

Operation

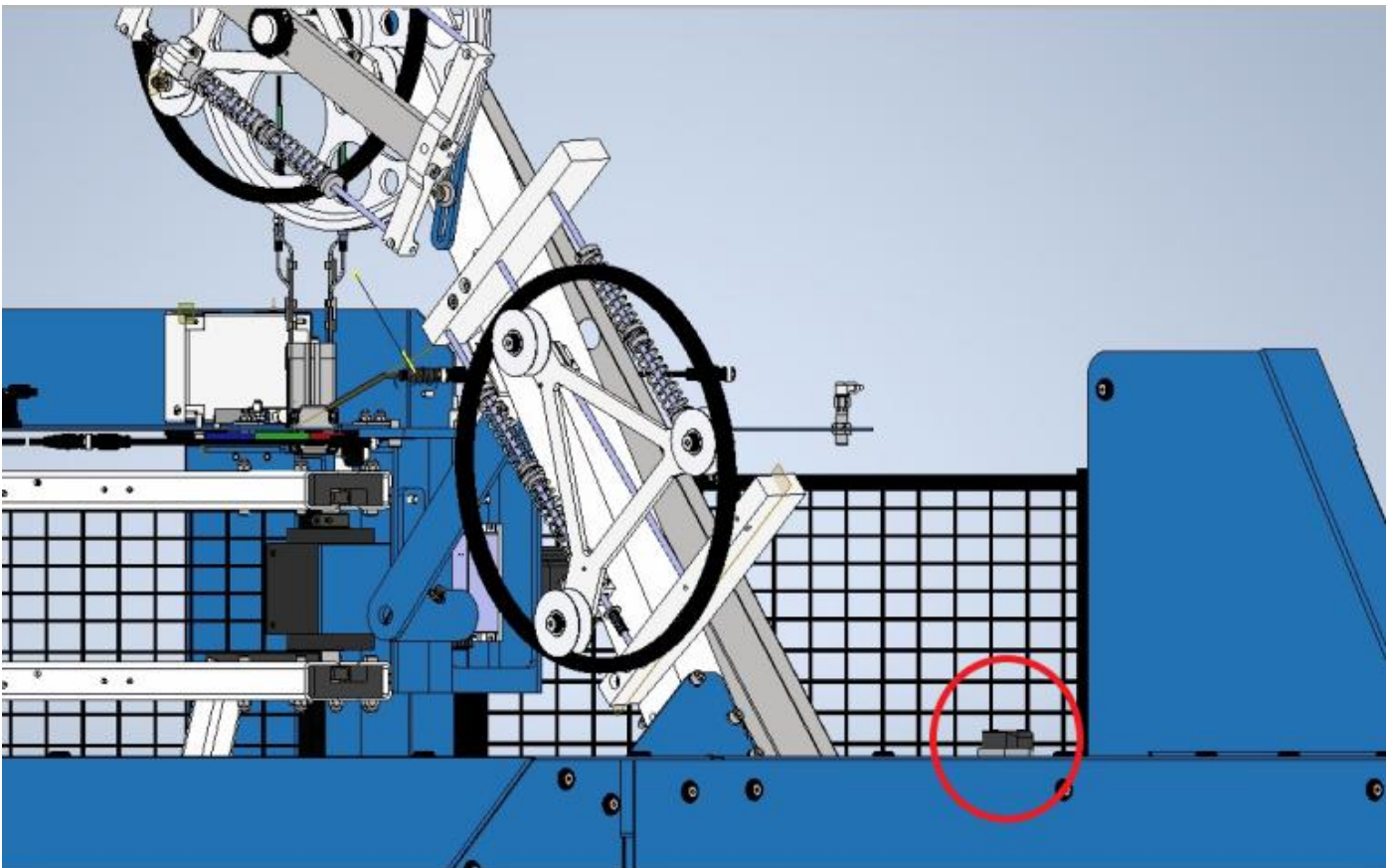
REELEX Machine Operation, HMI and Control System

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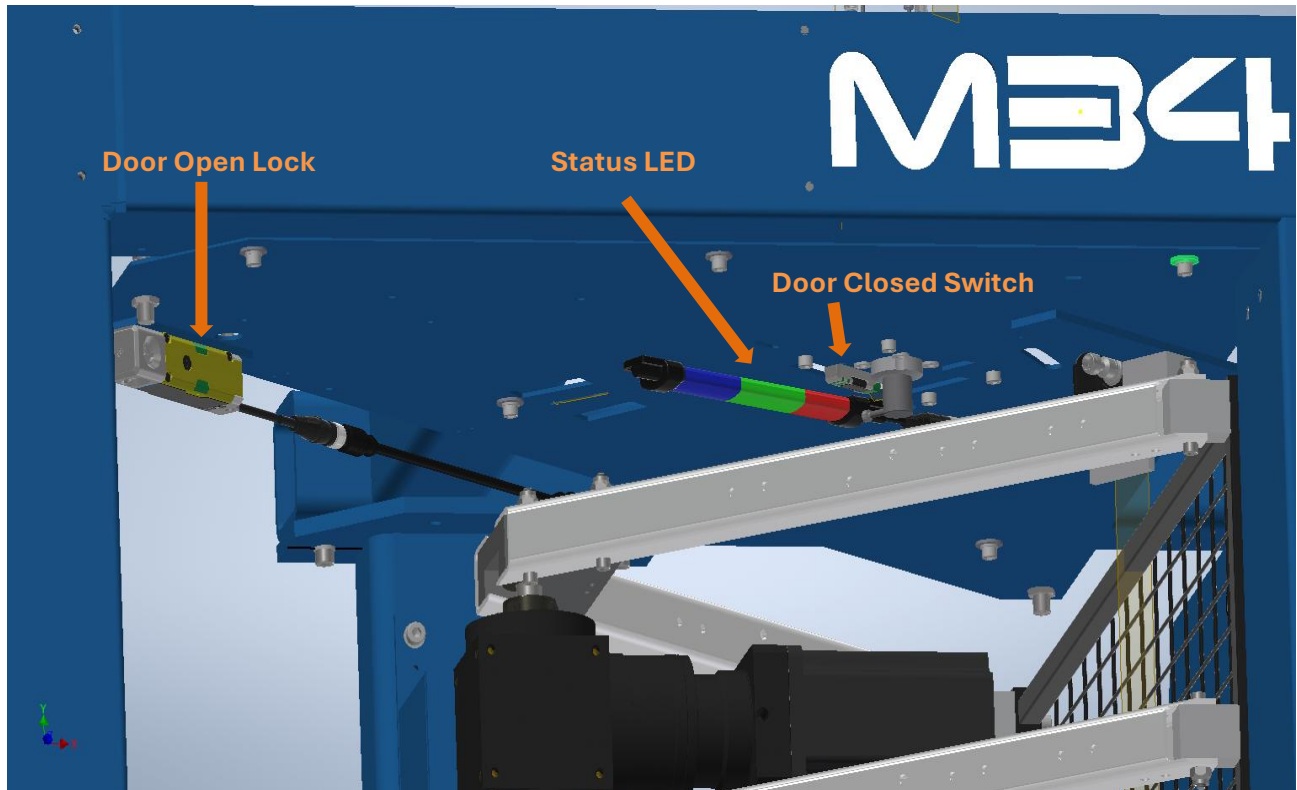
Machine Operation

Follow the procedure below for machine operation when no cable has been strung up on the line.

1. Turn on power to the M340 and remove any coils from the machine.
2. Turn power on to any upstream ancillary equipment being used (Payoff/POD with UDA, or Accumulator).
 - a. If cable is still strung up on the line and you are resuming production after an emergency stop, go to step 4.
3. String up Dancers and/or Accumulators and bring the cable over to the wire cleat (circled in red below) mounted atop the machine near the buffer.

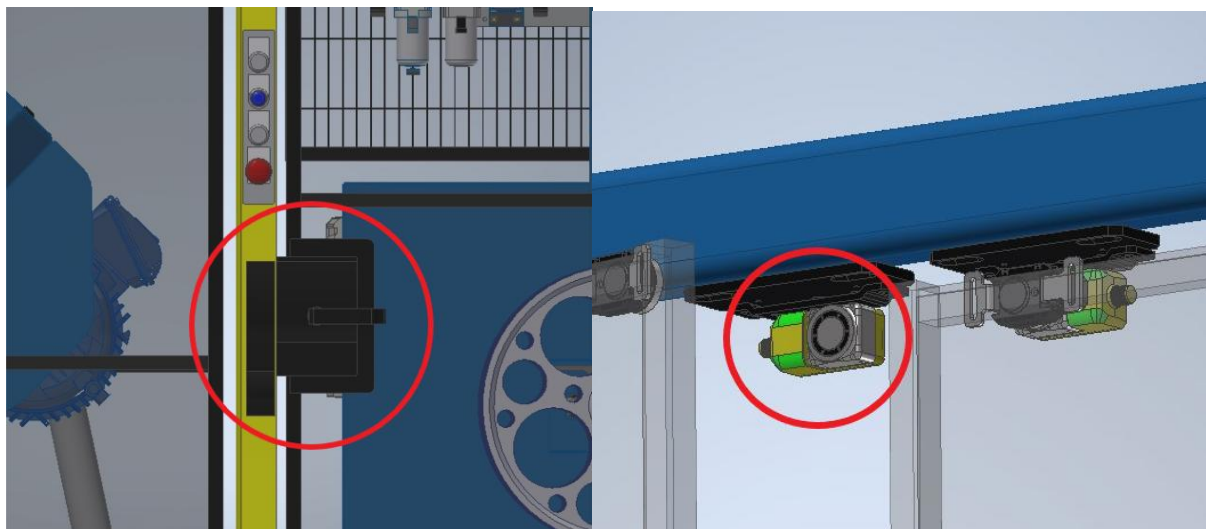


- Once upstream equipment has been strung up and cable has been brought to the M340, ensure all doors are closed on all line equipment. On upstream equipment (POD/Payoff/Accumulator), ensure the door locks are engaged and illuminated green. When the door is closed on the M340 REELEX machine, the door closed magnetic switch will illuminate green, as illustrated in the photos below.

