

# REELEX Machine Operation (G2 / G3)

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<b>Overview</b>	<b>5</b>
<b>Push-button Description</b>	<b>5</b>
If machine is equipped with safety guarding:	6
<b>Initial Line Start Up</b>	<b>7</b>
<b>Networking</b>	<b>9</b>
To Connect a REELEX Machine to the Network	9
Connecting via FTP	9
Connecting via Web Browser	9
Connecting via Modbus Data	9
G2 Modbus Addresses	9
G3 Modbus Addresses	13
<b>Operator Screens</b>	<b>16</b>
Home Screen	16
Current Product	16
Product ID / Part Number:	16
Product Description:	16
Status	17
Current Length Presets	17
Slowdown (Preset 1):	17
Stop (Preset 2):	17
Shutdown (Preset 3):	17
Feet/Meters Switch	17
Current Parameters	17
Length Counter	18
Counter	18
Previous Coil	18
Production Run Counter	18
Production Run Counter (Left)	18
Production Run Length (Right)	18
Line Speed	18
Indicators	19

Machine Speed	19
Other Indicators	19
Spark Fault Detected	19
Print Signal Detected	19
Spooler Mode Active	19
Maintenance Mode	19
Adjust Coil Size	20
Products Screen	21
To Load a Product	21
What Settings are Saved to the Product ID?	21
To Delete a Product	22
<b>Maintenance / Supervisor Screens</b>	<b>23</b>
Settings Screen	23
Product Identification	23
Product ID	23
Product Name / Description	23
Length Presets	24
Slowdown (Preset 1):	24
Stop (Preset 2):	24
Shutdown (Preset 3):	24
Coil Parameters	25
Coil Settings	25
How Do I know What Parameters to Use?	25
Line Tension	26
Two-Stage Speed	26
User Access	26
Two-Stage Tension	26
Packaging Calculator	27
What is NOT calculated:	27
<b>Maintenance Screens</b>	<b>28</b>
Troubleshooting Screens	28
Feedback	28
Traverse Responses	28

Indicators of Problems	28
Encoders	29
Spindle and Traverse Encoders	29
Indicators of Problems	29
Spindle and Traverse Digital to Analog	29
Indicators of Problems	29
Displacements and Errors	29
Indicators of Problems	29
Switch Panels	30
Machine Setup	31
Machine Mode	31
Length and Speed Calibration	32
Counter Pulse Value	32
Line Speed Sample Rate	32
Line Speed Scaling Factor	32
UDA Stop Height Setup	32
Sequential Printing Setup	32
Distance - Printer to Traverse	32
Sequential Window	32
Opens at:	32
Closes at:	32
Lump and Spark Detector Setup	33
Distance - Tester to Traverse	33
Action When Fault Detected	33
Speed Setup	34
About REELEX Machine Speed	34
Two Speed Modes	34
A. Regular Speed Mode	34
B. Constant Line Speed Mode (CLS)	34
Desired Line Speed	34
Logs, Memory and Security	35
Security Levels	35
• Operators	35

• Supervisors (Super)	35
• Maintenance (Maint)	35
To Change Passwords	36
Memory Card Options	36
Positions and Timers	36
System Information and Licensing	37
Machine Configuration	37
HMI / System Information	37
Information about Codes and Licensing	38
Why Codes?	38
How does it work?	38
What happens when the time remaining reaches 0?	38

# Overview

The G2 and G3 Control Systems include completely new operating systems, hardware, cabinet and interfaces for all REELEX coiling machines. Integrating equipment control with troubleshooting, on-screen manual, packaging calculator, multi-language support, product storage, networking capability and more, the REELEX HMI Control system is designed for 21st century industrial environments.

For G2 machines, the heart of the control system is an industrial-PC handling software calculations, whereas G3 machines are driven by a proprietary PCB board. Both control systems are interfaced by High-Definition 12-inch wide-screen touch screen HMI featuring unique REELEX software.



## Push-button Description

- EMERGENCY STOP:** The Emergency Stop button will dump all power from the REELEX machine and rest of the line. Follow instructions in initial line start up. For emergency only.
- STOP:** Stops REELEX machine in a controlled deceleration. The REELEX machine may be restarted at any time. STOP may also be pressed during transfer.
- START:** The line (Payoff/Accumulator) must be running. Press the START button to wind cable.
- ENDFORM ON:** Positions endform onto the empty mandrel. A foot pedal can be positioned near worktable for convenience.
- TRANSFER:** Transfers cable to the opposite mandrel if mandrel is ready. Footage counter is automatically reset.
- L.RESET:** Resets the footage counter regardless of FEET/METERS switch position.
- RESET:** Resets the REELEX machine after power up or Emergency Stop. The REELEX machine will run through its reset routine. All Emergency Stop circuits must be closed (pulled out) to operate.

## If machine is equipped with safety guarding:

- DOOR OPEN:** On machines equipped with safety guarding, this button will open or close the safety guard door. If a dual-spindle machine, see below.
- OPEN CLOSE Left Door:** Opens and closes left safety door after Reset is finished to initially string up line. Opens and closes left safety door after STOP button is pressed.
- OPEN CLOSE Right Door:** Opens and closes right safety door after Reset is finished to initially string up line. Opens and closes right safety door after STOP button is pressed.

# Initial Line Start Up

1. Turn on main power and remove any coils from the REELEX machine then press the RESET button.
2. String up Accumulators.
3. Lower buffer (if applicable) by turning the Raise/Lower switch, string up and raise. Tie in cable to mandrel (left mandrel on D-1500) and rotate clockwise. Note that after RESET on the D-1500, the machine will always start on left spindle.
4. Set input air on regulators as follows:

Equipment	Input Air Pressure
REELEX machine Input	80 PSI
Accumulator/Dancer	20 PSI
Motorized Payoff	80 PSI
Anti Reverse	10 PSI
Pocket Door Regulator (If equipped with Guarding)	30 PSI
Footage Counter Wheel	5 PSI

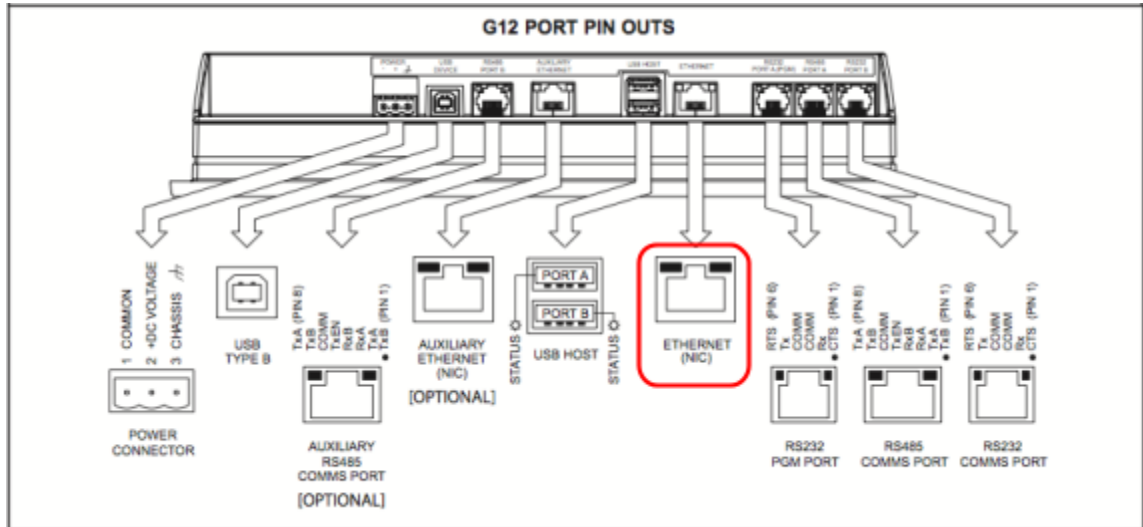
6. Press the START button on the REELEX machine to start winding.
7. The machine will automatically stop at PRESET 2 on single-spindle machines, or automatically transfer on dual-spindle machines.
  - a. On D-1500s, the machine will automatically stop at PRESET 2 and cut over if the opposite mandrel is empty and ready. After transfer, the left endform will come down. Remove the coil. Press ENDFORM ON button (or foot pedal), this prepares the left mandrel for transfer.
  - b. If the machine is ready, at the PRESET 2 footage, the REELEX machine will automatically transfer to the right mandrel.

