12” Tabletop Harvester Owners Operator Handbook

October 2021

General Manual

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Section 1

General

1.1 – Introduction

Designed and manufactured by Hamill Agricultural Processing Solutions, the 12” Tabletop Harvester for general use is a machine that emanates precision, quality, and reliability. Although a stand-alone system, the 12” Tabletop Harvester is of itself very technical, and this manual will provide guidance on all of the information a user may need. Included below are specifications and footprints of the tabletop. It will also range from the material used to make up the machine, dimensions to simple checklists for operation and limited warranty.

Specifically in Section 1, this guide will outline specifications, the materials this machine is built of, motors used, belting materials, power supply/requirements and how to move the Harvester. Below are the following specifications for the 12” Tabletop Harvester:

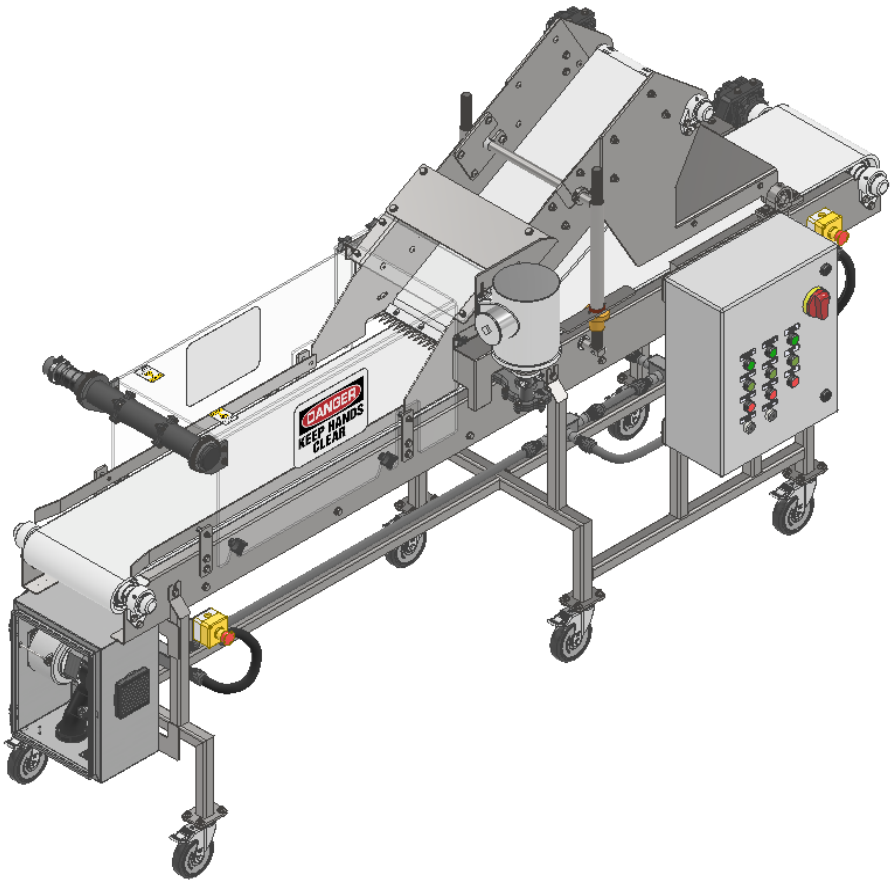


Figure 1.

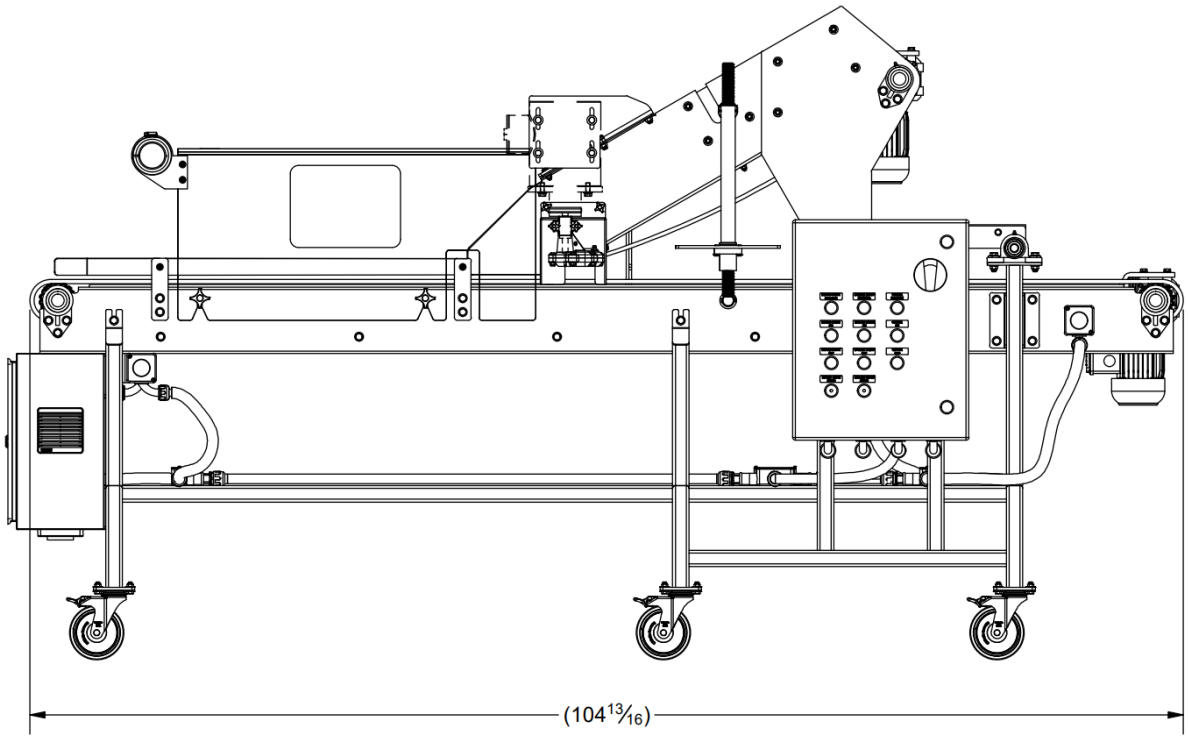
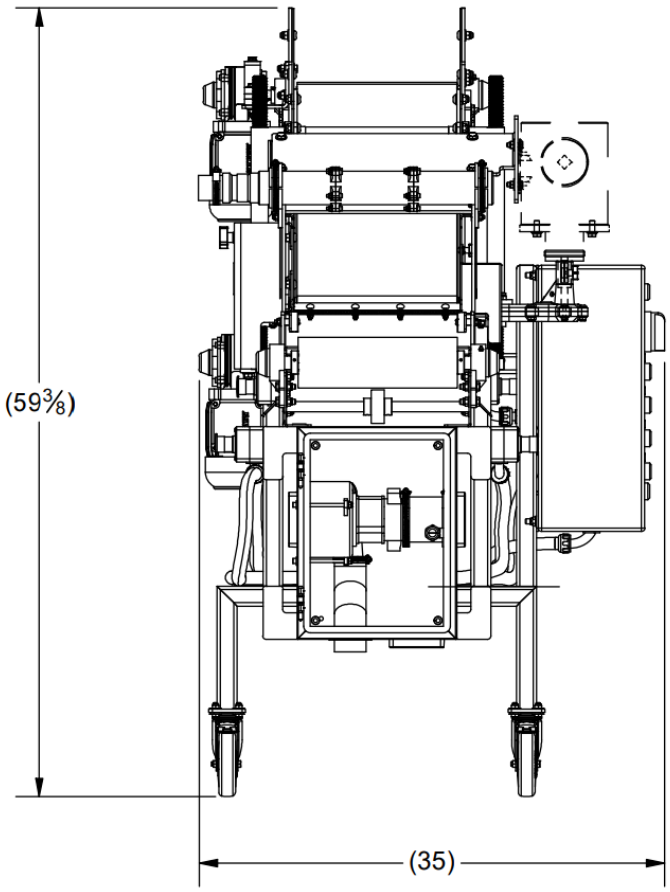
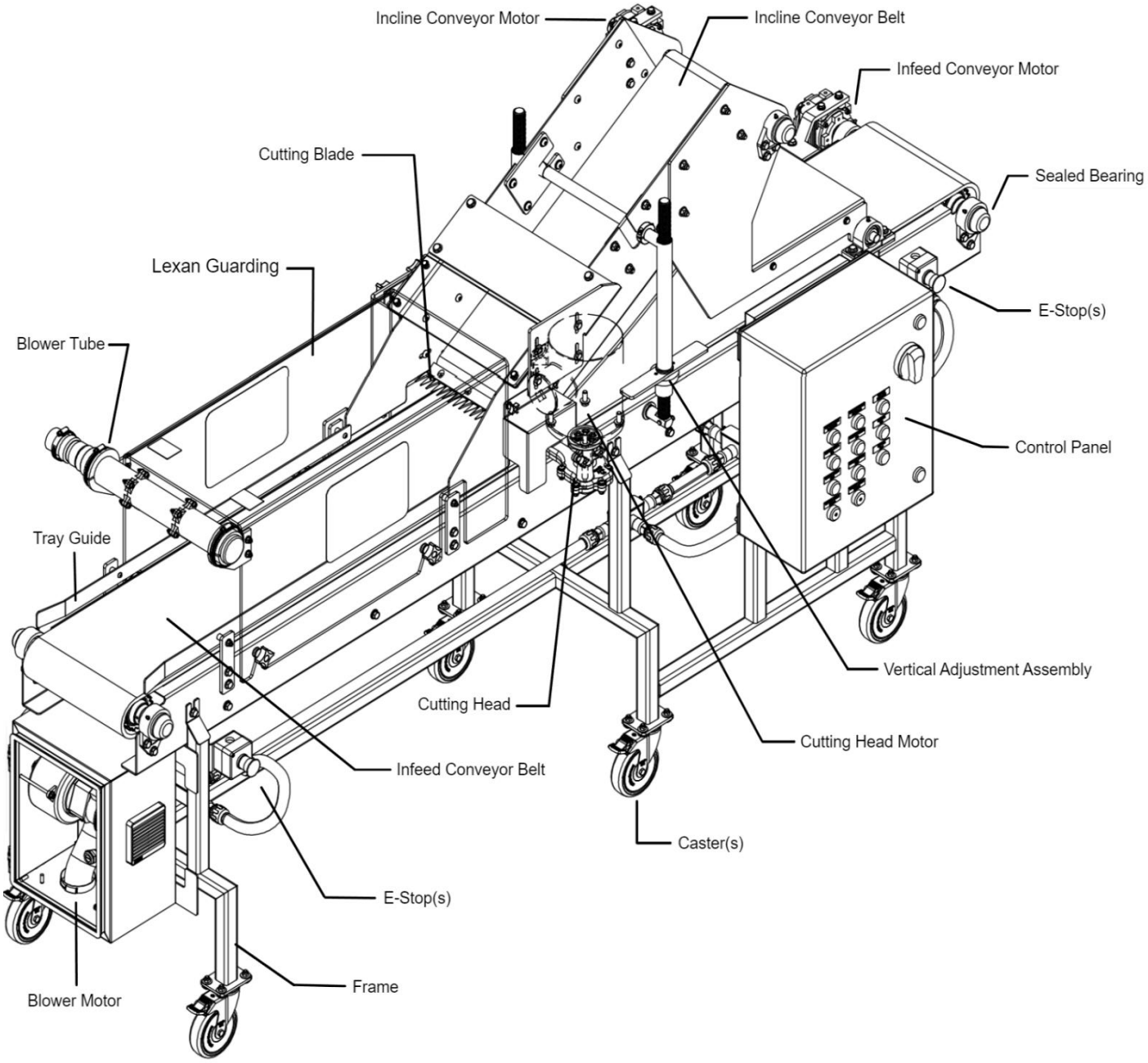