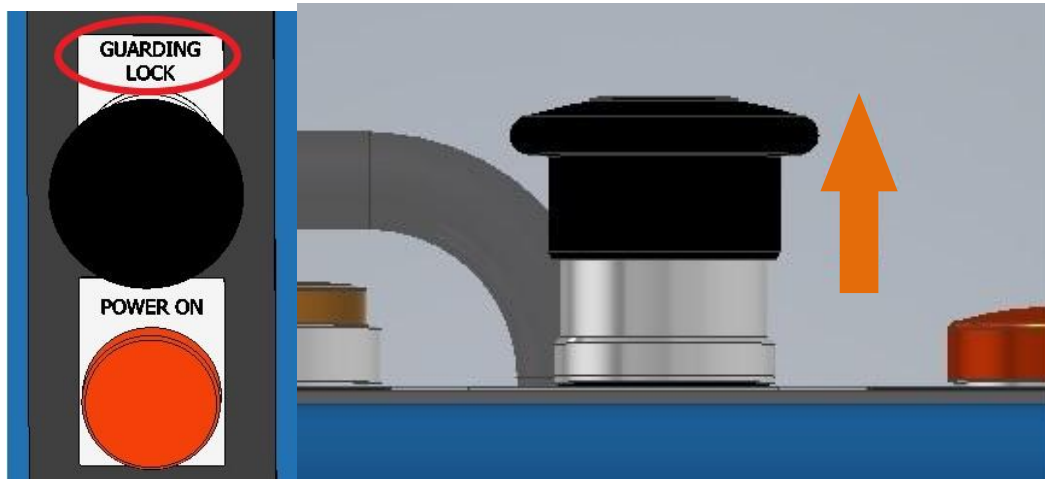


Locks on POD if applicable:

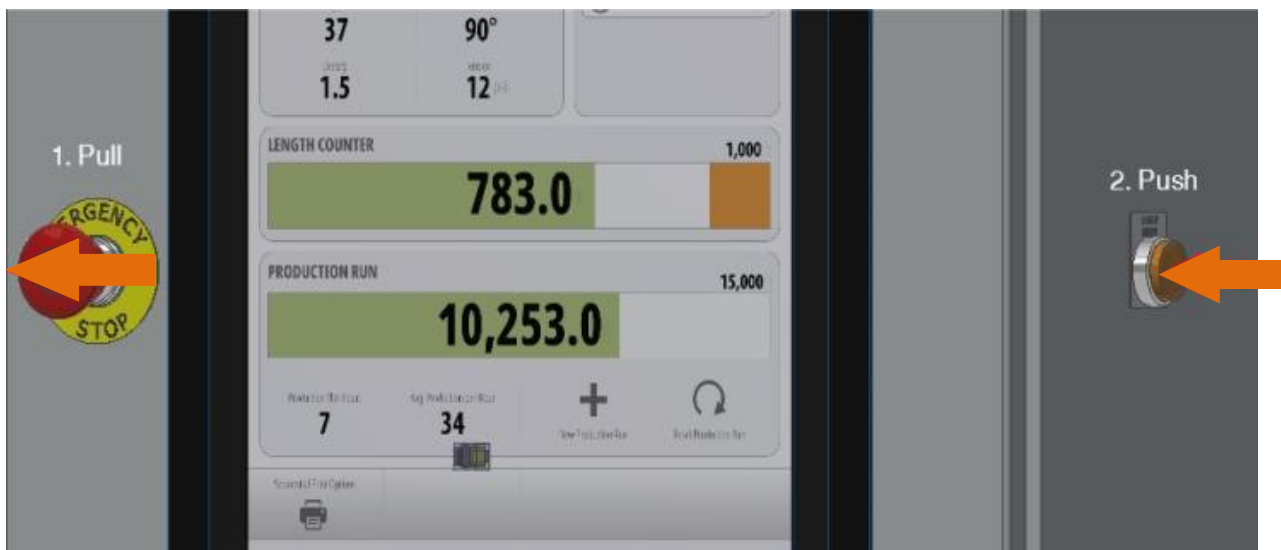
NOTE: Flashing green indicates closed and unlocked. Solid green indicates closed and locked. All ancillary door locks will have two lights. Schmersal locks will have a yellow and a green. A yellow light will flash if closed but not latched. Keyence locks on rear door of POD guarding will be red when open, flashing green when closed, and solid green when closed and locked.



5. If utilizing a REELEX Payoff or POD, pull up on Guarding Lock plunger button to lock the guarding doors. Press RESET on ancillary equipment to reset safety circuits.



6. If utilizing a REELEX accumulator, ensure the side door is closed and press the yellow RESET button on the Accumulator HMI box.
7. **Physically position the safety doors in the closed position so that access to the machine is not possible.** This will ensure the doors are in the reset position. When each door is in the correct position, the slim magnetic switch above the door will illuminate green.
8. Pull out the E-STOP button and press the RESET button on the side of the HMI control box. The RESET button light will be flashing prior to depressing and will remain illuminated once RESET is pressed.



9. The M340 will begin its reset routine. An audible click will be heard as the pneumatic door locking cylinders engage. Next, the transfer arms will move down and to the outside of the machine. The traverse will now move a bit to home and position. Next, the traverse table will perform its homing sequence and will stop in the center of the machine. Once this is complete, both doors will open to their outside reset positions. This will be the only time the doors will open outward. During normal operation, the doors will open inward to provide a physical barrier to the opposing spindle while running.

NOTE: The status light bar overhead will show four possible colors, depending on the status of the cell.

RED will be illuminated prior to reset. This means the machine is in an emergency stopped status.

GREEN will be illuminated when the machine is in its operational reset state, and the door is closed and locked.

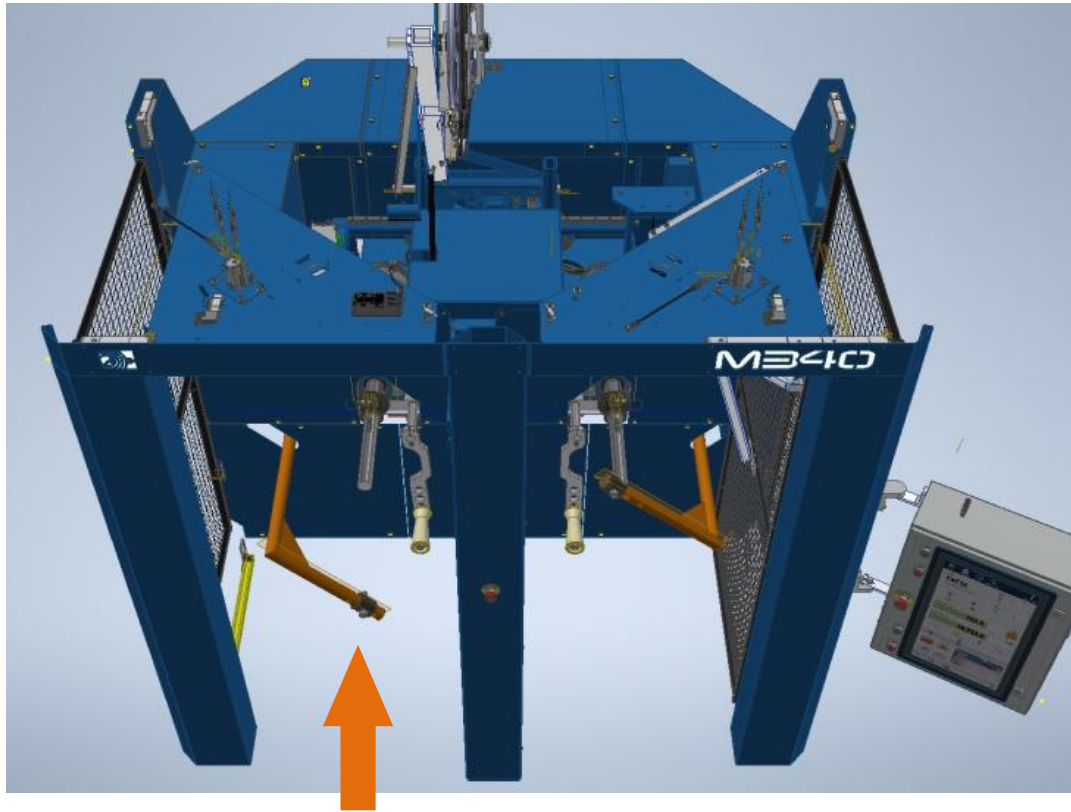
YELLOW will be illuminated when the door is in motion towards the center of the machine. It is important not to impede the door's movement, or interrupt the light curtains at this point, or the machine will emergency stop for safety.

WHITE will illuminate under slightly different conditions depending on the machine state. Upon pressing reset, the white light will illuminate during the duration of the door homing sequence and will remain on after the doors have completed their motion. Door motion is complete once the door lock cylinders extend. During the machine's coil winding state, the light will only turn white once the door has completed opening and the cell is safe to enter.

10. Once the doors are open, and air pressure has been released, the buffer can now be strung up.

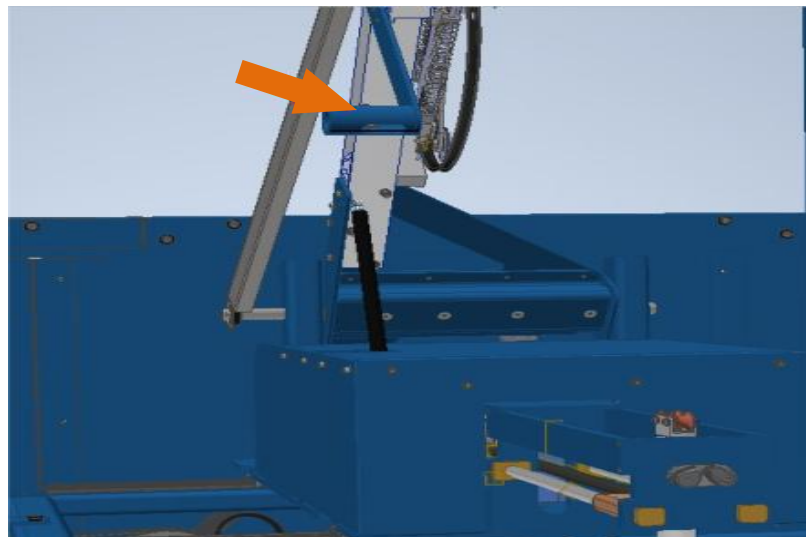
WARNING: Entering a cell prematurely will result in the light curtains tripping, causing an emergency stop state. This is a safety measure to ensure personnel are not injured while parts of the machine are still in motion. Wait for the Status LED light to turn white.

11. Walk into the machine on the left side.

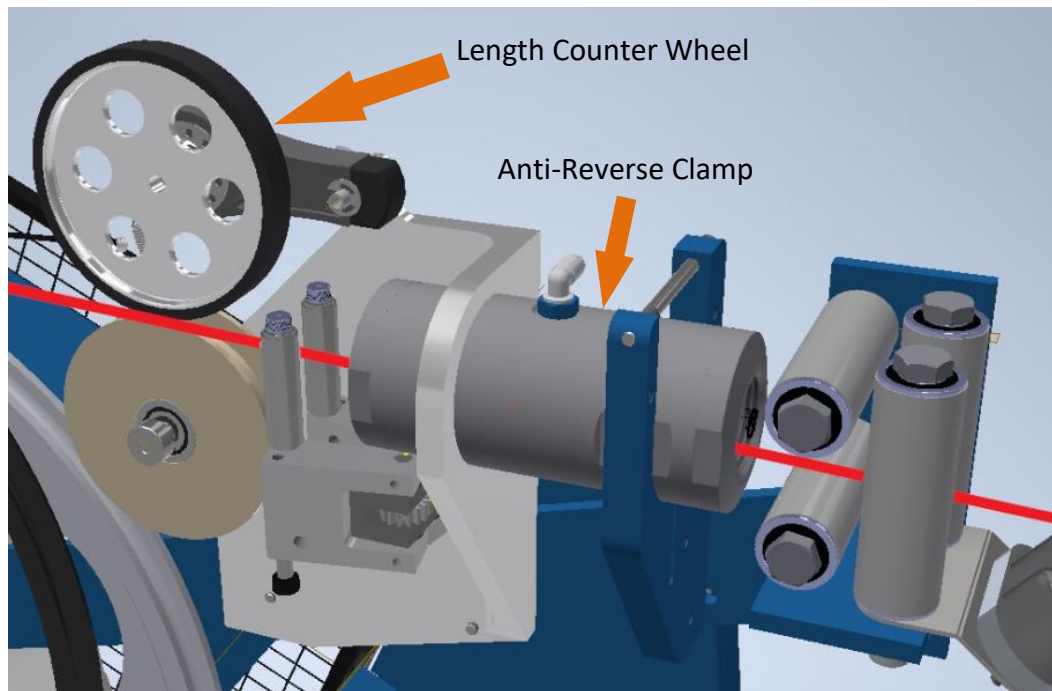


OPERATOR'S INSTRUCTION: The first coil after powering on, or emergency stop reset will always be on the left side spindle. Please ensure a fresh string up is performed on the left side.

