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Operations Manual

Cee® In-line Dispense Heater



Cost Effective Equipment

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1 Introduction

1.1 Confidentiality Statement

Information supplied is for the use in the operation and/or maintenance of Cee® equipment. Neither this document nor the information it contains shall be disclosed to others for manufacturing or any other purpose without written authorization from Cost Effective Equipment, LLC.

1.2 Warranty

Cost Effective Equipment, LLC warrants to the original purchaser (Buyer) that equipment is free from defects in material and workmanship under normal use and service in accordance with Cee® instructions and specifications. Buyer shall promptly notify Cee® of any claim against this warranty, and any item to be returned to Cee® shall be sent with transportation charges prepaid by Buyer, clearly marked with a Return Authorization (RMA) number obtained from Cee® Customer Support. Cee's obligation under this warranty is limited to the repair or replacement, at Cee® option, of any equipment, component or part which is determined by Cee® to be defective in material or workmanship. This obligation shall expire one (1) year after the initial shipment of the equipment from Cee®. This warranty shall be void if:

- Any failure is due to the misuse, neglect, improper installation of, or accident to the equipment.
- Any major repairs or alterations are made to equipment by anyone other than a duly authorized representative of Cee®. Representatives of Buyer will be authorized to make repairs to the equipment without voiding warranty, on completion of the Cee® training program.
- Replacement parts are used other than those made or recommended by Cee®.

CEE® MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, WITH RESPECT TO EQUIPMENT. NO WARRANTY IS MADE AS TO THE MERCHANTABILITY OF THE EQUIPMENT NOR ITS FITNESS FOR ANY PARTICULAR PURPOSE. In no event shall Cee® be liable for consequential loss or damages, however caused. No person or representative of Cee® is authorized to assume for Cee® any liability in connection with equipment nor to make any change to this warranty unless such change or modification is put in writing and approved by an authorized representative of Cee® in writing.

This warranty shall be governed by the laws of the state of Missouri, U.S.A.

1.3 Returned Materials

Any materials, parts, or equipment returned to Cost Effective Equipment, LLC must be clearly labeled with a Return Material Authorization (RMA) number.

To obtain an RMA number, contact:

Cee® Customer Support
Telephone ..... +1-573-466-4300
Email ..... support@costeffectiveequipment.com
Web Address ..... www.costeffectiveequipment.com

1.4 Environmental Considerations

Cee® fosters sustainability through innovation in the durability and reliability of our precision tools and equipment. Individual component modules are engineered for serviceability ensuring long lasting performance. Processes are designed to minimize use & consumption of chemical compounds ensuring accurate, replicable, industry-leading results every time.

Cee® diligently screens suppliers to ensure conflict-free sourcing of minerals and product components are constructed of recycled materials wherever possible.

Cee® equipment operates without the use of ozone depleting substances (ODSs) including chlorofluorocarbons (CFCs), methyl chloroform, hydrochlorofluorocarbons (HCFCs), carbon tetrachloride, perfluoro compounds (PFCs), or other volatile compounds/organic solvents.

1.5 General Safety Hazards / Precautions

Read this manual in its entirety before operating or servicing the machine.

1.6 Electrical

High voltage is present in the machine. Disconnect power before servicing.

Stored electrical energy is present in the machine. Before servicing allow sufficient time for discharge. The servo amp contains a charge light. Do not service the machine until this light has been extinguished.

This unit must be connected to an outlet with proper grounding.

1.7 Mechanical

This machine may contain compressed gases which can provide motive force for components and can expand violently upon decompression. Disconnect N_2 or CDA before removing any panels.

Ensure that all panels are on and in their correct locations before powering up or operating.

1.8 Chemical

Cee® does not supply or dictate chemicals to be used in conjunction with the Cee® Inline In-Line Dispense Heater. Enclosure material data will be reviewed during equipment design and configuration to ensure compatibility with the customer's proprietary process.

Prior to introducing new chemicals, refer to your chemical supplier's factory specifications and MSDS. Material Safety Data Sheets (MSDS) contain crucial information regarding chemical safety, including details about hazardous components, physical properties, spill and leak procedures, waste disposal guidelines, and personal protective equipment requirements for handling.



Ensure chemical compatibility of all chemicals and materials being used inside the machine. This includes all wetted parts of the storage, supply, dispense, and waste systems.