Figure 2.

**Measurements in Inches (In)



1.1.2 – Labeled Diagram



1.2 – Materials

The materials chosen went through a meticulous selection process. These had to be both strong enough, while withstanding moist, food grade conditions. All metal components are stainless steel and listed below are all major structural components and the grade used.

Frame: 304 Stainless Steel Square Tube

Shafts: 304 Stainless Steel

Panels: 304 Stainless Steel

Vertical Adjustment Shafts: 304 Stainless Steel

Clear Guarding: LEXAN Polycarbonate

Blades: 440C Hardened Stainless Steel

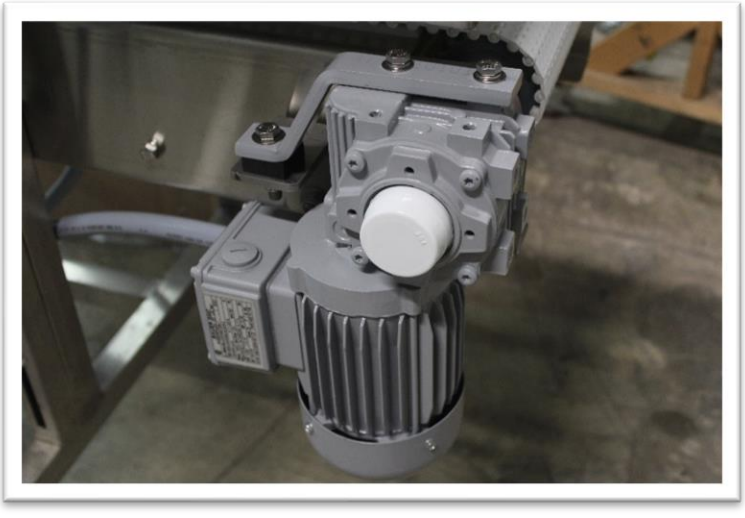
Lubrication is achieved using food grade products. Within the cutting head, and vertical adjustment shafts there's no large demand for lubrication, however, below is the product currently used:

Lubrication: Synco Multi-Purpose Food Grade Grease (syncolon PTFE)

1.3 – Motors

There are various motors used on the 12" Tabletop Harvester, all of which have custom power settings for each of their purpose. These include the infeed belt, takeaway belt, blade drive, and vertical adjustment ACME. Listed below are the models of motors for each given purpose.

Task	Type
Infeed & Incline Conveyor Drive	B-12TT-IC/IN Supply - 230/460 V Frequency - 60Hz Output Speed – 120 rpm



Cutting Head Motor	L-12TT-M Supply – 115/230V Phase - 1 Output Speed – 1725rpm

1.4 – Belting

For the movement of various parts or products on the 12” Tabletop Harvester, one style of conveyor belt was selected. The belts of interest will be the infeed conveyor belt and the product incline conveyor belt. Selected for the ease of use and extensive workload capabilities the belting supply’s great reliability and performance.

The infeed conveyor is a Forbo S4.1-0 FLT modular belt driven at variable speeds. This configuration is ideal with a large variety of trays and benches able to fit into the machine for both controllability and stability. This belting is modular and joined with various pins all along the belt as seen in image 1.4.1 below.

As the product is cut it moves up onto the product incline conveyor belt. Forbo S4.1-0 FLT/FRT1 belting was selected; mainly due to its simplicity and delicacy for the product. The Forbo belting is easy on the fresh cut product and with the help of the small rubber flights (see image 1.4.1 below), the product makes it up and over with ease as fast as the user desires. It is a modular belt; meaning you may remove a pin on any of the links and the belt comes apart at that seam, although this is STRONGLY discouraged it may be done for certain maintenance situations or deep clean situations (Please refer to Section 6/7)

Below are images of the belts.

Figure 6.

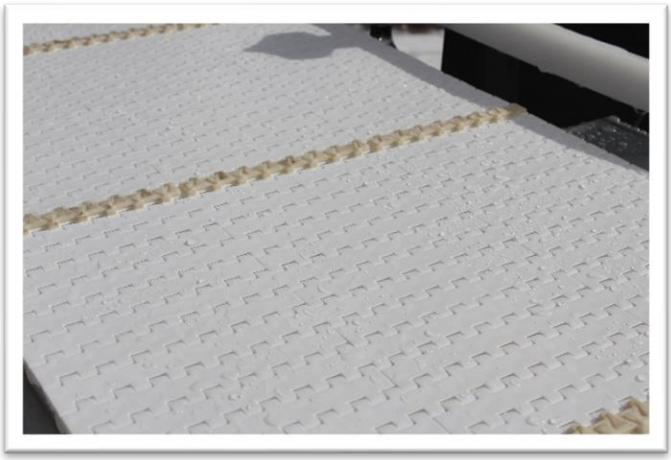
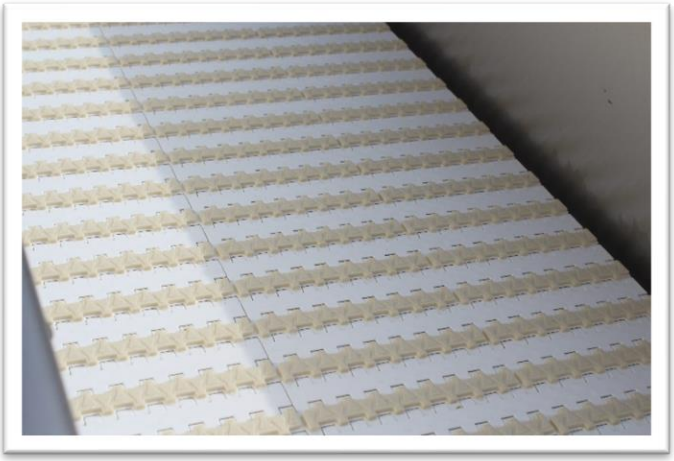


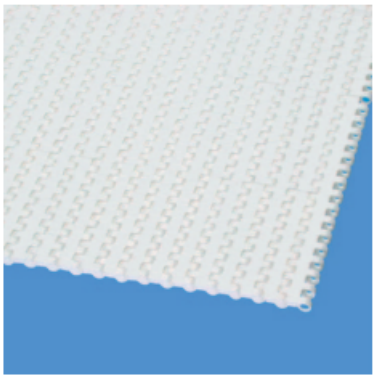
Figure 7.