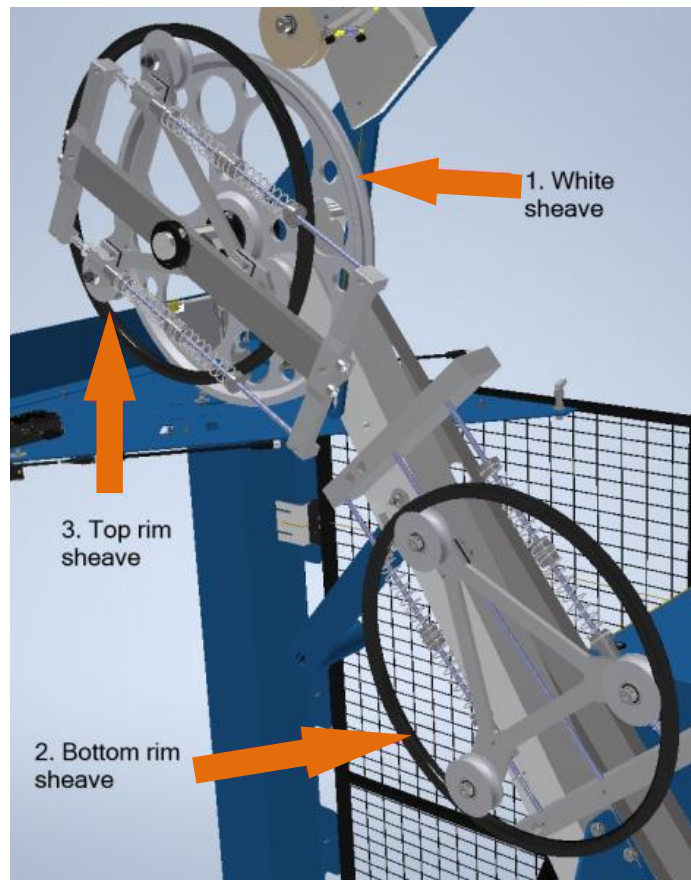
12. Press and hold the buffer release button on the buffer handle and lower the buffer assembly by hand. Once the buffer is down off of the lock, the button can now be released. The gas shock will assist in counteracting the weight of the assembly.



13. Insert the cable through the anti-reverse clamp, between the two vertical steel guide rollers, and through the length counter wheel.



14. String up the buffer. The cable should first wrap around the white sheave, then the bottom rim sheave, then the top rim sheave and down to the traverse guide tube.



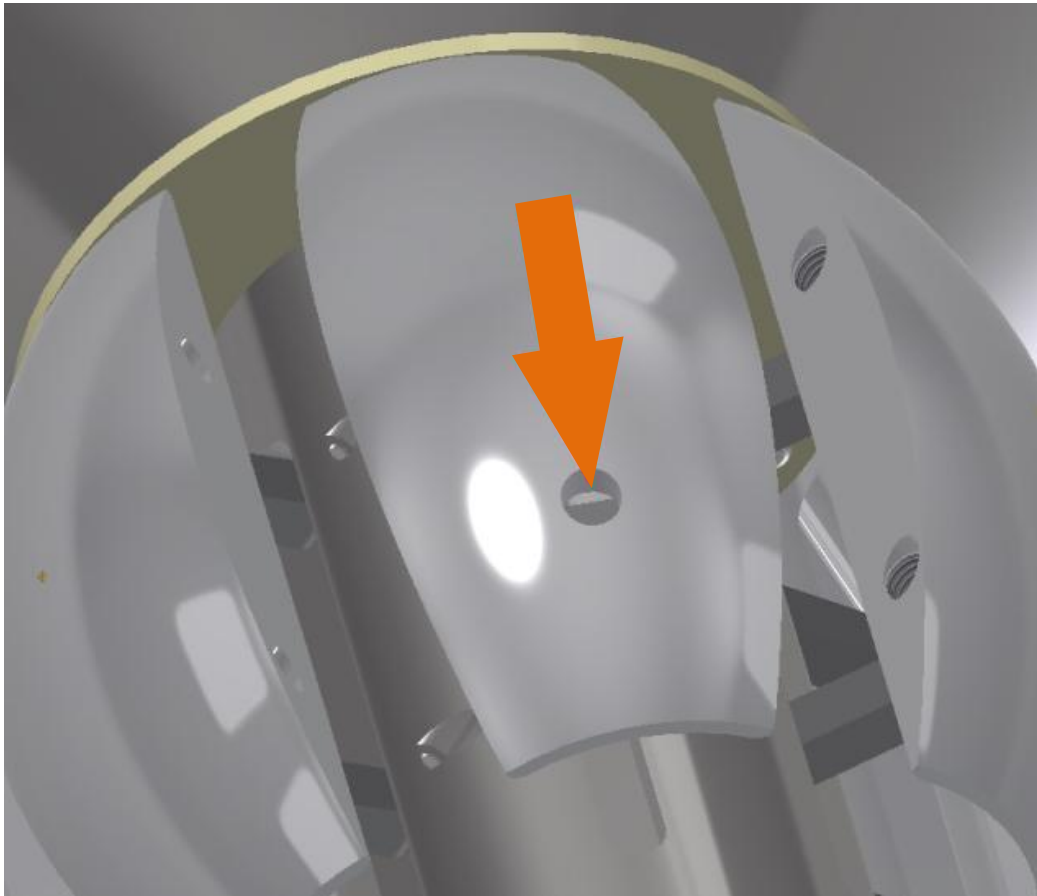
15. Thread the cable through the guide tube and wire guide.



16. Carefully raise the buffer back into the upright and locked position.

WARNING: Ensure buffer is locked in the up position before letting go of buffer to prevent injury from the buffer falling down.

17. Insert the end of the cable into the hole in the mandrel. Secure the wire by moving the mandrel segment into the raised position.



18. Exit the machine and press the “Door” soft key on the HMI screen. The doors will now close. An audible click can be heard as the safety lock cylinders will engage, as well as the door lock switch indicator lights turning solid green. This indicates that the door is now locked. The endforms will now come up and on, and the traverse table will move left into the run position.
19. Press the AUX START button. This will start the accumulator/payoff.
20. When ready, press the START button. The machine will configure for running and begin production.
21. When a coil has finished, the M340 will transfer to the right side and cut the cable automatically. The finished coil will be able to be removed once the door has finished opening. Do not step in the cell until the door has stopped moving.

WARNING: DO NOT MANUALLY TRY TO SPEED UP THE DOOR PROCESS. Doing so will result in a door drive fault and will emergency stop the machine.

22. This cycle of automatically transferring between left and right spindles will continue until the operator stops the line, or the inputted production length has been reached.

OPERATOR'S INSTRUCTION: When Production Run Counter has been reached, there is not a popup to tell you so. Instead, a fault might display saying "Stop circuit open". Make sure to check the Production Run Counter.

Control Buttons

M340 machines have a combination of hard (physical) and soft (on HMI screen) control buttons.



Hard Buttons

Aux Start / Stop

Starts and stops the ancillary equipment on the line. If in an offline configuration, this button turns on the payoff enable. If in an online configuration, the accumulator will enable. The AUX Start button will illuminate green if upstream equipment is running.

Start / Stop

Starts and stops the REELEX M340. The start button will illuminate green if machine is running.

Emergency Stop

When the E-STOP button is pressed, all air and power is cut to the machine, and the equipment will coast to a stop. If integrated with ancillary equipment, the entire line is immediately disabled. Access is denied for 5-8 seconds after an E-Stop to allow the machine to come to a complete stop. Access is available when the switches for the safety door blink green, indicating that the doors are now unlocked.

Reset

Initiates reset sequence, which is required after initial energizing of equipment, or after an emergency stop state. This button's purpose is to acknowledge the safe continuation of the machine. If in an emergency stopped state and all requirements are met (all emergency stop buttons pulled up, upstream equipment reset, doors on M340 are closed), the Reset light will flash. Once pressed, the Reset light will remain illuminated, and the Reset sequence will begin. The doors will mechanically lock, transfer arms will move downward, traverse will home, the traverse table will home left and right. Once the first phase of reset is complete, both doors will open outward to their reset/string-up position. The machine can now be strung up on the left side. Note the description of the status lights below.

NOTE: The status light bar overhead will show four possible colors, depending on the status of the cell.

RED will be illuminated prior to reset. This means the machine is in an emergency stopped status.

GREEN will be illuminated when the machine is in its operational reset state, and the door is closed and locked.

YELLOW will be illuminated when the door is in motion towards the center of the machine. It is important not to impede the door's movement, or interrupt the light curtains at this point, or the machine will emergency stop for safety.

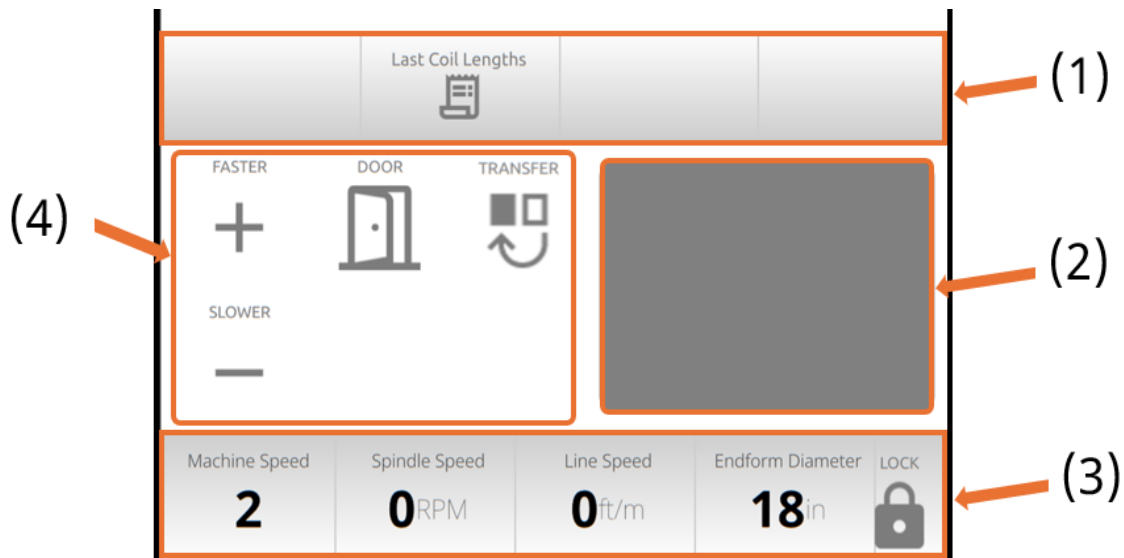
WHITE will illuminate under slightly different conditions depending on the machine state. Upon pressing reset, the white light will illuminate during the duration of the door homing sequence and will remain on after the doors have completed their motion. Door motion is complete once the door lock cylinders extend. During the machine's coil winding state, the light will only turn white once the door has completed opening and the cell is safe to enter.

