INTELLISPEC™

High Frequency Module Series 6

Pressco Technology Inc.

80657 Rev. 01

Hardware Guide Addendum

Written and designed at:

Pressco Technology Inc. World Headquarters

29200 Aurora Road

Cleveland, OH USA 44139-1847

TEL +1-440-498-2600

FAX +1-440-498-2615

www.pressco.com

Business Hours: Monday - Friday, 8:00am - 5:00pm Eastern Time

Customer Support:

24/ 7 Customer Support (for urgent system help): +1-440-498-2000

e-mail: Schedule a service visit: ***dispatch@pressco.com*** (***mailto:dispatch@pressco.com***)

Request technical support and remote support: ***techsupport@pressco.com*** (***mailto:techsupport@pressco.com***)

Customer Service Fax: +1-440-498-4761

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Chapter 1

High Frequency Inspection Module

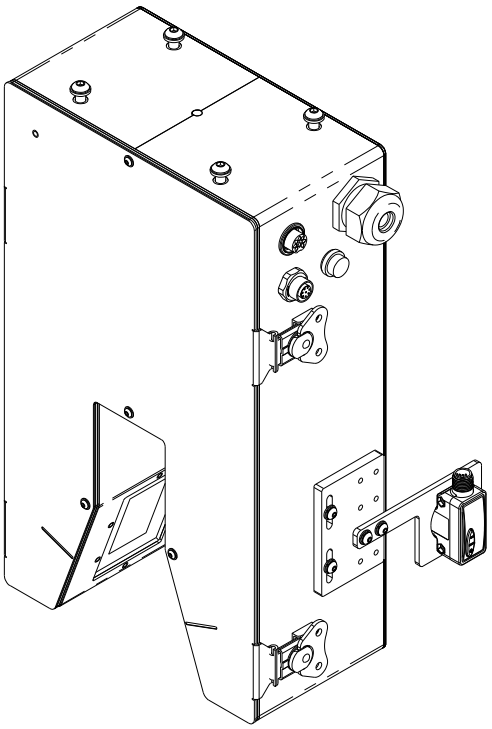
This module senses the fill level of the liquid in a bottle. Instead of camera inspection, it emits a high-frequency signal within the tunnel. A sensor takes a frequency reading. When a bottle is not present, the frequency remains constant. When a bottle is present, the frequency is reduced. The fill level affects the frequency reading. A lower fill level has a lower frequency, and a higher fill level has a higher frequency.

❖ *Note: the sensor values shown on screen (example: 504) are only merit values computed by the system. They DO NOT represent volume or fill level.*

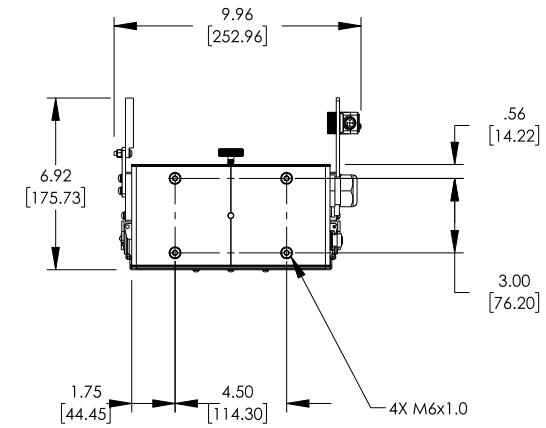
You will set limits on the fill levels. The Intellispec system will reject bottles that measure outside of the acceptable fill range.

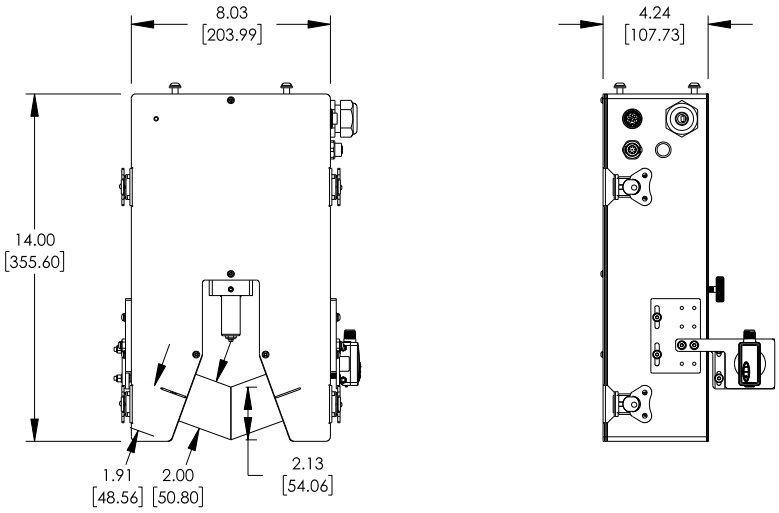
This module may be purchased as a standalone module, or in combination with a Cap 360 Inspection Module.