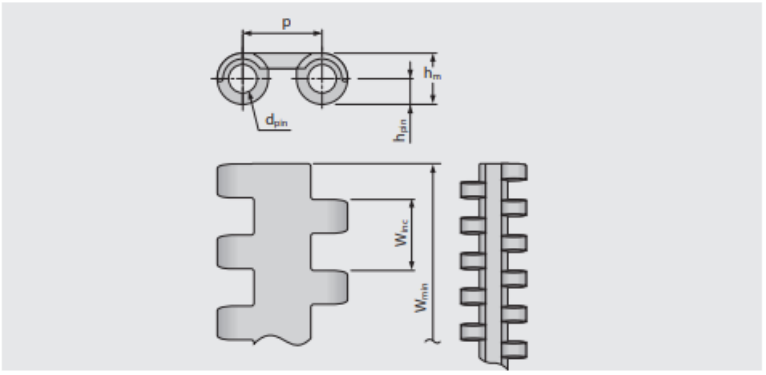


1.4.1 - Forbo S4.1-0 FLT/FRT1 PE WT X 4088 MM L Modular Belting

S4.1-0 FLT | 0 % Opening | Flat top

Closed, smooth surface | Flat top surface



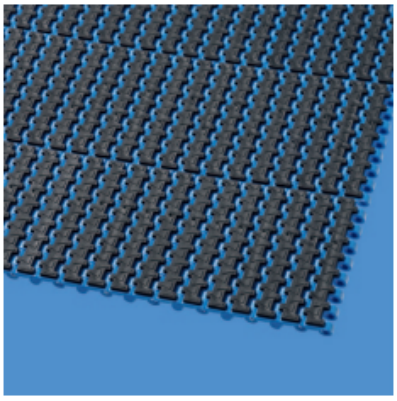


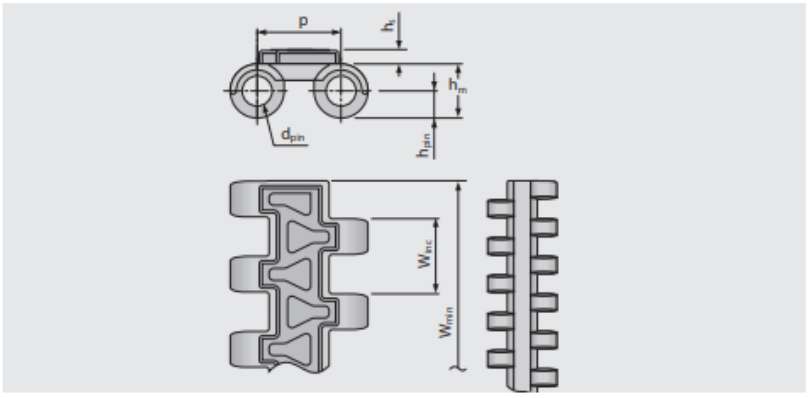
Belt dimensions

	p	d_{pin}	h_m	h_{pin}	h_s	W_{min}	W_{inc}	W_{tol}	Minimum flex radii[1]				
	Pitch	Pin Ø	Thickness [mm]	Pin position [mm]	Height [mm]	Width min. [mm]	Width Increment [mm]	Width tolerance [%]	r1	r2	r3	r4	r5
mm	14.0	5.0	9.0	4.5	0.0	25.0	12.5	±0.2	–	11.0	25.0	38.0	12.5
inch	0.55	0.2	0.35	0.18	0.0	0.98	0.49	±0.2	–	0.43	0.98	1.5	0.49

S4.1-0 FRT1 | 0% Opening | Friction top (Design 1)

Closed surface | Friction top with slightly elevated triangular shapes to reduce contact area/increase contact pressure to optimise grip and to channel dirt away from the friction surface





Belt dimensions

	p	d_{pin}	h_m	h_{pin}	h_s	W_{min}	W_{inc}	W_{tol}	Minimum flex radii[1]				
	Pitch	Pin Ø	Thickness [mm]	Pin position [mm]	Height [mm]	Width min. [mm]	Width Increment [mm]	Width tolerance [%]	r1	r2	r3	r4	r5
mm	14.0	5.0	9.0	4.5	2.4	25.0	12.5	±0.2	–	11.0	25.0	38.0	16.5
inch	0.55	0.2	0.35	0.18	0.09	0.98	0.49	±0.2	–	0.43	0.98	1.5	0.65

1.5 – Equipment Movement

1.5.1 - Casters

As with all our components, Hamill APS thinks of the grower with any situation or piece of equipment. With the 12” Tabletop Harvester that is no different. Built with 4/6 casters and 4/6 leveling feet, this piece of equipment is easily transportable and easy to level for use.

To move the harvester, the operator must first disconnect all power sources and “lock out” the machine; done with the lock tab on the power main disconnect. It is advised to push one or more e-stop(s). Once the harvester is secured and “locked out”, check the surrounding area and confirm there are no obstructions. At this point the operator can unluck the 6 casters using the foot locks and move the machine as desired (see figures below).

When the harvester has reached the desired location, re lock all 4/6 casters using the foot locks.

Figure 7. “Locked”

Figure 8. “Unlocked”

1.5.2 – Leveling Feet

To use the leveling feet, first the operator must “unlock” the foot to be able to adjust it. There are two settings. To raise the heigh of that localized position, the operator must turn the leveling foot counter clockwise to extend. To lower that localized position, the operator must turn the leveling foot clockwise to retract. This may be done by hand, or with an adjustable wrench. Once the machine is leveled and the feet are in the desired location, the user must “lock” the leveling foot with the counter screw. See figures 9 and 10 below.

Figure 9. “Locked”

Figure 10. “Unlocked”

Once all harvester movement is completed and locked, the operator is to reset e-stop(s), resupply power to the machine and continue use following the “Start Procedure” listed in Section 4.

Section 2

Performance

2.1 – General

In section 2, this manual will cover all performance-based specifications related to the 12” Tabletop Harvester. These details will include speeds of all moving components and the minimum, the ideal and the fastest operational speeds of the machine. This extends to the infeed conveyor, incline conveyor and blade. On a larger scale it will also outline what each of those respective local speeds mean for the overall pace of production; IE, how many trays can be produced per minute, hour, day, week, month etc.

Within the performance scope, this section will outline the temperature ranges of which certain components will operate best at. That primarily will focus on the blade cutting head, and secondarily the motors.

2.2 – Speeds

2.2.1 – Infeed Conveyor Belt Speed

For this 12” Tabletop Harvester, the infeed conveyor is quite flexible for speed operation. However, every product’s preference will be slightly different. Overall, this will be a general guide to use. These will be defined as the minimum, ideal and fastest operating speeds. Adjustable by the highlighted section below in figure 1.

Figure 1.

Minimum Speed of Operation:

When introducing the product to the blades, there will be a minimum speed at which it will start to be detrimental to the product. A user may notice that the product instead of being cut will start to be “mulched”. In such a scenario the user may increase the speed of the conveyor belt (in %) to mitigate the “mulching” of the product.

The user may start to notice “mulching” at speeds equal to and lower than 20% infeed conveyor setting.

Maximum Speed of Operation:

When the product contacts the blade there will be a noticeable sign that the infeed conveyor is running to fast for the desired product. A user will notice the product being cut fine; however, it may start to “bunch” up onto/on top of the blade. If the user notices this start to happen the speed of the indeed conveyor belt must be turned down in small increments (in %) until the “bunching” stops.

This “bunching” will start happening only with certain products and at 100% conveyor belt speed.

Ideal Speed of Operation:

Although every product is different, once the user finds the ideal speed for a particular product there will be no distinct issues. A user will find the cut is clean, fast, and smooth. The product will not be mulching or bunching up onto the blade.

This “ideal” range in speed will most likely fall anywhere between 20% and 100% of infeed speed.

2.2.2 – Product Incline Conveyor Speed

Unlike the infeed conveyor belt, the incline belt on the 12” Tabletop Harvester has a much wider ideal operating range (speed range at which the product is moved ideally). For almost all products this belt can be run at 100% speed setting and have the products still be moved timely while preserving the quality and not damaging it.

If a user starts to see any irregularities with this speed setting of 100% a user may turn down the speed to mitigate any issues. This may be adjusted by the green highlighted section in figure 2.

See image on next page.

Figure 2.

2.2.3 – Cutting Blade Speed

Unlike the product incline conveyor belt, the blade is fixed and set to run at 100% speed setting. To date, Hamill APS have noticed no issues with the cutting blades being run at full speed.

Figure 3.

Section 3

Limitations

3.1 – General

In Section 3, this manual will focus on the very small number limitations existing on the 12” Tabletop Harvester. This will cover limitations to do with temperatures and regular operating widows on various parts of the machine, power, and tray size specific limitations. This section will also offer specific figures to note and in the situations where these limitations are exceeded, what a user or operator should do.

The listed limitations however are outliers and when the machine is operated accordingly the risk of reaching these figures is minimal.

The power sub section will list and outline the electrical windows of operations as well as limitations imposed by the electrical engineer from Hamill Electrical Systems for safe and efficient use.

3.2 – Temperature Limitations

3.2.1 – Cutting Head

The cutting head developed and produced by Hamill APS is what will be use widely on the machine. Extremely reliable, this piece does produce a limited amount of heat, of which is mitigated by designed heat dispersion and lubricant. Detected with a heat gun, the specific ranges are below.