# Networking

The HMI can be connected to a network via Ethernet port. This connection will allow the user to access the HMI via web browser, or download information directly via Modbus.

## To Connect a REELEX Machine to the Network

1. Supply an ethernet connection to the inside of the HMI cabinet. The port for the ethernet connection is located under the HMI touch screen unit.



**NOTE:** Newer HMI units have primary and auxiliary ethernet ports. Your local network should connect to the primary port.

2. Press the "Help" button on the left side of the screen, then press "System Settings & Info" on the bottom of the help menu.
3. Press the "Configure Network" button and enter in your network information.
4. **Press "Apply Network Changes (Restart)" button.** This will reset the HMI and apply your settings to the Ethernet port.

## Connecting via FTP

Read/write access is enabled via FTP on port 21. You must use the primary ethernet port's IP address to communicate. Username: admin; password: admin.

## Connecting via Web Browser

To access the HMI touchscreen or log data via web browser, simply type the IP address you have assigned to HMI into your browser. The web server on the HMI uses HTTPS on port 443.

## Connecting via Modbus Data

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



## G2 Modbus Addresses

Modbus Address	Write	Item	Description	Interpretation
400001	Yes	Upper_Ratio	Upper Ratio	Actual
400002	Yes	Lower_Ratio	Lower Ratio	Actual
400003	Yes	density_program_factor	Density Setting	Divide by 64
400004	Yes	hole_size	Hole Size	May be three digits (090 = 90°)
400005	Yes	hole_shift	Hole Shift	May be three digits (010 = 10)
400006	Yes	hole_taper	Hole Taper	May be three digits (010 = 10)
400007	No	P1_slowdown_length	Preset 1 (Slowdown)	Actual (Feet)
400008	Yes	P2_desired_coil_length	Preset 2 (Stop)	Actual (Feet)
400009	Yes	P3_shutdown_length	Preset 3 (Shutdown if no Signal Seen)	Actual (Feet)
400010	No	Current_Tension	Current Tension	Actual
400011	No	Footage_Counter	Length Counter (Current)	Actual (Feet)
400012	No	prev_coil_length	Previous Coil Length when length was reset.	Actual (Feet)
400013	No	current_production_length	Production Run Counter (Current)	Actual (Feet)
400014	No	production_run	Set Production Run (Entered by Operator)	Actual (Feet)
400015	No	Total_Production_Counter 1	Total Amount (Feet) Run through Machine (Part 1)	Combine with Counter 2
400016	No	Total_Production_Counter 2	Total Amount (Feet) Run through Machine (Part 2)	Combine with Counter 1
400017	No	TargetSpeedforProduct	Target Speed (Index, 1-10) for this Product. Set on Speed Setting Screen.	Actual (1-10)
400018	No	target_wind_speed_index	Actual Speed (Index, 1-10) that Machine is Running	X-1. Speed Index must be subtracted by one to get actual (except on RS1).
400019	No	average_spindle_rpm	Current Average Spindle Motor Speed	Actual (RPM)
400020	No	avg_line_speed	Current Calculated Average Line Speed (Feet per Minute)	Actual (Ft/Min)
400021	No	mach_operation_mode_number	Current Operation Mode	Actual (Number)

400022	No	line_spd_sample_rate	Line Speed Sample Rate	Actual
400023	No	line_speed_scaling_factor	Line Speed Scaling Factor	Actual
400024	No	sparker_lump_distance	Sparker Distance from Unit to Spindle	Actual (Feet)
400027	No	rpm_set1	RPM Target Speed 1	Actual (RPM)
400028	No	rpm_set2	RPM Target Speed 2	Actual (RPM)
400029	No	rpm_set3	RPM Target Speed 3	Actual (RPM)
400030	No	rpm_set4	RPM Target Speed 4	Actual (RPM)
400031	No	rpm_set5	RPM Target Speed 5	Actual (RPM)
400032	No	rpm_set6	RPM Target Speed 6	Actual (RPM)
400033	No	rpm_set7	RPM Target Speed 7	Actual (RPM)
400034	No	rpm_set8	RPM Target Speed 8	Actual (RPM)
400035	No	rpm_set9	RPM Target Speed 9	Actual (RPM)
400036	No	rpm_set10	RPM Target Speed 10	Actual (RPM)
400037	No	cls_set1	Constant Line Speed Set (Calculated) - Speed 1	This number is a calculated value and represents the actual number sent to the controller to control constant line speed. To determine line speed setting in feet/minute, multiply this value by 6
400038	No	cls_set2	Constant Line Speed Set (Calculated) - Speed 2	
400039	No	cls_set3	Constant Line Speed Set (Calculated) - Speed 3	
400040	No	cls_set4	Constant Line Speed Set (Calculated) - Speed 4	
400041	No	cls_set5	Constant Line Speed Set (Calculated) - Speed 5	
400042	No	cls_set6	Constant Line Speed Set (Calculated) - Speed 6	
400043	No	cls_set7	Constant Line Speed Set (Calculated) - Speed 7	
400044	No	cls_set8	Constant Line Speed Set (Calculated) - Speed 8	
400045	No	cls_set9	Constant Line Speed Set (Calculated) - Speed 9	
400046	No	cls_set10	Constant Line Speed Set (Calculated) - Speed 10	
400047	No	low_speed	RPM at Low Speed	Actual (RPM)
400048	No	jog_speed_setting	RPM at Jog	Actual (RPM)
400049	No	on_screen_accel_time	Acceleration to Speed 10 in Seconds	Actual (Seconds)
400050	No	on_screen_decel_time	Deceleration from Speed 10 in Seconds	Actual (Seconds)

400051	No	CoilCountTotal	Continuous count of "good" coils produced. Likely resets on software update.	Actual (Number)
400052	No	NumberBoxesThisHour	Number of good coils produced this hour. Resets on the hour.	Actual (Number)
400053	No	MaxProdRate	Maximum Production Rate Achieved in One Hour.	Actual (Number)
400054	No	CoilCountedFlag	Flag that indicates a "good" coil has been completed (X% of Preset 2)	
400519	No	TensionControl	Current voltage to set regulator.	
400600	Yes	Distance from printer to cut - Spindle 1	Memory location 1 Hex Value MSW	The two memory locations must be interpreted correctly. Strongly recommend entering desired result in HMI, then reading each memory location in Modbus. Values are in HEX.
400601	Yes	Distance from printer to cut - Spindle 1 (2)	Memory location 2 Hex Value LSW	
400602	Yes	Distance from printer to cut - Spindle 2	Memory location 1 Hex Value MSW	
400603	Yes	Distance from printer to cut - Spindle 2 (2)	Memory location 2 Hex Value MSW	
400604	Yes	Distance from printer to cut - Spooler	Memory location 1 Hex Value MSW	
400605	Yes	Distance from printer to cut - Spooler (2)	Memory location 2 Hex Value MSW	
400606	Yes	Sequential Window Open	Length counter reading at which sequential print window opens.	
400607	Yes	Sequential Window Closed	Length counter reading at which sequential print window closes.	Feet
400608	Yes	Sequential Window On/Off	Note that on D-2050 the sequential window switch is physical and cannot be overridden.	0=Off, 1=On.

