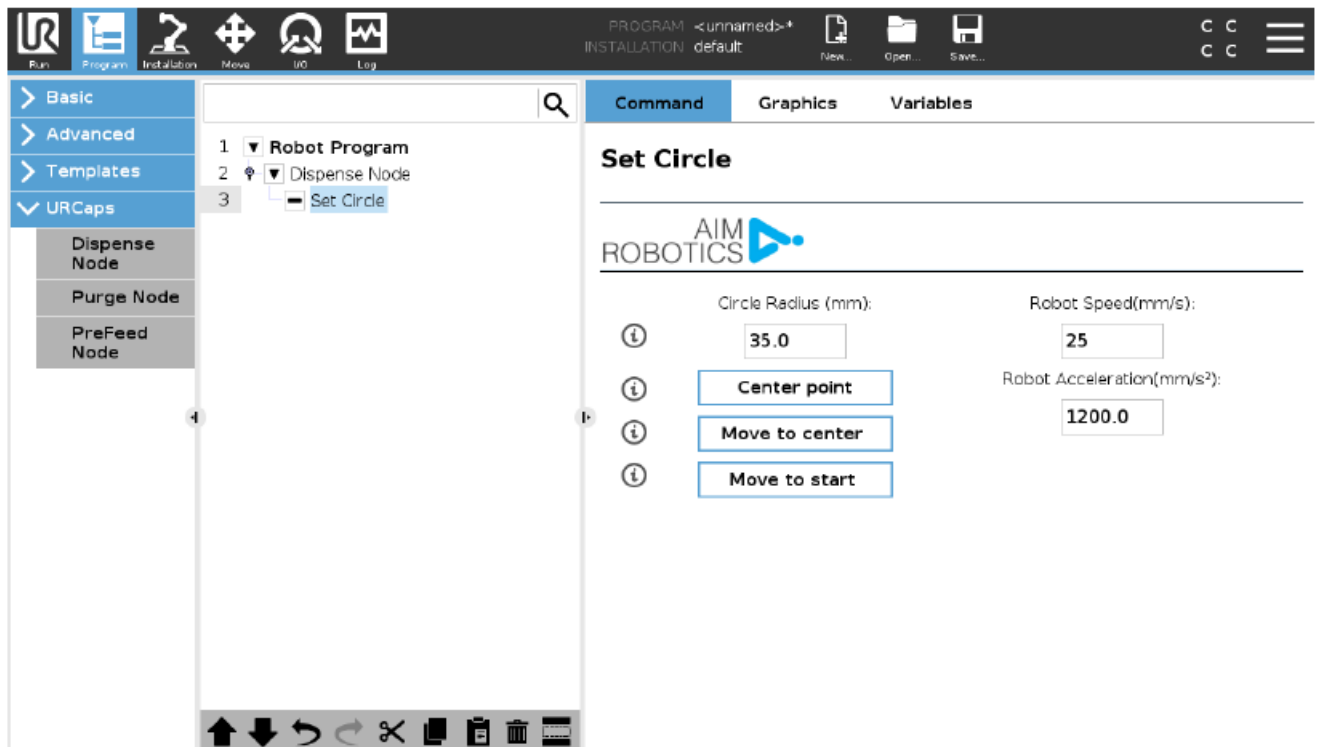
Programming WAVES

- To program waves select the ⌇⌇ button.
  - In the Program tree the Set Wave move has been inserted.
- Enter Wave Count (amount of waves between start and end point)
- Enter Wave Width
- Press Add Start-End to select the start and end point of the line for the wave to follow