The material used has a heat deflection rating of **293°F**. As a listed limitation the cutting head **CAN NOT** exceed that temperature as the material will start to break down. If the user sees such a temperature, they may slow the cutting speed to cool down, or shut the cutter down.

Through rigorous testing however these temperatures have never been observed. Standard operating temperatures during testing and operational use are observed to be between **90.3°F – 110.1°F**.

3.2.2 – Motors

All motors on the machine do not have a specific temperature limitation and each posses their own cooling methods from heat sinks to internal fans. It is advised however if the user notices a higher temperature on any of the motors, inspect the internal fans and visually confirm they are functioning or stop usage and investigate.

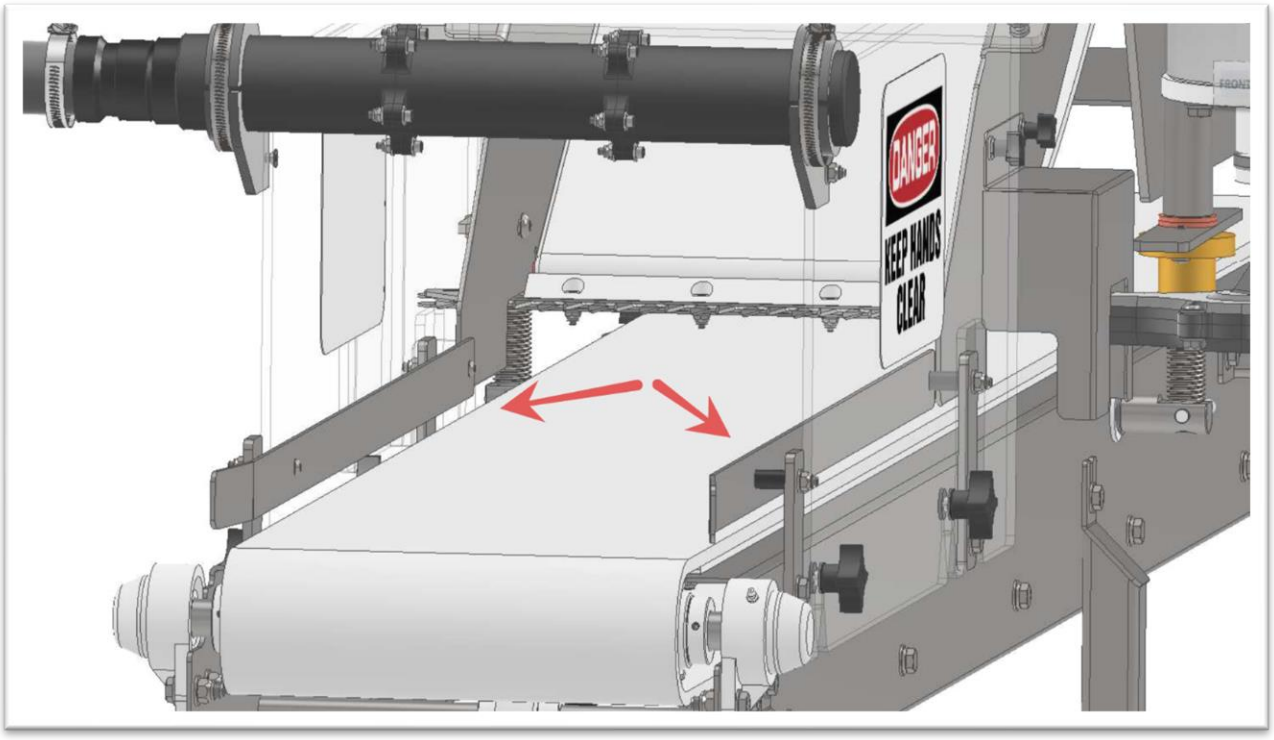
It is to be noted however that the cutting head motor will run slightly warmer than the other motors due to its high RPM and load. This is no cause for concern.

3.3 – Size Limitations

As listed in the title of the machine, the 12” Tabletop Harvester is designed to accommodate trays at or smaller than 12”. As highlighted below, there are 2 fixed stainless-steel guides on either side of the infeed conveyor belt with flared ends to ease the placement of trays. As the tray moves along the infeed conveyor belt towards the cutting blade, these guides will automatically align and guide the trays with no user input. These both are not adjustable in nature. A user may place trays smaller than 12” onto the machine but it is to be noted that it will be free, and tray misalignment can occur.

The limitation however is that the machine can not accommodate any tray larger than 12” as designed.

Figure 1.



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Section 4

Normal Operating Procedures

4.1 – General

Section 4 will cover all checklists to follow for normal operations. Formatted in an item-by-item checklist style, any operators can use these as an essential guide to operate the machine. They will cover a few key procedures. First will be the preparation; more specifically how to prepare the area and overall condition of the area for usage of the harvester. Next will be a pre-use inspection checklist; covering various critical components and items that need to be set before a user can engage the harvester for daily use. Following the machine being in working order there will be a start checklist for how to start the machine in the correct order and a recurrency check to be done roughly every 4 hours of the machine running to confirm its continued condition being acceptable. Last to be covered will be the stop checklist and cleaning preparation guide.

All of which are deemed essential and should be followed as recommended by the manufacturer.

4.2 – Checklists

4.2.1 – Preparation

This is to be done to ensure that the working area and machine is in basic ready condition to start work. The steps are as follows:

- ☐ Harvester cleanliness level (make sure the harvester is in clean order).
- ☐ Ensure the product on route to the harvester is ready.
- ☐ Confirm bins in place to receive product once cut.
- ☐ All employees and operators are prepared and ready for operation.

Once complete, proceed to item 4.2.2.

4.2.2 – Pre-Use Inspection

Once the area is deemed to be fit for work, the operators may proceed with the following checklist to technically inspect the machine for any defects, misplacements, loose fittings etc and address them accordingly. The steps for the pre use inspection are as follows:

- ☐ Panel is clean and secure
- ☐ All guards are secure, in place and covering danger areas
- ☐ Casters locked
- ☐ E-Stops are reset and out
- ☐ Conduit fittings are secure and watertight
- ☐ Belting seated and tensioned correctly
- ☐ Cutting head tight and secure
- ☐ Tail end of blade is secure
- ☐ Motor mounts are all secure and tight
- ☐ Tray guides in place and secure
- ☐ Vertical adjustment rod in desired location
- ☐ Blades clear

Once complete, proceed to item 4.2.3.

4.2.3 – Start Checklist

This checklist is to start the harvester for all operations. The steps to follow as listed by the manufacturer are:

- ☐ Supply machine with power by plugging into power source
- ☐ Check all E-Stops are out and reset
- ☐ Ensure area is clear / all user interface settings are as desired
- ☐ Start harvest

Once complete, proceed to item 4.2.4.

4.2.4 – Recurrency Checklist

This list is defined as the recurrency checklist. To be done every 4 hours, this is meant to be done during lengthy operations of the machine to ensure components are in working order and no changes have occurred from the 4.2.2 check. These can be done while the machine is in operation. The items for recurrency are as follows by the manufacturer:

- ☐ Check power connections are seated properly
- ☐ Check / update harvester settings
- ☐ Ensure cutting head temperature is within the operating window listed in 3.2.1
- ☐ Visually inspect blade state for any residue build up or obstructions
- ☐ Continue use of harvester
- ☐ Repeat until operations are complete

Once operations are complete, proceed to item 4.2.5.

4.2.5 – Stop Checklist

Once all operations are complete, the operators may complete the following guide for shutting down the harvester. The checklist is as follows:

- ☐ All product has completed transfer through harvester
- ☐ Turn off infeed, incline, blower, and blade motors VIA interface in 2.2.1
- ☐ Unplug and power down harvester
- ☐ Shutdown complete

4.2.6 – Cleaning Preparation Checklist

Once operations are complete and the users choose to clean the machine, these steps outlined by the manufacturer will serve as guide on how to prepare the machine for cleaning. These steps are as follows:

- ☐ Ensure harvester is powered down and unplugged from power supply

- [ ] Cover electrical panel with tarp / covering
- [ ] Depress one or more E-Stop(s)
- [ ] Proceed to clean the harvester following cleaning guidelines outlined in Section 6

Continue to next page.

Section 5

Fault Procedures

5.1 – General

Although unlikely, there are chances that with any piece of complex machinery or equipment that faults do happen. It is encouraged that with any fault with the 12" Tabletop Harvester, Hamill APS/ES be consulted in order to verify the issue is fixed. In Section 5, this manual will cover the more likely faults to occur and the proper procedure to rectify the issue. These faults can range from jammed trays to broken blades; all will be covered below. All relevant contact information for Hamill APS and Hamill Electrical Systems is listed at the ending portion of this manual.

5.2 – Fault Procedures

Listed below are the more likely faults to occur and the proper checklist items to follow to rectify the issue for continued use.

5.2.1 – Blade Jam

In the event that a cutting blade jams either due to product or foreign object debris the user will most likely observe the blade sheer pin breaking (as designed) and the motor spinning up to full speed. operation must be stopped to safely clear the issue. The manufacturer recommends following the steps below:

- ☐ Immediately push the closest e-stop(s)
- ☐ Lock out / tag out the harvester. Shut all power to harvester
- ☐ The user may now safely work on the machine and follow part 2 steps.

