



# **T-ZERO**

## **Operator Manual**

**Version 1.0 February 2020**



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## WARRANTY INFORMATION

Keirton Inc® will repair or replace any parts proven defective in material or workmanship without charge for a period of one year.

The warranty period will begin on the date the T-ZERO is commissioned by Keirton or delivered to the original purchaser without an installation agreement. T-ZERO warranty defects can be remedied directly through the manufacturer. Keirton reserves the right to use any manufacture-approved replacement part for warranty repair.

If warranty repair is required, contact Keirton at 1-888-254-3204 or support@keirton.com with the following information:

- Model and serial number
- Proof of purchase date
- Details of the defect or problem (including photos, video, etc.).

The T-ZERO or defective part must be returned to Keirton for analysis and replacement.

**DO NOT RETURN DEFECTIVE T-ZERO PARTS TO THE MANUFACTURER  
FOR REPAIR OR WARRANTY CLAIMS UNLESS YOU HAVE BEEN  
AUTHORIZED BY KEIRTON TO DO SO.**

You may be denied warranty coverage if your T-ZERO has failed due to the following:

- Abuse
- Accidental damage
- Improper installation
- Improper electrical connection
- Improper maintenance
- Neglect
- Normal wear
- Unapproved modifications

Keirton assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application of the product. In no event will Keirton be liable for any special, incidental, or consequential damages (including loss of use, loss of profit, and claims of third parties) however caused, whether by negligence of Keirton or otherwise. If you have any questions regarding your warranty rights and responsibilities, contact Keirton.

The T-ZERO is intended for use on legal aromatic herbs and hops. Check all municipal, provincial or state, and federal laws and regulations before using the T-ZERO. Keirton does not promote or condone the use of the T-ZERO in any way that may be deemed illegal.

Allow only persons who have read and understood this manual to operate the T-ZERO. Keirton claims no liability for any damage or injury that results from the use of the T-ZERO by persons who have not read and understood the cautions contained in this manual or through any misuse of the T-ZERO. You are responsible for your safety while operating the T-ZERO. Keep yourself safe!

To receive maximum performance and satisfaction from the T-ZERO, it is important that you read and understand the safety and maintenance precautions in this manual before using the T-ZERO.



# IMPORTANT SAFETY INFORMATION

## GENERAL

- This Operator Manual is for the Twister T-ZERO trimming system.
- The T-ZERO is a high-powered machine that requires special safety precautions to be practiced while in operation to prevent injury.
- The T-ZERO uses an industrial grade HEPA Filter Stack and fan. It is your responsibility to understand and take the necessary precautions to minimize the inherent risks associated with combustible dust from the trimmings. Contact Keirton or your local Authority Having Jurisdiction (AHJ) for further information on your responsibility and liability while using the T-ZERO.
- **IMPROPER USE OF THE T-ZERO MAY CAUSE SERIOUS OR FATAL INJURY.** Read the precautions and warning labels before operating the T-ZERO.

DO NOT TAMPER WITH OR BYPASS SAFETY SYSTEMS. **FAILURE TO ABIDE  
COULD CAUSE FATAL INJURY!**

- A first-time operator should receive proper instruction before using the T-ZERO.

DO NOT OPERATE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.

- Follow routine maintenance schedule.

DO NOT REMOVE SAFETY LABELS. **REPLACE SAFETY LABELS IF THEY  
BECOME DAMAGED OR OBSCURED.**

- Lock out power to the T-ZERO before trying to free any jammed parts, disassembly, or performing maintenance.

DO NOT PROCESS ANYTHING OTHER THAN PLANT MATTER. **THE T-ZERO IS  
DESIGNED ONLY FOR PLANT MATTER. ANY FOREIGN OBJECTS CAN CAUSE  
SERIOUS INJURY OR DAMAGE TO THE T-ZERO!**

## COMBUSTIBLE DUST HAZARD

Cannabis has been tested by an independent lab under worst-case conditions to be a class ST1 combustible dust.

IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE ANY SPECIFIC APPLICATION REQUIREMENTS OF EXPLOSION VENTING OR IF ANY ADDITIONAL FIRE PROTECTION AND SAFETY EQUIPMENT MAY BE REQUIRED.

The customer is urged to adhere to NFPA, OH&S, federal, provincial, and local codes and regulations applicable to industrial ventilation systems.

Equipment must be adequately grounded and bonded by installing contractor.

The iSMF system has been certified as a passive flame front arresting device. It meets NFPA.



Performance based provisions and NFPA 654 and 101 Life Safety Objectives related to dust collector deflagrations and explosions. According to NFPA 69 Chapter 15, this equipment must be maintained per the manufacturer's recommendations. Substituting filters other than original OEM filters would violate the NFPA standards and void the performance-based certification of this filter system. This system is a passive isolation device which meets all of the aforementioned criteria. To sustain this certification the owner is required to maintain this equipment per the manufacturer's recommendations and document periodic inspections as required in chapter 15 of NFPA 69 Standard on Explosion Prevention Systems.

EQUIPMENT SHOULD BE PROPERLY ANCHORED TO THE GROUND WITH A SUITABLY SIZED CONCRETE ANCHOR AND ADHERE TO LOCAL CODES AND REGULATIONS.

## BEFORE OPERATING THE T-ZERO

- Read this Operator Manual to familiarize yourself with the T-ZERO's features and functions.
- Make sure you wear personal protective equipment.

DO NOT OPERATE WITH LOOSE CLOTHING OR UNCONFINED HAIR. EAR PROTECTION IS MANDATORY.

- Inspect the area around the T-ZERO and remove hazards to yourself, others, and the T-ZERO.
- Inspect the T-ZERO for damage and any loose parts.
- Make sure of the following:
  - Ducting and hoses are installed and clamps are secure.

DO NOT TURN ON BLADE MOTOR WITHOUT ALL DUCTING INSTALLED

- All rollers are installed.
- Tumbler lid is installed and the knobs are tight.
- Tumbler belts are installed, tight and parallel to all pulleys.
- Tumbler spins without contacting blades or vacuum bars.
- Blade couplings are installed.
- Tumbler brushes are installed and adjusted so the bristles are poking through tumbler slots about 1/8".
- Electrical cables are clear of moving components such as lifting feet, tumblers, conveyor belts, doors, etc.
- Pulse Jet is powered, airline is connected and pressure gauge reads between 90 and 105 psi.
- Water line is connected and supply valves open if trimming wet product.
- Conveyors and Guards are in place and secured.

DO NOT OPERATE TRIMMER WITHOUT CONVEYORS ALIGNED



## WHILE OPERATING THE T-ZERO

- Only operate the T-ZERO with all components including conveyors, guards, ducting, vacuum shrouds, and tumblers in place. **FAILING TO PROPERLY RE-ASSEMBLE THE T-ZERO CAN CAUSE DAMAGE TO THE MACHINE OR SERIOUS INJURY CAUSING DEATH.**

DO NOT OPERATE THE T-ZERO WITHOUT THE SUCTION HOSE SECURED USING THE PROVIDED CLAMP AND GASKET.

- Never leave the T-ZERO unattended while in operation.
- Keep body parts clear of pinch-points that could cause injury to personnel, damage to other equipment, or the T-ZERO.
- Watch for pinch hazards around the tumbler.
- Never reach inside the tumbler for any reason while in operation.

DO NOT ATTEMPT TO FREE ANY JAMMED PARTS WHILE THE T-ZERO IS IN OPERATION.

- Make sure water pressure does not exceed 100 psi.
- Shut down the T-ZERO if any ducting or guards move out of place.

DO NOT OPEN ANY DOORS ON THE HEPA FILTER STACK.

- Avoid using the emergency stop button to stop the machine, unless required.
- Avoid unintentionally opening the lid and doors with the machine in operation. Doing so will trigger the emergency stop function.

DO NOT USE THE TILT FUNCTION WHILE THE CONVEYORS ARE ALIGNED TO THE MACHINE, YOU WILL RISK DAMAGING THE T-ZERO AND THE CONVEYORS.

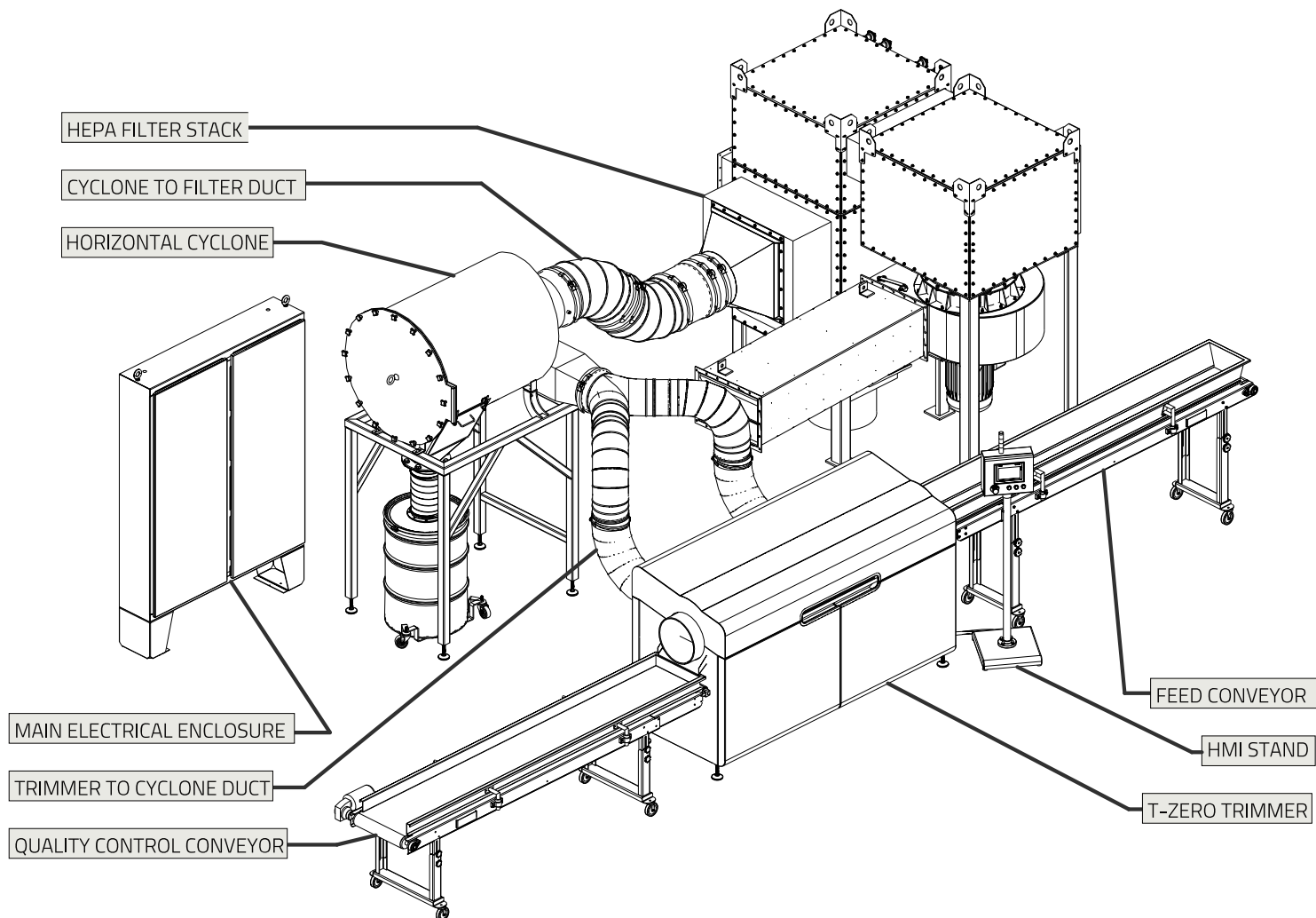
*Note: The Pulse Jet operates separately from the machine, ensure the power is off and pressure is released from the Pulse Jet Air Manifold before opening any of the HEPA Filter Stack doors or servicing the HEPA Filter Stack.*