There are two **standalone** models: model 74311 with no cap detection, and model 75659 with cap detection.



Dimensions - High Frequency Module

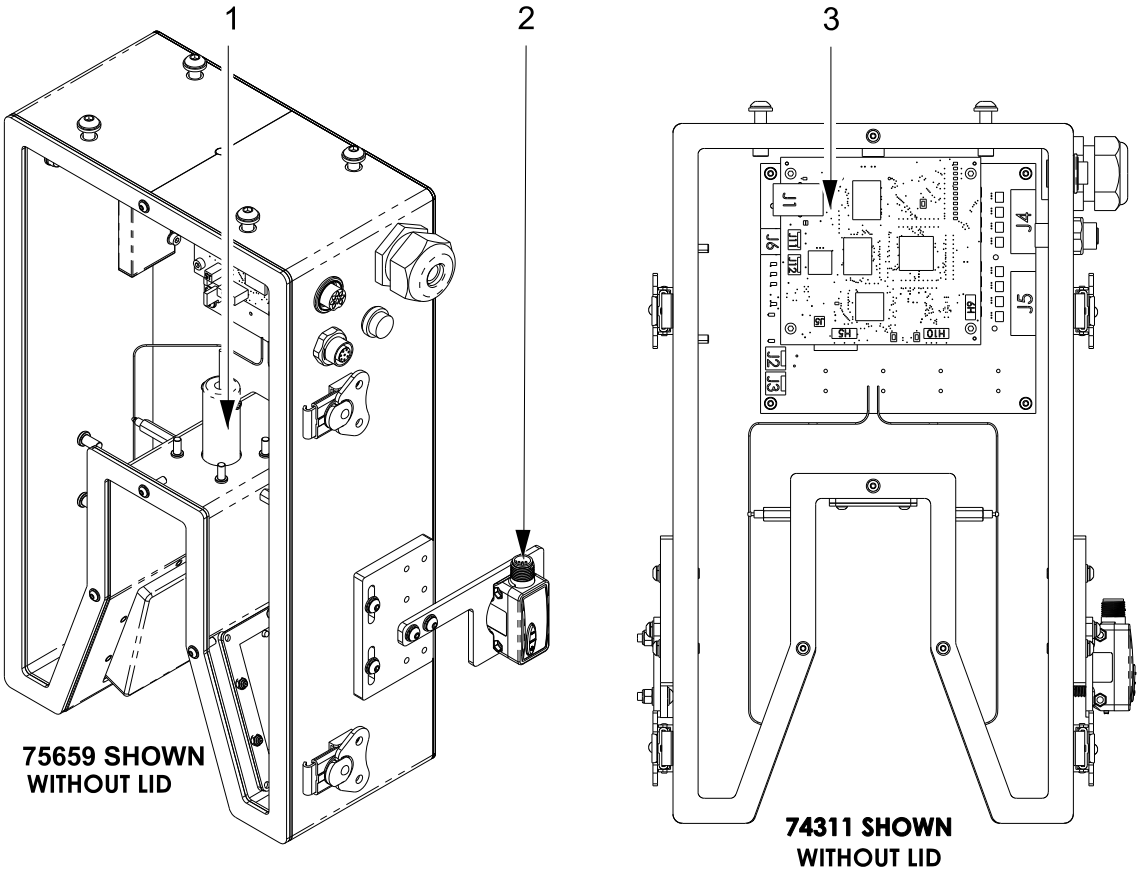




STANDARD BOTTLE CONFIGURATION

The measurements are in inches. The numbers in brackets are in millimeters.