The wave curve is also dependant on the robot's movements.
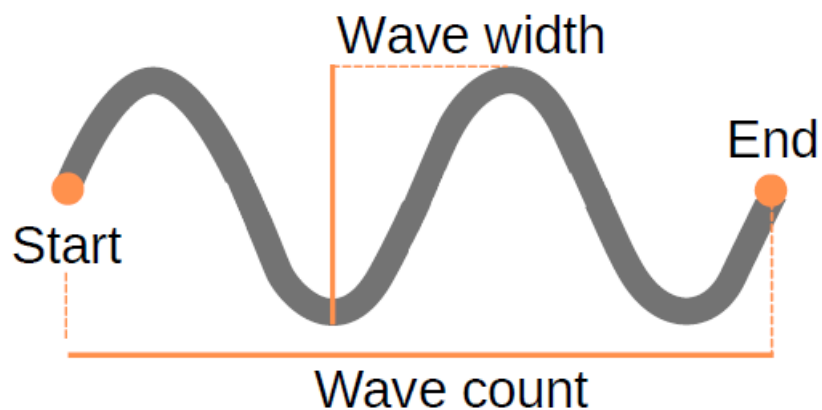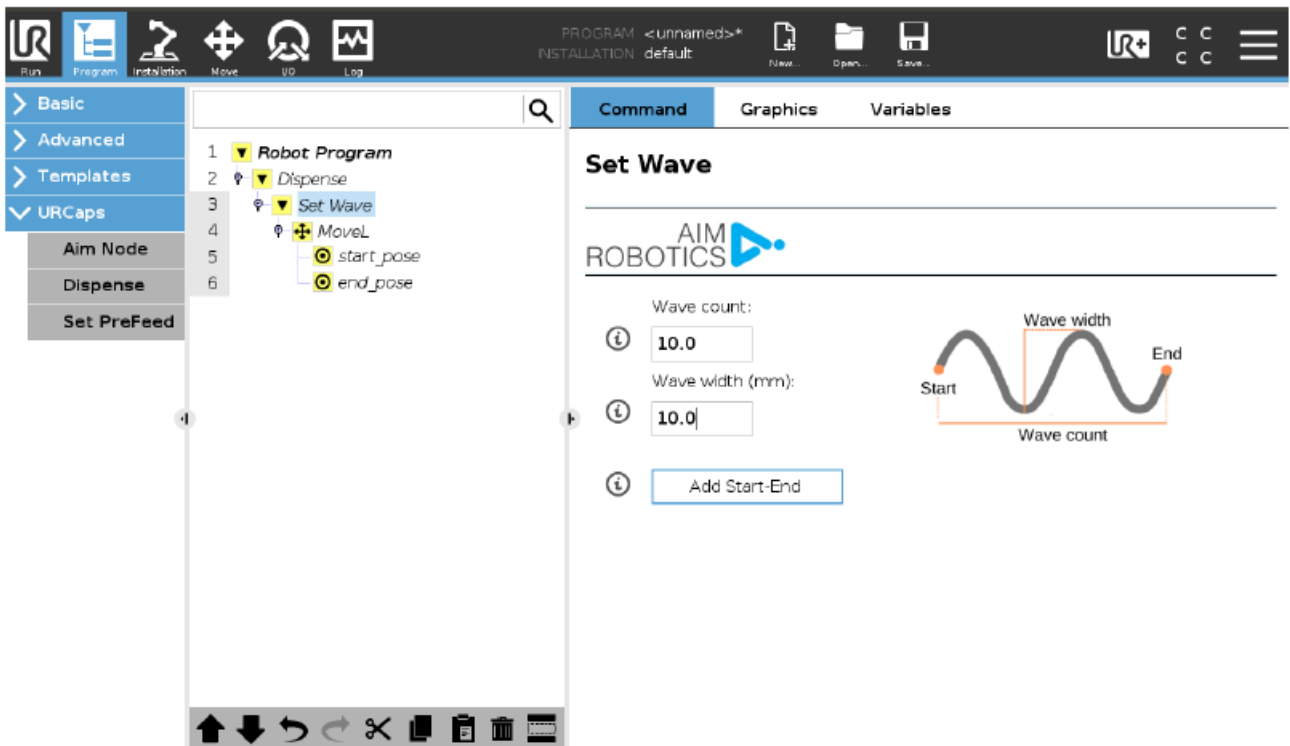
Aim Purge Node

This node will run in the program tree, if inserted.