### G3 Modbus Addresses

Modbus Address	Write	Item	Description	Interpretation
400001	yes	upper ratio	upper ratio	actual
400002	yes	lower ratio	lower ratio	actual
400003	yes	density	density	least significant digit is a decimal
400004	yes	hole size	hole size	actual in degrees
400005	yes	hole shift	hole shift	least significant digit is a decimal, in degrees
400006	yes	hole taper	hole taper	least significant digit is a decimal, in degrees.
400007	no	Preset 1	slowdown length	actual in feet or meters
400008	yes	Preset 2	stop length	actual in feet or meters
400009	yes	Preset 3	shutdown length	actual in feet or meters
400010	no	current tension	BDA air pressure	actual in PSI or bar
400011	no	footage counter	length counter	actual in feet or meters, no decimal
400012	no	last coil length	previous coil length when length was reset	actual in feet or meters, no decimal
400013	no	production run counter	production run length current	actual in feet or meters use unsigned integer
400014	no	production run	production run length desired (set by operator)	actual in feet or meters use unsigned integer
400015	no	production totalizer	total amount run through machine	actual in feet or meters use unsigned integer
400016				
400017				
400018	no	target speed	speed index 0-9	actual speed index
400019	no	average spindle speed	the average speed of the spindle	actual RPM
400020	no	line speed	the current calculated line speed	(feet/meters) / minute
400021	no	mode	the current operation mode of the machine	actual
400022				
400023				
400024				
400025				

400026				
400027	no	RPM set1	speed setting 1	actual RPM
400028	no	RPM set2	speed setting 2	actual RPM
400029	no	RPM set3	speed setting 3	actual RPM
400030	no	RPM set4	speed setting 4	actual RPM
400031	no	RPM set5	speed setting 5	actual RPM
400032	no	RPM set6	speed setting 6	actual RPM
400033	no	RPM set7	speed setting 7	actual RPM
400034	no	RPM set8	speed setting 8	actual RPM
400035	no	RPM set9	speed setting 9	actual RPM
400036	no	RPM set10	speed setting 10	actual RPM
400037	no	CLS set 1	constant line speed setting 1	(feet/meters) / minute
400038	no	CLS set 2	constant line speed setting 2	(feet/meters) / minute
400039	no	CLS set 3	constant line speed setting 3	(feet/meters) / minute
400040	no	CLS set 4	constant line speed setting 4	(feet/meters) / minute
400041	no	CLS set 5	constant line speed setting 5	(feet/meters) / minute
400042	no	CLS set 6	constant line speed setting 6	(feet/meters) / minute
400043	no	CLS set 7	constant line speed setting 7	(feet/meters) / minute
400044	no	CLS set 8	constant line speed setting 8	(feet/meters) / minute
400045	no	CLS set 9	constant line speed setting 9	(feet/meters) / minute
400046	no	CLS set 10	constant line speed setting 10	(feet/meters) / minute
400047	no	low speed	RPM at low speed	actual RPM
400048	no	jog speed	RPM at jog	actual RPM
400049	no	accel time	acceleration to speed 10 in seconds	actual seconds
400050	no	decel time	deceleration from speed 10 in seconds	actual seconds
400051	no	coil count total	Continuous count of "good" coils produced	actual
400052	no	coils this hour	number of "good" coils this hour	actual
400053	no	maxProdRate	max production rate achieved in one hour	actual
400054	no	coil counted flag	flag to indicate a "good" coil has been completed	transition of 0 to 1 indicates a good coil
400600	yes	distance from printer to spindle 1 left	distance to pull in before cut	actual in feet or meters

400601				
400602	yes	distance from printer to spindle 2 right	distance to pull in before cut	actual in feet or meters
400603				
400604	yes	distance from printer to spooler	distance to pull in before the cut	actual in feet or meters
400605				
400606	yes	sequential print window open	length at which sequential print window opens	actual in feet or meters
400607	yes	sequential print window closed	length at which sequential print window closes	actual in feet or meters
400608	yes	sequential window ON/OFF	enables the sequential window option	0= off , 1 = on
400609				
400610	yes	enter parameter change	write some different value to accept the one or many new parameters written	any new value

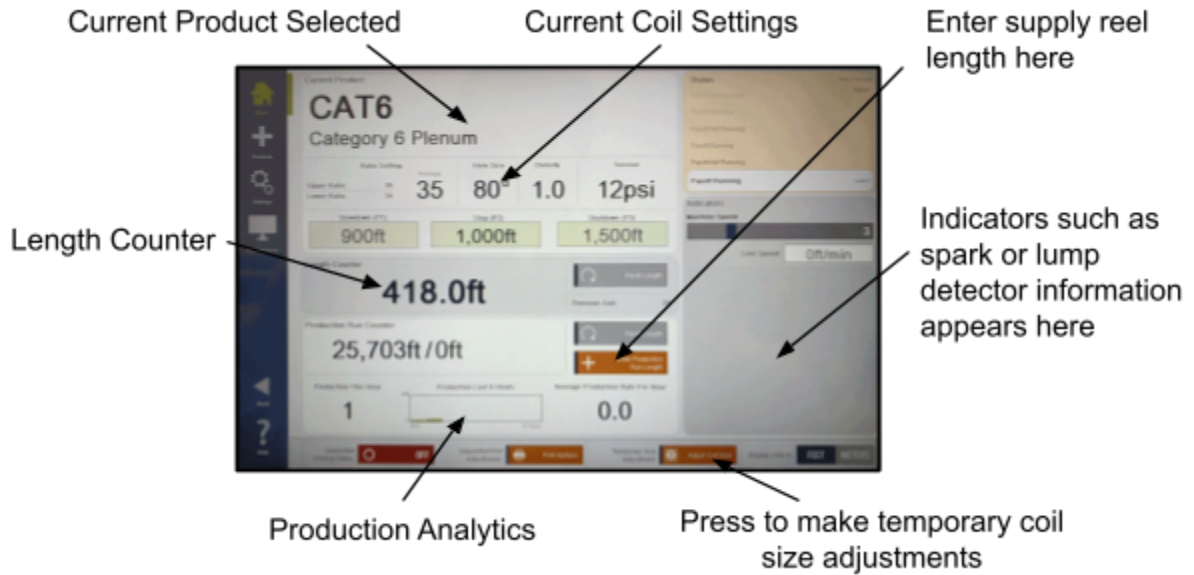
400611	no	system status	indicates current state of the machine.	0x0001 = machine reset, 0x0002 = ready to run, 0x0004 = running
400612	no	faults	indicates any pending faults	0x0010 = payoff not started, 0x0020 = fault1
400613	no	stop circuit open	indicates the systems stop circuit is not closed	0x0001 = stop circuit is open

**NOTE:** On G3 controlled machines new values written to Modbus parameters do not take effect at the write. After one or more values are written, write any new value to address 400610 and the system will accept the new parameter value(s).

# Operator Screens

**NOTE:** The HOME and PRODUCTS screens are unrestricted, meaning no login is required to access them. For details on other security levels, please see [Logs, Memory and Security](#).

## Home Screen



## Current Product

### Product ID / Part Number:

Shows the current part number or unique product ID being run on the machine. Different products are selected on the Products screen. Limited to 8 characters.

**NOTE:** The PRODUCT ID is entered and can be saved to the Product List on the SETTINGS screen. It is limited to 8 Characters and limited symbols, as it is used as a file name and is limited to PC file format rules.

### Product Description:

Shows longer product description or detail.

## Status

Message screen showing the current status of the machine. The most current message is at the bottom. Press to open the last 64 messages.

## Current Length Presets

### Slowdown (Preset 1):

Calculated value determined by the Speed Setup screen. Indicates length at which the machine will begin decelerating.

**OPERATOR'S NOTE:** Preset 1 changes depending on speed. Obviously, the faster the machine is running the longer it will take to slow down to a stop, so typically Preset 1 will lower at higher speeds, allowing the machine longer to decelerate before reaching Preset 2. Preset 1 for speeds 1-10 is typically set up once and can be adjusted in the Speed Setup screen of the SETTINGS section.

### Stop (Preset 2):

Desired package length in feet or meters. Machine will automatically stop at this length.

### Shutdown (Preset 3):

Typically used in sequential printing, this is the length at which the machine will shut down if a signal has not been seen.

## Feet/Meters Switch

Press this toggle to view all lengths in imperial or metric units.

## Current Parameters

Indicates the current machine settings. Can be used to spot irregularities or as a reference point between products.

For more information on Coil Parameters, see the SETTINGS screen.



## Length Counter

### Counter

Indicates current readout from length counter in feet or meters. Typically will automatically reset when machine reaches Preset 2 or Transfers. Can be manually reset by pressing the reset button.

**OPERATOR'S NOTE:** When first stringing up the REELEX machine, the footage counter should be reset to zero. Press the reset button to manually reset.

### Previous Coil

Shows length of last coil. Used for reference.

## Production Run Counter

**NOTE:** Applies to G2 and G3 machines only.

### Production Run Counter (Left)

This number continually counts the number of feet run through the machine until the button is pressed to reset the counter. Typically this count is used to determine how much product has been run from a supply reel. It is usually reset when a supply reel is empty and is replaced.

