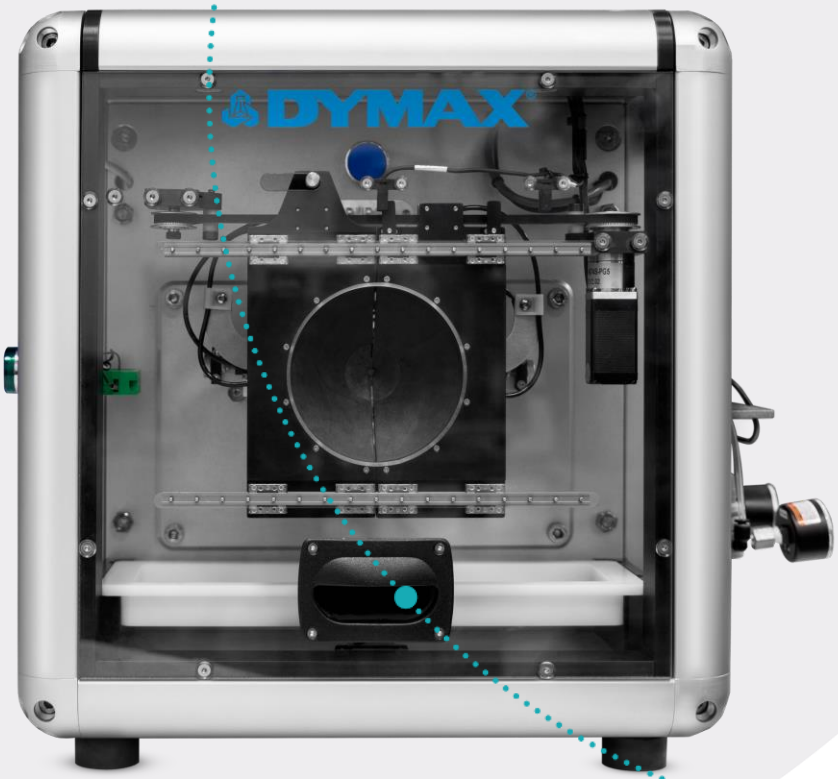


RotoSpense 360

Workstation
User Guide

DYMAX®

About Dymax

UV/Visible light-curable adhesives. Systems for light curing, fluid dispensing, and fluid packaging.

Dymax manufactures industrial, light-curable, epoxy, and activator-cured adhesives. We also manufacture a complete line of manual fluid dispensing systems, automatic fluid dispensing systems, and light-curing systems. Light-curing systems include LED light sources, spot, flood, and conveyor systems designed for compatibility and high performance with Dymax adhesives.

Dymax adhesives and light-curing systems optimize the speed of automated assembly, allow for in-line inspection, and increase throughput. System designs enable stand-alone configuration or integration into your existing assembly line.

Please note that most dispensing and curing system applications are unique. Dymax does not warrant the fitness of the product for the intended application. Any warranty applicable to the product, its application, and use is strictly limited to that contained in the Dymax standard Conditions of Sale. Dymax recommends that any intended application be evaluated and tested by the user to ensure that desired performance criteria are satisfied. Dymax is willing to assist users in their performance testing and evaluation by offering equipment trial rental and leasing programs to assist in such testing and evaluations. Data sheets are available for valve controllers or pressure pots upon request.

Contents

Introduction

This guide describes how to set up, use, and maintain the RotoSpense 360 safely and efficiently.

Intended Audience

This user guide is meant for experienced process engineers, technicians, and manufacturing personnel. If you are new to operating fluid dispensing equipment and do not understand the instructions, contact Dymax Application Engineering for answers to your questions before using the equipment.

Where to Get Help

Dymax Customer Support and Application Engineering teams are available by phone and email in the United States, Monday through Friday, from 8:00 a.m. to 5:30 p.m. Eastern Standard Time, and in Germany, Monday through Friday, from 8:00 a.m. to 5:00 p.m. Central European Time. You can also email Dymax at info@dymax.com or Dymax Europe GmBH at info_de@dymax.com. Contact information for additional Dymax locations can be found on the back cover of this user guide.

Additional resources are available to ensure a trouble-free experience with our products:

- Detailed product information on our website www.dymax.com
- Dymax adhesive product data sheets on our website
- Safety data sheets (SDS) provided with shipments of Dymax materials

Safety

WARNING! *If you use this fluid dispensing equipment without first reading and understanding the information in this guide, personal injury can result from the uncontrolled release of high-pressure gas, injection injury, or exposure to chemicals. To reduce the risk of injury, read and understand this guide before assembling and using Dymax fluid dispensing equipment.*

Safety Considerations

General Safety Considerations

All users of Dymax fluid dispensing equipment should read and understand this user guide before assembling and using the equipment.

To learn about the handling and use of dispensing fluids, obtain and read the SDS (Safety Data Sheet) for each fluid before using the fluid. Dymax includes an SDS with each adhesive sold. SDS for Dymax products can also be requested on the Dymax website.

Specific Safety Considerations

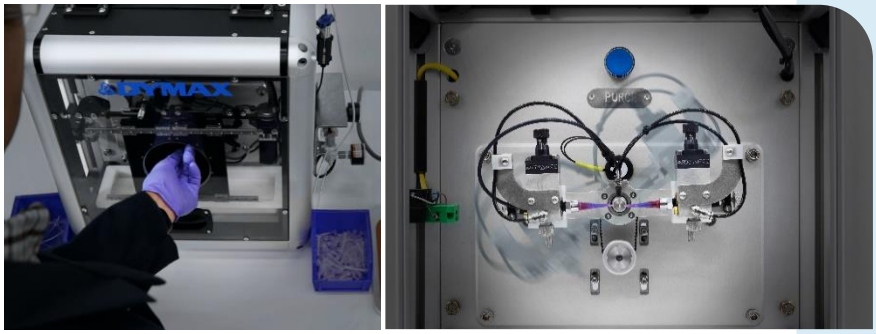
Pressurizing the components in the dispensing system beyond the maximum recommended pressure can result in the rupturing of components and serious personal injury. To minimize the risk of rupturing components and injury, do not exceed the maximum operating pressure of the components in the systems.

Discharging fluids or compressed air with a dispensing tip against your skin can cause very serious injection injury. To minimize the risk of injury, do not place the dispensing tip in contact with your skin.

Product Overview

The RotoSpense 360 is designed to vastly improve the bonding process for applications that require adhesive to be placed around the outer diameter at the ends of tubing or a connector that will be inserted into a receiving component. The RotoSpense 360 repeatedly and accurately places the same volume of adhesive in the same location without relying on the viscosity of the adhesive to flow into place on its own. This workstation is applicable for a variety of components that require an annular ring of adhesive applied to the tip of a cylindrical substrate.

Quality tubing bonds require a repeatable and precise amount of adhesive to properly fill joints without causing overflow, gaps, or voids. The RotoSpense 360 helps achieve that.



The operation of the system is as follows: operators insert a piece of tubing into the RotoSpense 360 face, triggering the integrated Dymax 455 valves to close in and rotate around the tube, dispensing the precise amount of adhesive required for the application.