# SYSTEM OVERVIEW

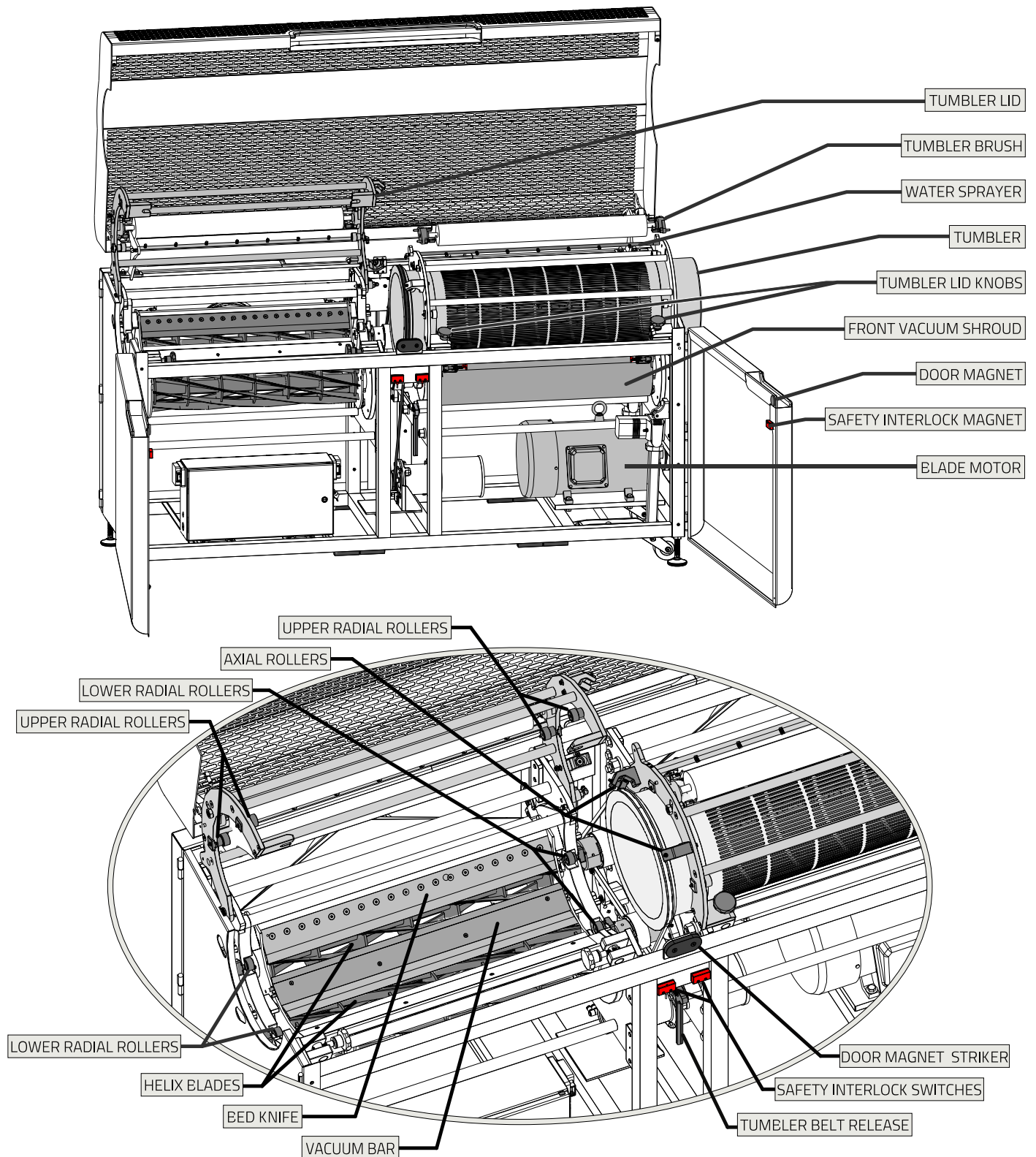
## DISCLAIMER

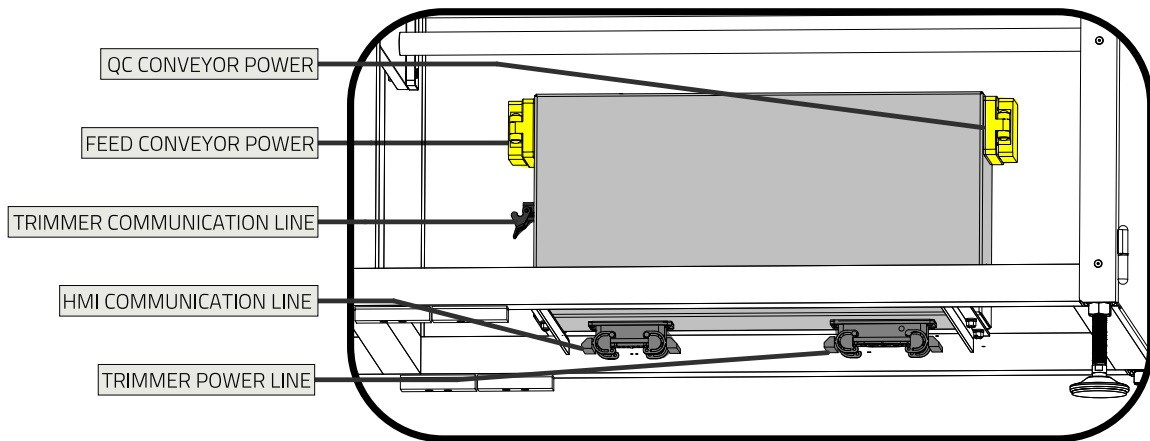
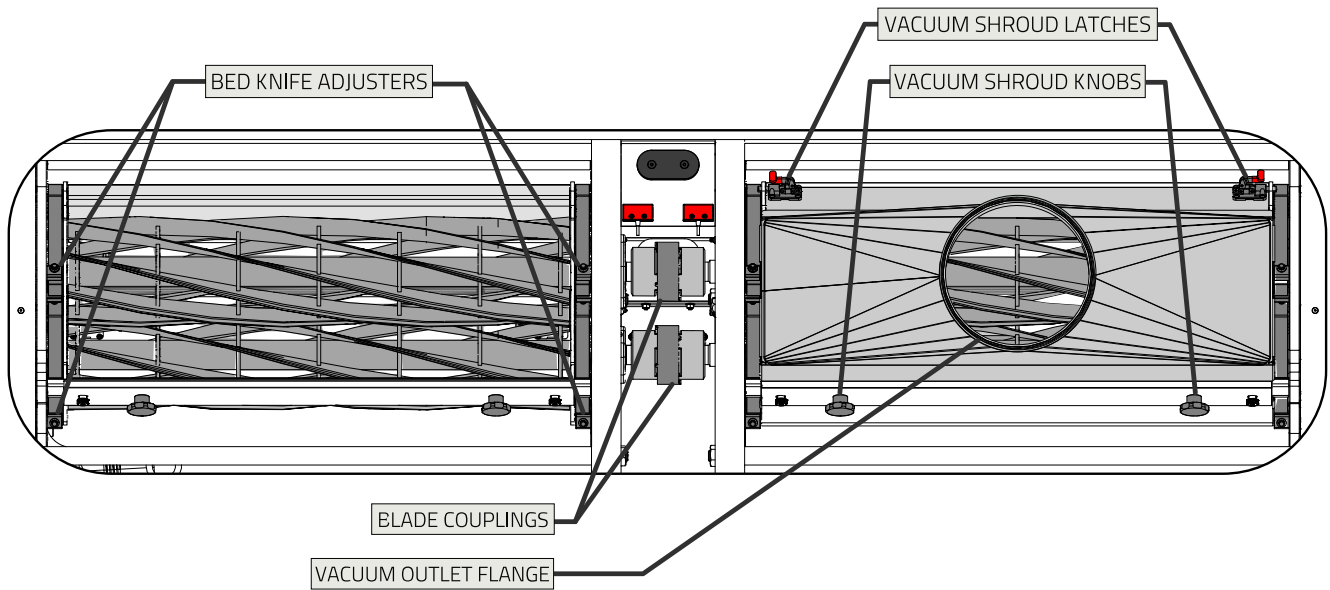
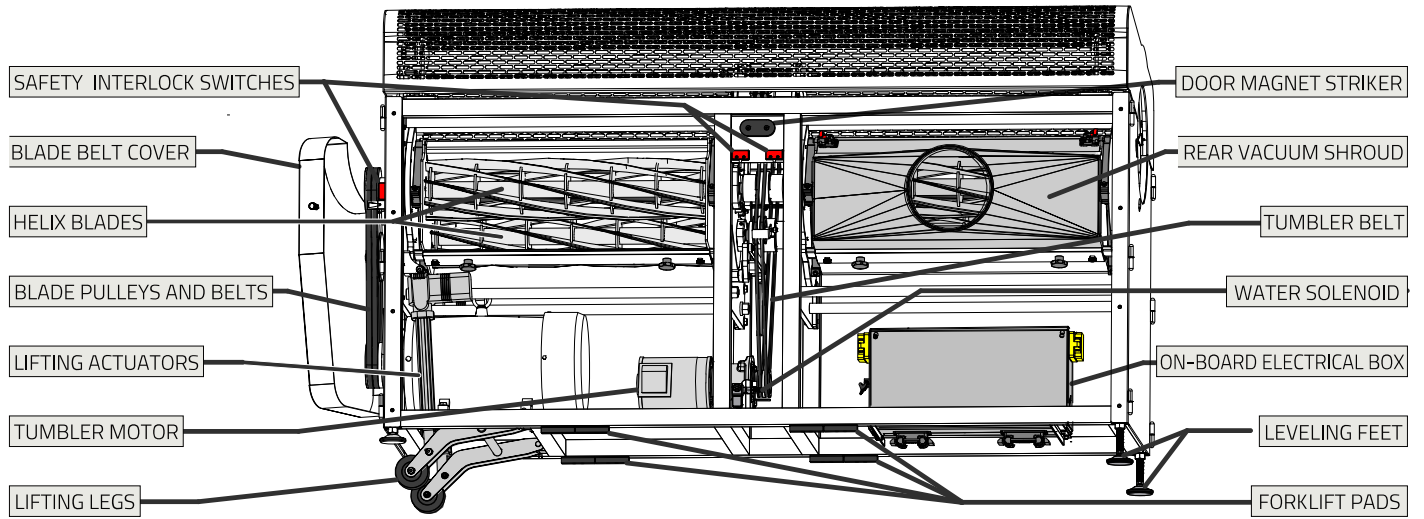
Keirton reserves the right to make design changes and/or improvements in the products they manufacture at any time. Specifications are subject to change without notice.