**OPERATOR'S NOTE:** After loading a new supply reel or beginning a new production run, press the Reset Counter button to manually reset to zero.

### Production Run Length (Right)

The number to the right of the "/" displays the set Production Run length. This number is typically set to the length of the supply reel on the payoff. It may be used to determine how much footage is left on the reel.

**OPERATOR'S NOTE:** When beginning a new run (typically after loading a new supply reel), enter the length of product on the reel, or set the length of the production run. The machine will automatically slow down when approaching this length to prevent a crash stop when reaching the end of the reel.

### Line Speed

Current line speed in feet or meters. For reference.

## Indicators

### Machine Speed

Shows current machine speed in terms of indexed value. Maximum speed is Speed 10. Index speeds are set on the Speed Setup screen under MAINTENANCE.

### Other Indicators

Other indicators will pop up on occasion. These include:

#### Spark Fault Detected

Will appear if a spark fault is detected. Will also show the footage at which the fault occurred.

#### Print Signal Detected

Will appear if a print signal is detected. Will also show the footage at which the fault occurred.

#### Spooler Mode Active

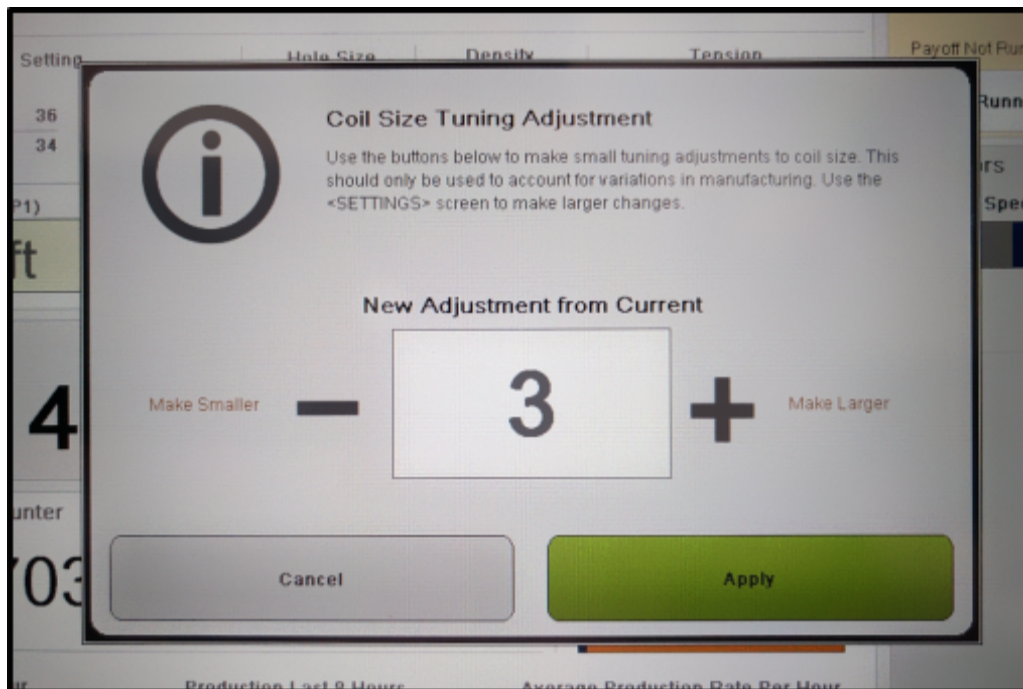
Will appear if the REELEX machine has a DHS-750 or SHS-750 spooler attached and if the spooler is active.

#### Maintenance Mode

Appears if machine is in maintenance mode. Usually applies to the D-2050.

## Adjust Coil Size

Pressing this button will cause the following popup window to appear:



This setting is used to make fine adjustments to coil size to accommodate production variations and anomalies such as changes in jacket size or material. The intention is to allow the operator some input into machine settings based on real-world feedback.

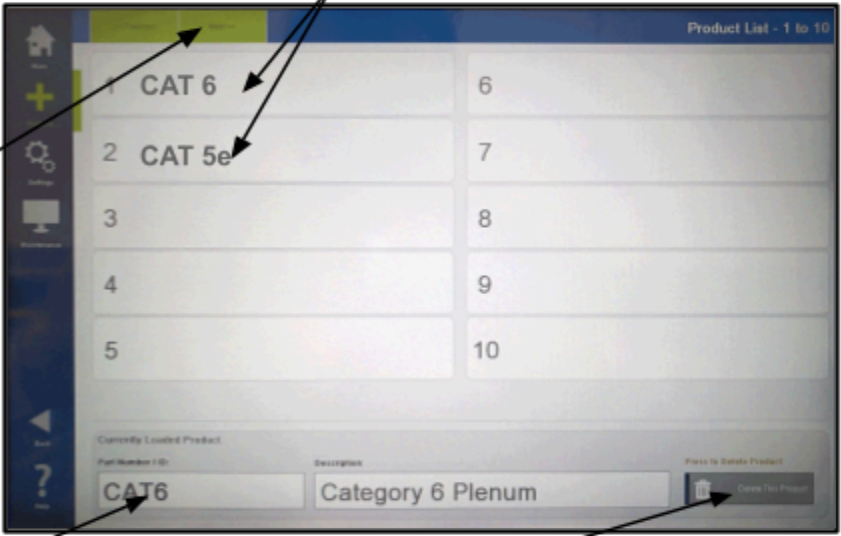
**OPERATOR'S INSTRUCTION:** If the coil being produced is too big or too small for the box, use this dialogue box to increase or decrease the coil size in small increments. Remember that the REELEX coil should be snug in the box, without causing bulging and without allowing the coil to move around.

**WARNING:** Changes made on the Coil Size Adjustment dialogue are temporary and are not saved to the product. When a new product is selected, the adjustment returns to 0. To make permanent changes, use the SETTINGS screen and then press "Save to Current".

# Products Screen

To load the settings for a product, simply press it.

Up to 50 products can be saved on 5 pages. Press here to go to the next page.



The currently loaded product is displayed here.

To delete a product from the list, first select it and then press here.

Product ID	Description	Product ID
1 CAT 6		6
2 CAT 5e		7
3		8
4		9
5		10

Currently Loaded Product

Part Number / ID: CAT6 Description: Category 6 Plenum

Press to Delete Product

## To Load a Product

Press the Product ID you wish to load. This will change the machine settings to the settings saved under that Product ID.

**NOTE:** Each saved product is an individual .CSV file saved on the SD Card located on the side of the HMI. Product ID names are limited to 8 characters, with limitations on characters (no spaces or symbols). For additional information, use the product description field.

## What Settings are Saved to the Product ID?

- Product ID
- Product Description
- Coil Parameters
  - Upper Ratio
  - Lower Ratio
  - Density Factor
  - Hole Size
  - Hole Shift
  - Hole Taper
  - Package Length (Preset 2)
  - Shutdown Length (Preset 3)
  - Tension Setting
- Operation Mode

- Speed Settings
  - Spindle Target Speed (RPM)
  - Slowdown
  - Acceleration
  - Deceleration
  - Low Speed
  - Jog Speed
- Two Stage Tension Control On/Off
  - Stage 1 Tension
  - Stage 2 Tension
  - Stage 2 Footage
- For RS1
  - Traverse Width
  - Traverse Center
- For Spooler
  - Spooler Active

## **To Delete a Product**

First load the Product you wish to delete by pressing the Product ID. Press “Delete This Product”. The product will disappear from the list.

# Maintenance / Supervisor Screens

## Settings Screen

This screen is used to change the coil parameters and other settings specific to the product being run.