Part 2.

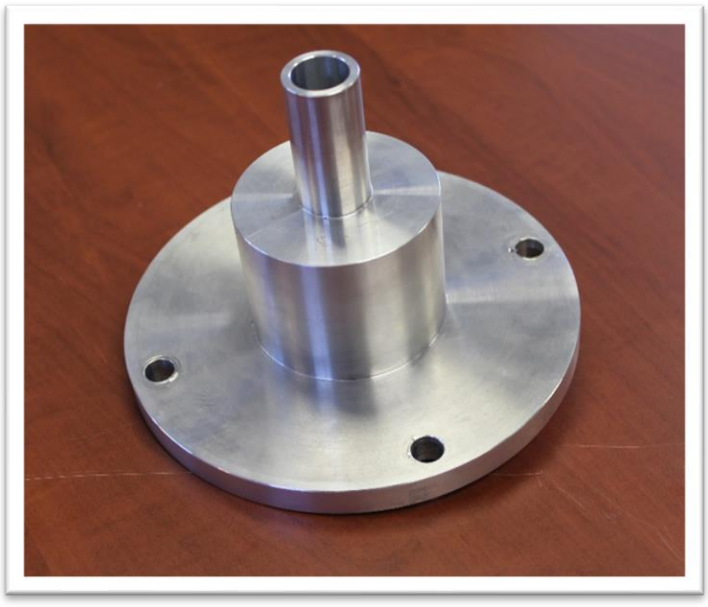
- ☐ Release the cutting head from the motor
- ☐ Remove the bell housing from the bottom of the motor
- ☐ The user should observe the sheer pin broken
- ☐ Replace sheep pin and bell housing
- ☐ Install new cutting head and blade
- ☐ Reset all e-stop(s)

☐ Follow checklist 4.2.3.

It is important to note a jam may cause quick stop damage to the cutting head and gearing inside. It is recommended that the blade and head be sent back to Hamill APS for assessment and repair if necessary. Figure 1 below shows an example of a sheer pin and Figure 2, a bell housing.

Figure 1.

Figure 2.



5.2.2 – Motor Failure

Motor burnout is something that can happen with long term use. In the event a motor does fail while in use, the operators must follow the steps below in order to secure the machine for maintenance. It is to be noted however that motor burnout is extremely rare.

- ☐ Immediately push the closest e-stop(s)
- ☐ Lock out / tag out the harvester. Shut all power to harvester
- ☐ Contact Hamill APS for replacement procedure

Once informed, Hamill APS will follow the necessary steps to rectify the issue.

5.2.3 – Blade Loose

General usage of the machine may result in the blade fitting both on the motor side and the tip side to come loose. Although not likely, it can happen after extended use and this will likely be mitigated with the pre-use inspection noted in 4.2.2 Item 7 & 8. If the blade does become looser than desired while in operation, please follow the steps below as outlined by the manufacturer.

- ☐ Immediately push the closest e-stop(s)
- ☐ Lock out / tag out the harvester. Shut all power to harvester
- ☐ Once secure and safe, the users are clear to tighten blade where necessary
- ☐ Reset e-stop(s)
- ☐ Power on and continue use of harvester

Once the blade is at the desired tension, the user may continue use and operations as listed.

5.2.4 – Jammed Tray

Although extremely unlikely a tray may be loaded onto the infeed conveyor incorrectly, or external forces could potentially be applied to “skew” the tray laterally off center. When such a situation occurs, the corners may become jammed on their guide rail or blade and seize movement. If such a situation occurs, please consult, and follow the steps below as outlined by the manufacturer.

- [ ] Immediately push the closest e-stop(s)
- [ ] Lock out / tag out the harvester. Shut all power to harvester
- [ ] Operators may now safely move the tray by hand and align it properly within the guides
- [ ] Once aligned correctly, reset e-stop(s)
- [ ] Power on and continue use of harvester

5.2.5 – All Electrical Faults

For all electrical faults with the harvester, please refer to contact information and consult Hamill Electrical Systems as soon as possible. Until such instructions are received, please follow the steps below.

- [ ] Immediately push the closest e-stop(s)
- [ ] Lock out / tag out the harvester. Shut all power to harvester
- [ ] Contact Hamill Electrical Systems

Continue to next page.

Section 6

Cleaning Guidelines

6.1 – General

Cleanliness within the food agricultural sector is of upmost importance. The 12" Tabletop Harvester was designed and built to be simple and effective to clean. The parts that come primarily in contact with the product are easily modular and simple to remove. This section will cover the approved methods to clean each part necessary, and the machine as a whole. More specifically, what products to use and the results of such cleaning methods.

There will be a comparison illustration with Glow Gel; a test chemical that emits light under UV. Hamill APS uses this tool to test the surface cleaning techniques as well as trace testing. To build on Glow Gel, Hamill APS also uses Hygiena swab bacterial and biomaterial detection testing to test the effectiveness of the blade cleaning. These will both be shown below.

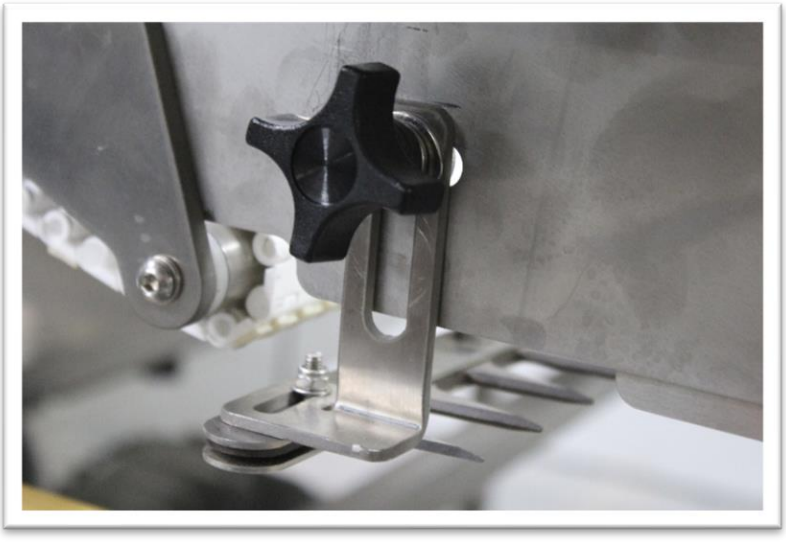
6.2 – Cutting Blade Cleaning

This subsection will cover the removal, preparation, cleaning, and reinstalment of the blades. Primarily there are two cleaning methods to be outlined.

6.2.1 – Blade Removal

To remove the blade, first the user must complete the checklist outlined in 4.2.6. Once complete, the user may proceed and remove the "tail end" of the blade. Held by a hand screw, the user may simply remove this to free the bracket. Illustrated below in Figure 1.

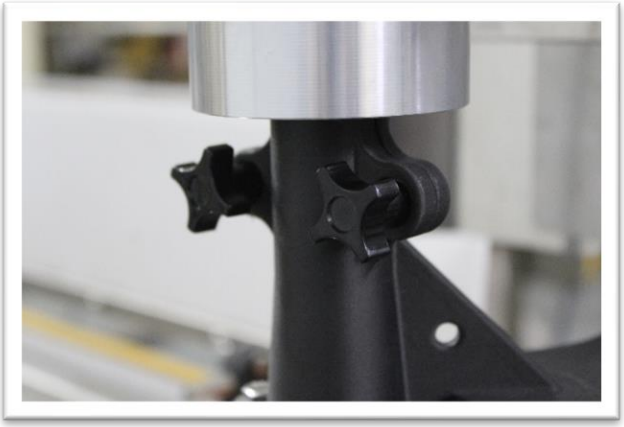
Figure 1.



Next, the user must proceed to the cutting head for removal. Held on by two quick release screws, they will need to be loosened. To do so, turn counter clockwise to loosen. The tabs act as a wrench, and to use it as such pull the “tab” out and relocate to the top of the rotation and repeat. This must be repeated for both quick release screws. Once completed, the cutting head assembly and blade will slip off the motor and motor mount. Figure 2 and 3 below illustrates the two quick release screws.

Figure 2.

Figure 3.



Once completely free on both sides, the users may remove the blade for cleaning. This must be done carefully.

6.2.2 – Blade Cleaning Method 1

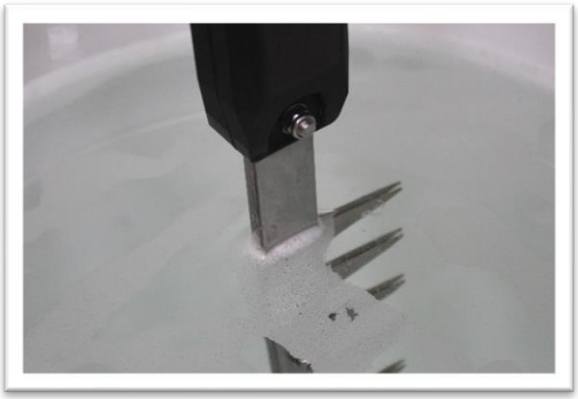
The primary method for cleaning the blade both ideal for ease of use and cleanliness involves a bucket (or container large enough for the blade) with cleaning product and water.