By freeing up the operators' hands, they can more carefully handle components and focus on assembly accuracy. The intent of the unit is to provide one hand use for adhesive dispense on inserted parts.

The RotoSpense 360 reduces operator variability and greatly increases the reliability of the overall assembly process. Ultimately, the systems helps make manufacturing qualification processes more efficient.

The unit is designed to be used in a benchtop manufacturing cell.

Main Components

Figure 1.
System Components – Front

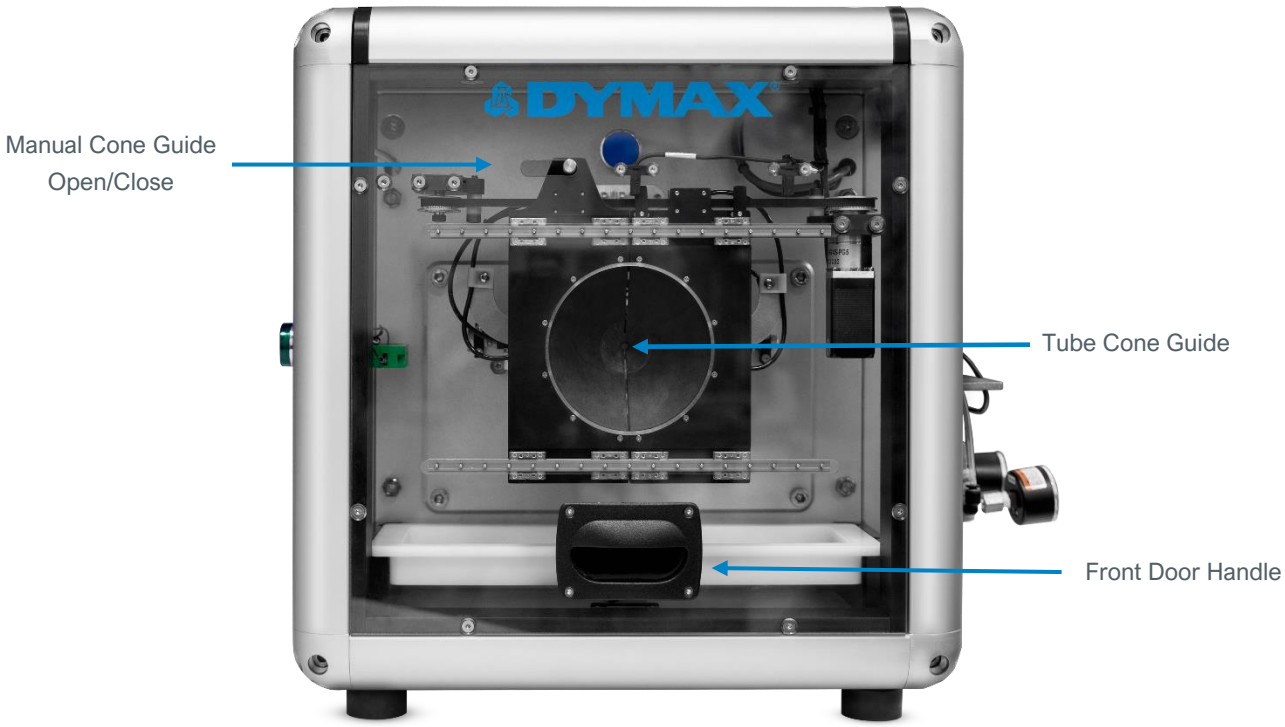


Figure 2.
System Components – Right Side

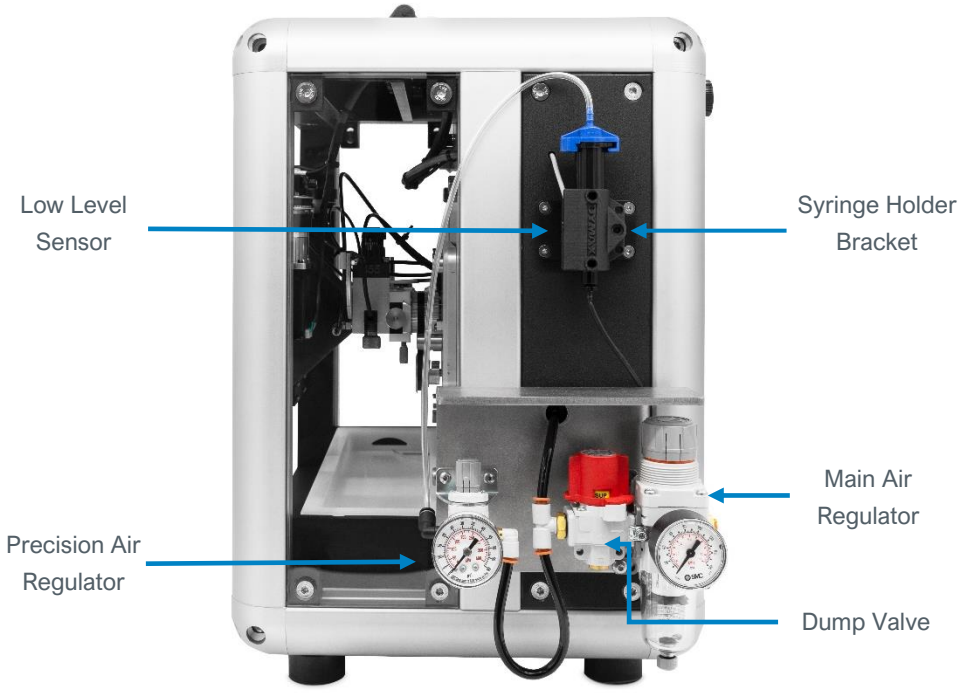


Figure 3.
System Components – Left Side

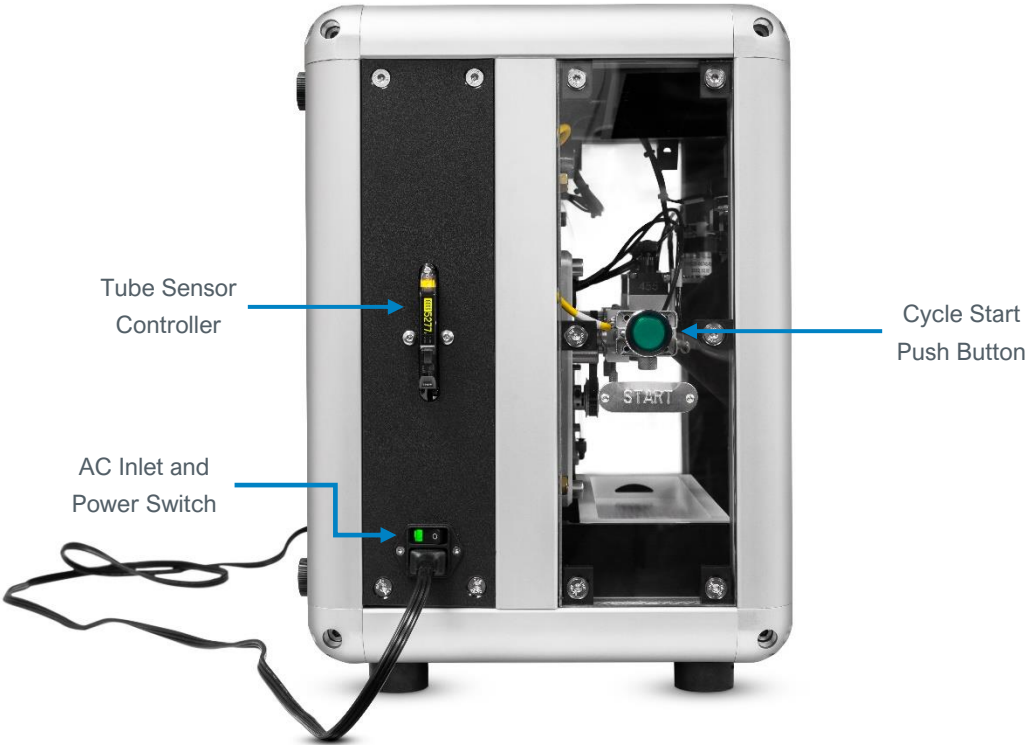
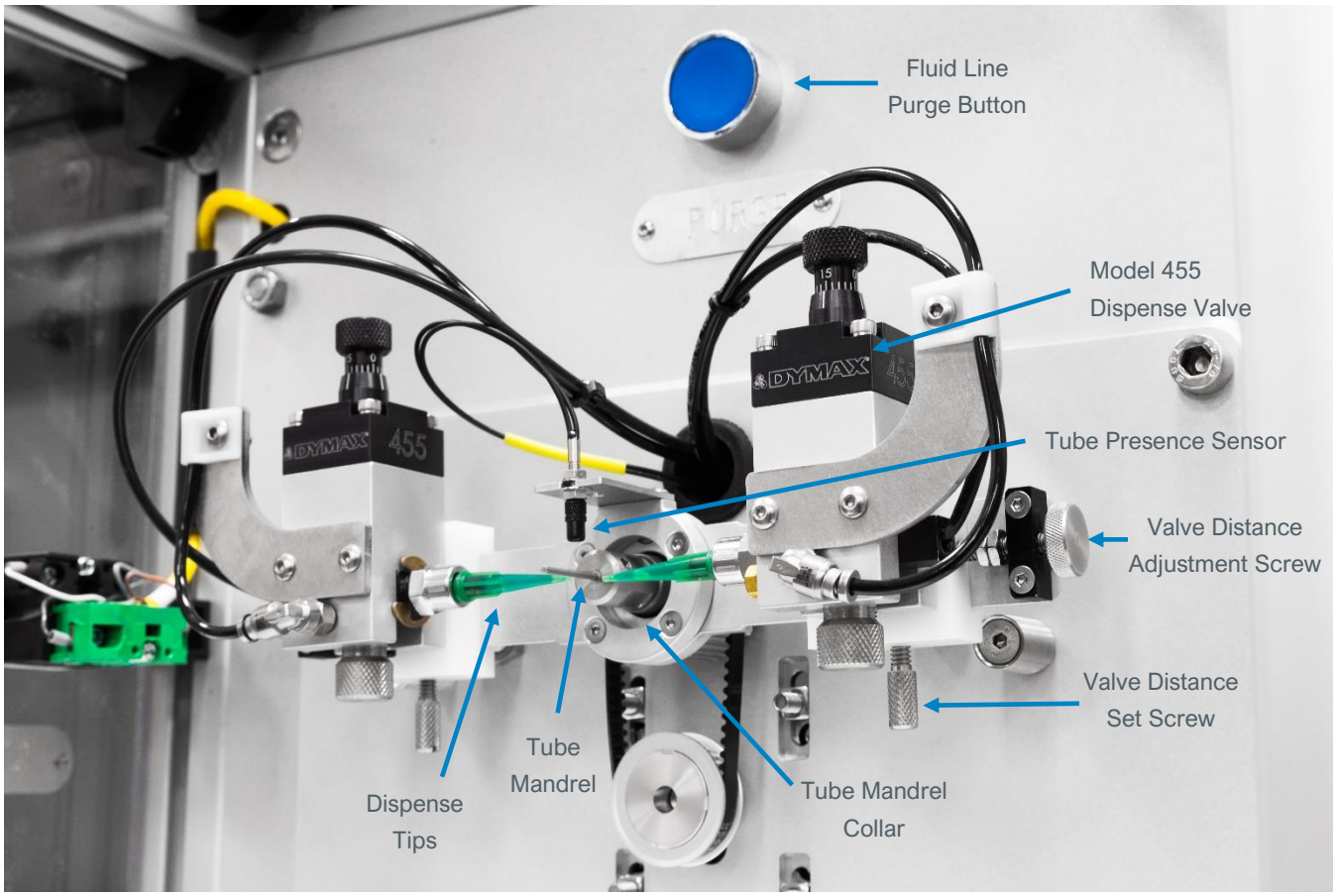