All dispensed materials are held in one common waste storage tank. Ensure chemical compatibility and verify potential for negative interactions between chemicals before use.



Flammable Chemicals. No open flames/sparks.



Avoid the use of materials with an auto-ignition point ≥30°C.



Relieve pressure before opening canisters, tanks, cartridges, or syringes to refill.



Relieve pressure and shut off chemical valves before servicing supply lines, dispense valves or other components such as EBR/BSR tubes, dispense nozzles, spray tips, or spinner lid.



Flush tubing and valves with an appropriate solvent and drain system before servicing.



When draining the waste tank, use appropriate containers and connection methods.



Ensure proper ventilation/exhaust is always used.



Always wear appropriate Personal Protective Equipment. This includes safety glasses, gloves, and other equipment, as needed, to protect from mechanical and chemical hazards.

Exhaust and fume management is important to prevent the release of hazardous materials and ensure a safe working environment.

1.9 Lockout/Tagout Procedures and Information

Before servicing, turn off the machine and remove the power inlet cord by disconnecting the plug where it enters the machine.

Note: There are no LOTO (Lock Out/Tag Out) facilities supplied with the Cee® In-Line Dispense Heater. It is the responsibility of the customer/installer/end-user to ensure that the suitable LOTO devices are provided on utilities being supplied to the Cee® Apogee™ Spin Coater in accordance with applicable laws, regulations, and/or company policies.

For more information, please contact Cee® Customer Support.

1.10 Intended Use of Machine

The Cee® In-Line Dispense Heater is intended for use as a semiconductor/optical application machine.

The Cee® In-Line Dispense Heater is not intended for use in food or medical applications or for use in hazardous locations.

The Cee® In-Line Dispense Heater is intended for use only by trained personnel wearing the proper personal protective equipment. Anyone not trained in the proper use of the Cee® In-Line Dispense Heater and having not fully read this manual, should not operate the equipment.

The Cee® In-Line Dispense Heater is intended for use in a cleanroom environment to provide the proper processing conditions for the substrates. If it is used outside of a cleanroom environment, substrate cleanliness may be compromised.

The Cee® In-Line Dispense Heater is not intended for use in a hazardous or explosive environment.

Normal Operating Conditions

The Cee® In-Line Dispense Heater is designed for indoor use only.

Ambient Temperature.....10˚C - 30˚C

Relative Humidity.....≤80%

Altitude.....up to 3000 m

Pollution Degree 2

Overvoltage Category.....II

Permissible Voltage Fluctuations .....208-230VAC ±10%

If the Cee® In-Line Dispense Heater is used in a manner not specified by Cee® or with accessories not provided by Cee® the protection provided by the equipment may be impaired.

2 Equipment Description

The Cee® In-Line Dispense Heater is specifically designed to heat and dispense aqueous solutions for developing/cleaning coatings on semiconductor substrates. This equipment ensures precise temperature control, facilitating optimal development processes critical for semiconductor fabrication.