The screenshot shows the 'Coil Settings' interface. It is divided into several sections: 'Product ID / Part Number' (containing 'CAT6'), 'Product Name / Description' (containing 'Category 6 Plenum'), 'Length Presets' (with three rows for 'On', 'Stop', and 'Shutdown' at 500ft, 1,000ft, and 1,500ft), 'Coil Parameters' (with 'Average Ratio' at 35, 'Hole Size' at 80°, 'Density Factor' at 1.0, and 'Line Tension' at 12), and 'Two-Stage Tension Control' (a toggle switch currently set to 'OFF'). Annotations with arrows point to various elements: 'Unique ID, limited to 8 characters.' points to the Product ID field; 'Name or Description, limited to 16 characters.' points to the Product Name field; 'Change coil length with these settings' points to the Length Presets section; 'Change the shape and size of the REELEX coil using these settings' points to the Coil Parameters section; 'Toggle Two-Stage Tension Control for this product' points to the Two-Stage Tension Control toggle; 'Press here after setting up a new product to save it to the list.' points to the 'Save New Product to the List' button; 'To save your changes to the current Product ID, press here.' points to the 'Save Changes to the Product' button; and 'Use the REELEX calculator when setting up a new product to get a starting place for settings.' points to the 'REELEX' button.

## Product Identification

### Product ID

Unique identification used to store product settings in memory. This will become the name of the file which stores the product settings.

**NOTE:** Product ID names are limited to 8 characters, with limitations on characters (no spaces or symbols). For additional information, use the product description field.

### Product Name / Description

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

**NOTE:** Product Name / Description is limited to 16 characters, with no limitations on spaces, characters, etc.

## Length Presets

### Slowdown (Preset 1):

Calculated value determined by the Speed Setup screen under MAINTENANCE. Indicates length at which the machine will begin decelerating.

**MAINTENANCE 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 longer to decelerate before reaching Preset 2. Preset 1 for speeds 1-10 is typically set up once and can be adjusted in the Speed Setup screen of the MAINTENANCE section.

### Stop (Preset 2):

Desired package length in feet or meters. Machine will automatically stop at this length.

### Shutdown (Preset 3):

Typically used in sequential printing, this is the length at which the machine will shut down if a signal has not been seen.

## Coil Parameters

**MAINTENANCE NOTE:** For more detailed information about coil parameters and their functions, please see on-screen help or even more detail in the [REELEX Packaging Guide](#).

### Coil Settings

	Gain	Hole Size	Density Factor
<b>Function</b>	Determines separation between winds.  Displayed as average between <b>Upper</b> and <b>Lower</b> gain. Press <+> or <-> to adjust average gain, or press Upper or Lower to adjust individually.	Determines number of degrees circumference the payout hole will be.  Press <b>TAPER</b> to adjust hole shape.  Press <b>SHIFT</b> to adjust amount of hole shift or slant.	Determines the density factor, or the rate at which the gains 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.
<b>Range</b>	0-99	<b>Hole Size:</b> 0-360  <b>Taper:</b> 1-5  <b>Shift:</b> 1-5	0.0-5.0
<b>Typical Range</b>  <i>LAN cable</i>	30-40	<b>REELEX I:</b> 50° to 60°  <b>EcoCore:</b> 60° to 80°  <b>REELEX II/AIR:</b> 80° to 100°  <b>Taper:</b> 1  <b>Shift:</b> 2-5	1.0

### How Do I know What Parameters to Use?

The [Packaging Calculator](#) is available on screen for just this purpose. See below for more information. It is also available on our website at: <http://www.reelex.com/support/calculator.html>.

Packaging formulas are available in the [REELEX Packaging Guide](#).



## Line Tension

If using a G2 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 < 12 PSI.

## Two-Stage Speed

This setting starts the machine at a low speed for a certain length, then increases winding speed to the speed setting selected by the toggle switch for the rest of the coil. Press to open window.

## User Access

Indicates the current user (settings screen is restricted to SUPERVISOR (“Super”) and MAINTENANCE (“Maint”). To lock the screen and exit, press the “Logout” button.

## Two-Stage Tension

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

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

# Packaging Calculator

By entering information about the product you wish to wind, the packaging calculator will calculate minimum and maximum average gain settings. The minimum and maximum coil diameters will also be calculated. The user can then select an average gain setting between the minimum and maximum to see the coil size, package dimensions, and recommended payout tube.

1. Enter product specifications.

3. Enter desired gain between Minimum and Maximum.

The screenshot shows the 'Packaging Calculator' interface. It is divided into several sections:

- A) Variable Entry:** Includes 'Product Information' (Product OD: 0.25in, Coil Length: 1000ft), 'Machine Setup' (Mandrel Diameter: 8in, Endform Diameter: 18in, Traverse Stroke: 12in), and 'Desired Payout Hole Size' (Hole Size: 118").
- B) The Gain Range for This Product to:** Shows 'Minimum Gain: 37' and 'Maximum Gain: 49'. Below this, it lists 'Coil Diameter if Set at Minimum Gain: 14.6in' and 'Coil Diameter if Set at Maximum Gain: 16.1in'.
- C) Choose a Gain Setting within Range:** Features a 'Select a Gain Setting' input field with a slider set to 40, and an 'Estimated Diameter at Selected Gain: 15.00in'.
- D) Estimated Package Dimensions and Type:** Displays 'Appropriate Payout Tube Types: REELEX B', 'Recommended Payout Tube Length: 7in', 'Estimated Package Height: 15.1in', 'Estimated Package Length: 15.1in', and 'Estimated Package Width: 10.0in'.
- E) Download Settings to Machine:** Includes a 'Use Settings' button.

Arrows from the numbered instructions point to the 'Product OD' field (1), the 'Gain Setting' slider (3), the 'Endform' button (2), and the 'Use Settings' button (4).

2. Enter package type.

4. Press "Use Settings" to download into machine. Make test packages then adjust.

## What is NOT calculated:

The Packaging Calculator does not take into account **Density** or **Hole Taper** or **Line Tension**. These settings must be determined manually.

**WARNING:** The Packaging Calculator is intended to be a **starting point** for achieving optimal coil settings. **Density**, **Taper** and **Tension** can have significant effects on coil formation and should be experimented with to achieve desired results. ALWAYS create sample coils and confirm coil fitment prior to ordering boxes or other packaging materials. If you need assistance, please contact us for samples or other consultation: [support@reelex.com](mailto:support@reelex.com).

**WARNING:** The calculated package size is **estimated** based on formulas. Real-world results may vary due to environmental (temperature), material (product friction) or other considerations.

# Maintenance Screens

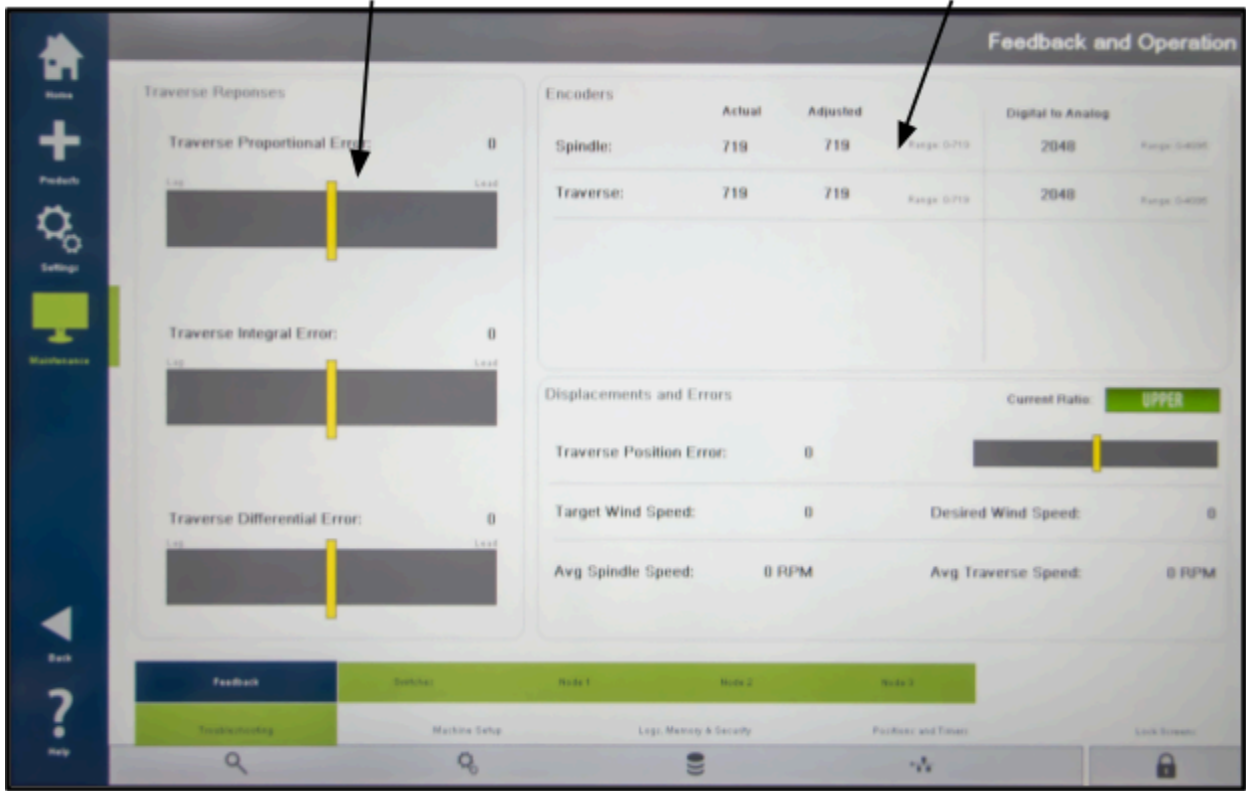
## Troubleshooting Screens

### Feedback

This is a read only Screen that shows the real-time values of encoders and motors. This screen can be used to identify potential encoder errors or motor displacements.