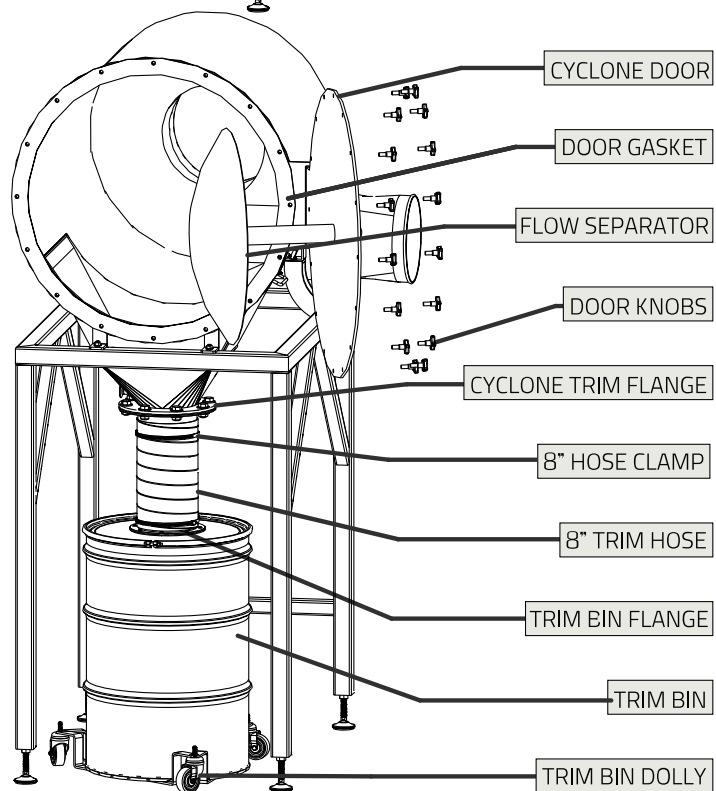
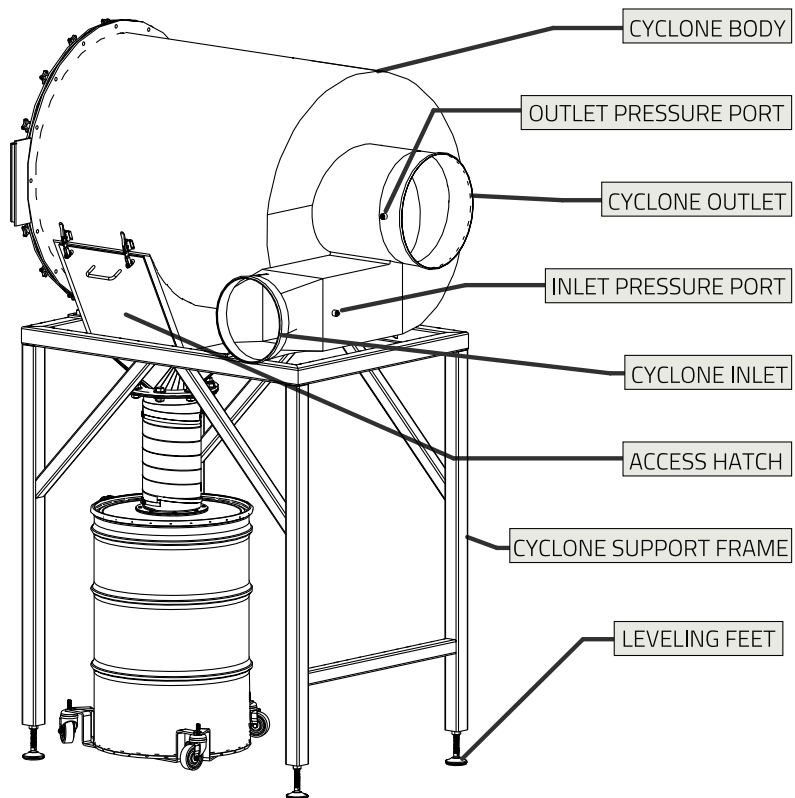


# TRIMMER OVERVIEW

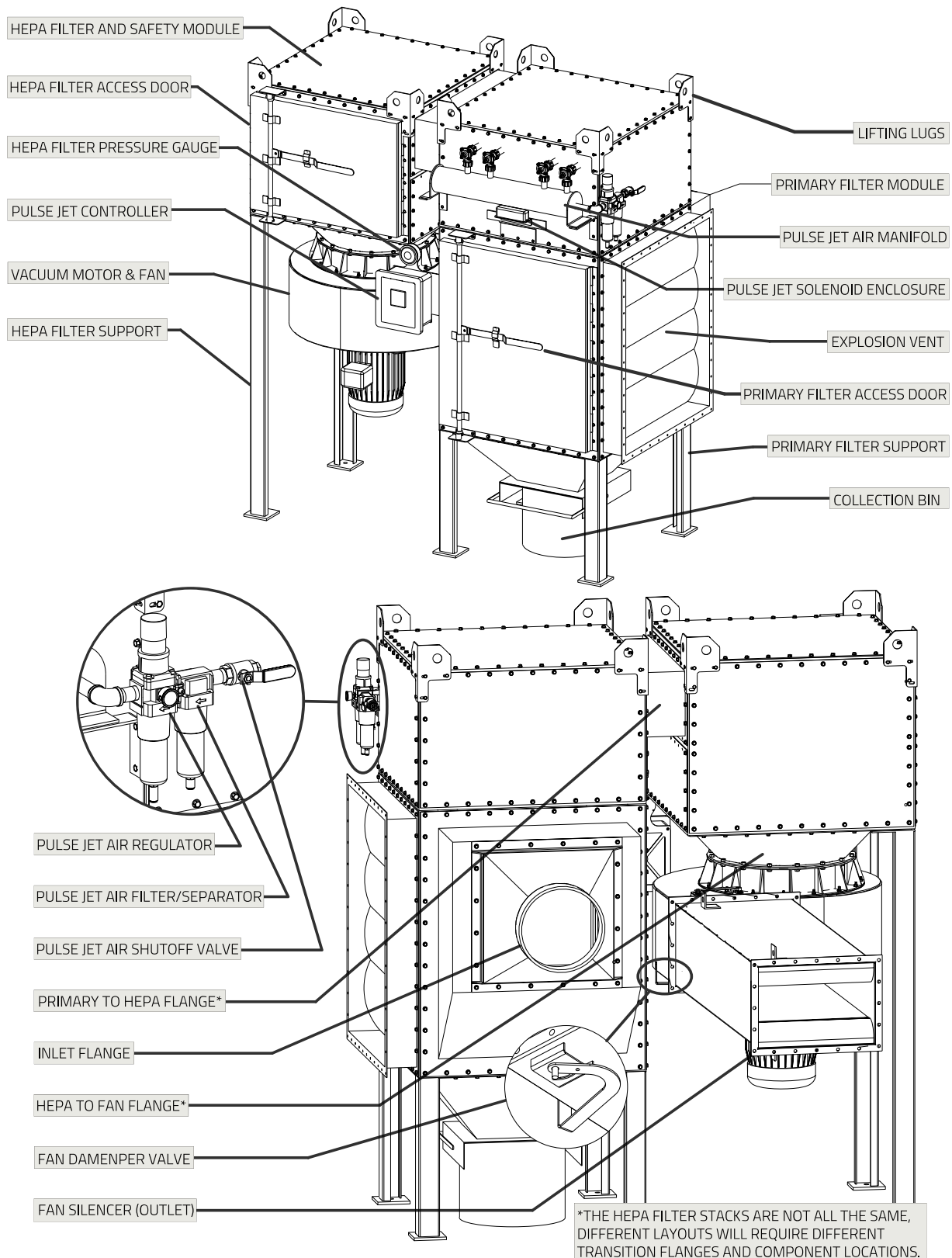




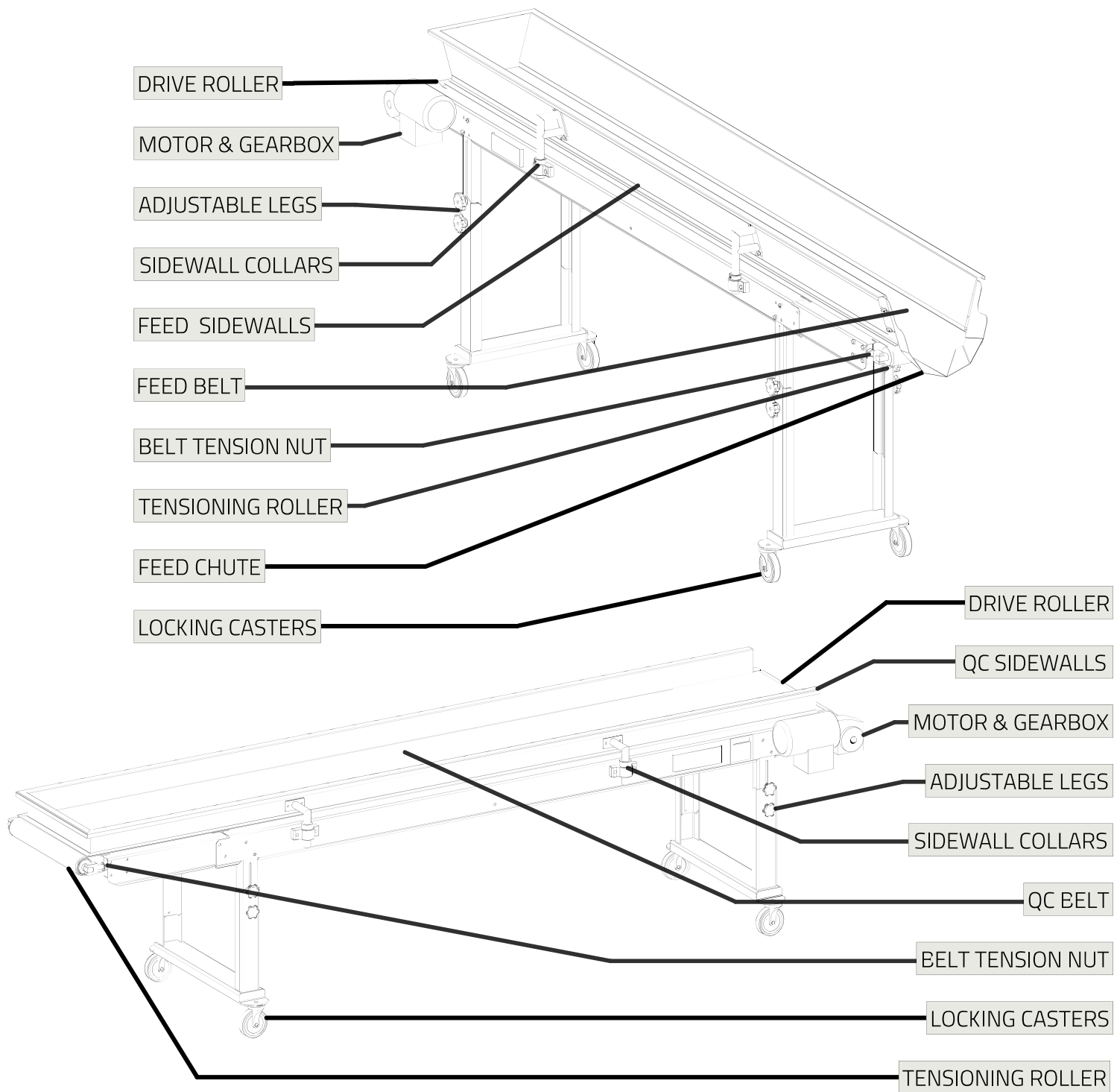
# HORIZONTAL CYCLONE OVERVIEW



# HEPA FILTER STACK OVERVIEW



# CONVEYOR OVERVIEW



# POWERING THE T-ZERO

## To power the T-ZERO:

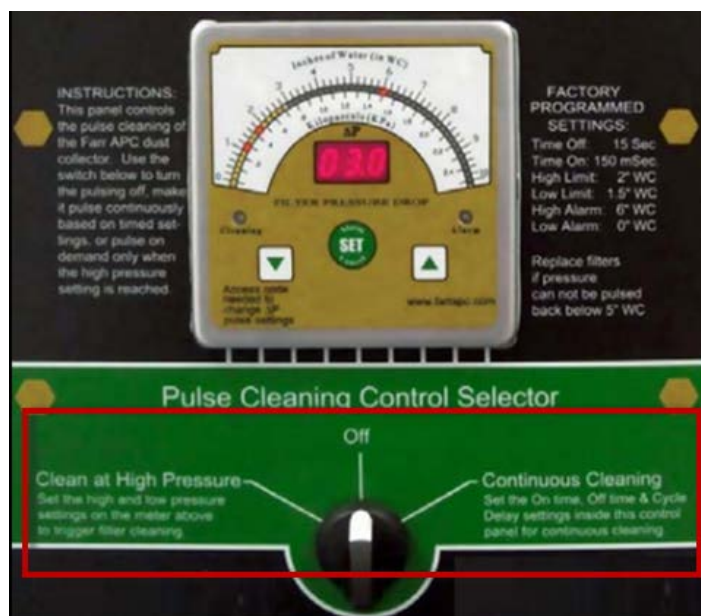
1. Ensure all cables and connectors are installed and secure.
2. Ensure all components, including vacuum shrouds, hoses, ducting and tumblers are installed.
  - Ensure tumbler belt, vacuum shroud knobs and tumbler sub-lid knobs are tight.

DO NOT OPERATE WITHOUT CONVEYORS ALIGNED AND GUARDS INSTALLED.

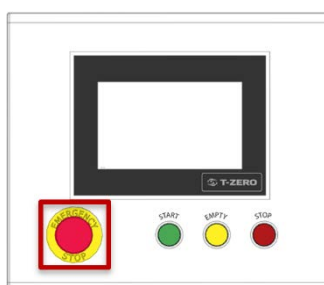
3. Turn on power supply to the T-ZERO.