- This can be used to ensure the fluid does not harden in the tip while the program is running or to wipe the tip.
- The parameters and the Purge Point must be defined in the Purge Node. Select Purge Point in the program tree.

If a Halt command is added at Purge Position, and the Clean Cycle is active, the cleaning cycle will start.

SAFETY

Control path of tip
As the units can be used with nozzles care should be taken when defining the movement for the robot ensuring the tip does not cause incidents.

- Define path to and from the dispensing path.
- Define path to and from the purge point

Sharp objects

The FD Series can be equipped with nozzles and needles to dispense as desired.
Caution should be taken when using these attachments, because they can puncture your skin.

Limitations
It is recommended to set robot limitations in Installation > Safety > Robot Limits: reduce limits to ensure greater safety so that the robot will stop dispensing if it exceeds these limits.

- Tool Speed / Elbow Speed: In the safety settings consider changing speeds to ensure only full speed when dispensing and reduced speed when away from the path to avoid needle injuries.
- Tool Force / Elbow Force: Limit the maximum force exerted by the tool or elbow on the environment.

CAUTION

- Take care when inserting/removing/releasing the handle on the container as the spring might release the container from the unit with great force. Hold on tight.
- Ensure the container is correctly fitted to unit before releasing the handle to avoid it falling of the unit
- Take care when attaching the container to the unit. If it is done while the unit is on the robot be careful to not use too much force, to protect the robot.
- Any change to the unit or in-correct assembly, such as removing o-rings or not screwing the unit on correctly, may lead to accidents, failures or leaks. Ensure that the orifice of the tip is suitable for the fluid to avoid pressure build-up.
- The electronics box must not be opened or the warranty will be void.

AVOID: Clamping between nozzle and work item

- Select the right (low) force settings in the safety system of the UR robot.
- Move slowly towards the work item.

AVOID: Dangerous chemical substances damaging eyes
Can happen if nozzle is blocked and pressure is built up in the system.

- Use cleaning node in programming.
- Change nozzles regularly.
- Use appropriate protective equipment when dispensing or handling dangerous substances (glasses/gloves / etc).
- Do not inspect nozzle at close range when attached to the unit.

AVOID: Collision between nozzle and eye when robot is moving
Can happen when moving between work units or between separate dispensing paths.

- Ensure safe (orientation down) versus unsafe travel paths between work units or separate dispensing paths.
- Move at slower speeds between work units / separate gluing points.
- Keep a short distance between nozzle tip and dispensing path.
- Whenever possible lock degrees of freedom in safety system.

AVOID: Entrapment of fingers/limbs

Entrapment of fingers between tool motor and cartridge can happen when inserting a hand between motor and cartridge and the robots program involves rotation in joint 6. Entrapment of fingers or limbs can happen if operator has extremities within the robots movement area.

- If possible select the right (low) torque/force settings in the safety system of the robot.
- Whenever possible limit rotational range of joint 6.
- Rotate a low speed or when clearance to robot links are small.
- Where possible ensure minimum gap to robot links and cartridge.

RECOMMENDATION
It is recommended that products from Aim Robotics are integrated in compliance with the following standards, technical reports and specifications:

- ISO 10218-2:2012
- ISO 10218-1:2012
    - §5.10 and one or more of the requirements in 5.10.2 to 5.10.5
- ISO 12100:2011
- ISO/TR 20218-1:2018
- ISO/TS 15066:2016