Figure 4.
System Components – Back

Figure 5.
System Components – Inner Components



Unpacking

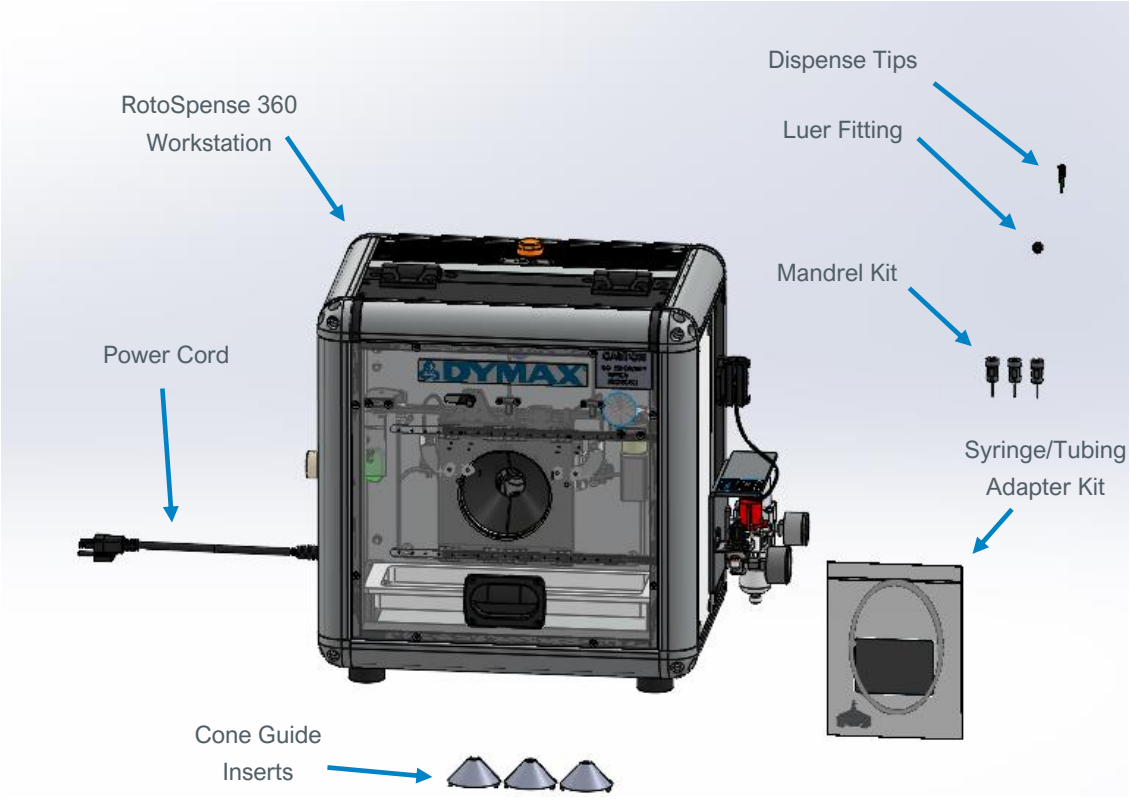
Unpacking and Inspecting Your Shipment

Upon arrival, inspect the crate and all boxes for damage. If parts are damaged, notify the shipper and submit a claim for the damaged parts. Contact Dymax so that new parts can be shipped to you immediately.

The parts below are included in every package/order. If parts are missing from your order, contact your local Dymax representative or Dymax Customer Support to resolve the issue.

Parts Included

- RotoSpense 360 Workstation
- 18 ga Dispense Tips (Qty: 2)
- Cone Guide Inserts for .031”, .062”, & .080” OD Mandrels (Qty: 3; 1 of each)
- Mandrel Kit (OD .031”, .062”, & .080”) (Qty: 3; 1 of each)
- Power Cord
- Syringe/Tubing Adapter Kit
- MAN129 - RotoSpense 360 Workstation User Guide



Installation

The RotoSpense 360 comes fully assembled less the dispensing tips and material syringe which require installation. The RotoSpense 360 will require connections to shop power (110-120VAC) and air (70-100 psi) as well as a 5/64” hex wrench (*not included*).

1. Remove the RotoSpense 360 from the crate and place it on a flat stable work surface.
2. Open the front door (**Figure 1**) and install the appropriate tube mandrel (**Figure 5)** and tube cone guide (**Figure 1)** based on the outer and inner diameters of the tube being prepared.
3. Install the material syringe in the Syringe Holder Bracket (**Figure 2**) and tighten the screws until it is secure. The height of the Low Level Sensor (**Figure 2**) can be adjusted to alert the operator when the material level in the syringe is low and needs to be replaced. The exact position will be based on the needs of the process.
    - ***Note:*** *The included small magnetic washer is required to be placed inside the syringe for the Low Level Sensor to function.*
4. Connect the syringe to the fluid line using the included male Luer barb fitting. Then connect the air cap securely to the syringe and ensure the air line is fully seated in the Precision Air Regulator (**Figure 2**)**.**
5. Open the front door and install the desired dispense tips on the Model 455 Dispense Valves (**Figure 5**) by pressing them firmly on the tube adapter.
    - ***Note:*** *Make sure the valve fittings are clean and dry before installing the dispense tips to provide a secure connection when the system is under pressure.*
6. Verify the regulators are connected as shown (**Figure 2**).
7. Connect the RotoSpense 360 to a 110-120VAC outlet using the supplied power cord and power the unit on.

Setting Up Valves for Dispense

Note: *The system purge and valve settings will be adjusted with the front door open. The valves will not rotate with the door in the open position.*

System Purge

The system requires the fluid lines to be purged prior to dispense on initial start-up and between material changes.

1. Ensure the Dump Valve (**Figure 2**) is in the "EXH" position, then connect shop air to the Main Air Regulator (**Figure 2**). It is recommended to supply the system with 100psi of air.
2. Adjust the Main Air Regulator to 80psi, turn the Dump Valve to the "SUP" position, and set the Precision Air Regulator to 25psi.
3. Once the regulators have been adjusted, push and hold the Fluid Line Purge Button (**Figure 5**) until material flows out of the tips and no air bubbles are present. Adjust the Precision Air Regulator as the system purges and material flows from the dispense tips to define the dispense rate and volume.
    - ***Note:*** *Various combinations of tube size and material viscosity can cause the purge cycle to take upwards of one minute or more for material to reach the dispensing tips.*
    - ***Note:*** *If the flow rates out of the valves are not consistent, see "Adjusting Material Flow" section below to set both valves to have the same flow rate of material.*
4. Allow the material to dispense out of the tips and onto the drip pan during fluid line purging.
    - ***Note:*** *Ensure the valves are in start position (parallel to the work surface) and not inverted to avoid adhesive drip onto sensor.*

Valve Distance Setting

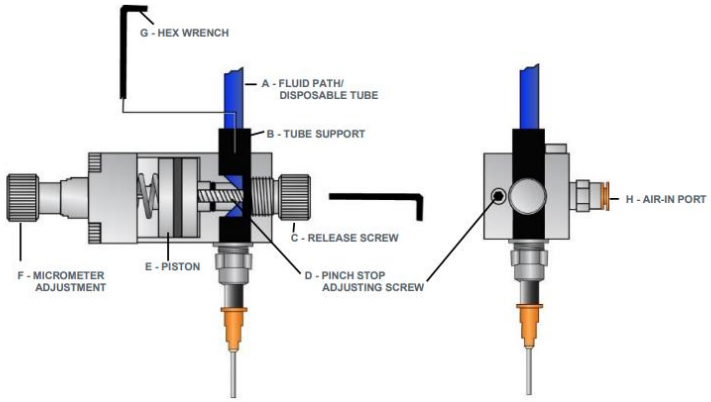
1. To adjust the distance between the dispense tips and tube mandrel (**Figure 5**), loosen the Valve Distance Set Screw on the bottom of the rail before using the Valve Distance Adjustment screw (**Figure 5**). On both valve brackets, use the Valve Distance Adjustment Screw (**Figure 5**) to set the distances. The distance from the tube mandrel can be adjusted after a few dispense cycles based on the operator's desired volume and dispense pattern.
2. Tighten the Valve Distance Set Screw once the desired position is confirmed.
    - ***Note:*** *The distance from the dispense tip to the tube mandrel should be equal for both valves. Adjust both tips until they are almost touching the substrate, then count the number of turns on each Valve Distance Adjustment Screw to ensure equal distances.*

For further information on using Dymax Model 455 valves, please refer to the Model 455 user manual (MAN030) by scanning the QR code.

Adjusting Material Flow

Figure 6.

System Components – 455 Dispense Valve Components



The Micrometer Adjustment (**Figure 6,** F) controls the distance the piston can travel from its resting position, thereby providing flow control. It is very important that the tube support (**Figure 6,** B) is firmly seated in the valve and secured tightly with the Release Screw (**Figure 6**, C). If it is loose, tighten the Release Screw clockwise against the tube support until it is firmly seated. If the release screw appears to bind, remove it and lightly grease the threads with a non-reactive lubricant.