*Note: It takes about two minutes for the T-ZERO HMI to completely power on.*

4. Turn the Pulse Jet on the HEPA Filter Stack to **Continuous Cleaning**.



5. Check the HMI screen for any message that may need to be addressed to operate the T-ZERO.

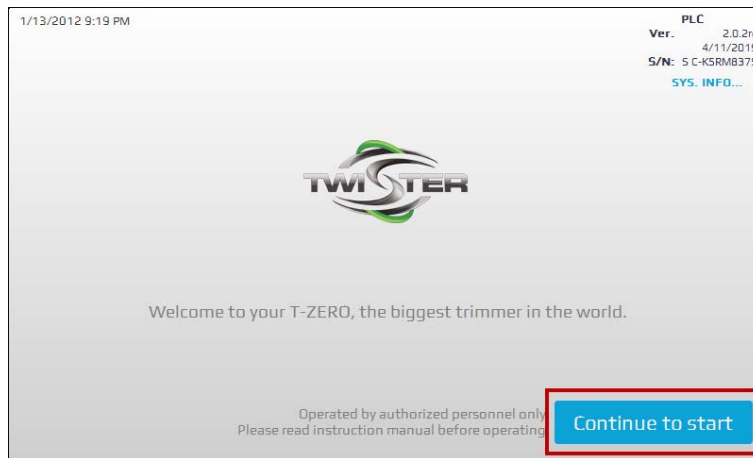


**To reset the Emergency Stop, pull the knob out.**

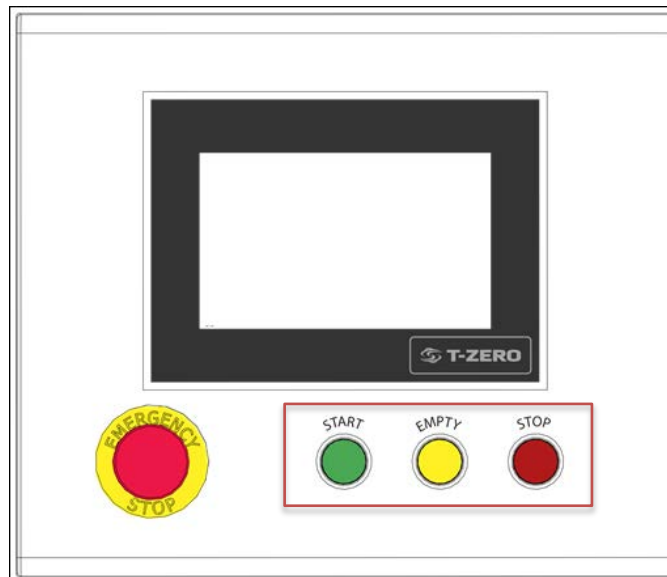




6. Tap **Continue to start** on the HMI screen. The HMI goes into Automatic mode.



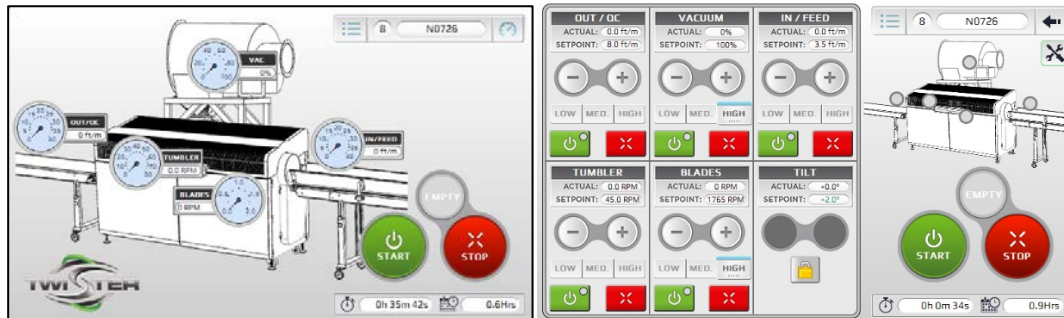
*Note: The T-ZERO also has physical buttons for start, empty and stop on the enclosure below the HMI screen. All buttons will work if the HMI does not power on.*





# OPERATING MODES

The T-ZERO has two operating modes: Automatic (left) and Advanced (right).



The Automatic mode operates the T-ZERO using recipes with pre-configured settings for the following components:

- Tumblers
- Blades
- Vacuum
- Infeed Conveyor
- QC Conveyor
- Lifting Legs\*

*\*Lifting Legs do not adjust automatically; the machine angle is saved but must be adjusted in Advanced Mode after loading the recipe (for instructions see [Adjusting the Tilt](#) on page 27).*

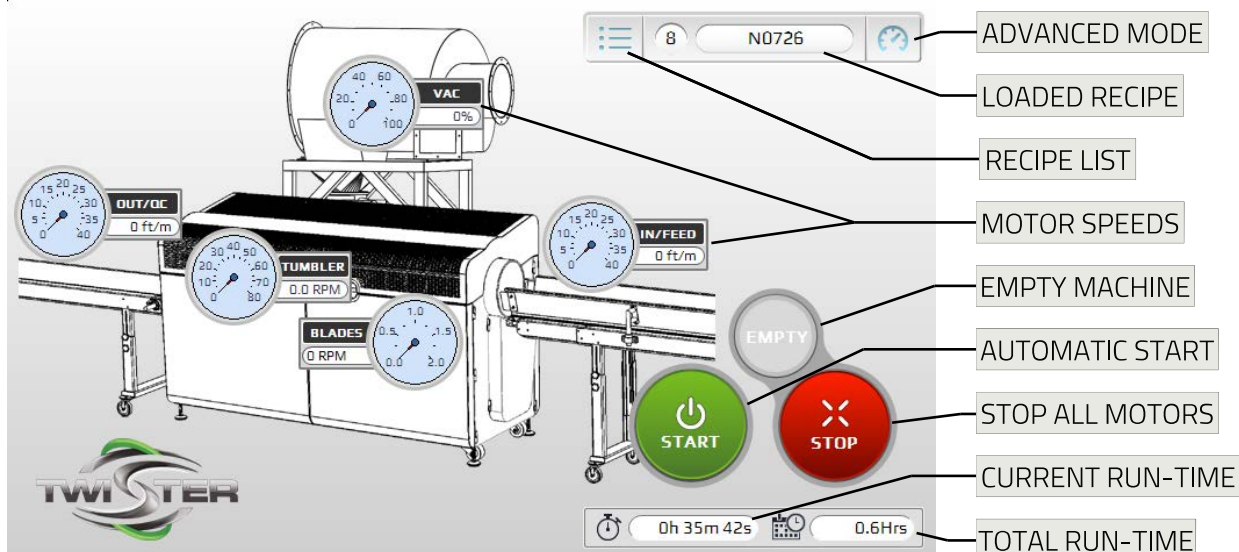
Advanced Mode allows you to change the settings on the T-ZERO, such as:

- Starting and stopping motors individually.
- Changing the speed set points for individual motors
- Saving the combination of current set points as a recipe
- Adjusting the machine's tilt angle.





## OPERATING IN AUTOMATIC MODE



Automatic Mode is a simplified way to run the T-Zero. Automatic mode only allows the user to load a recipe then start, stop or empty the machine.

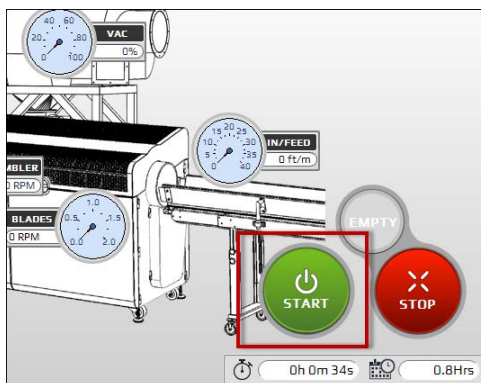
*Note: Due to safety reasons, adjusting the machine tilt is only available in Advanced Mode.*

WHEN LOADING A NEW RECIPE, ALWAYS ENSURE THE MACHINE IS AT THE CORRECT ANGLE.

## STARTING THE T-ZERO

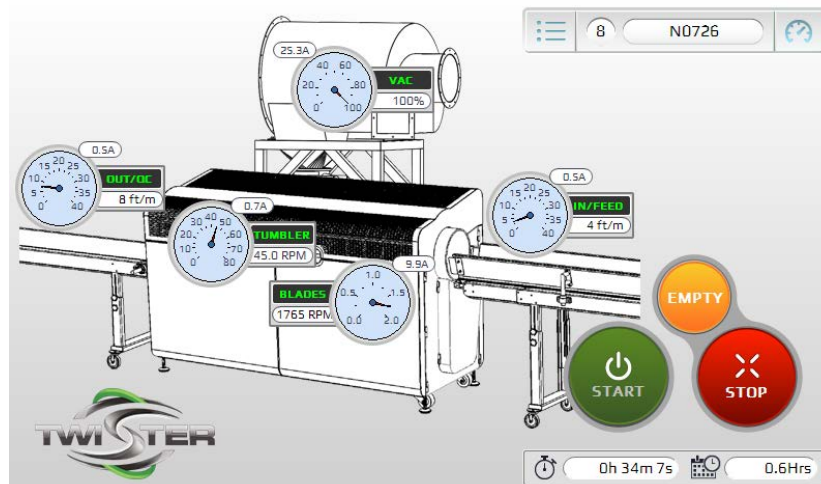
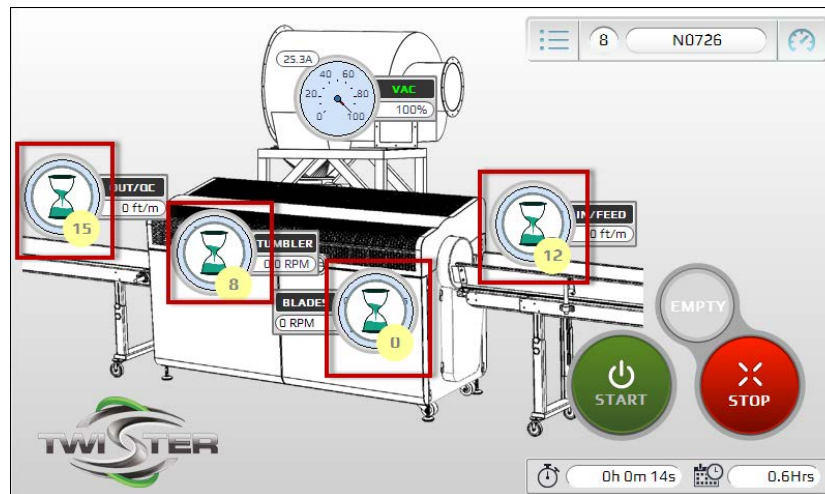
After the T-ZERO has powered up, complete the following steps to load a recipe:

1. Ensure the correct recipe is loaded (for instructions, see [Loading a Recipe](#) on page 24).
2. Adjust the machine to the correct tilt angle (for instructions, see [Adjusting the Tilt](#) on page 27 for instructions).
3. Tap the green **START** button on the HMI screen. All motors will start in a preprogrammed sequence.



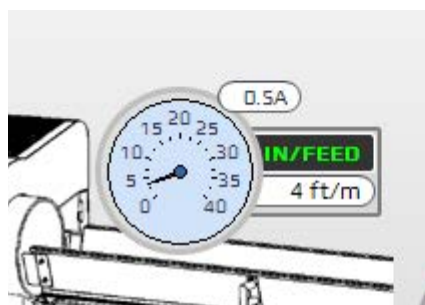


Countdown timers appear on motors pending to start. The delay time for each can be modified in Engineering Mode (explained in the Maintenance and Cleaning Manual).



After each motor has started, the HMI will display the setpoint and the current draw of each machine.