Soft Buttons (HMI)

As the primary interface with the REELEX machine, the high-definition HMI touchscreen offers a variety of useful features including recipe product selection, live feedback, machine status information and much more. Software is continuously updated, so screens shown in this manual may not be identical to your version.

Information Panel on All Screens

The bottom of all screens shows the information panel. In this section, machine controls and feedback are always displayed. Whether you are on the MAIN, PRODUCTS, SETTINGS, MAINTENTANCE, or SYSTEM screen, these features will always be available.



Action Button Bar (1)

Depending on what screen is active, different action buttons will appear in this section, including additional pages available under the different screens.

Video Feedback (2)

This section provides a real-time video feed. The camera is typically mounted upstream of the REELEX machine to visually verify how much cable is left on the supply reel (use the Production Run feature to automatically stop the machine at the end of the reel).

The camera can be located anywhere on the line, but is typically preferred to monitor the payoff reel for operator convenience.

NOTE: The video feed will not display until the page (MAIN) is refreshed. To do this, simply navigate to another screen (PRODUCTS, SETTINGS, MAINTENANCE, or SYSTEM) and then navigate back to the MAIN screen.

Machine Speed Information (3)

This section displays the current Machine Speed, Spindle RPM, Line Speed, and Endform Diameter. It also displays a Lock/Unlock button.

Security and Restricting Access

Locked Condition: Intended for operators that should not have access to machine setup. In the locked condition, the user can only access the HOME and PRODUCTS (recipe selection screen).

Unlocked Condition: Intended for maintenance personnel and engineers to enable configuration of products and maintenance of the equipment. In an unlocked condition, all screens are available. To unlock the additional screens, enter the password previously set on the SYSTEM screen.

Machine Control Buttons (4)

Speed Selection

The machine has 5 speed presets, with 1 being slowest and 5 being fastest. The speeds these indexes represent are set on the SETTINGS screen under the Speed Settings page.

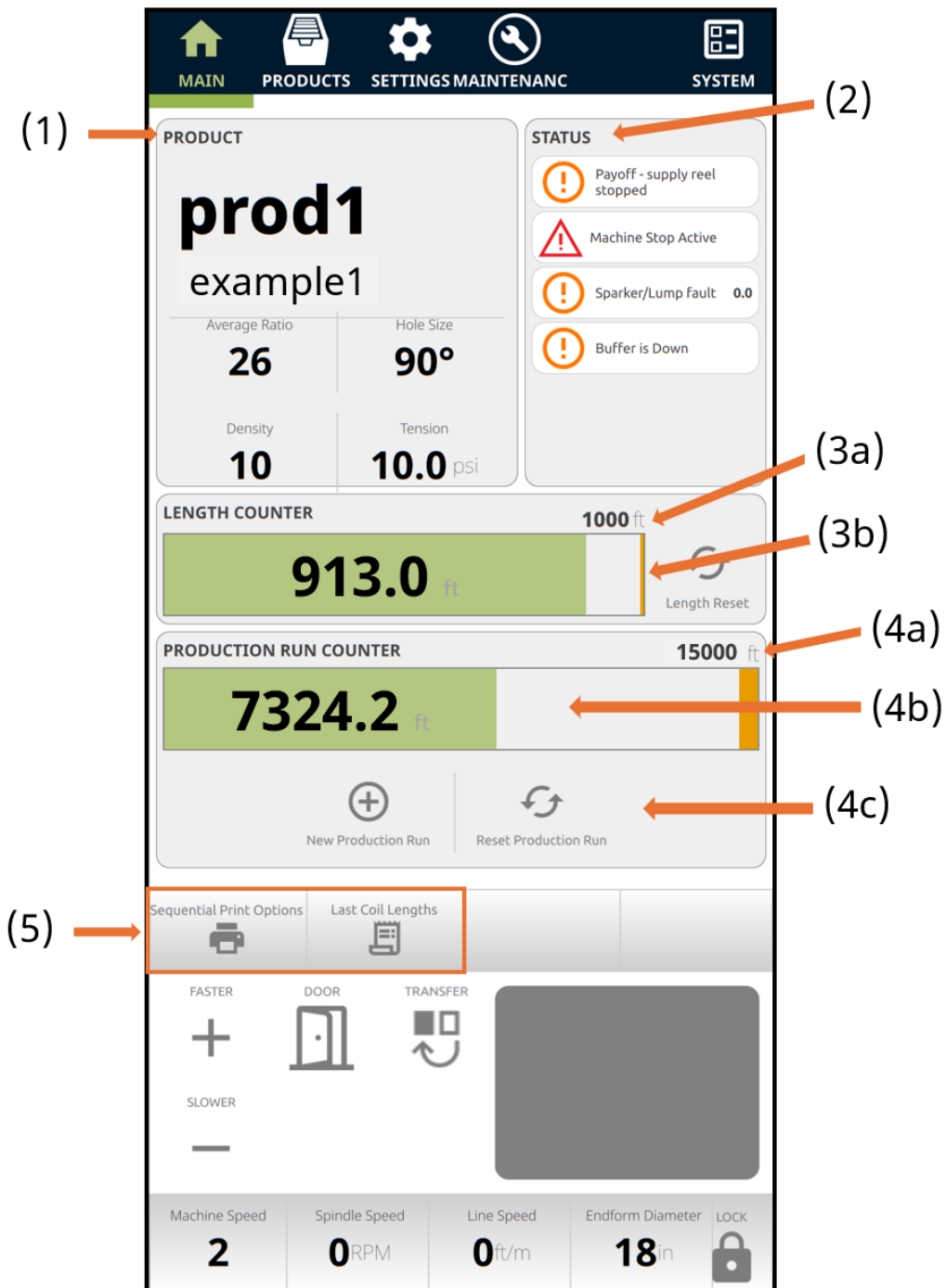
Transfer

Manually triggers a transfer and cut between spindles. Pressing while running will immediately cause the machine to slow down and transfer to the opposite spindle. **If sequentially printing, this will not reset the printer count.**

Door

When the machine is stopped and the door is closed, press to open the door and access the machine. Press this button again to close the door.

MAIN Screen



Current Product (1)

Shows what product recipe is currently selected on the PRODUCTS screen, its description, and the coil parameters.

Status (2)

Displays flags to indicate the current state of the machine. Status box is utilized to understand current machine state and possible faults.

Length Counter (3a/b)

The length counter shows the current length of the coil being wound in green.

(3a) Numerical value which represents Preset 2, which is the stopping length of the coil.

(3b) Yellow band that gives a visual indication of Preset 1, which is the Slowdown length. When the green band reaches the yellow, the machine will begin to slow down in preparation for the completion of the coil.

Preset 1 and Preset 2 can be modified on the SETTINGS screen under the Coil Settings page.

Production Run Counter (4a/b/c)

When beginning a new production run, use this feature to keep track of the amount of product left on the supply reel.

(4a) The total length of product on the reel that has been set (or the length of the production run).

(4b) The amount of wire that has been consumed from the reel. This is NOT how much product is left on the supply reel.

How Production Run Feature Works

When beginning a new run/loading a new supply reel...

1. Press "New Production Run" button.
2. Enter the Supply Length. Ideally, this number will be lower than the actual reel length to ensure the payoff stops before the reel runs out of cable. For example, a reel that has 15,000ft total length, Supply Length will be set to 14,000-14,800 (depending on the line configuration).
3. Enter the Slowdown From End length. This is the length of the production run where the machine speed is reduced to its Low Speed setting.
4. The machine will run the entire length of the production run and automatically begin slowing down at the set Production Run Slowdown length, regardless of what the current coil Length Counter value is, to prevent a crash stop when reaching the end of the reel.
5. The machine will stop once the production run is completed. **To start the machine again, reset the Production Run Counter.**

Action Bar Buttons - MAIN Screen (5)

Sequential Print Options

NOTE: This button will only appear if the Machine Operation Mode is in a sequential print state.

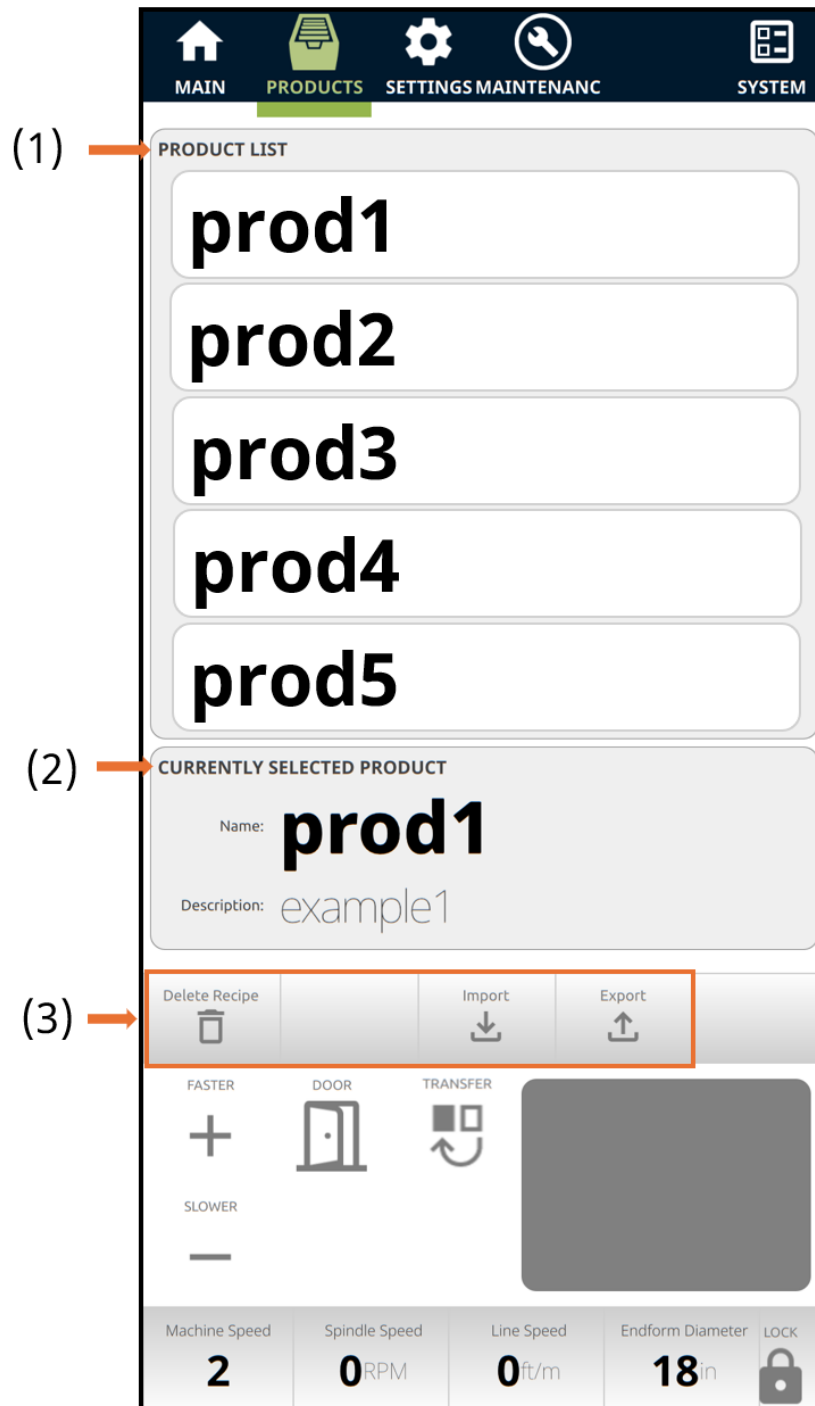
Turn on or off the “Sequential Print” window and set the lengths between which a sequential print signal will be seen by the control system.