2.1 Components

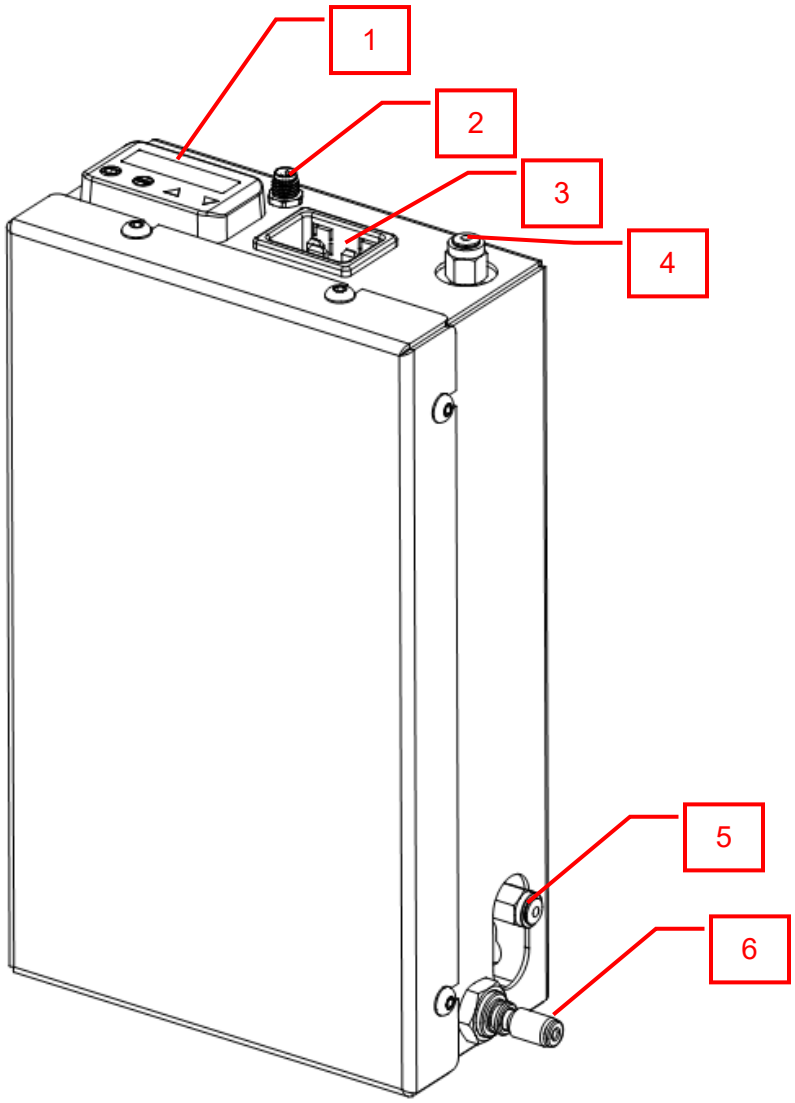


Figure 1: Cee® In-Line Dispense Heater

1. control display ..... displays temperatures and advanced settings
2. communication connector ..... M8, 4 pin port used for communication with Apogee® equipment
3. AC power in ..... single phase 208-230VAC, 12A
4. fluid outlet..... fluid emerges from heater via this port
5. fluid inlet..... fluid enters heater via this port
6. heater trigger..... de/activates heater via dispense control box pneumatic trigger

2.2 Dimensions

8” (203 mm) W x 3 ½” (89mm) D x 14 ½” (368mm) H
machine weight..... 10lb (4.54kg)

2.3 Features & Programmability

- On-demand heated dispense for aqueous solutions from 20°C to 80°C.
- High-performance heating element designed for rapid response and uniform heat distribution.
- Recipe defined dispense temperatures through DataStream™ technology.
- GUI accommodates multiple *In-Line Dispense Heaters.*
- Flow rate:
  - 150 ml/sec (up to 50°C)
  - 110 ml/sec (up to 80°C)
- Real-time monitoring and feedback for precise control over dispense and heating process.

2.4 Utilities

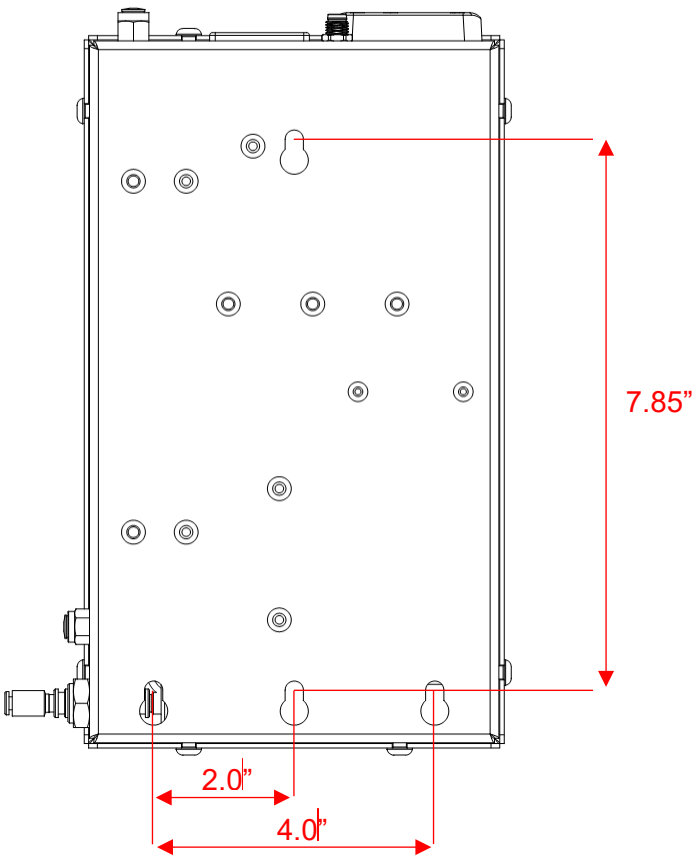
voltage ranges ..... 208-230 VAC, single phase, 50/60Hz
power requirements ..... 2755 Watts (12A)
inlet port..... 1/8 or 1/4” OD
outlet port..... 1/8 or 1/4” OD
pilot port..... 1/8” OD