HOW TO

Set Tool IO to 'zero'
Tool IO: Power must be ´zero´ when plugging in the end-effector Select the Installation tab and select General > Tool IO
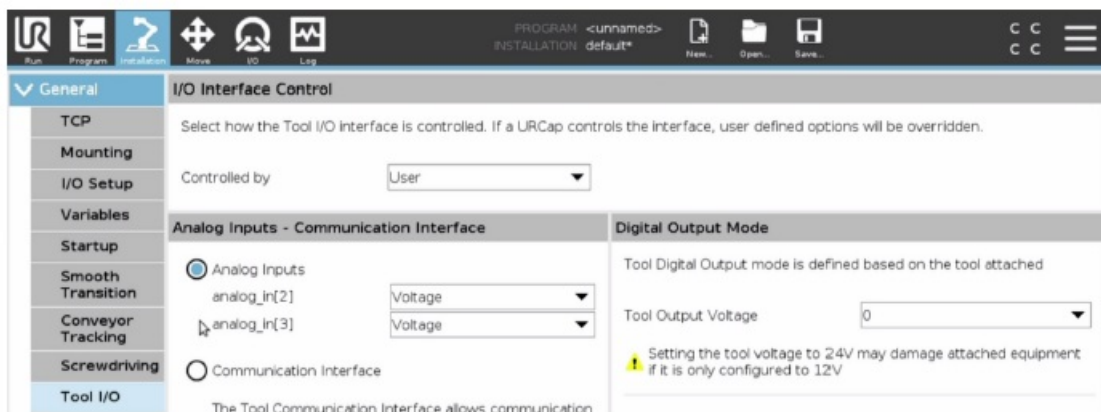
FAQ

The unit does not dispense

- Too many URCaps controlling the Tool I/O
    - Try to delete all other URCaps to avoid interference
- Restart
    - Ensure that restart has been done after installation and LED light is a steady green

CERTIFICATION

EU Declaration of Incorporation in accordance with ISO/IEC 17050-1.2010		
Manufacturer:	Aim Robotics ApS Maskinvej 5 DK-2860 Søborg Denmark	CVR: 40494197 www.aim-robotics.com
Description and identification of the partially completed machine(s)		
Product and Function:	Dispensing end-effector for Collaborative Robots	
Model:	FD (Fluid dispenser)	
Serial Number:	YEAR-model-sequential numbering restarting at 0 each year. Starting from 2020-FD-0000	
Incorporation: The Aim Robotics product shall only be put into service upon being integrated into a final complete machine (robot system, cell or application), which conforms with the provisions of the Machinery Directive and other applicable Directives. When this incomplete machine is integrated and becomes a complete machine, the integrator is responsible for determining that the completed machine fulfils all applicable Directives, updating the relevant harmonized standards, other standards and documents.		
It is declared that the above product, for what is supplied, fulfil the following directives with reference to harmonised standards:		

I. Machinery Directive 2006/42/EC: It is declared that the relevant technical documentation has been compiled in accordance with Part B of Annex VII.
    A. EN 12100:2010
II. EMC Directive 2014/30/EU
    A. EN 61000-6-2:2005
    B. EN 61000-6-4:2007/A1:2011
III. RoHS Directive 2011/65/EU
    A. EN 50581:2012
IV. WEEE Directive 2012/19/EU		

The relevant information on the partly completed machinery shall be transmitted in response to a reasoned request by the national authorities.		
Person authorized to compile the relevant technical documentation		
Mie Haraldsted, CEO	Aim Robotics ApS Maskinvej 5 DK-2860 Søborg Denmark	

Signature

Søborg, Denmark

18.11.2021   Mie Haraldsted / CEO

DESIGNED IN DENMARK BY AIM ROBOTICS APS
AIM-ROBOTICS.COM / **CONTACT@AIM-ROBOTICS.COM**

Documents / Resources

FD SERIES
USER MANUAL | **AIM ROBOTICS FD HIGH-V FD Series Fluid Dispenser** [pdf] User Manual
FD HIGH-V, FD Series, Fluid Dispenser, FD Series Fluid Dispenser, FD HIGH-V Fluid Dispenser, FD HIGH-V FD Series Fluid Dispenser |

References

- ▶ **Automated Robotic Dispensing Systems - Aim Robotics**
- 🌐 **ROBOTICS.COM**

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