To set the piston (**Figure 6**, E) for the proper travel distance (the amount the fluid path opens), adjust the Micrometer Adjustment using the following steps:

1. Ensure pressures are set as described in the System Purge section above.
    - ***Note:*** *If the Pinch Stop Adjusting Screw (**Figure 6**,* D*) prevents the piston from closing the Fluid Path (**Figure 6,*** A*), flow will begin as the system is pressurized. If this happens, skip to step 4.*
2. Initiate the dispense via the Fluid Line Purge Button or through a complete closed cycle. If there is no flow, increase pressure until flow begins.
3. Stop dispense (release the Purge Button or open the front door).
    a. If an increase of flow is needed: Turn the Micrometer Adjustment counterclockwise equally on both 455 Dispense Valves.
    b. If decrease of flow is needed: Turn the Micrometer Adjustment clockwise equally on both 455 Dispense Valves.
    - ***Note:*** *The position of the graduations on the Micrometer Adjustment may not be the same on both valves. Count how many turns/graduations you loosen or tighten for each valve to stay consistent.*
    - ***Note:*** *One full turn of the Micrometer Adjustment changes the piston travel distance by 0.025".*
4. If the 455 Dispense Valve drips or allows material to flow when in the closed position, the Pinch Stop Adjusting Screw must be adjusted. To set the proper piston stop point with the Pinch Stop Adjusting Screw (the amount the fluid path closes), turn the Pinch Stop Adjusting screw counterclockwise until material is no longer flowing from the dispense tip.

Notes:

- *The valves can be manually rotated while the front door is open for adjustment.*
- *Adjusting material flow can be done during the system purge for an initial setting.*
- *The dispense tip sizes can be changed to maintain a more desirable material dispense rate.*
- *Failing to properly seat the tube support or adjust valve piston pinch may result in premature tube failure and a loss in shot size accuracy.*
- *There is a direct relationship between valve rotation speed/fluid pressure and dispense volume.*

Changing Fluid Lines

1. Verify all air pressure has been removed from the system by moving the dump valve to the “EXH” position, then remove the shop air supply and power cord.
2. Open the front door of the RotoSpense 360.
3. Remove the fluid lines from the wye push-connect fitting. Use gloves and a lint-free cloth to clean any excess fluid that may drip from the lines.
4. On the Model 455 Dispensing Valves, remove the tube support assembly (**Figure 9**) from the valve body by removing the Release Screw (**Figure 6**)
5. Remove the existing tube from the tube support assembly by unscrewing the tube fastener screw (**Figure 9**) and remove the tube from the tube adapter.
   ***Note**: The existing tube may no longer fit through the tube support assembly due to deformation from the piston. In this case flush cutters can be used to cut out the affected section of tubing.*
6. Run the new tubing through the tube support assembly and press the barbed end of the Tubing Insert into the end of the tube.
7. Press the tube adapter against the tubing insert (**Figure 9**), then place the tube fastener screw over the tube adapter and tighten it onto the tube support assembly.
8. Seat the tube support assembly in the Model 455 Dispensing Valve and verify the piston is pressed against the tubing.
9. Reinstall the Release Screw on the Model 455 Dispensing Valve and install the desired dispense tips by pressing them firmly over the tube adapter.
10. Connect the shop air supply and power cord, turn the unit on, move the dump valve back to the “SUP” position, and purge the system.

Figure 7.
Rotate the Dump Valve Clockwise to Set it to EXH

Figure 8.
Remove Fluid Lines from Wye Push Connect Fitting

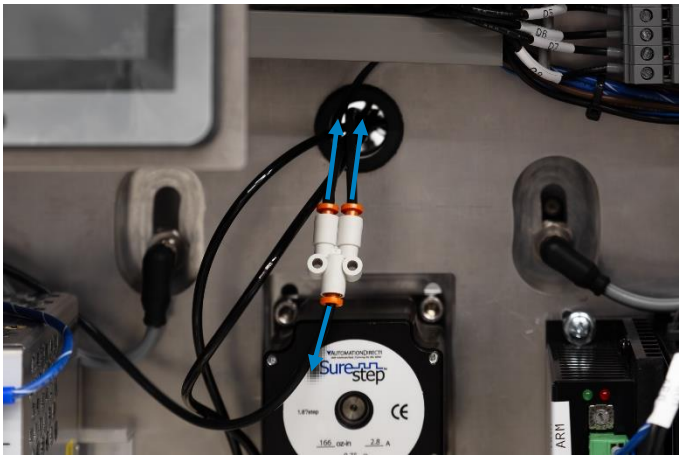
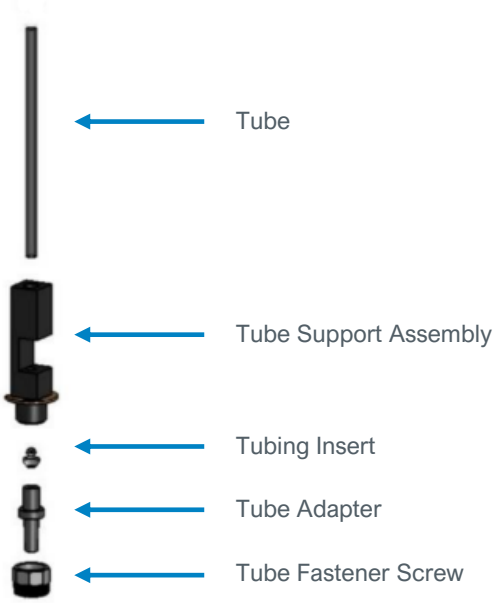