This is typically used in UV mark printing where you do not want errant UV marks to be picked up as actual points at which to stop the machine or cut the cable. It can also prove to be useful if electrical noise is present.

Last Coil Lengths

Provides a list of the lengths of the last 10 coils completed.

PRODUCTS Screen



Product List (1)

This is a list of saved recipes in the system. Press one of the products to load it as the Currently Selected Product.

Currently Selected Product (2)

This displays the currently loaded recipe. To delete a recipe from the list, first load the recipe so that it is displayed in this window, then press the “Delete Recipe” button.

Action Bar Buttons – PRODUCTS Screen (3)

Delete Recipe

Deletes the currently selected recipe from the product list.

Import

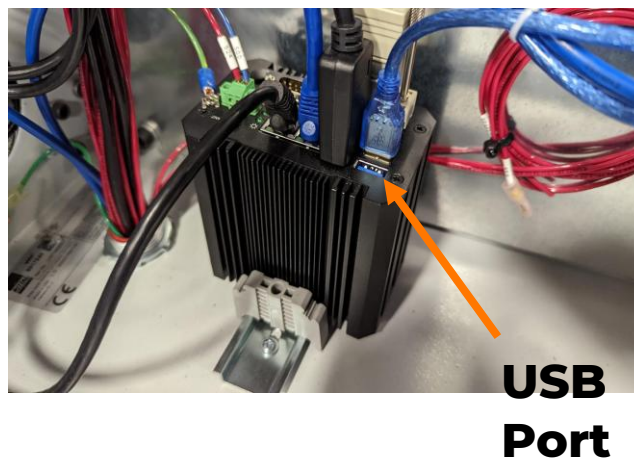
Download saved recipes from a USB drive by using this function. Insert a USB drive and press this button to load recipes from the USB drive.

Export

You can transfer recipes between machines or save a backup by uploading the recipe files to a USB storage device. Insert the USB drive and press this button to save files to the drive.

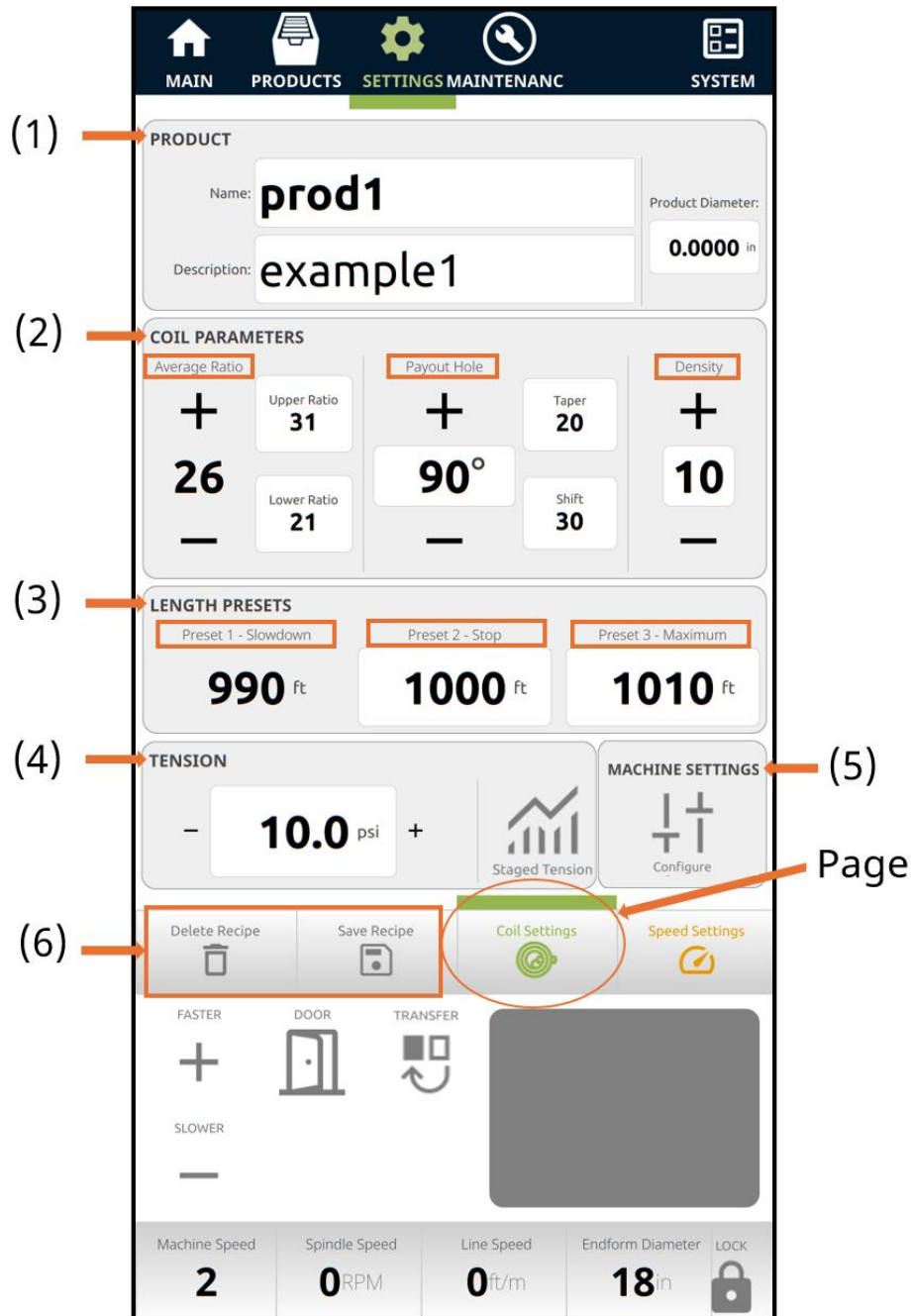
ENGINEERS NOTE: Use the import/export function of the HMI to make recipes consistent across multiple machines.

The USB port is located on the top of the industrial PC inside the HMI cabinet.



SETTINGS Screen - Coil Settings

NOTE: This screen contains two pages that can be selected from the Action Bar - Coil Settings and Speed Settings.



Product (1)

Name

The unique identification used to store product settings in memory. This will become the name of the file that stores the product settings.

NOTE: If you change the Name of the recipe, it will become a new recipe or it will overwrite a previously existing recipe with that exact name.

Description

A longer description, part number, or name of the product can be entered here. This is a separate text field that can be used for more detailed information about the product.

Coil Parameters (2)

	Function	Range	Typical Range for LAN cable
Average Ratio	Determines separation between wraps. Displayed as average between Upper and Lower ratios. Press (+) or (-) to adjust average ratio, or press Upper or Lower to adjust individually.	0-99	Average ratio: 30-40 Try to separate the upper ratio number and lower ratio number by 5-7. Do not use numbers that can easily be divisible by the same factor (i.e. 20 and 40, or 12 and 24)
Payout Hole	Determines the number of degrees of the coil circumference that the payout hole will be. Press TAPER to adjust hole shape. Press SHIFT to adjust the amount of hole shift or slant.	Hole Size: 40-120 Taper: 10-50 Shift: 10-50	REELEX I: 50° to 60° EcoCore/REELEX 1.5: 60° to 80° REELEX II/AIR: 80° to 100° Taper: 10 Shift: 20-50
Density	Determines the density factor, or the rate at which the ratios will decrease as the coil builds. A higher number results in a denser coil. Too high a number will have the opposite effect, as layers will stack atop one another.	00-50 (A 10 on G4 machines represents 1.0 on G2 and G3 machines)	10 * Subject to change based on cable diameter and package size.

How Do I Know What Parameters to Use?

For more detailed information about coil parameters, their functions, and packaging formulas, please reach out to support@reelex.com.

Length Presets (3)

Preset 1 - Slowdown:

Calculated value determined by the Speed Settings page. Indicates the length at which the machine will begin decelerating. Not editable on this screen, as it changes depending on the machine speed.

ENGINEER'S NOTE: Preset 1 changes depending on speed, because the faster the machine is running the longer it will take to slow down to a stop. Thus, typically Preset 1 will be lower at higher speeds, allowing the machine to decelerate before reaching Preset 2. Preset 1 for speeds 1-5 is typically set up once and can be adjusted in the Speed Settings page of the Settings section.

Preset 2 - Stop:

Desired coil length in feet or meters. The machine will automatically stop at this length.

Preset 3 - Shutdown:

Typically used in sequential printing, this is the length at which the machine will shut down if a signal has not been seen. This may also be viewed as a "Do Not Exceed" limit, so the machine does not continue to make a coil in the event of a missed signal.

Tension (4)

If using a UDA or Accumulator with Digital Air Regulation, this setting will remotely control the line tension at the dancer. Measured in PSI or BAR. Typical range for LAN cable is < 14 PSI.

Staged Tension

This setting changes line tension based on length. This is typically used to reduce the effects crossovers may have on the electrical properties of twisted-pair cables.

ENGINEER'S NOTE: Staged Tension control can be a useful tool for mitigating electrical performance issues in twisted-pair cables. Try using minimal tension for the first 100-200 feet and raising it to normal operating tension after that.

Machine Settings (5)

Allows you to select the mandrel size for the current build of the machine.

Action Bar Buttons – SETTINGS Screen (6)

Delete Recipe

Deletes the currently selected recipe from the product list.

Save Recipe

If changes have been made to the currently loaded recipe, you can press this button to overwrite the currently selected product.

NOTE: When you modify a recipe that is currently being used while the machine is running, the update is live and the machine will receive the new input. However, if you cycle power without pressing Save Recipe, it will not be saved.

SETTINGS Screen - Speed Settings

NOTE: This screen contains two pages that can be selected from the Action Bar: Coil Settings and Speed Settings.

(1) →

SPEED SETTINGS

Machine Speed	Slowdown (from end)	Target Spindle Speed	Target Line Speed
1	10 ft	75 RPM	100 CLS
2	20 ft	150 RPM	200 CLS
3	30 ft	225 RPM	300 CLS
4	40 ft	300 RPM	400 CLS
5	50 ft	375 RPM	500 CLS

(2) →

LOW SPEED SETTINGS

Low Speed

100 RPM

(3) →

ACCELERATION SETTINGS

Acceleration

12 SEC

Deceleration

10 SEC

(4) →

Delete Recipe Save Recipe

Coil Settings Speed Settings

Page

FASTER DOOR TRANSFER

SLOWER

Machine Speed 2 Spindle Speed 0 RPM Line Speed 0 ft/m Endform Diameter 18 in LOCK

About REELEX Machine Speed

The M340 machine has 5 speed settings, 1 being the slowest, and 5 being the fastest. Speed 5 typically represents the fastest that the motors can safely run (typically 750 RPM). The soft (+) and (-) speed buttons incrementally increase or decrease run speed.

Two Speed Modes- Overview

REELEX machines are equipped to run in two speed modes: **Constant RPM** and **Constant Line Speed** (or CLS). Constant RPM mode has corresponding RPM values for each speed setting, whereas CLS mode calculates corresponding RPM values based on desired line speeds.

Which speed mode the machine is in is determined by the Machine Operation Mode under the MAINTENANCE screen in the Setup page.

Constant RPM Speed Mode:

Machines follow RPM speed values set to each speed index on the Speed Settings page.