3 Installation

3.1 Mounting Requirements

Please review the following guidelines before mounting the Cee® In-Line Dispense Heater:

- The Cee® In-Line Dispense Heater is designed be mounted on a vertical surface.
- The outlet[1] must be mounted pointing upward as illustrated in the diagram below.
- For best results, mount so that tubing to the dispense valve is as short as possible.
- Mounting holes are designed to be used with #10 Button Head Screws.
- Mounting points and measurements are reflected in the diagram below.



Clearance Requirements

Adherence to these requirements ensures adequate spacing, ventilation, and access to the detachable MAINs[2] supply cords as needed. The overall dimensions given previously account for clearance spaces.

device top ..... 3” (76.2mm)
device right side ..... 1” (25.4mm)

[1] See Section 2.1 for details.
[2] The tool should only be operated with the MAINs supply cord provided by Cee®.

3.2 Facilities Requirements

The Cee® In-Line Dispense Heater requires the following utilities for operation.

voltage ranges..... 208-230VAC, single phase, 50/60Hz
power requirements..... 2755 Watts *(12A)*
inlet port ..... 1/8 or 1/4" OD *(From Aqueous Solution Source)*
outlet port ..... 1/8 or 1/4" OD *(To Dispense Valve)*
pilot port ..... 1/8" OD *(from Cee® Dispense Control Box)*

3.3 Environment

The Cee® In-Line Dispense Heater should be operated in a clean, low humidity environment.

3.4 Unpackaging/Inspection

1. Remove from the packing crate and remove any packing foam and plastic wrap.
2. Thoroughly check for shipping damage. If physical damage is seen, **DO NOT APPLY POWER!** Contact Cee® Customer Support immediately.

The following items are included with shipment:

- Cee® In-Line Dispense Heater
- M8, 4 pin cable
- power cord
- operations manual (USB thumb drive)

Optionally Included Items:

- dispense systems and related components

3.5 System Installation & Setup

1. Mount the Cee® In-Line Dispense Heater as described in section 3.1 Mounting Requirements. The control display does not have to be visible when connecting to Apogee® equipment.
2. Connect power per the reference diagram in section 2.1 Components and power requirements from section 3.2 Facilities Requirements.
3. Connect the 4-pin, M8 connector from the programmable exhaust port of the Apogee® equipment to the communication connection [item 2 in section 2.1 Components.]
4. Connect the chemical supply line to the inlet [item 5 in section 2.1 Components] by loosening the nut, inserting the tubing and tightening the nut back down by hand.
5. Connect the dispense valve line to the outlet [item 4 shown in section 2.1 Components] by loosening the nut, inserting the tubing and tightening the nut back down by hand
6. Connect the trigger line from the Cee® supplied control box to the pilot port [item 6 in section 2.1 Components.]

3.6 Start Up

The Cee® In-Line Dispense Heater will automatically turn on when plugged in and the control display will light up showing the current temperature. The heater will remain idle until the Apogee® equipment it is connected to is turned on, a temperature is set in the GUI, and a dispense is triggered. The In-Line Dispense Heater will only heat when dispense is triggered from the connected Apogee® Equipment.

3.7 System Checks

On the ***Process*** screen, navigate to ***Tools>Manual Control*** and perform the following system checks for initial validation of the Cee® In-Line Dispense Heater.

Inline Heater- Set :

Choose the Inline Heater based on dispense number. Enter a set point for the desired temperature (20-80ºC). Press *Apply*. The set point parameter will show the current setpoint from the controller. If the setpoint does not appear, the In-Line Dispense Heater is not connected correctly.