Figure 9.
Tubing Installation Components

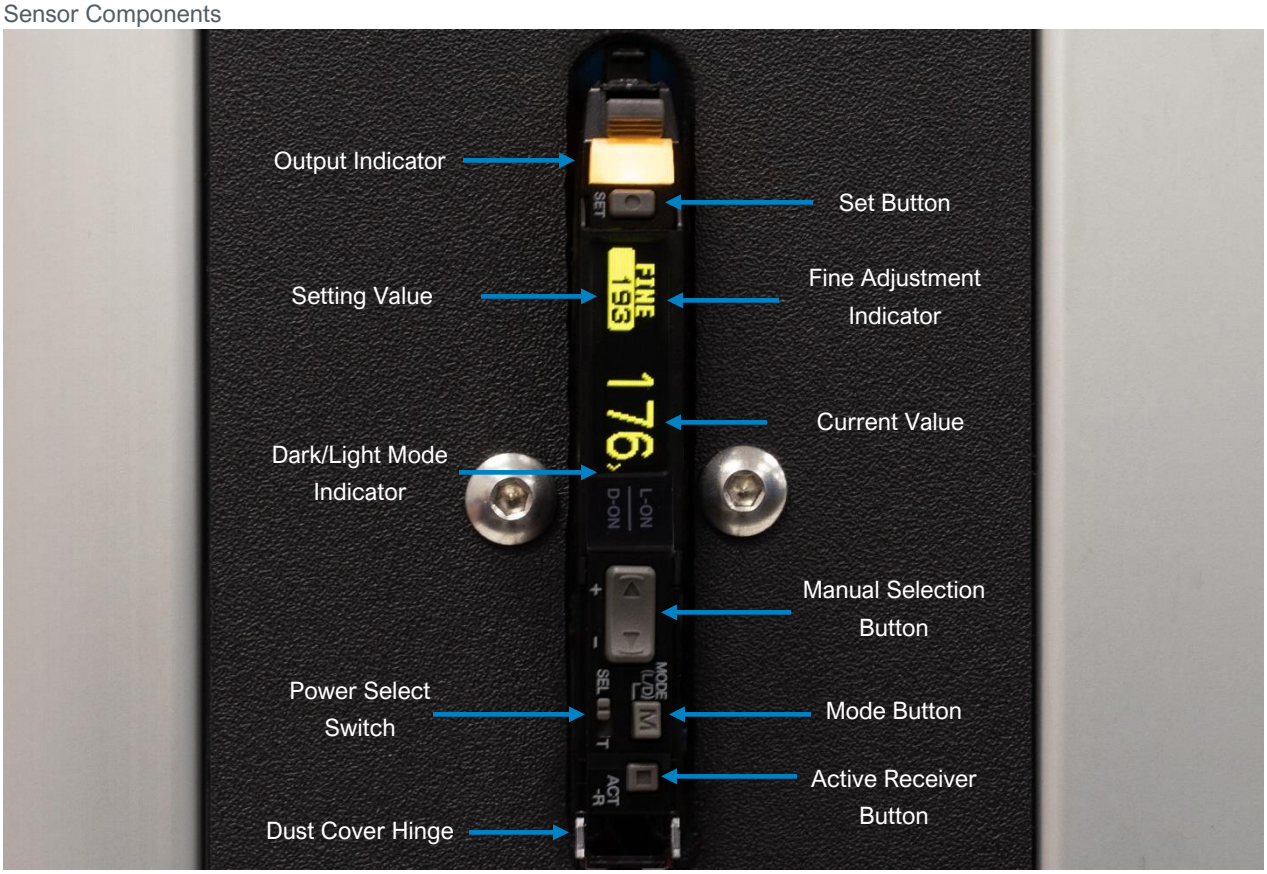


Setting Up and Calibrating the Tube Sensor

Setting Up the Sensor

Once the unit is powered on, the sensor will automatically power on. The sensor will have all preliminary commissioning completed, however the set points will need to be defined. To adjust the settings, the dust dover will need to be opened to access the controls.

Figure 10.
Sensor Components



For the sensor to properly recognize parts inserted into the unit, the sensor must be in “Dark Mode”, indicated by a yellow arrow on the display pointing to the text “D-ON” (**Figure 10**). Ensure the indicator is in the correct position before proceeding with the sensor calibration. If the sensor is not in dark mode, follow the steps below:

1. Press the Mode Button (**Figure 10**) repeatedly until “Switch L-On/D-On” appears on the display.
2. Switch to Dark Mode by then pressing the Manual Selection Button (**Figure 10**) in either direction until “Dark ON” appears on the display.
3. Press the Mode Button once more to confirm Dark Mode operation.

Note: *When using Dark Mode, the Output Indicator (**Figure 10**) should be lit when no part is inserted.*

Setting the Sensor Set Points

The set points defined on the sensor are what initiate a dispense cycle when a part is recognized. There are two values which drive the sensor control for the unit: the Current Value and the Setting Value (**Figure 10**). These represent the received light intensity and detection threshold respectively. The Setting Value is the point at which a dispense cycle will be initiated. The Current Value represents the sensor's measurements in real time. When a tube is inserted, the Current Value should meet or exceed the Setting Value, and in turn initiate a dispense cycle.

To set the Tube Sensor for tube recognition and dispensing follow the steps below:

1. With the front door and tube cone guide closed, press the Set Button (**Figure 10**) once for the sensor to prepare for set point configuration.
2. Insert the tube fully onto the tube mandrel.
3. Press the Set Button again to save the measurement to the sensor.
4. The Setting Value will use the measurement from when the tube was inserted and, due to slight variations on the outer surface of the tube, subsequent parts may register at a lower value than where the sensor was set. The Manual Selection Button can be used to set a more precise value when the sensor display is on the main screen, and the word "FINE" will appear next to the Setting Value while doing so (**Figure 10**). The Setting Value can be lowered to recognize the tube more readily, regardless of orientation.

- **Quick Tip:** When setting the Setting Value with the tube inserted, spin the tube on the tube mandrel and note the fluctuation in the Current Value. Using the Manual Selection Button, set the Setting Value to the lowest observed Current Value. If the Setting Value is too low there may be false triggers, and a higher value may need to be used.

Notes:

- *The Current Value will continue to fluctuate – this is normal as the sensor is providing live measurements.*
- *It is recommended that the sensor be calibrated with the front door and tube cone guide closed to reduce ambient light and produce a more accurate measurement.*
- *Values shown in the figure above are not representative of measurements during use.*

User Interface

The RotoSpense 360 comes equipped with an HMI (Human Machine Interface) in the form of a touchscreen display mounted to the rear panel. It consists of an integrated control module with an external power supply, and provides complete control of the system mechanics, as well as part count tracking. The settings menu on the HMI provides the operator control of the 455 Dispense Valve rotational speed and dispense time delay, as well as the cone guide open speed and close time delay.

Figure 11.
HMI Main Screen

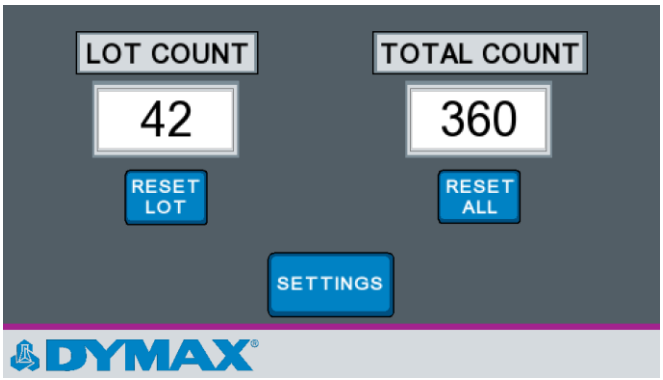


Figure 11 shows the main screen display where the system logs the quantity of parts that have been cycled through the RotoSpense 360.

Table 1.
Main Screen Functions

Name	Description
Lot Count	Displays the number of parts that have been inserted where a dispense cycle has been completed for a batch. *Note: For operator or syringe changes, the Lot Count quantity can be useful data for production volume tracking.*
Total Count	Displays the total number of parts that have been inserted where a dispense cycle has been completed.
Reset Lot	Resets the Lot Count quantity, allowing for operators to keep a log of how many dispense cycles have been completed for a batch, or how many cycles the syringe has been used for.
Reset All	Resets all quantities shown on the main screen.
Settings	Brings up the setting profile within the unit where adjustments can be made to the dispense and part loading sequences.