Constant Line Speed Mode (CLS)

Machine will calculate RPM values for each speed index based on corresponding line speeds, not to exceed the Target Spindle Speed. As the coil grows, the machine will begin to reduce spindle speed as the circumference of the coil takes in more product for each rotation. As a result, the machine will compensate to match Target Line Speed. Typically used in online configurations.

Speed Settings (1)

Slowdown (From End)

Slowdown is defined by the length, from the end of the coil, in which the machine should begin to decelerate.

Example: If you want to make 1,000-foot coils, and you want the machine to begin to slow down when it reaches 990 feet, then Slowdown (from End) should be set to 10 feet. As a result, Preset 1 is 990 feet on the SETTINGS screen.

General Guidelines

In general, the slower the machine is running, the closer to Preset 2 the Slowdown point can be. The faster the machine is running, the more time is needed to decelerate, so the machine does not overshoot Preset 2.

Preset 1 should be selected for each speed so that the machine begins to decelerate at the right moment, allowing the machine to arrive at Low Speed right before Preset 2. This will ensure the machine stops accurately and under control.

If Preset 1 is too early (i.e. too many feet/meters from the end of the coil), the machine will begin to decelerate too soon and spend too much time at low speed prior to the end of the coil being reached. An early Preset 1 means the machine is not operating as efficiently as it could be, as time spent at low speed should be minimized where possible.

If Preset 1 is too late (i.e. too close to Preset 2), the machine will not be able to decelerate in time and will overshoot Preset 2 (desired coil length). If constantly overshooting, wire will be wasted, and the efficiency of machine operation will decrease.

Online vs Offline Guidelines

While these speed settings are saved to each product's recipe, they may need to be adjusted depending on production scenarios.

When running in an offline configuration from a supply reel, these settings depend on the weight of the reel, the power of the payoff, and the deceleration setting.

If running online with an extruder or another source that does not have inertia, deceleration can occur much faster and Preset 1 can be set closer to Preset 2 without overshooting.

Target Spindle Speed

Target Spindle Speed is the machine's spindle RPM that the AC motor drives will target at each speed setting. In Constant RPM modes, this is the spindle speed that the machine will maintain at each speed setting. In Constant Line Speed modes, this setting is more of a "do not exceed" speed, since the actual machine speed will be lower in order to maintain line speed.

Target Line Speed

This is the target line speed for each speed index the machine will try to maintain. Available in Constant Line Speed (CLS) operation modes.

NOTE: This section will only show based on the Machine Operation Mode that is selected.

Low Speed Settings (2)

Low Speed

The speed the machine will operate after decelerating from Preset 1, but prior to stopping at Preset 2.

If Low Speed is set too low, the machine may bog down during transfer of some products. To prevent this, increase the Low Speed RPM to increase the torque applied to the spindle motors.

Acceleration Settings (3)

Acceleration

Measured in seconds, this is the time the REELEX machine will take to accelerate from standstill to target speed. This setting sets the rate of acceleration regardless of speed setting.

If acceleration is set too low (machine accelerates quickly), the REELEX machine may accelerate too quickly, outrun the payoff's ability to accelerate the reel, and cause the dancer to crash.

Deceleration

Measured in seconds, this is the time the REELEX machine will take to decelerate from maximum speed.

If deceleration is set too low (machine decelerates quickly), the REELEX machine may decelerate too quickly, creating a condition in which the inertia of the product causes the product to jump off the sheaves.

ENGINEERS NOTE: Typically set to 7-10 seconds, this setting should be set according to the ability of the motorized payoff to accelerate the supply reel up to running speed.

Action Bar Buttons – SETTINGS Screen (4)

Delete Recipe

Deletes the currently selected recipe from the product list.

Save Recipe

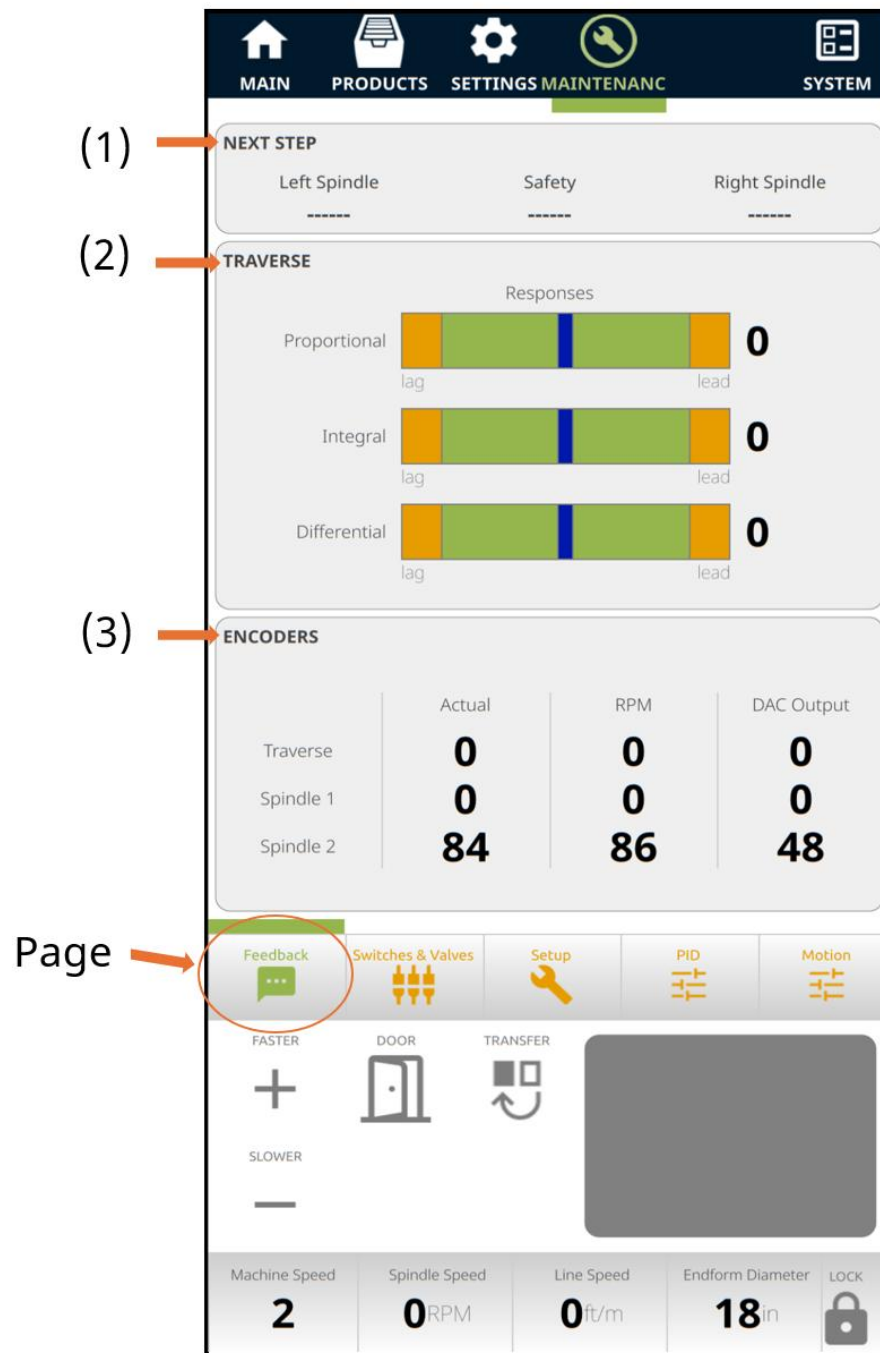
If changes have been made to the currently loaded recipe, you can press this button to overwrite the currently selected product.

NOTE: When you modify a recipe that is currently being used while the machine is running, the update is live and the machine will receive the new input. However, if you cycle power without pressing Save Recipe, it will not be saved.

MAINTENANCE Screen – Feedback Page

NOTE: This screen contains five pages that can be selected from the Action Bar: Feedback, Switches & Valves, Setup, PID, and Motion.

Maintenance screens can be used to identify potential encoder errors, motor displacements, and switch or valve issues. Such settings are not meant for changing, but rather diagnosing problems, with the exception of the Setup Page.



Next Step (1)

Used for troubleshooting purposes. Divided into three categories, the Next Step section will show what the machine is waiting for in its next step of each process.

Traverse Feedback (2)

The Feedback screen shows graphs of the Proportional, Integral, and Differential responses of the Traverse drive while running. This indicates how far the motor is leading (right of center) or lagging (left of center) compared to where the program indicates it should be positioned. Off center values indicate the motor is running too fast or too slow. The further off-center the value indicates, the further out of sync the traverse and spindle are.

Indicators of Faults

If indicators are far off center, the drive is not responding as expected. Maintenance personnel should review the function of the encoders, ensure keyways are secure, or consider looking at drive performance.

Encoders (3)

Actual: Indicates encoder position and reads a range from 0 to 7199, representing two 360-degree rotations with 10 pulses per degree of rotation.

RPM: Indicates rotation speed in revolutions per minute

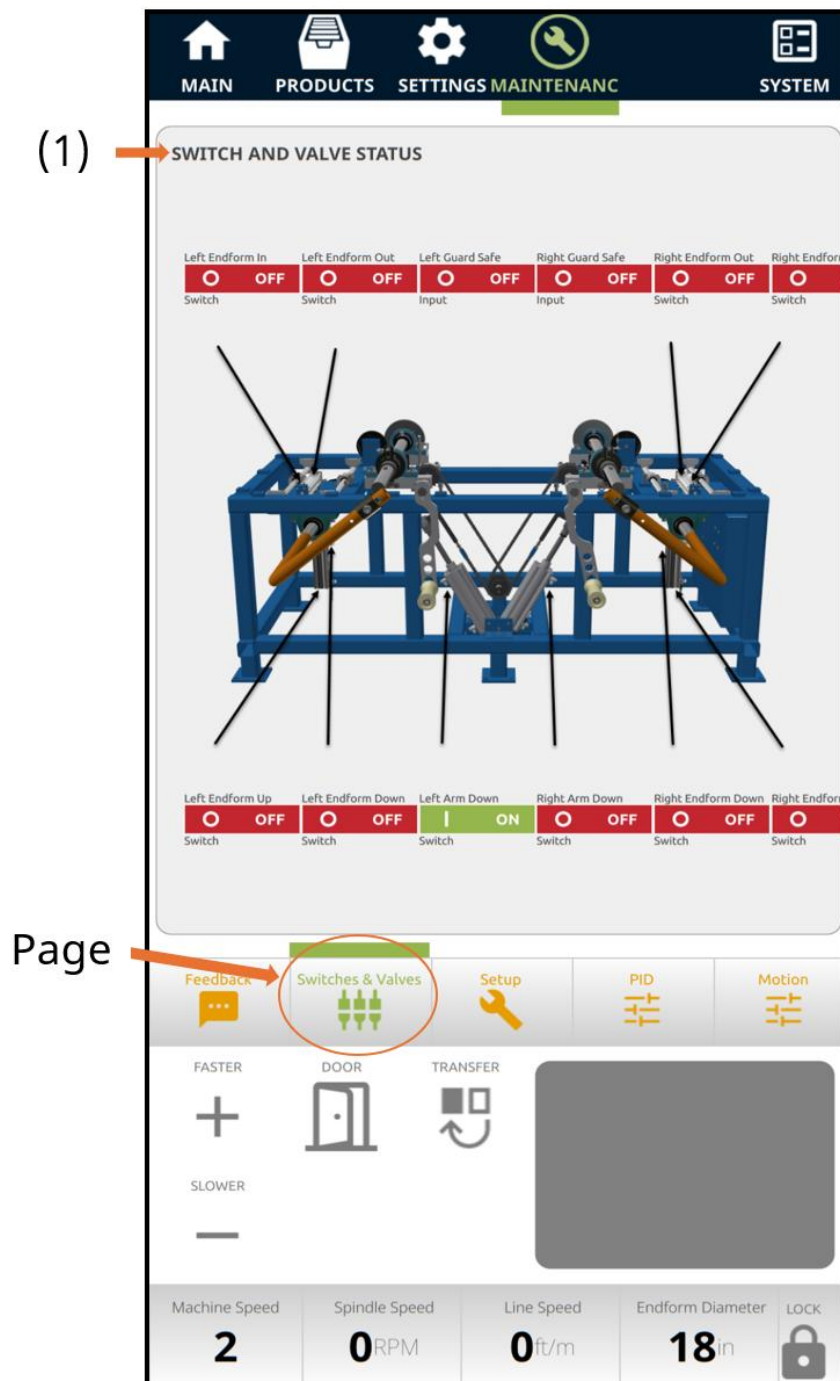
DAC Output: Represents digital to analog reference input to the drive. Values are between 0-4096 with 2048 representing 0 volts. Anything below 2048 (0 to -10 volts) is the reverse direction, and anything above 2048 (0 to +10 volts) is the forward direction.