The user must find a container fit for the blade being cleaned. Once complete, fill the bucket with warm/hot water mixed with cleaning product. Through various testing Hamill APS found the ideal product to work above average for both traces and biomaterials. For blade cleaning, Diversity Cleaning Products develops the Diversity Divosan Q400 Sanitizer Concentrate. As per the instructions, this is to be mixed in that bucket of warm/hot water with a ratio of 1-2 mL per 500 mL of water. It is recommended that the user cleaning wear gloves while operating with the Diversity Sanitizer. Please follow all safety and user instructions listed on the back of the product bottle.

Once the solution is prepared, the user may submerge the blade all the way into the water up to the cutting head; **AVOID SUBMERGING CUTTING HEAD**.

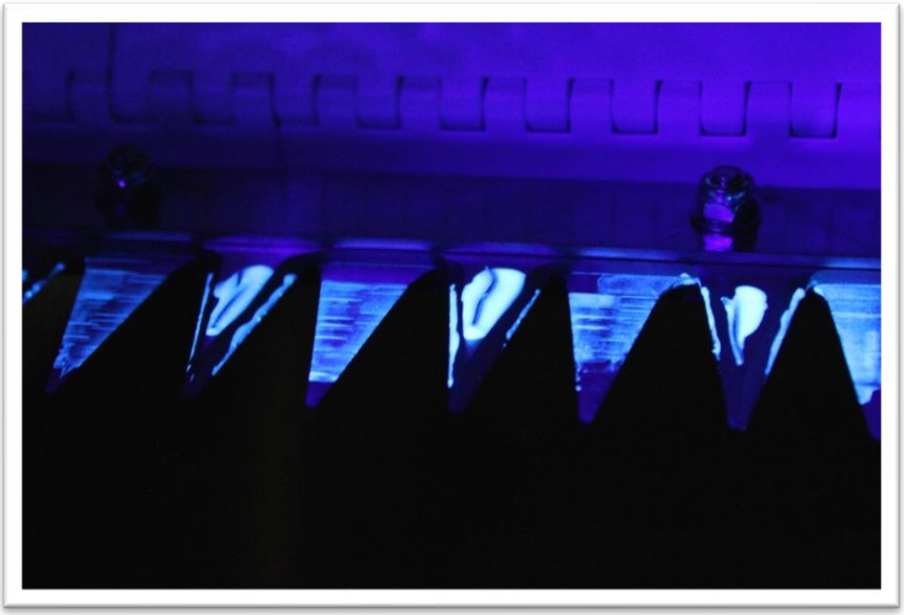
With extra key stock supplied, the user will now run the blade under the cleaning solution infused water for 3-5 minutes. This vibration and gyration create an environment ideal for the cleaning solution to reach tight spots and clean the blade thoroughly. This method avoids the need to take the blades apart which is **strongly discouraged**. See image below in Figure 4 for an illustration of the blade within the cleaning solution.

Figure 4.



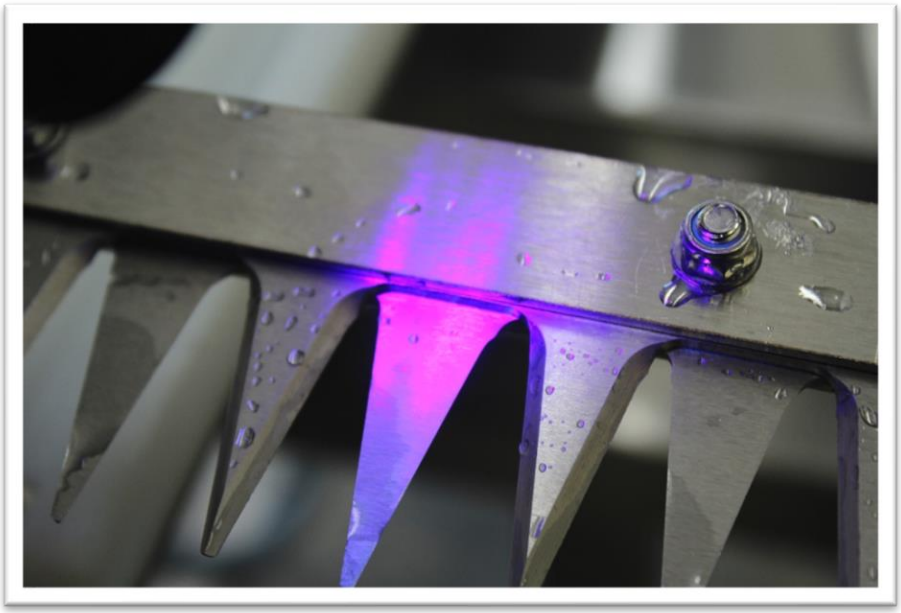
After 3-5 minutes of constant running under the cleaning solution infused water, the user may remove the blade. The container then can be drained and replaced with clean water. It is imperative that the container be free of all diversity product before rinsing water is added. Once the container is filled with warm/hot clean water, the user may repeat the above instructions to complete a thorough rinse. This process too will be done for 3-5 minutes.

Upon completion of the blade rinse, the user may remove it and finding a safe location to let stand until dry. The blade is now considered clean and safe for use back onto the machine when ready. This method has been tested and verified using 2 methods, shown below is Example 1 and Example 2. Example 1 shows the Glow Gel testing to illustrate the effectiveness of this cleaning method to remove material from the blade and its tight spaces. Example 2 shows the swab testing using Hygiena products to show there will be no remaining biomaterial left on the blade as result of the cleaning, and it is certified food safe for use. The blade may now be reinstalled using the same methods above, in reverse.



Example 1a.

For this visual example, Hamill APS covered the cutting blade with Glow Gel and ran the machine to test where and how the material spreads. This is shown in the UV light image (Left).



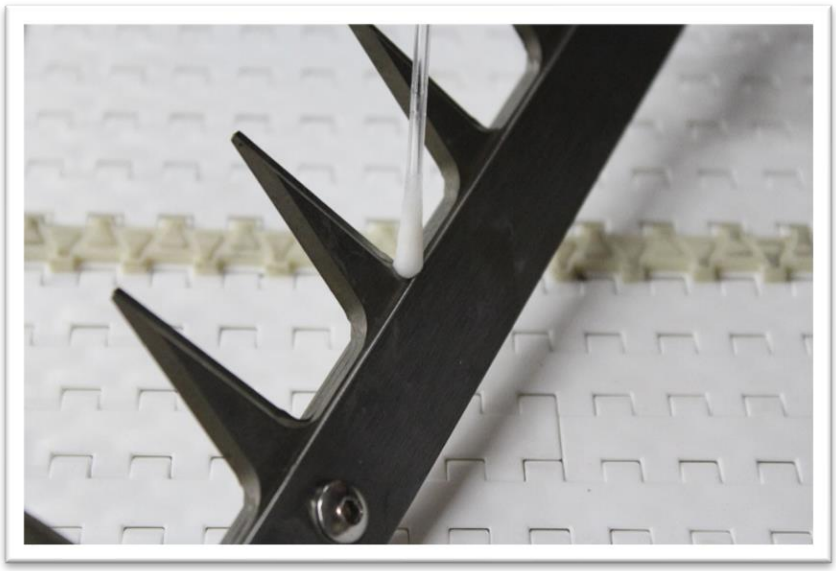
Example 1b.

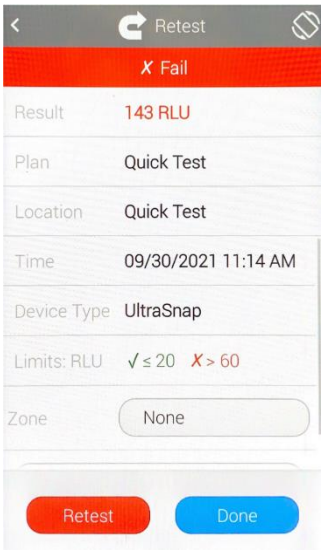
The result shown (Left) is of the blade under UV Light. Illustrated is the absence of any glowing Material both on the teeth of the blade and In the blade crevasses.

Continue to next page.

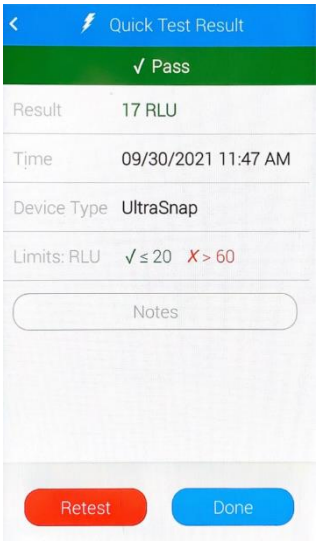
This set pictures shows the method of which Hamill APS tests for biomaterials and how to interpret the data. Example 2a is a “dirty” blade, or a blade that has yet to be cleaned of any biomaterial before the cleaning process. Example 2b is a “clean” blade, after the cleaning process outlined above. [RLU = amount of biomaterial]

Example 2a.





Example 2b.



6.2.3 – Blade Cleaning Method 2

Although “Blade Cleaning Method 1” is the recommended option, Method 2 is an alternative in case the user does not have the listed items. This option is a more “hands on” approach however yields the same results of cleanliness both tested with Glow Gel and the Hygiena swab testing. Method 2 is outlined as follows.