Figure 12.
Setting Screen

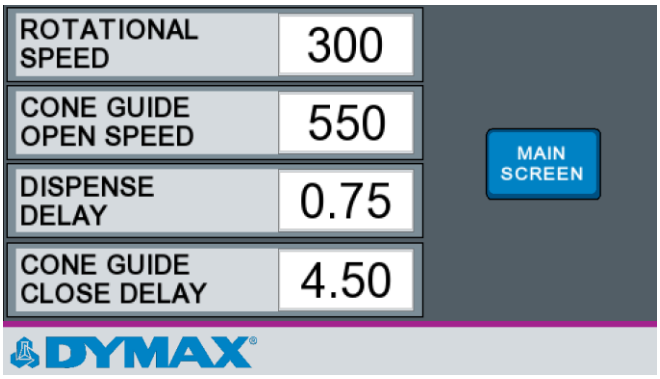


Figure 12 shows the setting screen for adjustments. There are four parameters which can be adjusted to maintain desired dispense sequence control. Maximum and minimum values are shown on the keyboard pop-up when the setting value is pressed.

Table 2.
Setting Screen Functions

Name	Description
Rotational Speed	Change the speed of the valve's rotation around the inserted part. (Range: 100-400, reference values only)
Cone Guide Open Speed	Change the speed at which the cone guide opens. (Range: 125-999, reference values only)
Dispense Delay	Delay the start of the rotational dispense cycle from the time the sensor detects a part as being loaded. (Range: 0.00-5.00 seconds)
Cone Guide Close Delay	Delay the closing of the cone guide after a dispense cycle has been completed and the part is removed. (Range: 0.00-5.00 seconds)

Operation

Start Up and Operation

Once the unit has been set up with the fluid lines primed, sensor calibrated, and dispense settings adjusted, the unit is ready for use. Ensure that the unit is powered on and the air pressure to the system is sufficient. The front door must be fully closed for the unit to dispense. As the operator completes initial dispenses, they can change the settings as they deem fit for use.

1. Press the green Cycle Start push button (**Figure 3**) and verify that the light is on. This will home the valves to the starting position and close the tube cone guide.
2. Insert the tube so that it is fully seated on the tube mandrel and pressed firmly to the back of the mandrel.
3. The unit will cycle through the dispense sequence when the part is recognized, and the tube cone guide will open when the cycle is complete.
4. Remove the part and the tube cone guide will close after the part is removed.
5. The unit will automatically return to the starting position after each dispense cycle.
6. Repeat steps 2-4 until the syringe is low or empty.
7. Once the Low Level Sensor detects the syringe is low on material, the Low Level Indicator (**Figure 4**) will turn on and the syringe can be replaced.

Notes:

- When changing the syringe, ensure that all pressure to the system is off.
- Each time the front door is opened, the operator will need to press the green cycle start button for a dispense cycle to be completed.
- Dymax recommends starting with a speed setting between 150-200.
- Dymax recommends 16-20ga tips, however this will depend on the material being used.

Changing the Mandrel and Cone Guide Inserts

For operations with a change in tubing size, the operator will need to remove the mandrel and insert another of the appropriate size. The operator will also need to change the cone guide Inserts to accommodate the new part.

1. Open the front door of the RotoSpense 360.
2. Using an adjustable crescent wrench (*not included*), remove the mandrel and tube mandrel collar (**Figure 5**) by rotating the tube mandrel collar counterclockwise.
3. Replace the tube mandrel and tube mandrel collar with the appropriate size for the inner diameter of the new part.
4. cone guide inserts (**Figure 13**) are removed by moving the cone guide to the open position using the manual cone guide Open/Close (**Figure 1**), then sliding the innermost portion of the cone toward the center.
5. Once removed, a new cone guide insert can be installed by sliding the part into the grooves of the cone guide and pressing firmly. Ensure that the cone guide Inserts are fully seated into the press fit connection.
    a. ***Note:*** *Changing the tooling for tube sizes will require readjustment of the valve positions.*

Figure 13.
Cone Guide, One Insert Removed

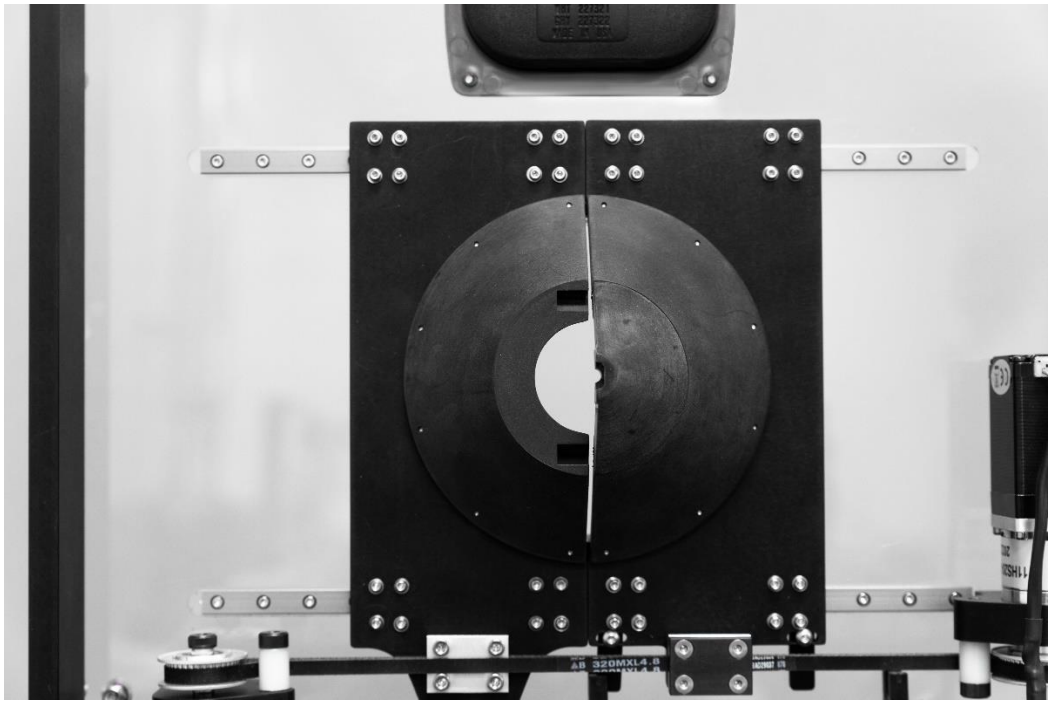


Figure 14.
Cone Guide Inserts

Troubleshooting

Table 3.
Troubleshooting Chart for Model 455 Dispensing Valve

Problem	Possible Cause	Corrective Action
Valve does not dispense	Supply air pressure is too low	Increase the supply air pressure.
	Material is cured in the tip	Disassemble and clean or replace tip
Air bubbles in fluid	Valve not properly purged	Cycle until air bubbles are removed
	Problem with material reservoir and fluid delivery system	Check material reservoir and fluid lines for possible damage
Material leaks from valve tip	Valve is not adjusted correctly	Follow valve adjustment procedures
	Air bubble trapped in fluid body or in dispense needle	Cycle until air bubbles are removed
Dispense rate too fast	Valve flow is not adjusted correctly	Tighten the Micrometer Adjustment
	Fluid pressure set too high	Decrease fluid pressure on precision regulator
	Dispense tip gauge too large	Replace dispense tip with smaller size tip
Dispense rate too slow	Valve is not adjusted correctly	Loosen the Micrometer Adjustment
	Fluid pressure set too low	Increase fluid pressure
	Dispense tip gauge too small	Replace dispense tip with larger size tip

Table 4.
Tube Presence Sensor Troubleshooting

Problem	Possible Cause	Corrective Action
Valves are rotating/dispensing with no tube inserted	The sensor is in light mode and the set points are set incorrectly.	Configure the sensor to be in dark mode and reset the setting value with the tube inserted.
	The setting value is too low and too close to the measurement for current value with no tube inserted.	Increase the setting point using the manual button for fine adjustment.
Valves are not rotating/dispensing with a tube inserted	The setting value is too high, and the part is not being recognized.	Decrease the setting point using the manual button for fine adjustment.