Indicators of Faults

If a fault with an encoder is suspected, stop the machine and manually spin the spindle and traverse by hand. Numbers should be sequential and not skip. Spindle values will increase in the winding direction. This can be described as clockwise for the left spindle and counterclockwise for the right spindle when viewed from the operating position. Conversely, the spindle encoder position will decrease when the spindle is spun in the opposing direction (counterclockwise for the left spindle and clockwise for the right spindle).

MAINTENANCE Screen – Switches & Valves

NOTE: This screen contains five pages that can be selected from the Action Bar: Feedback, Switches & Valves, Setup, PID, and Motion.

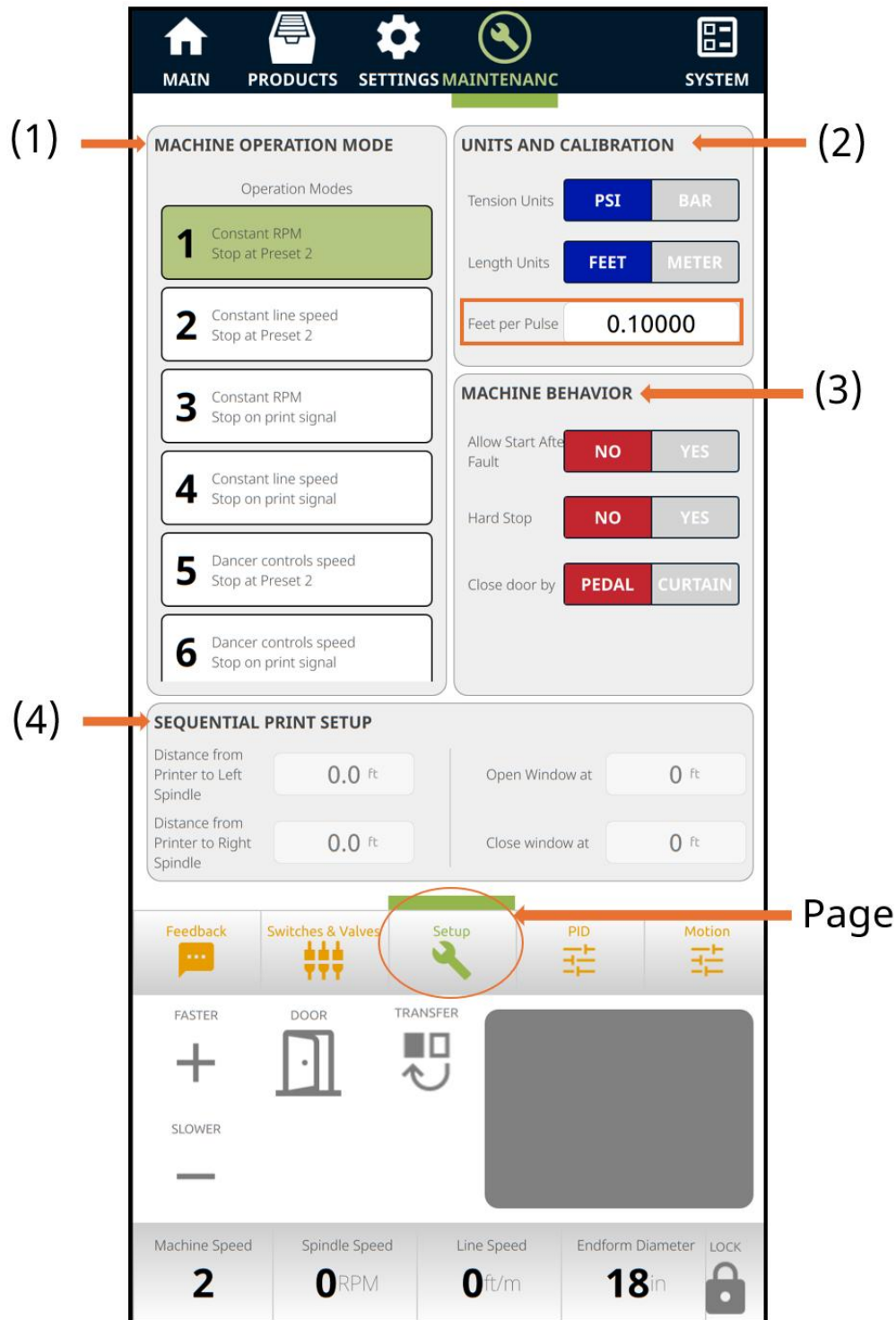


Switch & Valve Status

Provides real-time feedback of valves and switches on the M340 for fault isolation.

MAINTENANCE Screen – Setup Page

NOTE: This screen contains five pages that can be selected from the Action Bar: Feedback, Switches & Valves, Setup, PID, and Motion.



Machine Operation Mode (1)

Configures the machine to behave differently depending on the line configuration. Each mode number corresponds to a different machine configuration. The configurations are listed next to the mode number.

Mode	Speed Mode	Slowdown	Stop or Transfer	Printing	Other
REWIND Modes					
1	RPM	Preset 1	Preset 2	X	
2	Line Speed (CLS)	Preset 1	Preset 2	X	
3	RPM	Preset 1	Sequential Print Signal	✓	
4	Line Speed (CLS)	Preset 1	Sequential Print Signal	✓	
ONLINE Modes					
5	Follow Dancer	Dancer	Preset 2	X	
6	Follow Dancer	Preset 1	Sequential Print Signal	✓	

Units and Calibration (2)

Unit Selection

Used to select which units of measure the machine should operate in for pressure and length (imperial or metric).

Unit Per Pulse

Represents the resolution of the length counter. Default is 10 pulses = 1 foot or 0.3048 meters. Also written as 0.1 foot per pulse or 0.03048 meters per pulse.

Machine Behavior (3)

Controls how the machine responds to an external fault signal, such as a lump or spark detector. Allows the customer to set their desired machine behavior with these four switches based on the line setup.

Allow Start After Fault

This toggle applies to machines equipped with a Sparker/Lump detector and works in conjunction with the “Hard Stop” toggle. Every time a fault is detected, the machine will come to a stop. Toggling this switch to “yes” will allow the machine to run after an external fault is detected (ex. sparker/lump fault). The operator will still need to push START again to continue the coil if repairing that coil is not desired. This will NOT allow the machine to run after an emergency stop condition.

NOTE: This will NOT allow the machine to run after an emergency stop condition.

Hard Stop

This toggle applies to machines equipped with a Sparker/Lump detector and works in conjunction with the “Allow Start After Fault” toggle. The machine will always come to a stop after a fault is detected. Toggling this switch to yes will cause the machine to come to a stop as quickly as possible, if a fault is detected. This is desirable when trying to salvage a coil from being scrapped. If the toggle is set to “no”, the machine will decelerate according to the deceleration rate input into the machine.

Close Door By

This toggle sets the mechanism by which the door closes after removing a completed coil from the machine. Assume the correct setting is "curtain" unless otherwise instructed by REELEX personnel. This allows the light curtain beam status to control the position of the door. When someone is in the cell, the light curtain beam is interrupted, and the door is instructed to remain open. The door is set to close after only one cycle of “breaking” and “completing” of the light curtain beam. If the operator exits before fully removing the coil and desires to open the door again, they can push the “door” soft button on the HMI to re-open the door safely. DO NOT try to stop or interrupt the door while it is moving as it can pose a safety risk.

WARNING: Do not try to stop or interrupt the door while it is moving as it can pose a safety risk.

Sequential Printing Setup (4)

Distance from Printer to Left and Right Spindle

Distance the product must travel from the printer head to the traverse where the cut is made. Note that these values will differ slightly from left to right.

Sequential Window

The Print Signal Window causes the machine to only see print signals within a specified footage range (ex. between 950 feet and 1050 feet). This range can be input in the “open window at” and “close window at” dialog boxes. If the print window is on, the machine will ignore all print signals or marks outside of the window. Utilized to prevent erroneous and undesired false print signals due to noise or printer errors which may lead to more waste.

Print Window Settings

Opens at: When the length counter reaches this number, the computer looks for the sequential reset mark from the printer or UV sensor. Any signals before this footage will be ignored. Only in modes 3, 4 & 6.

Closes at: The machine will ignore any signals beyond this length.

MAINTENANCE Screen – PID Page

Do not alter the values of these settings unless instructed by REELEX personnel.

The screenshot displays the 'MAINTENANCE' screen, specifically the 'PID' page. The top navigation bar includes icons for MAIN, PRODUCTS, SETTINGS, MAINTENANCE (highlighted), and SYSTEM. The main content area is divided into three sections: TRAVERSE, DANCER CONTROL, and DRIVE OFFSET CONTROL. Each section contains four input fields with 'RESET' buttons. The bottom bar features icons for Feedback, Switches & Valves, Setup, PID (circled in red), and Motion. The bottom status bar shows Machine Speed (2), Spindle Speed (0 RPM), Line Speed (0 ft/m), Endform Diameter (18 in), and a LOCK icon.