Inline Heater – Test:

For this test, liquid must be supplied to the heater. Refer to the provided Dispense Manual for fluid connections. Trigger dispense to test that heater is functioning correctly. Navigate to ***Dispense>Enable Dispenses.*** Choose the dispense you wish to test, and press apply. The fluid will start to flow, turning the heater on. It may take up to 20 seconds for the fluid to reach the desired temperature. This will be shown on the *Actual* column of the Parameters list.

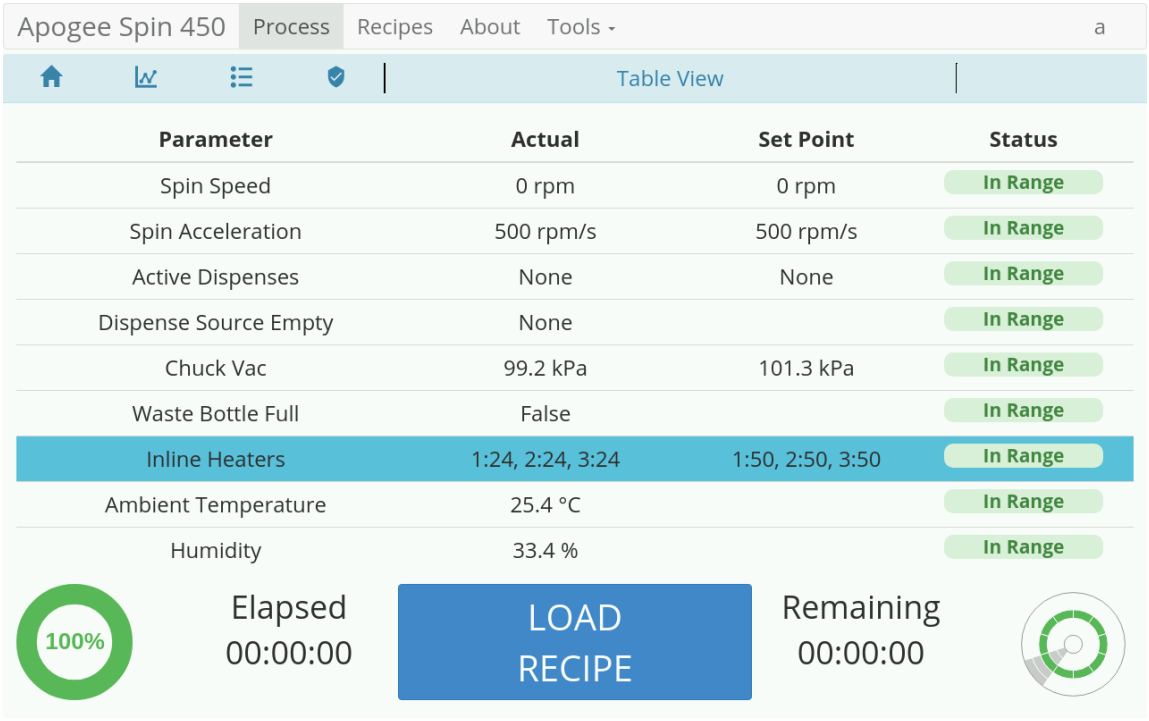
Once operations have been validated, the Cee® In-Line Dispense Heater is ready for use. Begin by creating a recipe. See the DataStream™ Manual for more information.

In the event of a fault condition, power cycle the tool to restore function

4 DataStream™ Technology

This section covers information *specific to Cee® In-Line Dispense Heaters* and is intended as a companion to the DataStream™ Technology Software Manual. ***Please review the DataStream™ Operations Manual*** for detailed guidance on software usage.