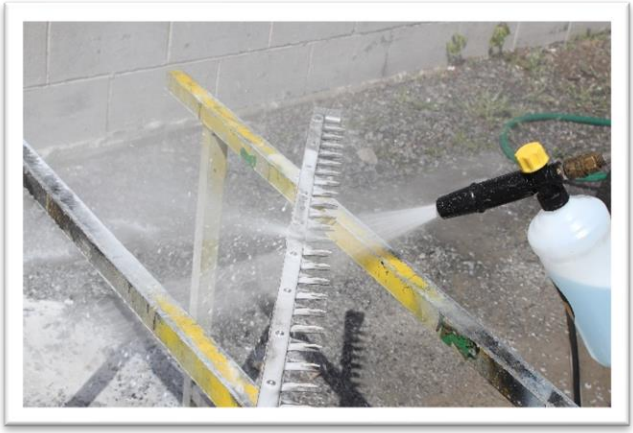
Once the blade is removed, the user is to grab a container in order to create a cleaning solution, water mix. As described in 6.2.2 for blade cleaning, Diversity Cleaning Products develops the Diversity Divosan Q400 Sanitizer Concentrate. As per the instructions, this is to be mixed in that bucket of warm/hot water with a ratio of 1-2 mL per 500 mL of water. It is recommended that the user cleaning wear gloves while operating with the Diversity Sanitizer. Please follow all safety and user instructions listed on the back of the product bottle.

Once the solution is ready, the user may set the cutting blade in a safe, sturdy location and proceed to hand wash with any combination of sponge or scrubber. This method is enhanced with the use of a power washer/sanitizer combination mix as well. The amount of force required is as needed depending on the level of contaminant. See figures 5, 6 and 7 below as examples of hand washing and power washing.

Figure 5.

Figure 6.

Figure 7.



At which point the blade is clean, the user must rinse with clean warm/hot water until all cleaning solution and sanitizer is cleared. The manufacturer suggests letting sit until dry, upon which time the blade is clean and ready for use again.

6.2.4 – Blade Cleaning Closing Note

As stated earlier, both methods equally complete the task of ensuring the blade becomes food safe and sanitary. It is suggested as well that after the cleaning and drying of the blade, the user sprays and dry's the blade with an alcohol, sanitizing solution to create a multi layer of protection and guarantee no contamination of the blade.

6.3 – Surface Cleaning

Contributing to the overall level of cleanliness, making sure the surfaces (IE, panels, guarding, and structural panels) are sanitary is paramount of the food grade characteristic of the machine. The process is very similar to that of the blades, just applied in a slightly different manor. First to be covered will be the hand method, followed by the power washing method.

6.3.1 – Hand Washing Method

To prepare cleaning of all surfaces of the machine, please follow the items in checklist 4.2.6. Once complete, the user may grab two containers, or buckets; these are to be filled with warm/hot water. Selecting one of the buckets as the sanitization container, fill the bucked with a mixture of water and Diversity Divosan Q400 Sanitizer Concentrate. Be sure to follow the mixture ratios outlined on the back of the bottle. For quick reference however the ratio can be suggested at 1-2 mL per 500 mL of water.

Now the user may scrub the machine in the desired areas using a variety of tools such as brushes, sponges, and scrubs. This machine is built with durability in mind; meaning there is no concern of damage from hard scrubbing. Below in Figures 8 and 9 are examples of the hand cleaning method.

Continue to next page.

Figure 8.

Figure 9.

Once the desired level of cleanliness is achieved, the user may now repeat with the “clean water” bucket to rinse off any cleaning product left on the machine. This step must be done thoroughly to avoid any residue being left on the machine. Upon the rinse being complete, it is acceptable to let the harvester air dry or the user may use a clean sanitary cloth to accelerate the drying by hand.

Below are examples using Glow Gel to demonstrate the effectiveness of the cleaning techniques. These are the results the user can expect from the hand washing method.

Figure 10.

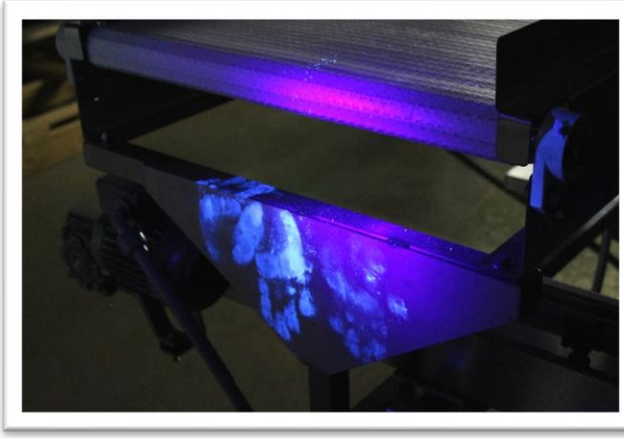


Figure 11.

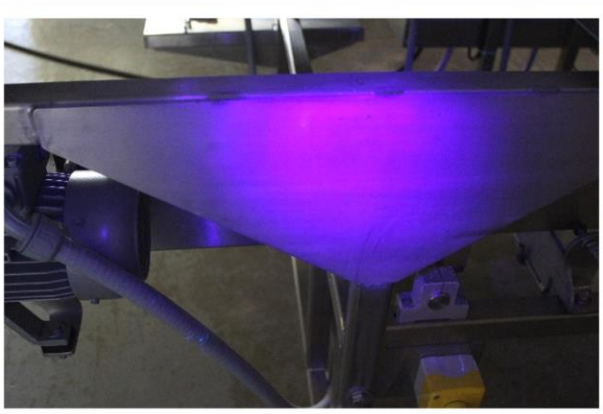


Figure 10 above represents a commonly touched area of the machine (uncleaned) as shown by the glowing residue. Figure 11 is the result after hand washing; as displayed there is no remaining biomaterial and a clean, sanitary surface.

6.3.2 – Power Washing Method

Achieving the same level of cleanliness, the power washing method is quite a bit more aggressive and requires the machine to be in a well ventilated and drainable location. The user must cover all electrical components and avoid power washing them. Doing so may result in water forcefully entering the electrical chambers and causing damage.

If the users would like to utilize this method, first follow the preparation steps listed in 4.2.6. Once complete, the user may prepare a power washer with a foamer attachment. For the cleaning and sanitization agent, the user is suggested to use a foamer attachment with Diversity Divosan Q400 Sanitizer Concentrate at a 1-2 mL per 500 mL of water ratio of mixture. Once prepared the user may now wash the desired parts of the machine.

Once cleaned to the desired level, the user is to remove the foaming attachment and thoroughly rinse down the machine until all traces of any cleaning agent have been removed. The below figures 12 and 13 are examples of the power washing method and Figure 14 is an image displaying an example on how to wrap the electrical panel.

Figure 12.

Figure 13.

Figure 14.

Images shown are from older models

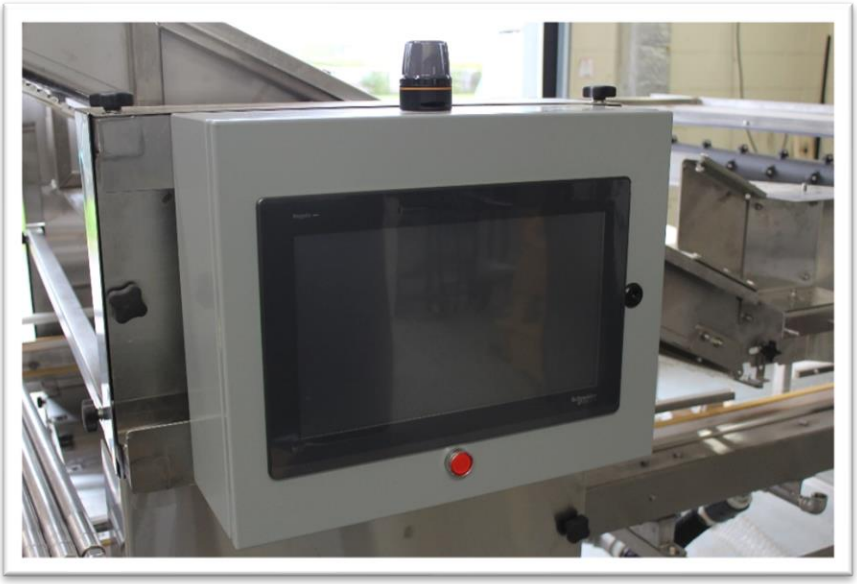
6.3.3 – Cleaning Digital and Display Screen

If your 12” Tabletop Harvester is equipped with the digital display in place of the standard analog panel, this will serve as a guide to clean such display.

Although not as paramount to be food grade levels of clean, this is a commonly touched surface and thus there is a risk of contaminant transfer. These components are inherently sensitive in relation to water and delicate.

To clean these surfaces, simply apply any all-purpose cleaning agent and wipe with a clean cloth until the desired level of sanitation is achieved. Once complete, dry off promptly with a clean, dry cloth. Figure 15 below is an illustration of the display used on the 12” Tabletop Harvester.

Figure 15.