Components included in the High Frequency Module



1) Cap sensor (only on model 75659)

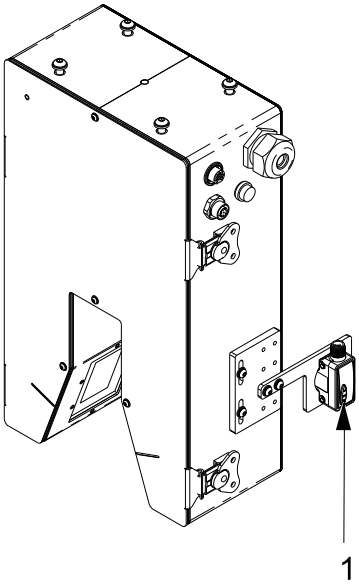
2) Part Detector (only present if the High Frequency module is installed without the Cap 360 module)

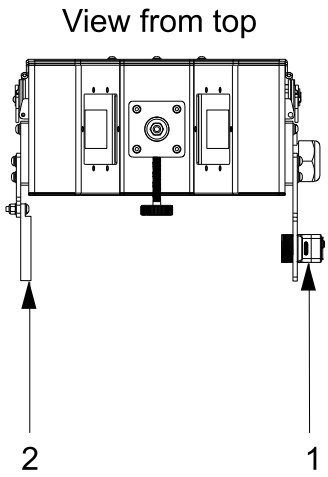
3) Electronics board for high frequency module

Part Detector with High Frequency Module

If your High Frequency Module is installed with a Cap 360 Inspection Module, then the Cap 360 part detector is used to detect bottles.

If your High Frequency Module is installed as a standalone module, then the part detector and reflector are mounted as shown below.

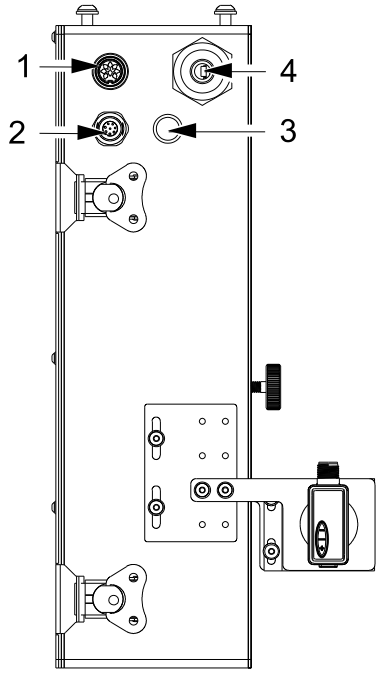




1) Part Detector

2) Reflector

External Connections



1) Trigger/ power cable

2) Encoder input

3) LED indicator. This LED illuminates when a cap is detected on the bottle.

4) Cable conduit for Pressco Data to the vision processor

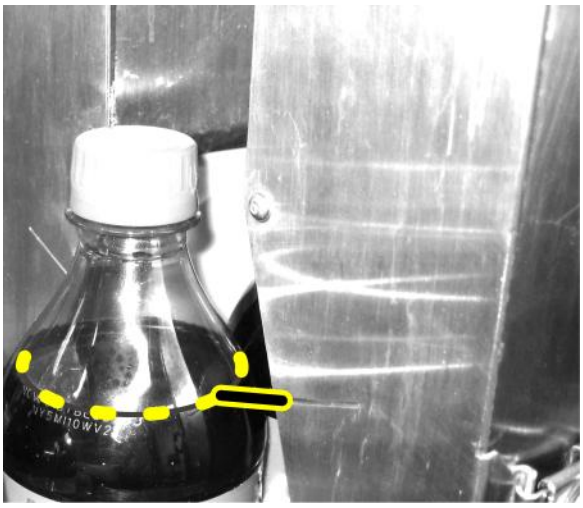
Part Changeover - Module Height Adjustment

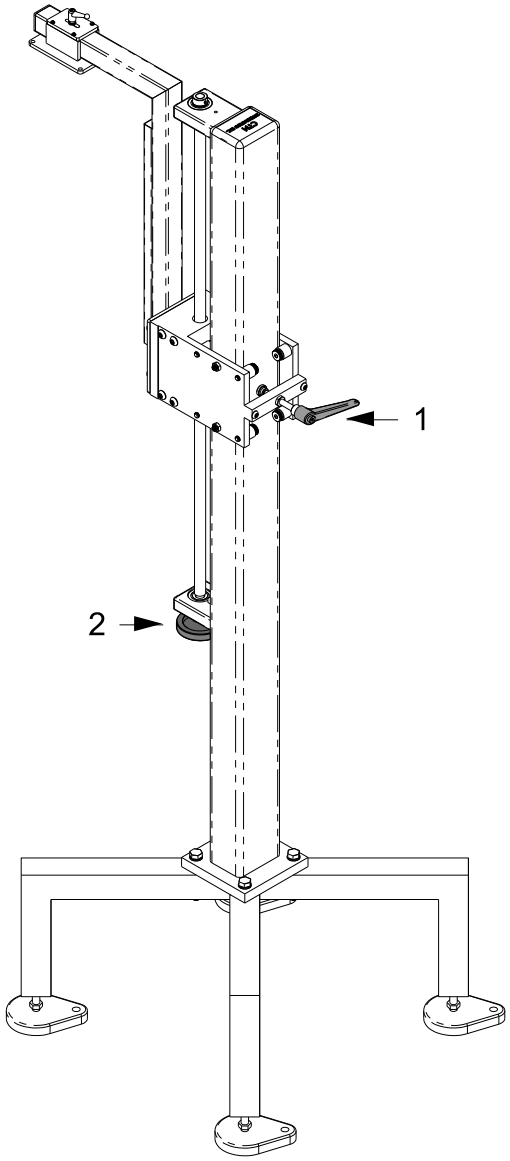
If you begin inspecting a different size bottle, then you may need to adjust the module height.