Monitor Traverse Performance and Accuracy

Monitor Encoder Values



### Traverse Responses

The Troubleshooting 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 motor is running too fast or too slow.

### Indicators of Problems

- If indicators are far off center, the drive most likely requires a tune up.

## Encoders

### Spindle and Traverse Encoders

Indicate encoder position and read a range from 0 to 719, representing two 360 degree rotations. Values for spindle and traverse should be somewhat close to each other and read sequentially.

#### Indicators of Problems

- Stop the machine and manually spin the spindle and traverse by hand. Numbers should be sequential and should not be able to go backwards.
- Numbers should be relatively close to one another, if not, the traverse and spindle are out of sync.

### Spindle and Traverse Digital to Analog

D to A value is a measure of speed with reference to the drive. Value is in binary and indicates what the board is outputting to the computer. Higher numbers indicate higher output voltage. The traverse D to A value should fluctuate above and below the spindle value, indicating a switch from upper to lower ratio.

The D to A numbers are 12 bit so the range of these numbers is between 0 and 4095. A value of 2048 is zero speed (mid point). Numbers greater than 2048 are forward speeds with 2048+1500 (3548) being full rpm forward, and 2048-1500 (548) being full reverse rpm. The numbers (ex: 3548 and 548) are approximate because certain factors can change the values that the computer sends out. For example, the computer is always monitoring the rpm of the spindle. If there is an increase in load on the spindle (such as exists with constant line tension and increasing coil diameter) the computer will see a drop in the number of degrees of spindle displacement in a given time interval and will respond by increasing the D/A value.

#### Indicators of Problems

- Excessively high or low values could indicate an out of tune condition or bearing failure.
- Spindle value should stay relatively constant. Traverse should fluctuate above and below spindle value.
- Numbers should increase at higher speed settings.

### Displacements and Errors

Traverse error indicates how far away the traverse position is related to where the program believes it should be.

Target Speed is a value of 0-1500 which indicates D to A output for drive reference.

Average RPM readouts should be within 20 RPMs of speed values set on the Speed Setup screen. If not, a drive tune up is recommended.

#### Indicators of Problems

- Traverse error should not indicate high numbers or be consistent.
- Average spindle RPM should be within 20 RPMs of set speed value determined by the Speed



Setup screen. If not, a drive tune up is recommended.

## Switch Panels

Shows current status of various switches on the machine without opening the control cabinet. Can be viewed from a panel or physical perspective.

View by Panel Location | View by Physical Location | DeviceNet Node 1 - Panel Location

VALVE DESCRIPTION	ADDRESS	TYPE
V2-2 ENDFORM IN	1B01	E
V2-4 ENDFORM OUT	1B02	E
V3-2 ENDFORM UP	1B04	E
V3-4 ENDFORM DOWN	1B08	E
V4-2 GUARDING OPEN	1B10	U
V4-4 GUARDING CLSD	1B20	U
V5-4 BLANK		L
V5-2 BLANK		L
V6-4 BLANK		L
V6-2 BLANK		L
V7-4 BLANK		L
V7-2 BLANK		L
V8-2 TRANSFER ARM UP	1C10	E
V8-4 TRANSFER ARM DOWN	1C20	E
V9-2 CUTTER IN	1C40	E
V9-4 CUTTER OUT	1C80	E

SWITCH DESCRIPTION	ADDRESS	TYPE
X1 - TABLE	1001	
X2 - TRANSFER ARM DOWN	1002	
X3 - ENDFORM ARM DOWN	1004	
X4 - ENDFORM ARM UP	1008	
X5 - ENDFORM IN	1010	
X6 - ENDFORM IN	1020	
X7 - UNUSED		
X8 - UNUSED		

DESCRIPTION	ADDRESS	TYPE
X1 - WIRE CLAMP	1A01	
X2 - OILER ON	1A02	
X3 - GUARD LOCK	1A04	
X4 - BLANK		
X5 - BLANK		
X6 - BLANK		
X7 - BLANK		
X8 - BLANK		

Main Panel | Node 1 | Node 2 | Node 3

Feedback | Switches/Valves | Machine Setup | Logs, Memory & Security | Positions and Timers | Lock Screens

View by Panel Location | View by Physical Location | DeviceNet Node 1 - Locations

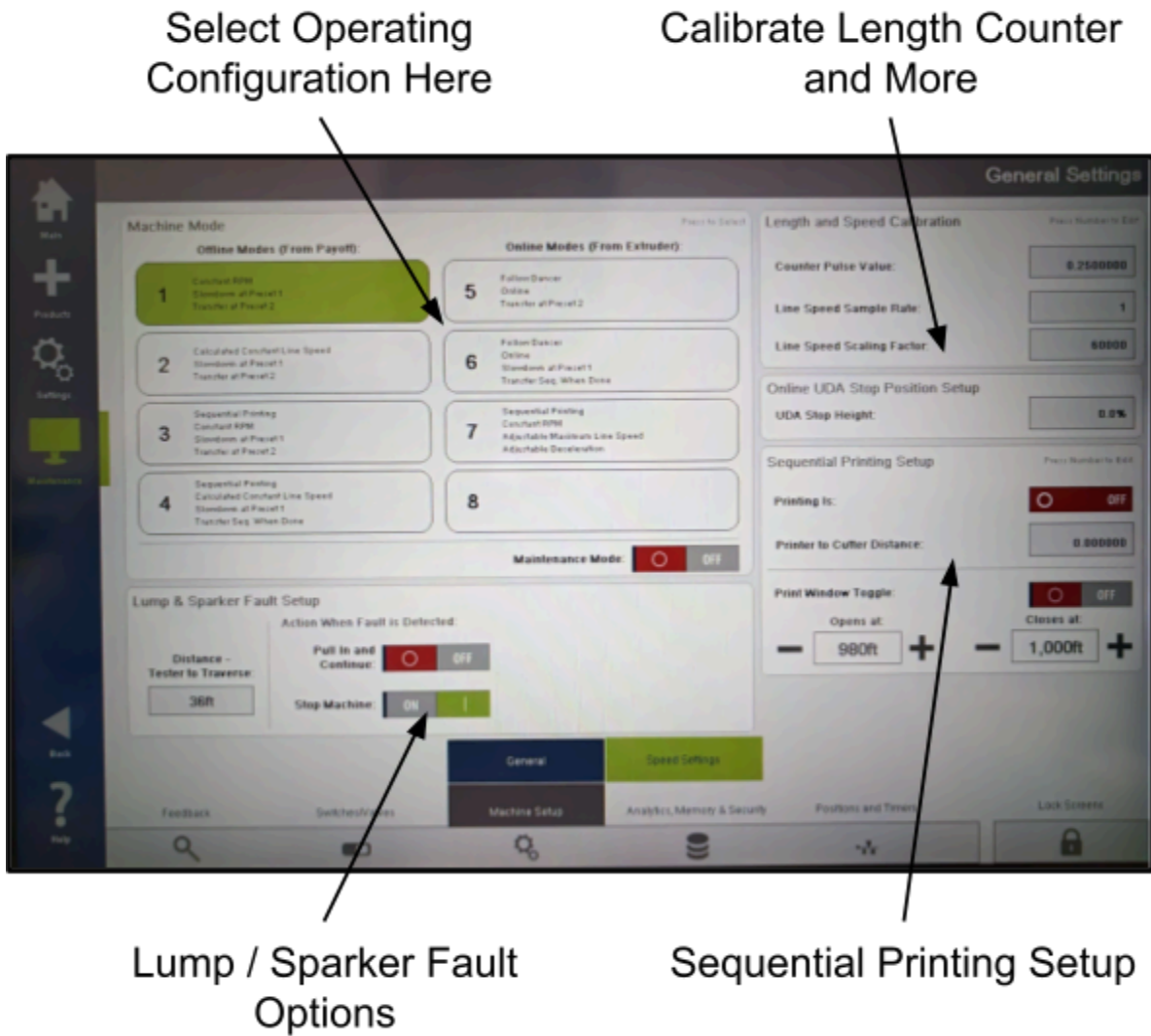
- 1001 Table
- 1008 Left Endform Arm Up
- 1004 Left Endform Arm Down
- 1020 Left Endform In
- 1010 Left Endform Out
- 1002 Transfer Arm Down