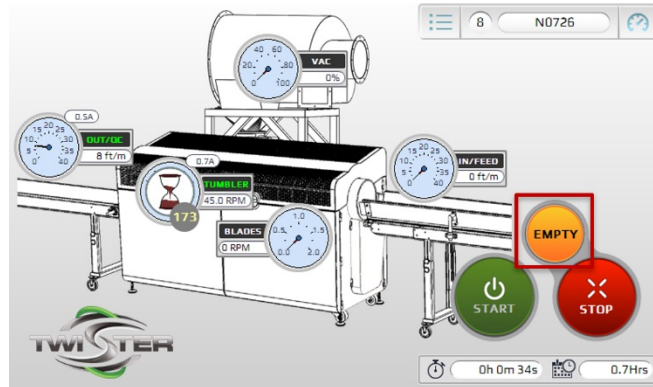
The image below shows the feed conveyor readings. It is currently set at speed of 4 feet per minute, and the motor is drawing 0.5A. Keep a log of motor currents to notice when power draws change, this could be an indicator that service is required soon.





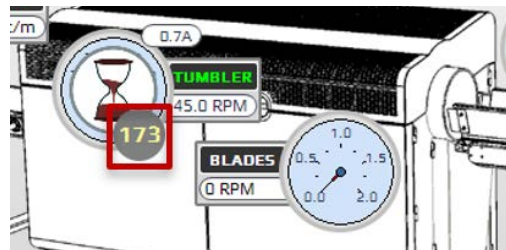
## EMPTYING THE T-ZERO

The **orange EMPTY** button on the T-ZERO shuts off the feed conveyor, blades, and vacuum, then keeps the tumbler and QC conveyor running to allow product to flow out of the machine.



Press this button after the feed conveyor has emptied and most product has flowed down to the second tumbler. This usually takes 2-4 minutes.

Once the empty button is pressed, you will see a countdown start on the tumbler motor reading.

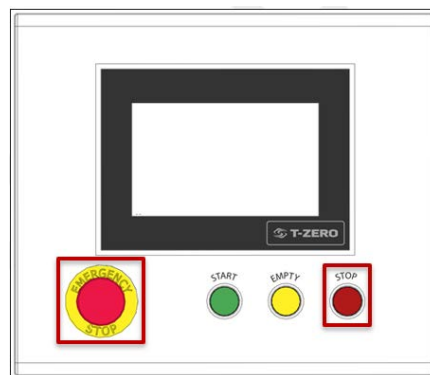
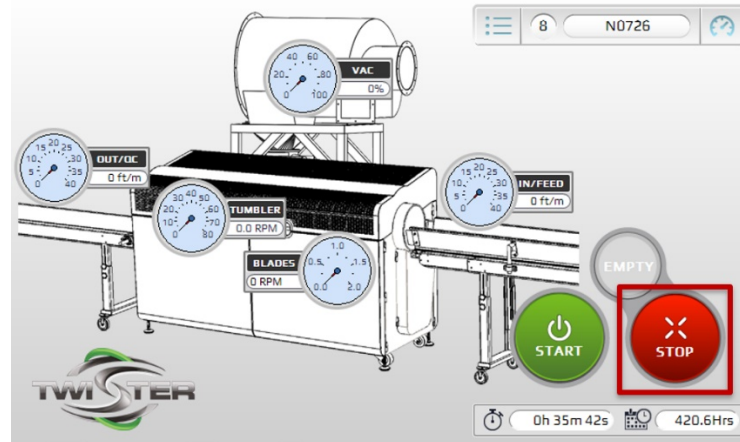


This number can be modified in the Engineering Mode (explained in Maintenance and Cleaning manual).



## STOPPING THE T-ZERO

There are 3 different buttons to shut down the T-Zero: the HMI stop button, the physical stop button, and the emergency stop button.



Use the emergency stop any time there is a safety issue, or anything unexpected happens with the machine. The emergency stop will apply a brake to the motor, slowing it down faster.

*Note: Opening up any door on the T-Zero will shut down the machine similarly.*

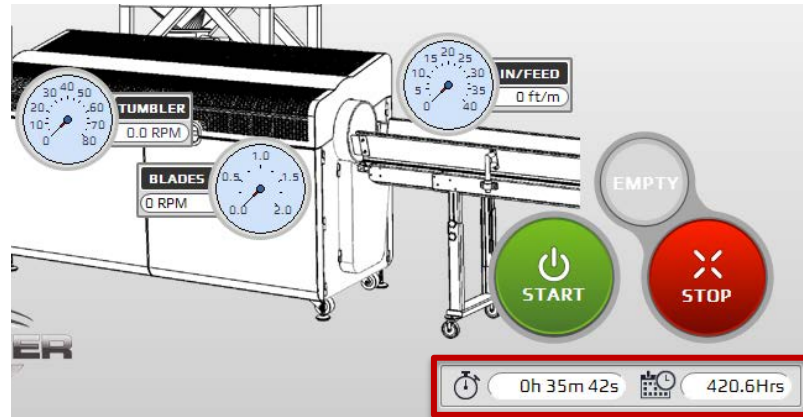
The physical stop button and HMI stop button have the same function. These buttons will stop the machine, but the motors will take longer to slow down.

*Note: in normal operation it is recommended to use the stop button instead of the emergency stop because it puts less stress on the motors.*



## TIMERS

In the bottom right corner of the HMI screen there are two timers.



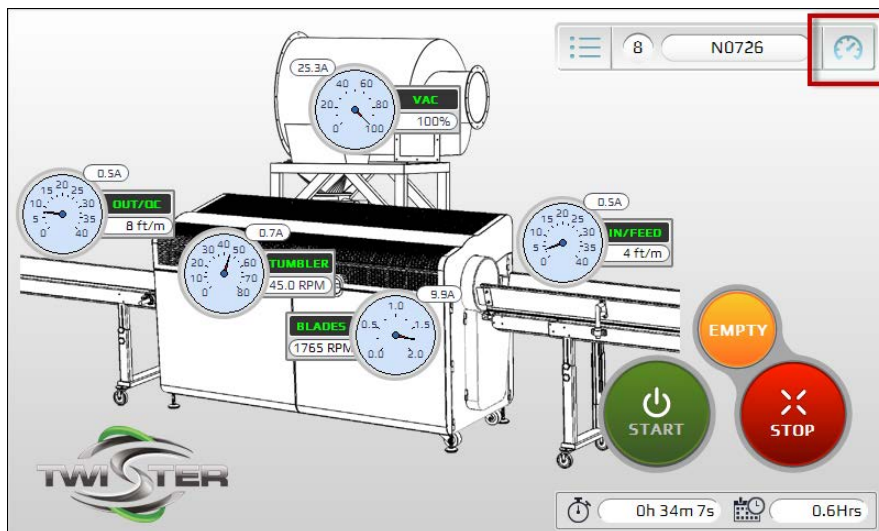
The timer on the right shows the total run-time on the T-ZERO. This timer doesn't automatically reset, but it can be reset through Engineering Mode (explained in the Maintenance and Cleaning Manual).

The timer on the left shows the current run-time of the blade motor. This timer will reset each time the machine starts. **Use this timer to determine when to change the trim bin.**

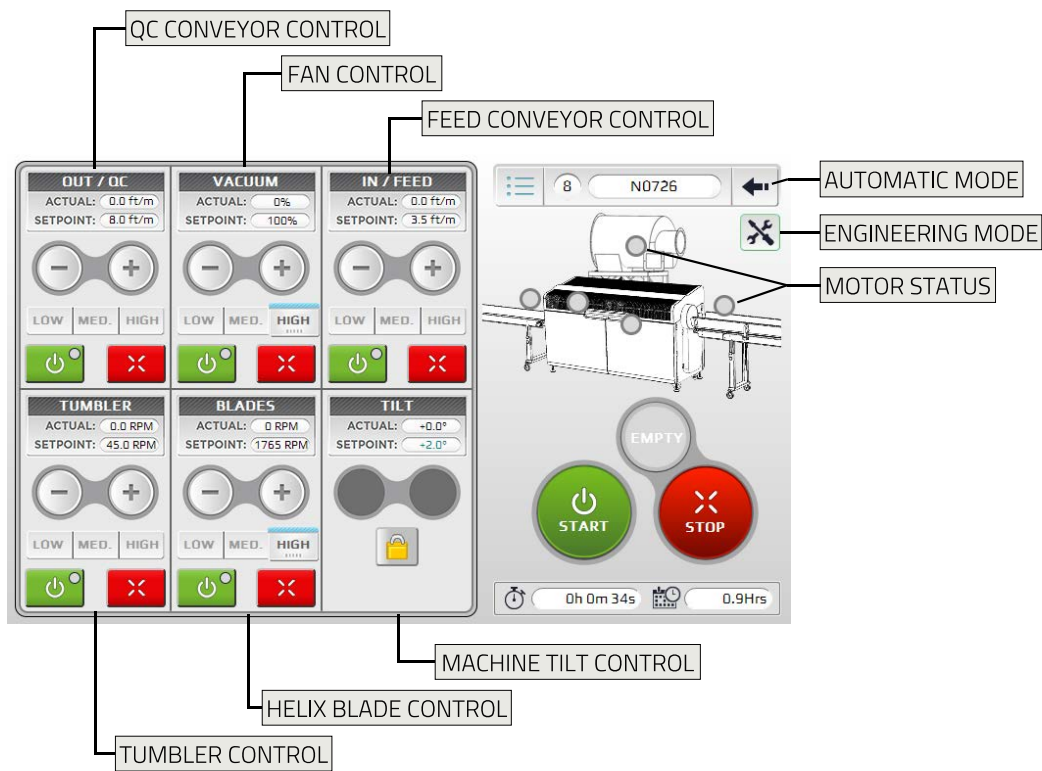


# OPERATING IN ADVANCED MODE

To switch to the T-ZERO Advanced mode, tap the Advanced Mode button from the Automatic Mode screen.



The HMI screen will switch to the Advanced mode.







MACHINE TILT CONTROL MUST BE UNLOCKED BEFORE USE. IT CANNOT BE ADJUSTED WHILE ANY MOTORS ARE RUNNING. SEE [ADJUSTING THE TILT](#) ON PAGE 27 FOR MORE INFORMATION.

Advanced Mode allows the operator to make adjustments to the motor speeds. All motors are controlled using a similar layout to the tumbler motor shown below:



- To start and stop each motor individually, tap the green and red buttons.
- To adjust the speed of each motor, tap the “+” and “-” buttons.
- To jump to different speeds while operating the machine, use the low, medium, and high buttons.

*Note: As the motors accelerate, the **ACTUAL** reading will increase to the **SETPOINT**. If dynamic mode is on, the tumbler actual RPM will cycle above and below the set point in normal operation.*

All setpoints relate to the actual speed of the machine components. Tumbler and helix blade are controlled by RPM, the conveyors are set by the conveyor speed in feet per minute, and the fan uses a percentage of the rated fan suction.



## CREATING A RECIPE

Recipes are a saved combination of setpoints which relate to different product strains.

### To save the machine setpoint to a recipe:

1. Go to the Advanced mode (for details, see [Operating in Advanced Mode](#) on page 19).
2. Adjust the trimmer to the desired setpoints.

All parameters can be changed while the machine is running except for the machine tilt angle. When starting a new strain, fine tuning parameters may take some trial and error. Once desired output quality is achieved, the recipe is ready to be saved.

*Note: The recipe does not affect the Pulse Jet settings*

3. Once ideal motor setpoints are found, rename the recipe (this can be performed while the machine is running):
  - a. Tap the recipe label.
  - b. Type the new recipe name using the onscreen keyboard (recipes have a maximum of 12 characters).