4.1 System Parameters



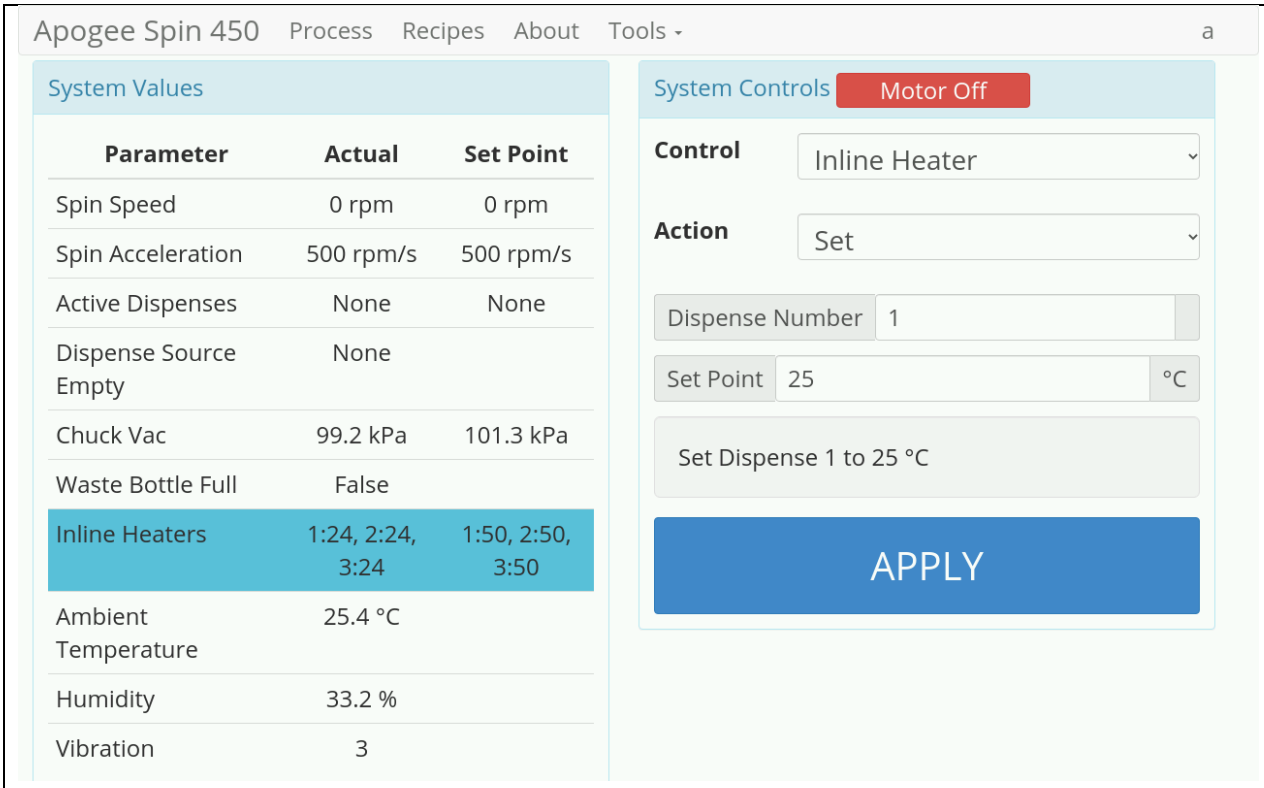
Inline Heaters---------- Lists real time and set point temperatures for each dispense (°C)

4.2 Manual Controls – Cee® In-Line Dispense Heater

The Manual Control activity is an advanced feature that allows users to run most operating processes outside of a recipe. This mode is useful for tasks such as prototyping processes, verifying equipment operation, and recovering from aborted processes. To access the activity, navigate to ***Tools > Manual Control***. Actual and set point parameter values are displayed on the left. A drop-down menu of available controls is located on the right.

If using remote feature, the user must confirm local presence to execute manual commands. *Refer to the DataStream™ Manual for guidance on the Local Presence feature.*

Inline Heater



Select a Control of *Inline Heater* and the Action will default to *Set.*

Enter a value to select the Dispense Number for the desired In-Line Dispense Heater.