Main Panel | Node 1 | Node 2 | Node 3

Feedback | Switches/Valves | Machine Setup | Logs, Memory & Security | Positions and Timers | Lock Screens

## Machine Setup

Main machine and line setup screen configures how the machine operates.



## Machine Mode

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

## Length and Speed Calibration

### Counter Pulse Value

Default is 1 Pulse = 1 foot. If 4 Pulse per foot counter wheel is being used, divide 1 by 4 and Counter Pulse Value will be 0.25.

### Line Speed Sample Rate

Enter the number of Length Counter Pulses per sample. If 1 Pulse per foot counter wheel is being used, enter 1, if 4 Pulse per foot wheel is used, enter 4.

### Line Speed Scaling Factor

Used to adjust displayed length counter value on the HOME screen. 60000 is the base number (use for 1 pulse per foot wheel). Divide by length pulses per sample. If using a 4 Pulse per foot counter wheel, enter 15000.

## UDA Stop Height Setup

Used in mode 5 and 6 (online) to adjust the height at which the UDA signals the coiling machine to stop pulling in wire. Measured in % of total UDA sheave travel. Example: 10% is 10% from the top of the UDA.

## Sequential Printing Setup

### Distance - Printer to Traverse

Distance product must travel from the printer to the traverse (in feet).

### Sequential Window

The Print Signal Window causes the machine to only see print signals within a footage window. If the print window is on, the machine will ignore all print signals or marks outside of the window.

#### 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.

## **Lump and Spark Detector Setup**

### **Distance - Tester to Traverse**

Distance product must travel from the sparker to the traverse (in feet).

### **Action When Fault Detected**

These switches determine how the machine behaves if a lump or spark fault is detected.

If STOP MACHINE is on, the machine will immediately stop if a fault is detected. If PULL IN AND CONTINUE is on, the machine will pull the fault in and finish the coil.

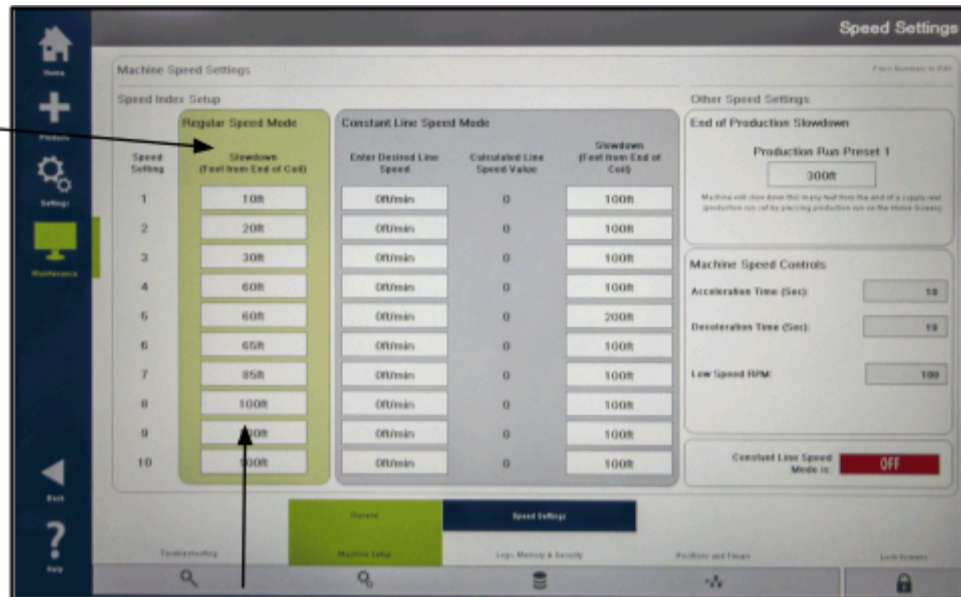


## Speed Setup

### About REELEX Machine Speed

REELEX machines have 10 speed settings, 1 being the slowest and 10 being the fastest. Speed 10 represents the fastest that the motors can safely run (typically 750 RPM). The speed switch incrementally increases or decreases run speed.

The currently active Speed Mode will be illuminated in green.



These Lengths define Slowdown, or "Preset 1"

### Two Speed Modes

REELEX machines are equipped to run in two speed modes: **Regular** and **Constant Line Speed** (or CLS). Regular speed 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 Mode under the [Machine Setup](#) Screen

#### A. Regular Speed Mode

Machine follows RPM speed values set on the terminal inside the controller.

#### B. Constant Line Speed Mode (CLS)

Machine will calculate RPM values for each speed index based on corresponding line speeds.

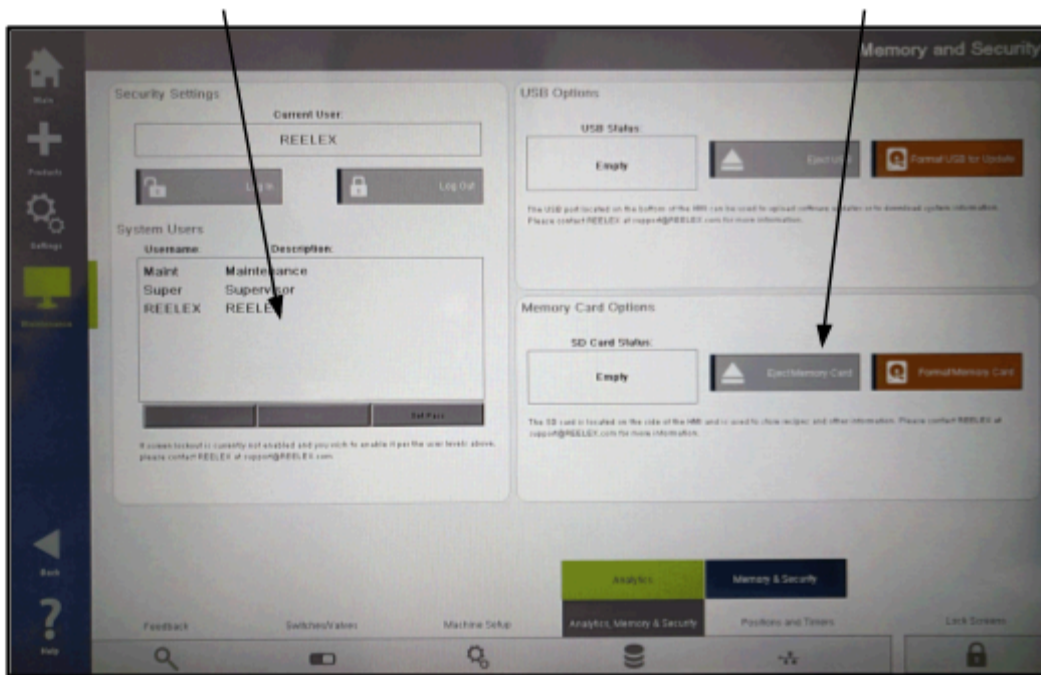
#### Desired Line Speed

Enter desired line speed in FEET per MINUTE for each speed setting. The machine will calculate corresponding values to achieve this line speed when in CLS mode.