*Note: Modifying settings after renaming the program will reset the name to "ManualSpeed"*

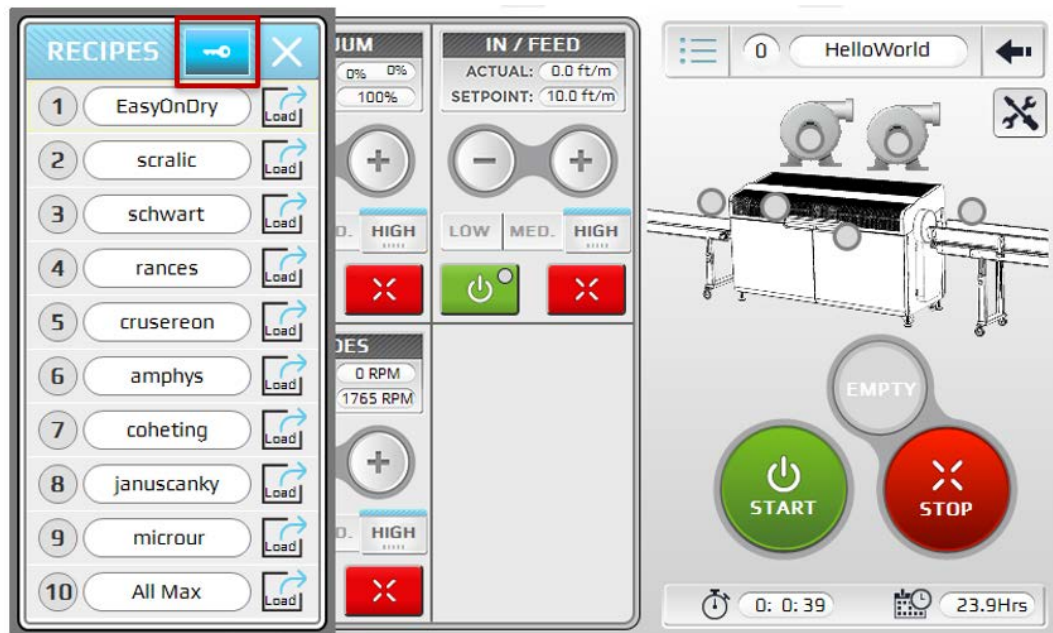
4. Save the settings by tapping the **Recipe List** button on the HMI screen.



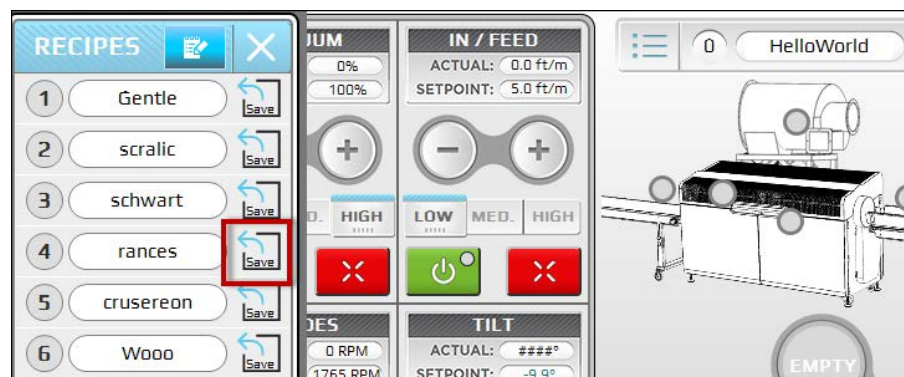
*Note: If the Key icon does not appear, ensure the HMI is in advanced mode.*



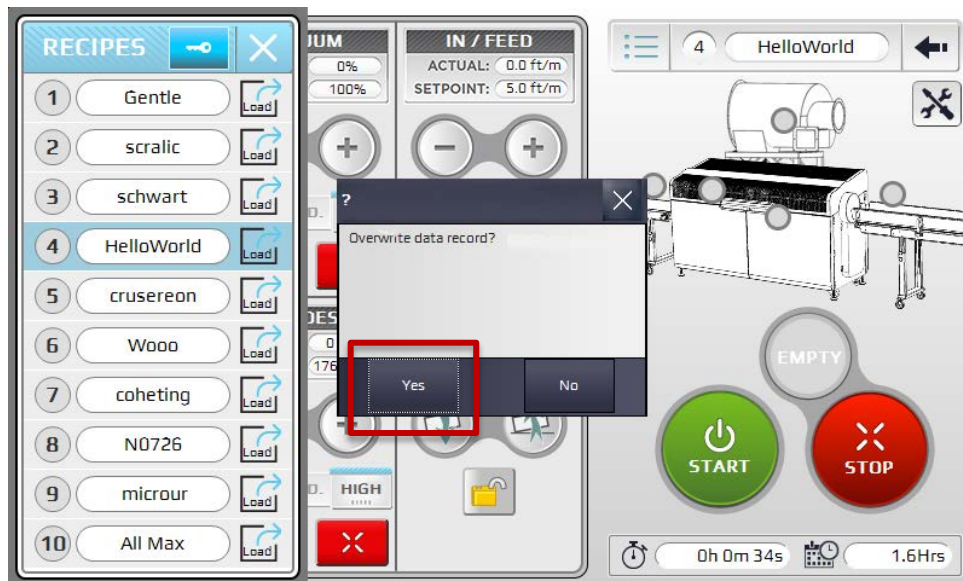
5. Tap the **Key** icon. The key will turn into an edit icon, and the **Load** buttons will change to **Save** buttons.



6. Save the recipe:
  - a. Tap the **Save** button next to the recipe slot you would like to modify.



- b. A pop-up message will appear asking if you want to overwrite the data record. The old settings are still saved under the original recipe name; these must be overwritten to permanently modify the recipe. Tap **Yes** to overwrite.

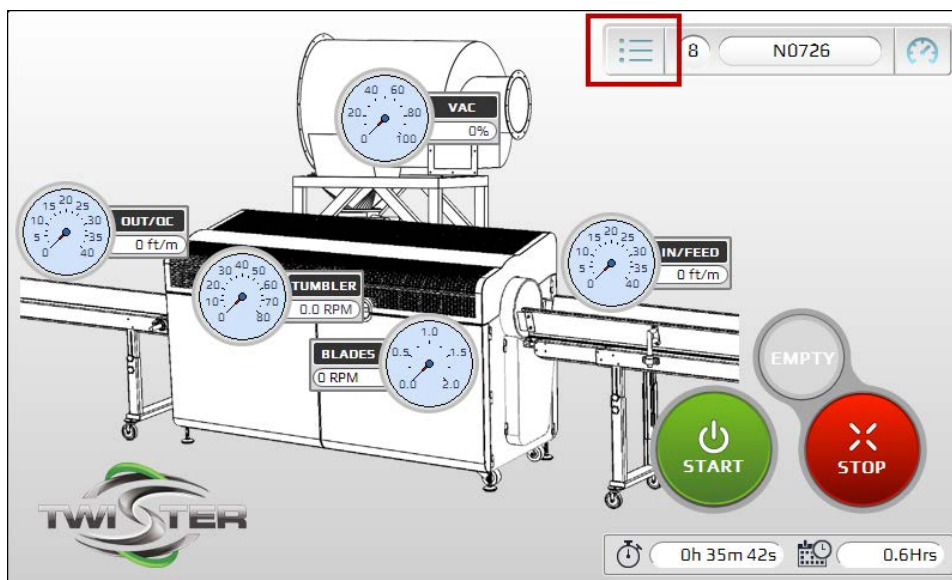


*Note: The recipe will be saved in the HMI's memory and will remain even if the machine is powered off. If a software update is scheduled, it is recommended to save the recipes to the SD card. See Engineering Mode in the Maintenance and Service Manual for instructions.*

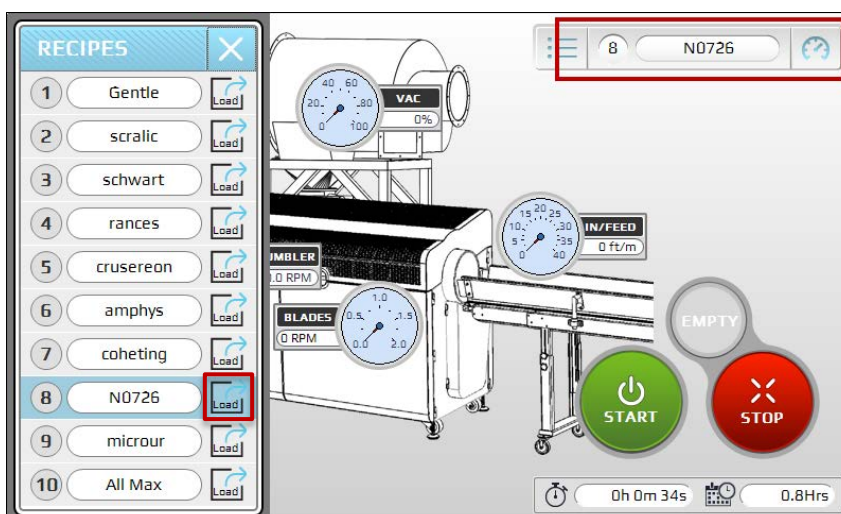
# LOADING A RECIPE

To load a recipe on the T-ZERO:

1. Tap the **Recipe** button on the HMI screen.

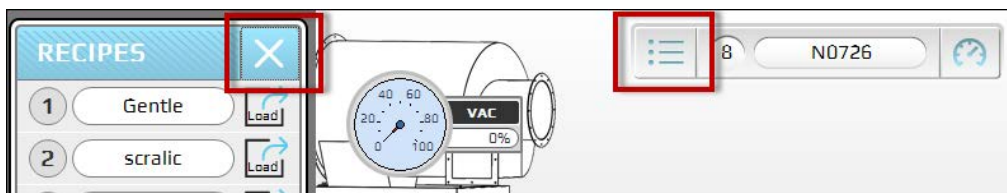


2. Tap the recipe name from the list.
3. Tap the **Load** button to the right of the recipe name. The recipe name you selected will appear in the top right corner of the screen. The operating setpoints for each motor will change according to the recipe.

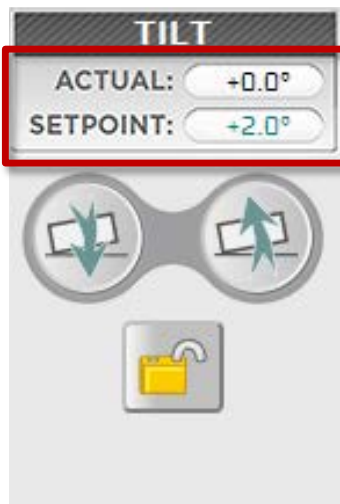


*Note: Loading a recipe will not automatically adjust the angle of the machine. The setpoint will be saved to the recipe, but for safety reasons, the machine does not move by itself.*

4. Tap the **Recipe** button or the **X** to close the Recipe menu.



5. Manually set the tilt of the machine to the setpoint shown underneath the actual angle of the machine. This will be saved in the recipe (for instructions on how to operate the lifting legs, see [Adjusting the Tilt on the T-Zero](#) on page 27).





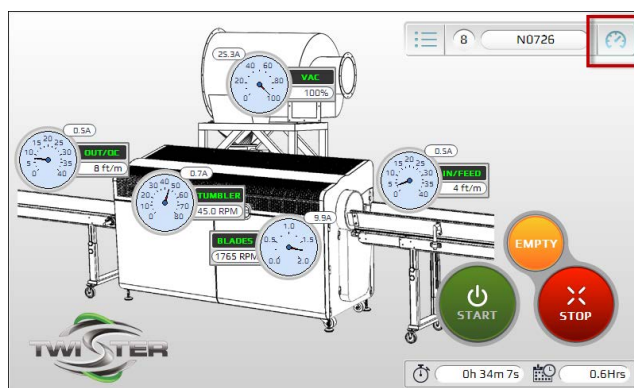
# MODIFYING A RECIPE

You may need to adjust the recipe in cases such as when the product is bouncing around the tumbler or if the moisture content of the product has changed. As an operator, you can adjust the motor speeds without saving the new setting on the recipe (to save these changes, see [Creating a Recipe](#) on page 21).

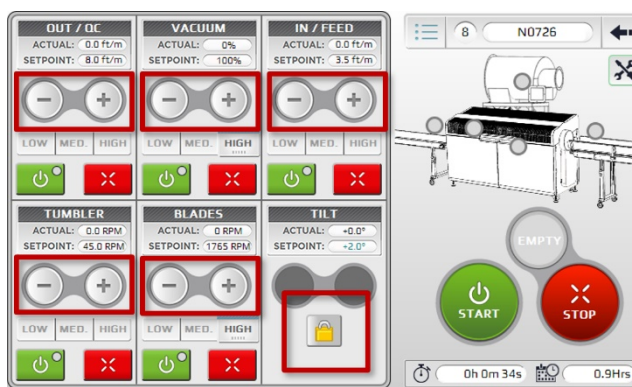
The machine is designed to allow all motors except for the lifting legs to be adjusted while in operation (to adjust the tilt see [Adjusting the Tilt on the T-ZERO](#) on page 27).