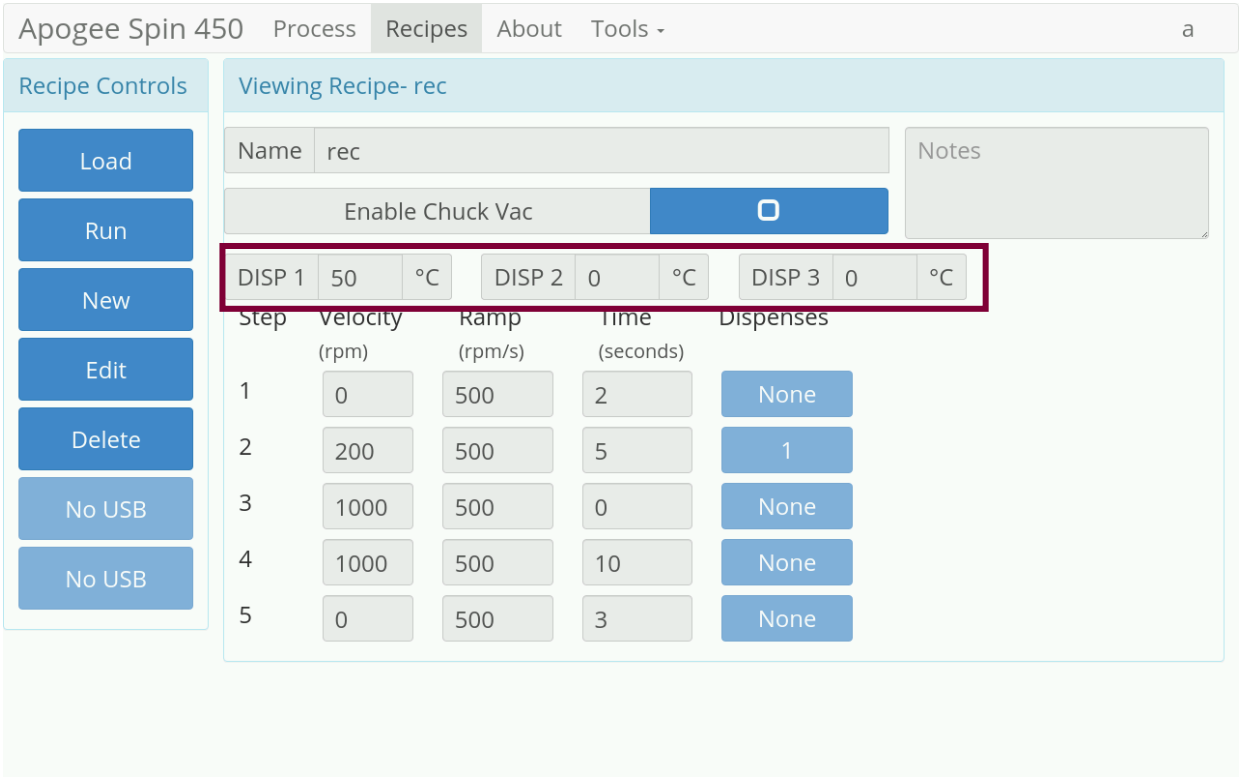
Enter a value for the Set Point to define the desired temperature (C°).

Click APPLY

*Heating will only commence when a dispense is triggered and fluid begins to flow.

4.3 Editing Recipes

Temperatures are set independently for each Cee® In-Line Dispense Heater in the recipe. Set points are established at the beginning of each recipe. A temperature setting of 0°C maintains the ambient[3] condition, preventing the heater from engaging.



DISP [#] ---------- The dispense correlating with each In-Line Dispense Heater

[#]°C---------- The temperature set point for the In-Line Dispense Heater

[3] The Cee® In-Line Dispense Heater exclusively raises temperatures above ambient conditions and lacks cooling capabilities.

5 Preventative Maintenance

This maintenance manual provides personnel with procedures and guidelines for conducting routine maintenance on a Cee® In-Line Dispense Heater. Below is a chart of recommend maintenance scheduling.

5.1 Service and Repairs

Safety Notice: Important Repair Information for Cee® Equipment

⚠ In order to maintain safety and performance standards, only authorized representatives of Cee® are permitted to conduct repairs or alterations on Cee® equipment.

⚠ When servicing the machine, use only replacement parts made or recommended by Cee®.

⚠ Use only Cee® supplied shielded cables with this machine.

⚠ Unauthorized repairs may lead to serious risks such as equipment malfunction, damage, personal injury, or even death.

5.2 Fault Condition

In the event of a fault condition, power cycle the tool to restore function.

5.3 Safety Checks

Inspect spin coater lid for the following defects each day prior to use:

- loose assemblies
- improper closure

5.4 Mechanical/Utilities Checklist

Evaluate	Frequency	Detail
Connections	Bi-Annually	Inspect all connections for proper installation.
Power	Bi-Annually	Verify that AC power is connected and of the proper voltage.

5.5 Cleaning

To clean the Cee® In-Line Dispense Heater, use the mildest solvent possible such as acetone or isopropyl alcohol. ***Do not use caustic acids or bases.*** Contact Cee® Customer Support with any questions or concerns.

6 Table of Revisions

Doc Rev #	Author	Description of Change(s)	Reviewed/Approved By	Date