Spare Parts and Accessories

Item	Part Number
Adapters	
10CC Syringe Adapter	60591
Valves	
Model 455 Seal Rebuild Kit	T16781
Model 455 Disposable Fluid Path Valve	T10056
Fluid Path Replacement Parts	
PTFE Tubing Assembly, 0.066" [1.68 mm]	T17409
PTFE Tubing Assembly, 0.095" [2.41 mm]	T17554
Polyethylene Tubing Assembly, 0.125" [3.17 mm]	T17557
Tubing Insert, 0.095” [2.41 mm]	T15052
Tube-To-Luer Adapter, Teflon	T15220
Wye Connector Push Connect Fitting	T40574
Dispense Tips 18 ga Taper Luer	P3232
Cone Guide and Mandrel Parts	
Cone Guide Inserts	T40634
Mandrel Kit	T40638

Specifications

RoHS Compliant

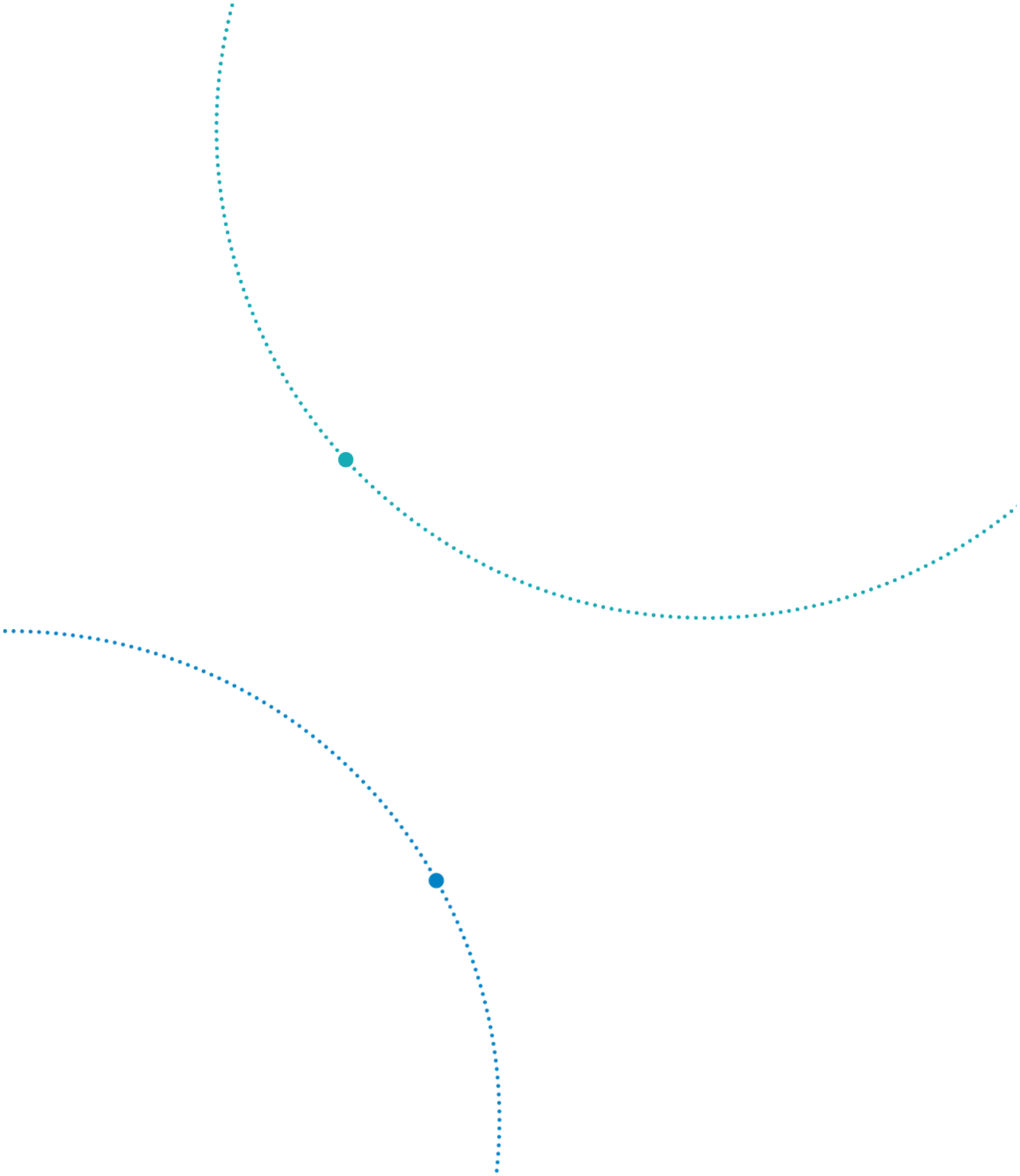
Property	Specification
Power Requirements	Input Voltage: 110-120VAC
Air Requirements	Input: 70-100 psi (4.8 - 6.9 bar) Main Regulator Output: 1-100 psi (0.1 - 6.9 bar) Precision Regulator Output: 1-60 psi (0.1 - 4.1 bar)
Dispense Time	0.01 – 9999 seconds
Cycle Speed	55-60 cycles per minute
Dimensions (WxDxH)	14” x 16” x 14” (36 cm x 41 cm x 36 cm)
Acceptable Tubing Dimensions	0.076”-0.125” OD, .031”-.080” ID Custom sized Mandrel Pins and Cone Guide available upon request and quote
Weight	38 lbs (18kg)
Unit Warranty	1 year from purchase date

Warranty

From date of purchase, Dymax Corporation offers a one-year warranty against defects in material and workmanship on all system components with proof of purchase and purchase date. Unauthorized repair, modification, or improper use of equipment may void your warranty benefits. The use of aftermarket replacement parts not supplied or approved by Dymax Corporation will void any effective warranties, and may result in damage to the equipment.

IMPORTANT NOTE: DYMAX CORPORATION RESERVES THE RIGHT TO INVALIDATE ANY WARRANTIES, EXPRESSED OR IMPLIED, DUE TO ANY REPAIRS PERFORMED OR ATTEMPTED ON DYMAX EQUIPMENT WITHOUT WRITTEN AUTHORIZATION FROM DYMAX. THOSE CORRECTIVE ACTIONS LISTED ABOVE ARE LIMITED TO THIS AUTHORIZATION

Index



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