## To modify a recipe:

1. From Automatic Mode, tap the **Advanced Mode** button on the HMI.



2. Modify the recipe as needed:
  - a. Tap the plus (+) or minus (-) button on any of the motors, or adjust the machine tilt angle to optimize product flow. Once any setting have changed, the recipe name will automatically change to "ManualSpeed."



3. You will need to save the modified recipe again (for instructions, see [Creating a Recipe](#) on page 21).



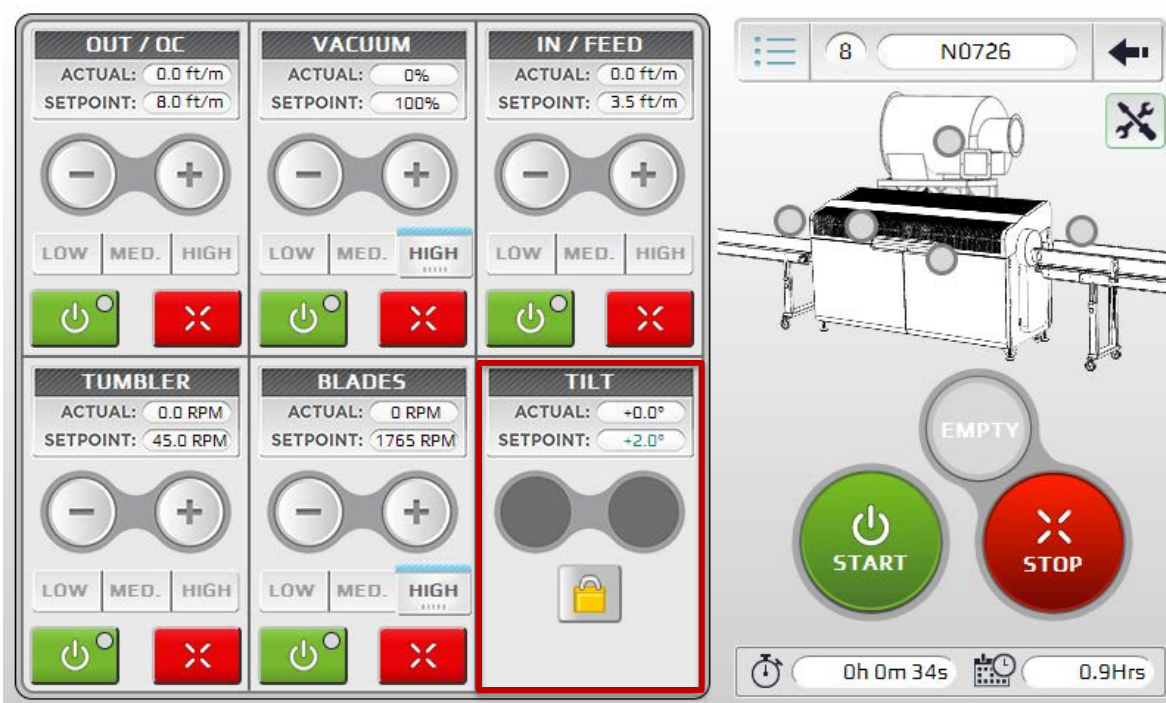


## ADJUSTING THE TILT ON THE T-ZERO

The infeed side of the T-ZERO has the powered lifting feature which allows the operator to adjust the tilt on the trimmer to a maximum of 7°.

The angle on the T-ZERO plays an important role on how fast product moves through the T-ZERO and how full the tumbler gets during operation. **Decrease the tilt angle to get more product in the tumbler or increase the angle to have less.**

FOR SAFETY, THE POWERED LIFTING FEET CANNOT BE OPERATED WHILE THE MACHINE IS RUNNING. THIS FEATURE MUST BE UNLOCKED EACH TIME IT IS USED, AND SAFETY PRECAUTIONS MUST BE TAKEN BEFORE OPERATING THE LIFT.



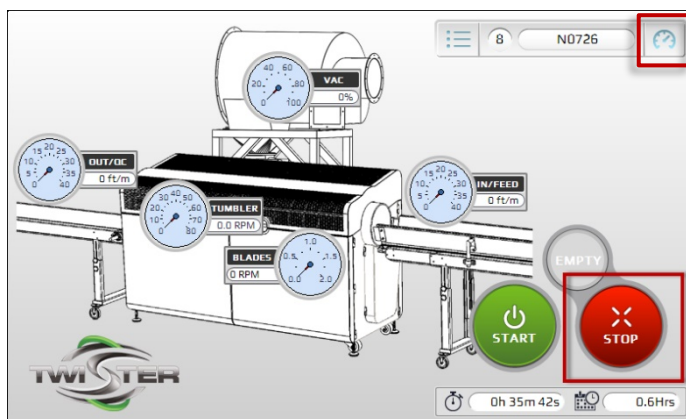
- Make sure the feed and QC conveyors are clear from the tumbler.
- Keep a safe distance from the T-ZERO. Never put feet or any body part under the T-ZERO.
- Watch for obstructions around the wheels of the lifting feet, these will move as the machine tilts.
- Check the power cable routing and ensure the machine can tilt without stretching or crushing any cables.



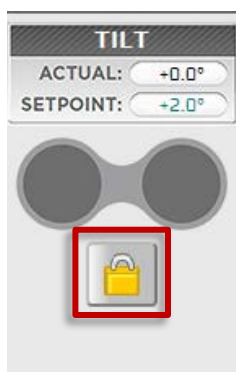
*Note: The powered lifting feature is interlocked with all the motors, requiring all motors to be stopped before using the powered lifting feature. A Lock/Unlock button prevents accidental lifting.*

## To adjust the tilt on the T-ZERO:

1. Tap the **STOP** button and make sure all motors have come to a complete stop.
2. Once all motors have come to a complete stop, tap Advanced Mode button (located at the top right of the screen).



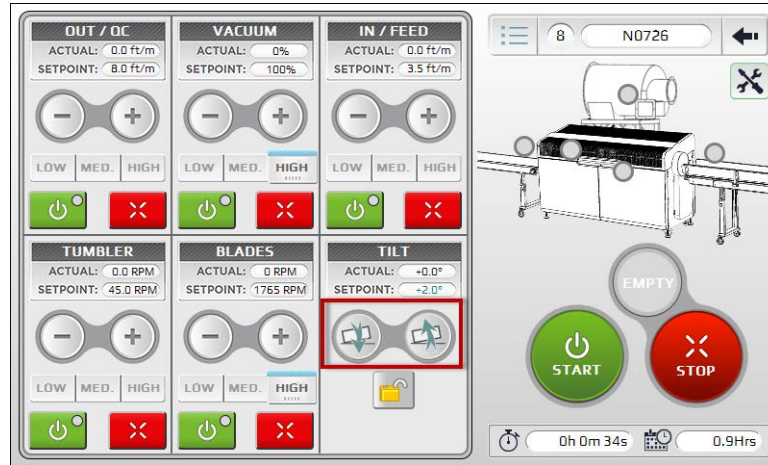
3. Check the T-ZERO's immediate surroundings to make sure no one or anything is near it.
4. **Make sure both conveyors are at least 6" away from the machine and all cables are clear of the lifting feet.**
5. Tap the **Tilt Lock** button to activate the Raise and Lower buttons.



6. Tap **I UNDERSTAND** to confirm that you have checked the T-ZERO's surroundings.
7. Ensure all motors have stopped and all workers are a safe distance from the T-ZERO.

THE LIFTING FEET ROLL AS THE MACHINE TILTS. MOVE ANY ELECTRICAL CABLES AWAY FROM THE LIFTING FEET TO AVOID DAMAGE.

8. Tap the **Lower** or **Raise** button to adjust the tilt on the T-ZERO. When loading a recipe, adjust the machine until the **ACTUAL** reading matches the **SETPOINT** reading to set the trimmer at the correct angle (the actual reading states what angle the machine is currently at).



9. Re-align the conveyors to the machine, ensuring the feed chute is clear of the tumbler (for more information, see [Adjusting the Conveyor Height](#) on page 30).

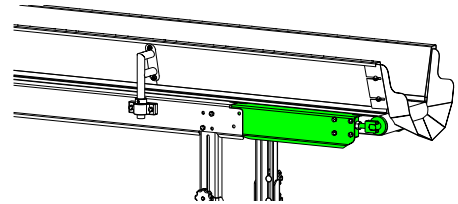


# ADJUSTING CONVEYOR HEIGHT

## IMPORTANT SAFETY INFORMATION



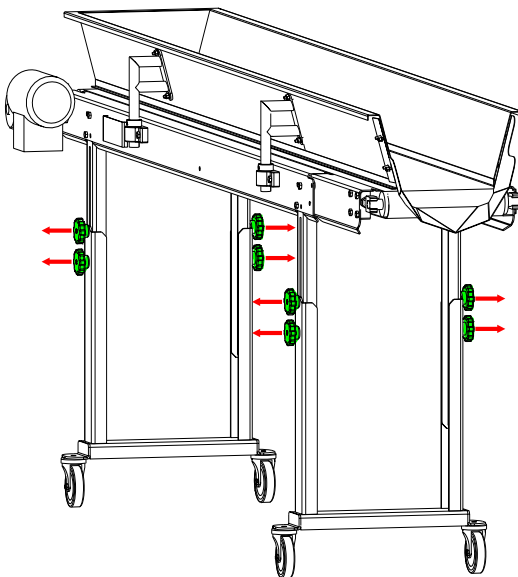
- The conveyor is heavy. Always use at least two people for the following tasks.
- Always move the conveyors away from the machine before adjusting the height.
- DO NOT LIFT CONVEYORS FROM THE TENSIONING END (highlighted in green to the right). This section of the conveyor is on a pivot and could damage the sidewalls and chutes when lifted.



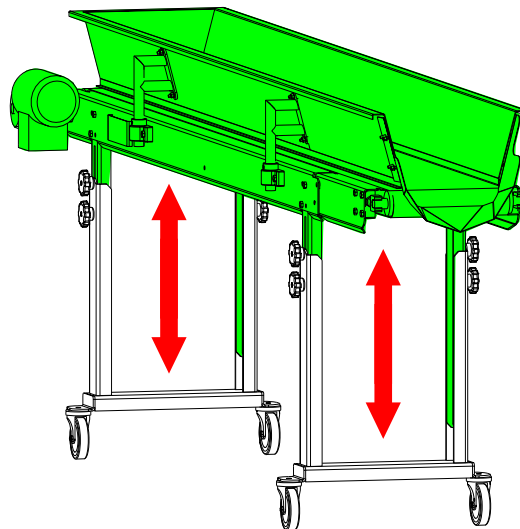
Adjusting the Feed and QC conveyor height is the same procedure.

## To adjust conveyor height:

1. Loosen the knobs on the conveyor legs and lift the conveyor to the desired height.
2. Once conveyor is at desired height, retighten the knobs.



1



2

3. After desired height is achieved, realign the conveyors and spin the tumbler by hand to ensure there is no interference.

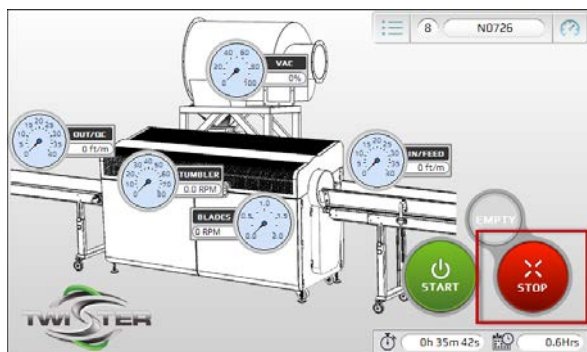
## EMPTYING THE TRIM BIN

The trim bin will fill up and need to be emptied periodically. The time it takes for the trim bin to fill will depend on the amount of leaf going through the trimmer. When starting a new strain for the first time, check the bin after 30 minutes, then every 15 minutes afterwards.