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Section 7

Elemental Maintenance Guidelines

7.1 – General

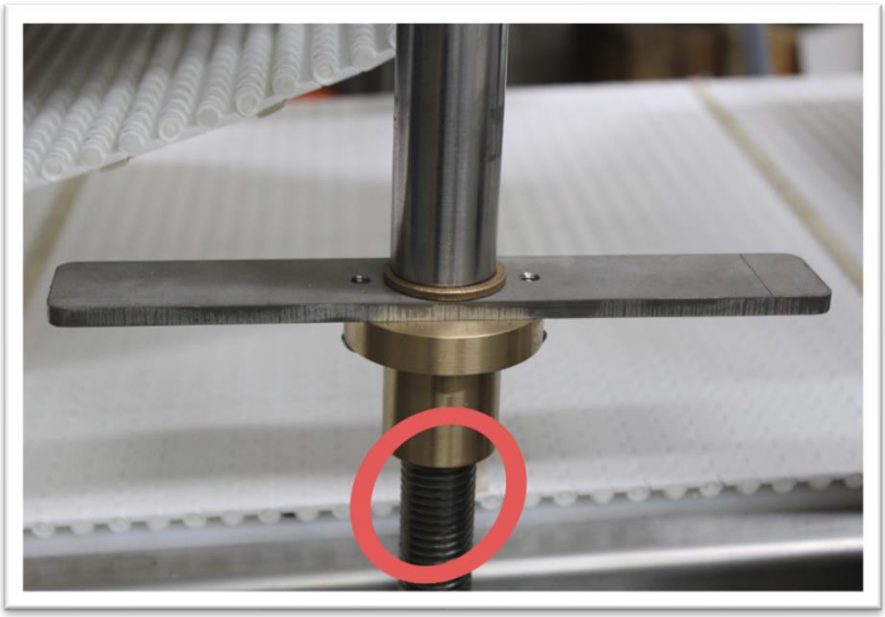
Section 7 of this 12” Tabletop Harvester manual will focus on some elemental maintenance that a single user can do to prolong the life of the machine. These following listed items are not complex in nature, however are largely beneficial to the smooth operations. These will range from rod lubrication, blade inspection, and bearing inspections.

Although these are elemental maintenance tasks, it is strongly suggested and encouraged that all tasks of this nature are communicated with Hamill APS or Hamill ES. For more intricate maintenance tasks, contact the manufacturers first before starting work.

7.2 – Vertical Rob Lubrication

The 12” Tabletop Harvester uses two vertical rods to adjust and customize the height of the blade. These rods don’t necessarily complete many revolutions within a given year, however it is important to check and maintain the work readiness levels of them. This is done so VIA visual inspections and re-applying lubricant. To do so, please follow these instructions. If there are any issues at any point in the process, please call Hamill APS for guidance and further instructions.

The first stage is to secure and make sure the machine is safe by disconnecting all power and “locking-out” the harvester. Then locate the two vertical adjustment shafts and the hand crank as illustrated below.



Once located and confirmed, the user may apply a conservative amount of lubricant [Synco Multi-Purpose Food Grade Grease (syncolon PTFE)] on the circled/highlighted section.

7.3 – Blade Inspection

As the most used item on the machine, the blade deals with many kinetic challenges throughout its operational life. Although not a largely interactive process for maintenance, it is imperative that users do inspect the cutting blade for various items or tells of damage or wear.

To do so, the user must “lock out” the machine, and disconnect all power supply ensuring a safe inspection environment. Once completed, the user may now inspect the blade. There are a few things to note when inspecting a blade.

First item would be discoloration. This blade is made of 440C Hardened Surgical Stainless Steel. Being in its nature, this material WILL NOT rust. The user may however notice some discoloration that mimics that of rust. This discoloration is staining from organic material being allowed to settle and stay on the blade. To rectify the issue, simply follow the directions in section 6.2.1 to remove the blade. Once complete the user may clean the blade to rid it of the staining.

Second item to note when inspecting a cutting blade are chips. Although hard to go unnoticed when in operation, if the blade were to start chipping itself there will be small pieces missing from the teeth or shaft. Simply remove the blade following the steps in 6.2.1 and apply a new one.

Lastly, the user should inspect the connections to make sure all bolts and fasteners are tight. A loose blade can pose issues as it may decrease the cutting quality. This item extends to blade droop. Being 12 Inches, a blade of this length will not naturally droop. Although, Hamill APS has a redundancy built in preventing any change of this, it is still recommended that the user visually inspects the blade for any unexpected excessive drooping.

If the user has any questions or inquiries, it is recommended that they contact Hamill APS or Hamill ES for guidance and instructions.

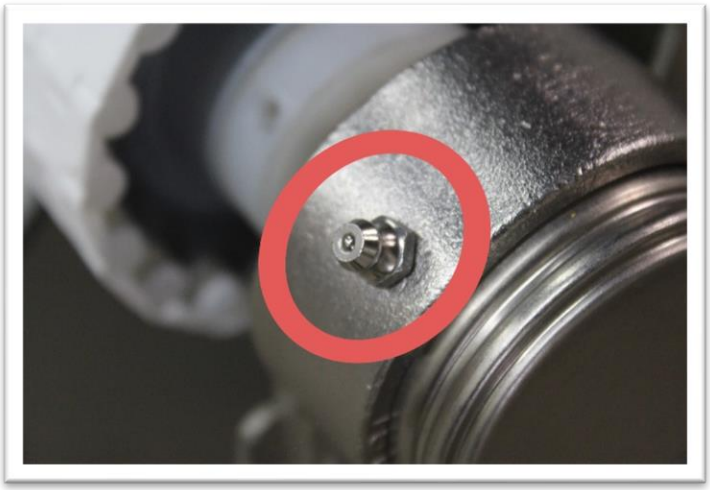
7.4 – Bearing Inspection and Lubrication

Hamill APS designed the 12” Tabletop Harvester with maintenance and food safety in mind. All bearings on the system are sealed and safe, however over long-term periods they may require some attention. Below is an image of the bearings commonly used around the entire system. Observe the metal covering and guarding thus creating a sealed environment.

Figure 1.

When inspecting these bearings, the user may look over and inspect for any indication of leaking lubricant. In the event a bearing is found to be releasing lubricant at a minimal rate, the user may introduce more VIA the nipple indicated in the figure below. If excessive leaking is occurring with a bearing, please contact Hamill APS to arrange a replacement or replacement plan.

Figure 2.



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Section 8

Closing Items

8.1 – General

In this closing section, several items will be covered. Specifically, it will include the limited warranty outline, contact information and a small summary of Hamill's professional culture called "With the Grower in Mind".

8.2 – Limited Warranty

Hamill Agricultural Processing Solutions and Hamill Electrical Systems (Hamill APS/ES) warrants that new equipment will be free from defects in material and workmanship under normal use for a period of (1) one year after the date of shipment by Hamill APS/ES to the first purchaser.

8.1.1 - Hamill APS/ES reserves the right to invoice purchases for parts replaced under warranty, pending return of the defective parts for inspection and determination of the cause of failure. Returned parts to Hamill APS/ES from purchaser must be freight prepaid.

8.1.2 - The purchaser is responsible for freight costs for the shipment of replacement defective parts, between the machine manufacturer's plant and the purchaser's location.

8.1.3 - Hamill APS/ES shall not be responsible for work done, parts removed, or repairs made by outside parties.

8.1.4 - This limited warranty does not cover damage or loss resulting from misuse, accident, neglect, improper installation, operation, or maintenance.

8.1.5 - All machines are supplied with the appropriate CSA and/or Electrical Safety Authority approvals. Any modifications that are required because of local or provincial inspection programs are the responsibility of the purchaser at own expense.

8.1.6 - Hamill APS/ES will not be liable for lost profits, loss of business, inconvenience, damage or injury to properties/persons, or damage relating in any way to the equipment.

8.1.7 - By accepting delivery of equipment, products and services, Hamill APS/ES customers agree to be bound by and accept the terms, conditions, and limitations of this limited warranty.

8.3 – Contact Information

This brief section will outline the necessary contact information related to the 12" Tabletop Harvester. These are to be freely contacted if the user of the machine has any questions or concerns. Contacts accordingly are below.

Hamill Agricultural Processing Solutions
4795 Kent Ave
Niagara Falls, Ontario, Canada
contactus@hamillaps.com
+1 905 354 2922

Hamill Electrical Systems
Chris Ainsley
4795 Kent Ave
Niagara Falls, Ontario, Canada
Chris@HamillES.com
+1 905 354 2922

Hamill Group CEO
Robert Benner
Bob.Benner@HamillAPS.com
+1 905 354 2922

8.4 – With the Grower in Mind

At Hamill APS and ES, we are available to answer any questions you may have regarding our equipment. Our harvesting knowledge acquired over the years from working with growers of all sizes and types has allowed us to accumulate added knowledge in order to utilize the ability to design exactly what the farmer needs. Our equipment is built with the grower in mind and is to be your harvesting partner. Share your expertise with us, we will listen.

At Hamill, there is a culture of constant improvement to create and maintain the best products globally in the market and are always open to any information that can help us improve. Continuing to develop the best harvesting equipment in the world is paramount and is done so by listening to the best growers in the world. Through that culture it is strongly encouraged that all customers of Hamill APS and ES reach out and work with our team with any suggestions in order to continue our products effectiveness and beyond.

End of Operating Handbook