## Logs, Memory and Security

To change a password, select the username and press “Set Pass”.

Use these buttons to eject or reformat the SD card.



### Security Levels

The HMI is set up into four levels of access:

- **Operators**
  - No Login or password required. Can access HOME and PRODUCTS screens.
- **Supervisors (Super)**
  - Can access SETTINGS screen, make coil adjustments and save or delete products. Cannot access Maintenance screens.
- **Maintenance (Maint)**
  - Can access all screens.
- **REELEX Technicians (REELEX)**
  - Used by REELEX personnel only

**NOTE:** The default password for “Maint” and “Super” is: **reelex** (all lowercase)

**You may change passwords for each user after successful commissioning.**

## To Change Passwords

Select the username and press “Set Pass”

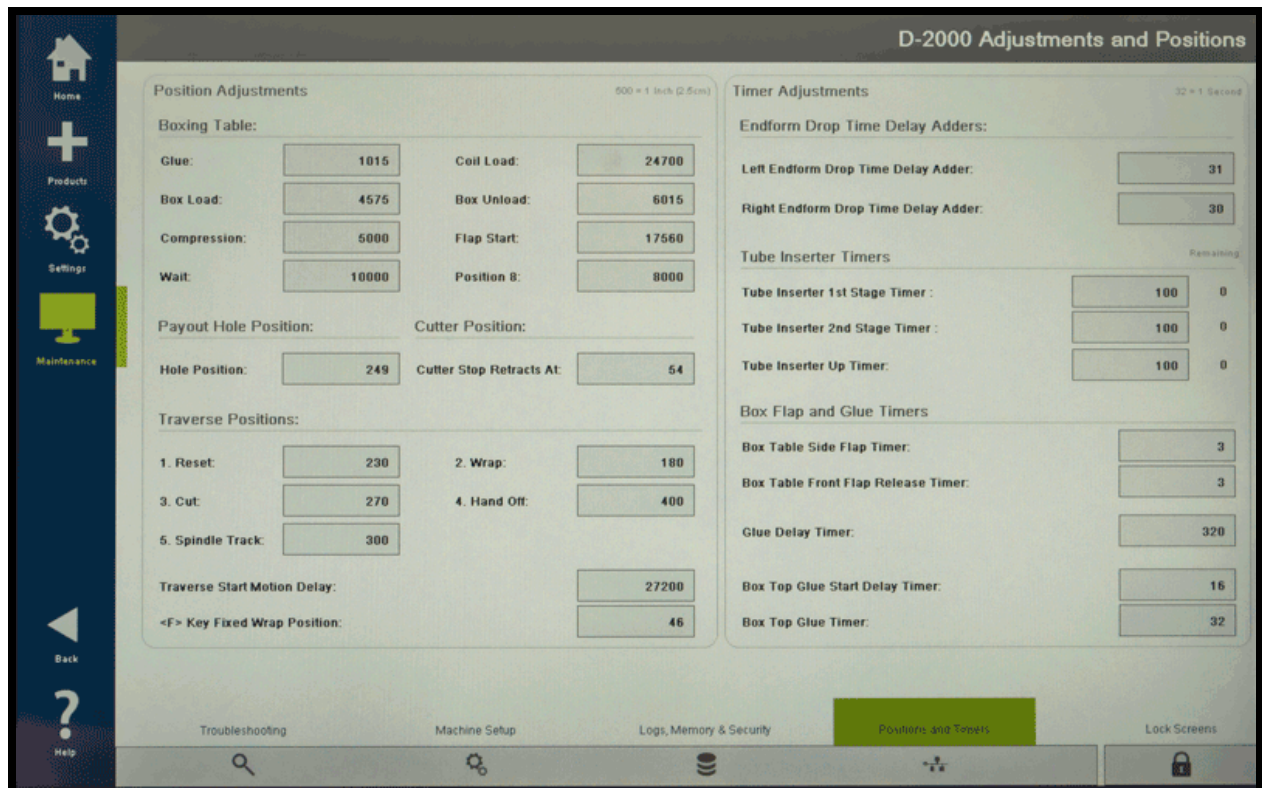
## Memory Card Options

The SD card located in the side of the HMI can be removed and accessed on computer. It will store packaging logs, product files and more.

If the SD card becomes corrupted or you are using a new SD card, you must press “Format Memory Card” before use in order to erase and set up the necessary directories for HMI functionality.

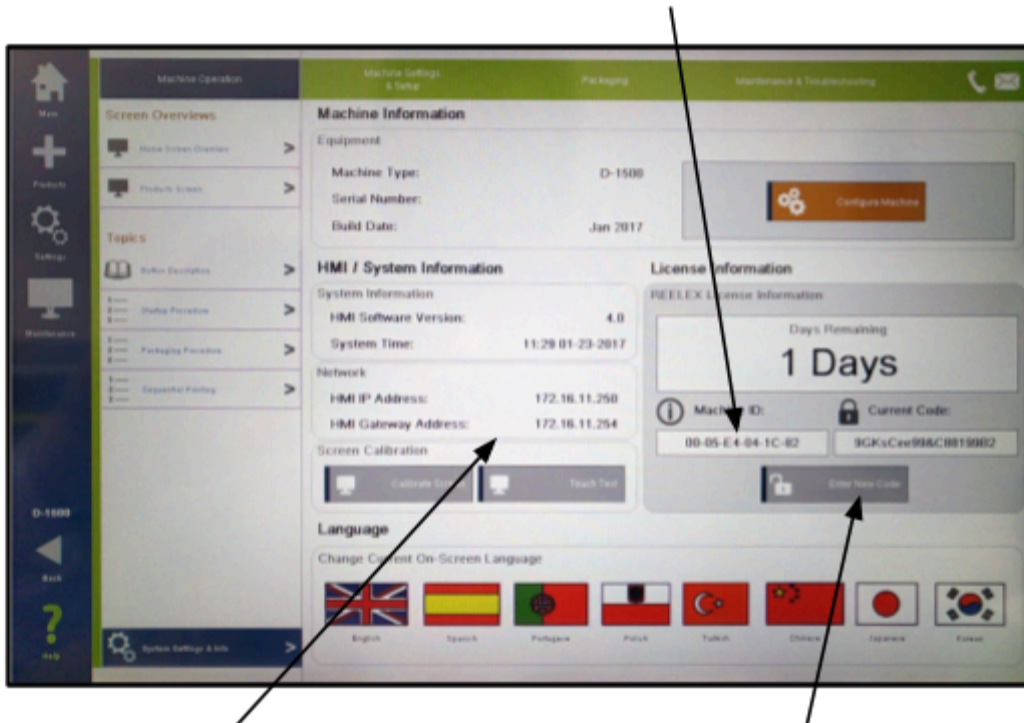
## Positions and Timers

**WARNING:** These are typically set up at commissioning and should not be adjusted unless necessary. Improper adjustment could cause significant equipment damage!



# System Information and Licensing

Your Unique Machine ID is here. Please provide it to REELEX exactly as shown if requesting a new code.



Want to access your machine via browser? Use these addresses.

Press here to enter a new code. Enter EXACTLY as provided.

## Machine Configuration

Pressing this button will open a popup configuration screen. It is important to select the correct machine type, as this drives different options on the HMI.

## HMI / System Information

The HMI includes web access built in. By connecting to the machine via Ethernet port (located on bottom of HMI), you can remotely access the REELEX machine's HMI and make adjustments if necessary. Use these addresses to connect.



# Information about Codes and Licensing

## Why Codes?

To insure payments are current and to prevent unlawful patent infringement, a code system is used that allows an authorized REELEX licensee to run the machine for one year. This system disables the REELEX machine in the event of machine sale, bankruptcy, black market sale, account delinquency or unauthorized or unlicensed use of REELEX.

Every year a new code must be entered in order for the machine to continue running. Codes will be provided when licensee account balances are current and paid.

## How does it work?

Each year, a new unique code will be emailed to you. You must enter this code EXACTLY as provided by pressing the “Enter Code” button.

A three month and one month reminder will display for convenience.

## What happens when the time remaining reaches 0?

The machine will be rendered inoperable and will lock. A new, valid code must be entered to continue running.