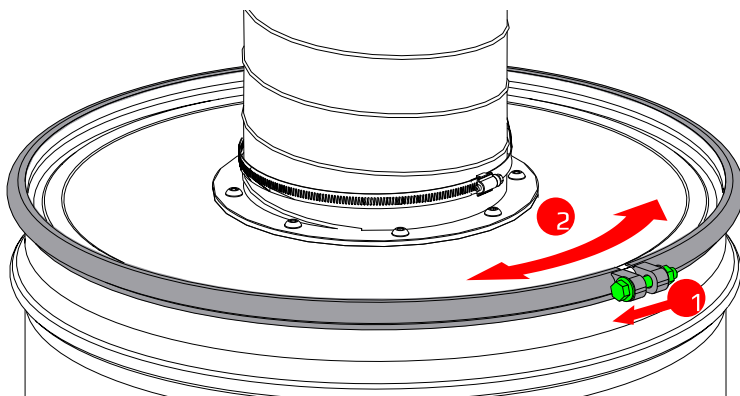
With the same strain, this number will remain fairly consistent. **It is recommended to empty the bin at less than  $\frac{3}{4}$  full to avoid overflow into the Filter Stack.**

### To empty the trim bin:

1. Tap the **STOP** button on the HMI.

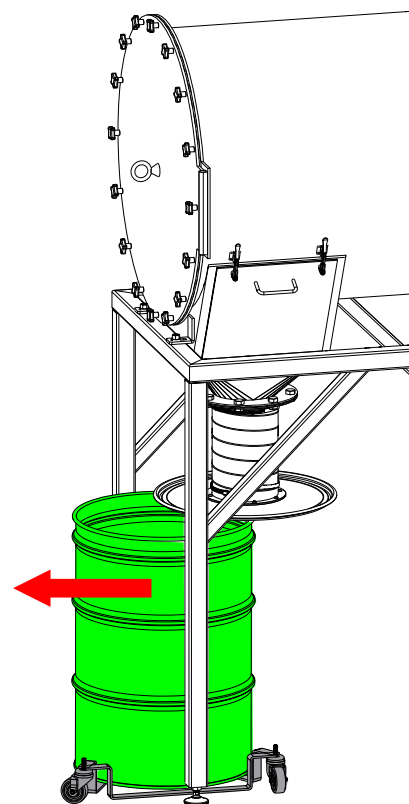


2. Wait for all motors to stop spinning.
3. Unlatch the trim bin clamp by loosening the screw, raise the lid and roll the bin from under the cyclone.



4. Empty the bin using your facilities SOP.
5. Reinstall the bin to the T-ZERO.

*Note: It is also recommended at this point to verify that there are no blockages in the ducting from the cyclone exit into the bin.*





## TROUBLESHOOTING

### TRIM BIN FILLED ABOVE THE HOSE

If the trim bin is left for too long without emptying and it fills up, trim may make its way to the HEPA Filter Stack. **If the trim bin is filled above the hose:**

1. Use the cyclone access hatch to help clean out the excessive trim.
2. Empty trim bin.
3. Check for plant matter inside the Primary Filter Module. **If plant matter is found inside the Primary Filter Module, Primary Filters may require cleaning.**
4. Check the pressure drop across the Primary Filter while the fan is at full power. **If it is above 5" water gauge then the filters will require cleaning** (for instructions, see the Maintenance and Cleaning Manual).

### EXCESS TRIM FOUND IN THE HEPA FILTER STACK

The Primary Filters will slowly clog over time and will need cleaning when the pressure drop rises above 5" water gage—as shown on the digital readout of the Pulse Jet Controller. **If a significant amount of product is found in the Primary Filter Module:**

1. Empty the trim bin and ensure the line from the cyclone inlet to the bin is clear.
2. Turn the HEPA Filter Stack fan to full speed for 5 to 10 minutes or until the Pulse Jet has fired four times. This will clear all debris within the ducting and remove any loose particles from the filters.
3. Turn the HEPA Filter Stack fan off and clear the plant debris from inside the unit and from the primary filter media.
4. Turn the HEPA Filter Stack fan on to the operating setting and verify that the differential pressure is still within the acceptable range: 5" W.C. for the primary filter and 2" for the HEPA filter.
5. Inspect the cyclone, bin, and connections for leaks. Leaking components or an improperly assembled system can cause excess trim to pass through the cyclone.

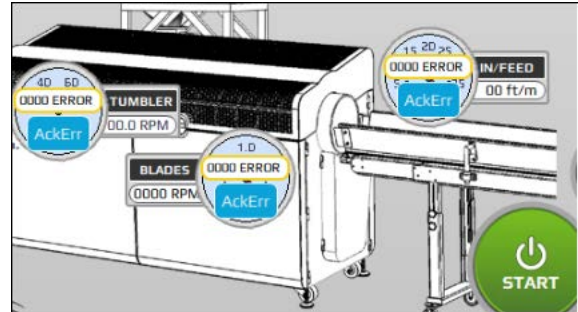
IF THE DIFFERENTIAL PRESSURE IS NOT WITHIN THE ACCEPTABLE RANGE AFTER CLEANING THE PRIMARY FILTERS, ARRANGE FOR THE T-ZERO TO BE SERVICED.



## MOTOR WON'T TURN ON

### If any motor won't turn:

1. Verify that the T-ZERO is connected to power and that the power is on.
2. Check for the **Ack Err** (Acknowledge Error) button on the HMI. If the **Ack Err** button appears on the HMI screen:
  - a. Tap the Ack Err button.
  - b. If the errors remain, hold both the **Empty** and **Stop** buttons for 5 seconds.
3. If errors disappear, start the machine normally. If the error remains, turn off the power source and wait two minutes.
4. Restart and check operation. If the motors are still not operating:
  - a. Shut down the T-ZERO again, disconnect and reconnect all cables running to the T-ZERO, and try running it again. If motors still do not start, contact technical support (for contact details, see page 37).



## TUMBLER HITTING BLADES OR VACUUM BAR

The tumbler hitting the Bed Knife, Helix Blades, or Vacuum Bar is often caused by one of the following:

- Tumbler or vacuum bar has been damaged.
- Lower axial rollers are damaged and/or set too low.
- Bed knife has been set too high.

### If the tumbler is hitting something as it rotates:

1. Rotate the tumbler slowly by hand, and try to isolate the area of the tumbler that is interfering. If it is easily locatable, check for scratches on the tumbler, vacuum bar, and blades to determine the source.
2. Remove the vacuum bar and check to see if the problem is solved. If the interference is gone, check the vacuum bar for bends, scratches or any other damage. This can usually be solved by bending the sheet metal away from the tumbler.
3. If the vacuum bar is not the issue, check the bed knife and helix blades for corresponding wear from the tumbler.
4. Check the height of the lower radial rollers using the roller height tools.



5. Roll the tumbler by hand and listen for contact. If the contact is isolated to a single or couple of locations, it is likely caused by damage to the tumbler. If it is consistent around the perimeter, it is likely caused by misaligned rollers or blades. Have the service team re-adjust the rollers slightly higher until the interference is solved.

*Note: Each time the rollers are raised, it will reduce the tightness of cut. This method will work to fix minor dents and bends but will reduce the effectiveness of the machine as the tumbler moves farther from the blades.*

## TRIM QUALITY IS LOW

1. Make sure all the steps in the [Powering the T-ZERO](#) procedure have been completed.
2. Ensure that the fan on the HEPA Filter Stack is on and rotating in the correct direction.
3. Ensure that the damper on the exit of the fan is 100% open.
4. Ensure that the shrouds have been installed correctly and all ducting connections are tight with seals in place, and there are no blockages anywhere in the ducting.
5. Ensure that the filters are within acceptable operating range: under 5" W.G. for the primary filter and 2" W.G. for the HEPA filter.
6. Ensure that the HEPA Filter Stack doors are all closed, drawer is latched in place, and all seals are intact.
7. Increase the speed of the Helix blade motor if it is not already at the maximum 1750 rpm.
8. Ensure vacuum bars are in place. If trimming dry, it is recommended to only use the vacuum bar on the exit side of the machine.

*Note: If trimming dry, the moisture of the product could cause low trim quality. A moisture content of 11-13%, crispy on the outside with more moisture in the center, is ideal.*

9. Make sure all four helix blades are spinning.
  - a. If motor is on but blades are not spinning, verify that the belts are intact and that the blade couplings have been installed.
  - b. If frayed stems and leaf are exiting the tumbler, shut down the machine and perform a paper cut test on the blades, explained in the Maintenance and Cleaning manual.
10. Make sure the T-ZERO is off, and make sure tumbler is filled approximately  $\frac{1}{3}$  full.

*Note: To optimize tumbler fill, the objective is to have the product fall after it passes the upper blade and land about 1" past the lower blade.*



11. Make sure the feed conveyor is filled to a consistent height when feeding the T-ZERO.

*Note: Fluctuations in product feed rate can cause inconsistent flow inside the T-ZERO and will result in low trim quality.*

12. Observe the product in the tumbler and make sure there is no surging.
  - a. If the product in the tumbler is surging or the vacuum hoses are bouncing, adjust the tumbler's RPM.
  - b. If the vacuum hoses are bouncing, adjust the vacuum's RPM.

*Note: Plant strain and flower composition can affect trim quality and overall throughput of the machine.*

## TRIM TO FLOWER RATIO IS TOO HIGH

Depending on the settings of the machine, it is possible to feed the machine too slowly and over-trim the product. In order to combat this, the machine needs to be adjusted to increase the throughput.

### To increase the throughput:

1. Increase the angle of the machine. Ideal settings are when the product is just barely held in by the vacuum. This will allow the feed conveyor speed to determine the throughput of the machine.
2. Increase the feed conveyor speed until the trim quality is visibly worse, then back off the speed in increments until desired quality is achieved.

*Note: Due to the size of the machine, it takes 3-5 minutes for any setting change to change the output. It is important to wait to see the results before changing settings again.*

*Note: Reducing the vacuum will reduce the trim to flower ratio and it will also reduce the machine's efficiency in the process. Only reduce the vacuum if running dry or low-density product.*

## PRODUCT WILL NOT EXIT THE TUMBLER

The T-Zero has a powerful vacuum system capable of holding product indefinitely in the tumbler.

### To release product from the tumbler:

1. Increase the angle of the machine. Increasing the angle allows gravity to pull the product out of the machine, overcoming the vacuum.
2. If the product is bunching up at the exit, but not exiting, remove the vacuum bar on the infeed side. This will change the airflow distribution so the feed side



tumbler can hold more product. It will also reduce the airflow to the exit side. This evens out product distribution in the tumbler, allowing the product to exit.

3. If a very dry or low-density product is used, the fan speed can be reduced to allow product to exit the tumbler.

## PRODUCT IS STICKING TO THE INSIDE OF THE TUMBLER

1. Verify tumbler brush isn't damaged.
2. Ensure tumbler brush is protruding into tumbler approximately 1/8".
3. Verify water sprayers are functioning if running wet product. If working, increase the duration of spray in Engineering Mode.
4. Clean the inside of the tumbler and decrease the temperature of the room.

*Note: The colder the room, the cleaner the machine will be. Cooling the room to 10-15°C or lower will maximize the machines performance and improve cleaning and trimming efficiency.*

## TUMBLER IS BOUNCING AROUND WHILE ROTATING

1. Make sure the Tumbler Lid is secured and Tumbler belt is correctly installed.
2. Make sure the top rollers are at the correct height and not damaged.
3. Have service team readjust the rollers or replace them if damaged (for instructions, see Maintenance Manual).

## CONVEYOR BELT IS NOT MOVING

1. Check the motor is functioning:
  - a. Turn the conveyor on and ensure the conveyor motor is spinning. Look at the roller on the motor side, it should be rotating slowly.
2. If the drive roller is spinning, check the conveyor sidewalls and chutes to ensure there is a 1/8" gap around the conveyor belt.
3. Check the belt tension and position. The belt should be tight around the rollers with the rib on the belt inside the groove.
4. If the conveyor rollers and belt are dirty, clean the conveyors (all procedures for conveyor adjustments can be found in the Maintenance Manual).



## CONTACT US



Keirton Technical Support is available at 1-888-254-3204 between 7 a.m. and 7 p.m. Pacific Time, seven days a week.