Section	Parameter	Value	Reset
TRAVERSE	Kp:	4	RESET
	Ki:	200	RESET
	Imax:	200	RESET
	Kd:	2	RESET
DANCER CONTROL	Kp:	4	RESET
	Ki:	2000	RESET
	Imax:	100	RESET
	Kd:	6	RESET
DRIVE OFFSET CONTROL	Left Spindle:	0	RESET
	Right Spindle:	0	RESET
	Traverse:	0	RESET

Bottom Bar Icons: Feedback, Switches & Valves, Setup, **PID** (highlighted), Motion

Bottom Status Bar:

Machine Speed	Spindle Speed	Line Speed	Endform Diameter	LOCK
2	0 RPM	0 ft/m	18 in	LOCK

Page

MAINTENANCE Screen – Motion Page

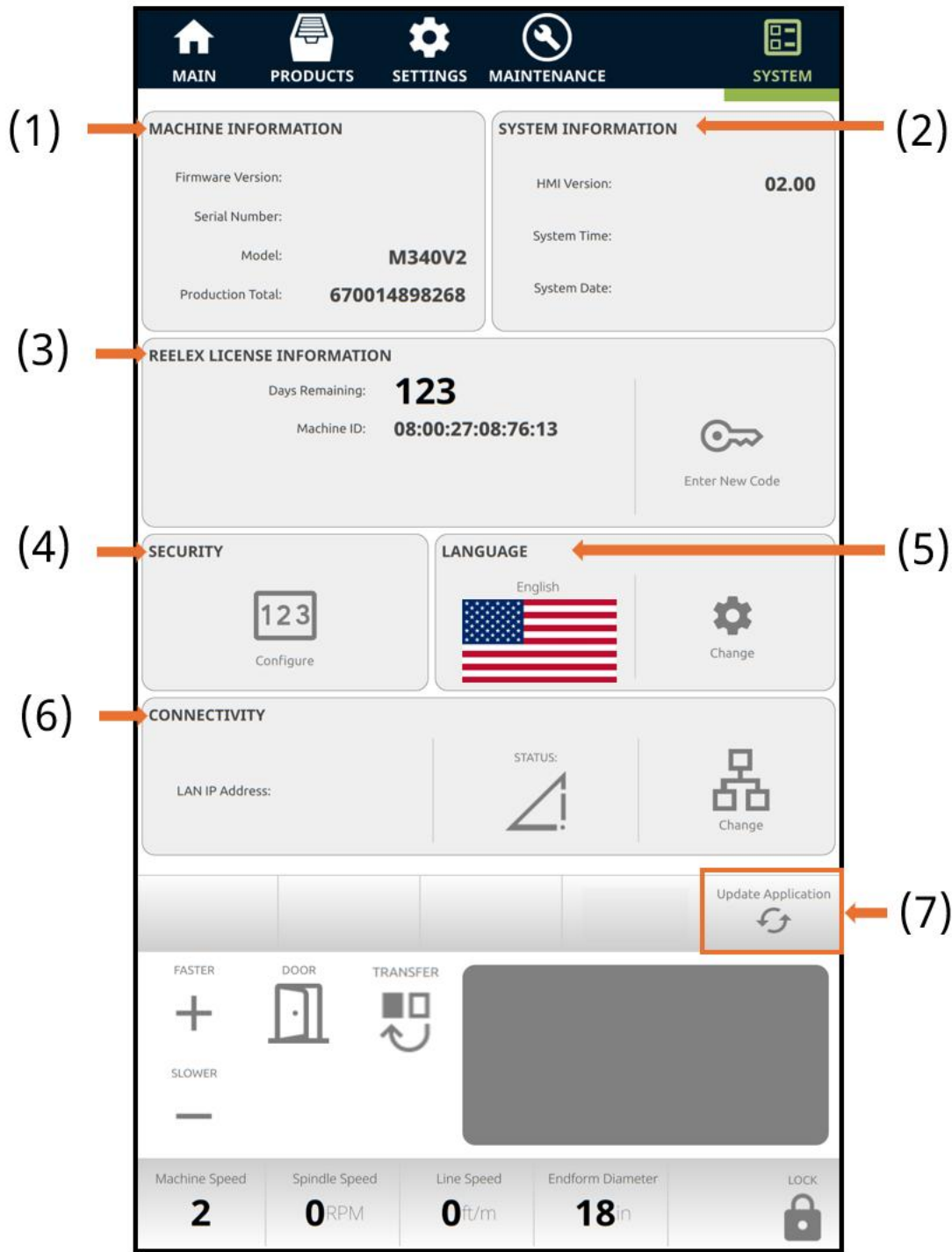
Do not alter the values of these settings unless instructed by REELEX personnel.

The screenshot displays the 'MAINTENANCE' screen with the 'MOTION' tab selected. The top navigation bar includes icons for MAIN, PRODUCTS, SETTINGS, MAINTENANCE (highlighted), and SYSTEM. The main content area is titled 'MOTION ADJUSTMENTS' and contains several input fields with 'RESET' buttons:

Parameter	Value	Action
Table Left	21735	RESET
Table Center	9000	RESET
Table Right	-10010	RESET
Left home to closed	39250	RESET
Left middle to closed	-38000	RESET
Left closed to middle	12000	RESET
Right home to closed	39250	RESET
Right middle to closed	-38000	RESET
Right closed to middle	12000	RESET

Below the adjustments, there are four tabs: Feedback, Switches & Valves, Setup, and PID. The 'Motion' tab is highlighted with a red circle and an arrow pointing to it from the word 'Page'. Below the tabs are three icons: FASTER (+), DOOR (door icon), and TRANSFER (transfer icon). At the bottom, there are five status indicators: Machine Speed (2), Spindle Speed (0 RPM), Line Speed (0 ft/m), Endform Diameter (18 in), and a LOCK icon.

SYSTEM Screen



Machine Information (1)

Shows current version of the Winding Module software (firmware version), machine serial number, and machine model.

Production Total

Like an odometer in a vehicle, this is the total length of product that has been run through the REELEX machine.

System Information (2)

Shows the current version of HMI software, system time and date.

REELEX License Information (3)

Shows the amount of time remaining if using a time-based code, or the amount of length remaining if using a length-based code. The Machine ID is the license code that a REELEX employee will provide to you.

NOTE: When the time or length remaining reaches 0, the machine will be rendered inoperable.

Security (4)

Pressing this button opens a popup window that allows you to set the unlock password.

Language (5)

Pressing this button opens a popup window that allows you to change the language on the HMI.

Connectivity (6)

Provides the IP address of the REELEX machine for networking purposes. Also allows the user to configure networking and remote connectivity by clicking the “Change” button. The Status triangle will be filled in green if connected and appear gray (like the photo above) if disconnected.

Action Button Bar – SYSTEM Screen (7)

Update Application

Used by REELEX personnel for updating HMI software version.

Networking

The HMI can be connected to a network via Ethernet port. This connection will allow the user to access the HMI via Modbus.

Connecting to the REELEX Machine

1. Supply an ethernet connection to the inside of the HMI cabinet. The port for the ethernet connection is located on the IPC and labeled X3.



2. Navigate to the SYSTEM screen on the HMI. Note that if the HMI is not unlocked, this screen is not visible.
3. Click the "Change" button to configure the Network settings. If you are using DHCP, ensure it is ON. If you are not using DHCP, enter the static IP address, netmask, and gateway.
 - o The Status triangle will be filled in green if connected and appear gray if disconnected.
 - o If using DHCP, a network connection must be available at power up of the machine. If a DHCP server is not available, the HMI will not create a connection and will only retry on the next power cycle.

Connecting via Modbus Data

Raw Modbus data can be accessed by configuring the HMI with a Modbus port (usually 502).

NOTE: This device does not support Modbus function code 0x10, Write Multiple Registers. **The HMI only accepts single holding register writes, function code 0x06.** An attempt at writing multiple registers will result in machine failure.

Modbus Addresses

Modbus Address	Write	Item	Description	Interpretation
40001	Yes	Upper Ratio	Upper ratio	Actual
40002	Yes	Lower Ratio	Lower ratio	Actual
40003	Yes	Density	Density	Least significant digit is a decimal
40004	Yes	Hole Size	Hole size	Actual in degrees
40005	Yes	Hole Shift	Hole shift	Least significant digit is a decimal, in degrees
40006	Yes	Hole Taper	Hole taper	Least significant digit is a decimal, in degrees
40008	Yes	Preset 2	Stop length	Actual in feet or meters
40009	Yes	Preset 3	Shutdown length	Actual in feet or meters
40010	No	Current Tension	BDA air pressure	Actual in PSI or BAR
40011	No	Footage Counter	Length counter	Actual in feet or meters No decimal
40012	No	Last Coil Length	Previous coil length when length was reset	Actual in feet or meters No decimal
40013	No	Production Run Counter	Production run length current	Actual in feet or meters Use unsigned integer
40014	No	Production Run	Production run length desired (set by operator)	Actual in feet or meters Use unsigned integer
40015	No	Production Totalizer	Total amount run through machine	Actual in feet or meters Use unsigned integer 32 bits
40016	No	Production Totalizer	Total amount run through machine	Actual in feet or meters Use unsigned integer 32 bits
40018	Yes	Target Speed	Speed index 0-9	Actual speed index
40019	No	Average Spindle Speed	The average speed of the spindle	Actual RPM
40020	No	Line Speed	The current calculated line speed	(Feet/meters) / minute
40021	No	Mode	The current operation mode of the machine	Actual
40027	Yes	RPM Set1	Speed setting 1	Actual RPM
40028	Yes	RPM Set2	Speed setting 2	Actual RPM

40029	Yes	RPM Set3	Speed setting 3	Actual RPM
40030	Yes	RPM Set4	Speed setting 4	Actual RPM
40031	Yes	RPM Set5	Speed setting 5	Actual RPM
40037	Yes	CLS Set 1	Constant line speed setting 1	(Feet/meters) / minute
40038	Yes	CLS Set 2	Constant line speed setting 2	(Feet/meters) / minute
40039	Yes	CLS Set 3	Constant line speed setting 3	(Feet/meters) / minute
40040	Yes	CLS Set 4	Constant line speed setting 4	(Feet/meters) / minute
40041	Yes	CLS Set 5	Constant line speed setting 5	(Feet/meters) / minute
40047	No	Low Speed	RPM at low speed	Actual RPM
40048	No	Jog Speed	RPM at jog	Actual RPM
40049	No	Acceleration time	Acceleration to speed 10 in seconds	Actual seconds
40050	No	Deceleration time	Deceleration from speed 10 in seconds	Actual seconds
40051	No	Coil Count	Continuous count of coils since power up	Actual
40054	No	Coil Counted flag	Flag to indicate a "good" coil has been completed	Transition of 0 to 1 indicates a good coil
40055	Yes	Distance from Printer to Spindle 1 (Left)	Distance to pull in before cut	Distance in feet with implement decimal place 105 -> 10.5
40057	Yes	Distance from Printer to Spindle 2 (Right)	Distance to pull in before cut	Distance in feet with implement decimal place 100 -> 10.0
40066	No	System Status	Indicates current state of the machine	0x01 = Resetting 0x02 = Ready to run 0x04 = Running
40067	No	Fault Status	Indicates any pending faults	0x02 = Payoff not running 0x10 = Process fault1 0x40 = Buffer up
40070	No	Totalizer Word1	Total production	Actual in feet or meters Use unsigned integer 64 bits
40071	No	Totalizer Word2	Total production	Actual in feet or meters Use unsigned integer 64 bits
40072	No	Totalizer Word3	Total production	Actual in feet or meters Use unsigned integer 64 bits

40073	No	Totalizer Word4	Total production	Actual in feet or meters Use unsigned integer 64 bits
40078	No	License Days Remaining	Time left on license	In days
40079	No	Product Name	Characters 1 and 2	Unicode for Basic Latin and Latin-1 Supplement
40080	No	Product Name	Characters 3 and 4	Unicode for Basic Latin and Latin-1 Supplement
40081	No	Product Name	Characters 5 and 6	Unicode for Basic Latin and Latin-1 Supplement
40083	No	Product Name	Characters 7 and 8	Unicode for Basic Latin and Latin-1 Supplement
40084	No	Product Name	Characters 9 and 10	Unicode for Basic Latin and Latin-1 Supplement
40085	No	Product OD	Diameter of wire	In inches 0.123 -> 1230 0.0123 -> 123