If your module is installed with a Cap 360 module, then both modules are mounted on the same bracket. They will move up and down at the same time. See Part Changeover - Camera Height Adjustment for Cap 360 module.

If your module is a standalone module, then adjust the module height:

The module should be positioned so that the notches in the module frame point to the desired fill level of your bottles.





1) locking handle: loosen to adjust height, then tighten after adjustment

2) turn the knob to adjust module up or down

Maintenance

 Turn off power before opening the module or cabinet.

When conducting maintenance or repair work:

	Follow the Machine Maintenance Lockout Procedure.
	Before starting the machine, ensure that no person is close to the machine.
	If maintenance or repair requires the disconnection or removal of safety or protection systems, authorized personnel who ensure the prevention of personal injury or damage to the machine must supervise this operation. All machine movements must be performed with limited speed and limited movements.
	Exclusively authorized and trained personnel must carry out maintenance or repair work on electrical components. When running tests with power connected, you must strictly comply with the rules provided.
	Personnel working on higher parts of a machine must wear a harness and hook it on to a structure and must always move with extreme caution. The harness must not be connected to Pressco equipment or structure as it cannot support body weight.
	Never perform lubrication or maintenance procedures on mechanical parts with the machine running.

Clean the Part Detector

The part detect sensor and reflector surfaces of the part detector must remain clean to properly detect parts. Clean these surfaces regularly to prevent dirt and oil build-up.

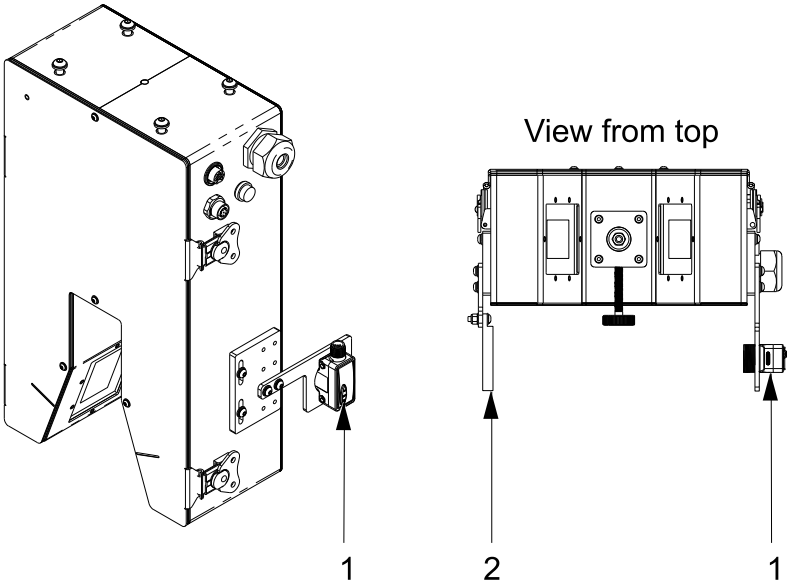
➢ ***To clean the part detector:***

- Clean the part detector surfaces with a soft, clean, lint-free cloth dampened with a mild soap and water solution
- Clean the sensors on both sides of the conveyor

❖ *Note: The frequency of cleaning will depend on plant and process conditions.*

If your High Frequency Module is installed with a Cap 360 Inspection Module, then the Cap 360 part detector is used to detect bottles.

If your High Frequency Module is installed as a standalone module, then the part detector and reflector are mounted as shown below.

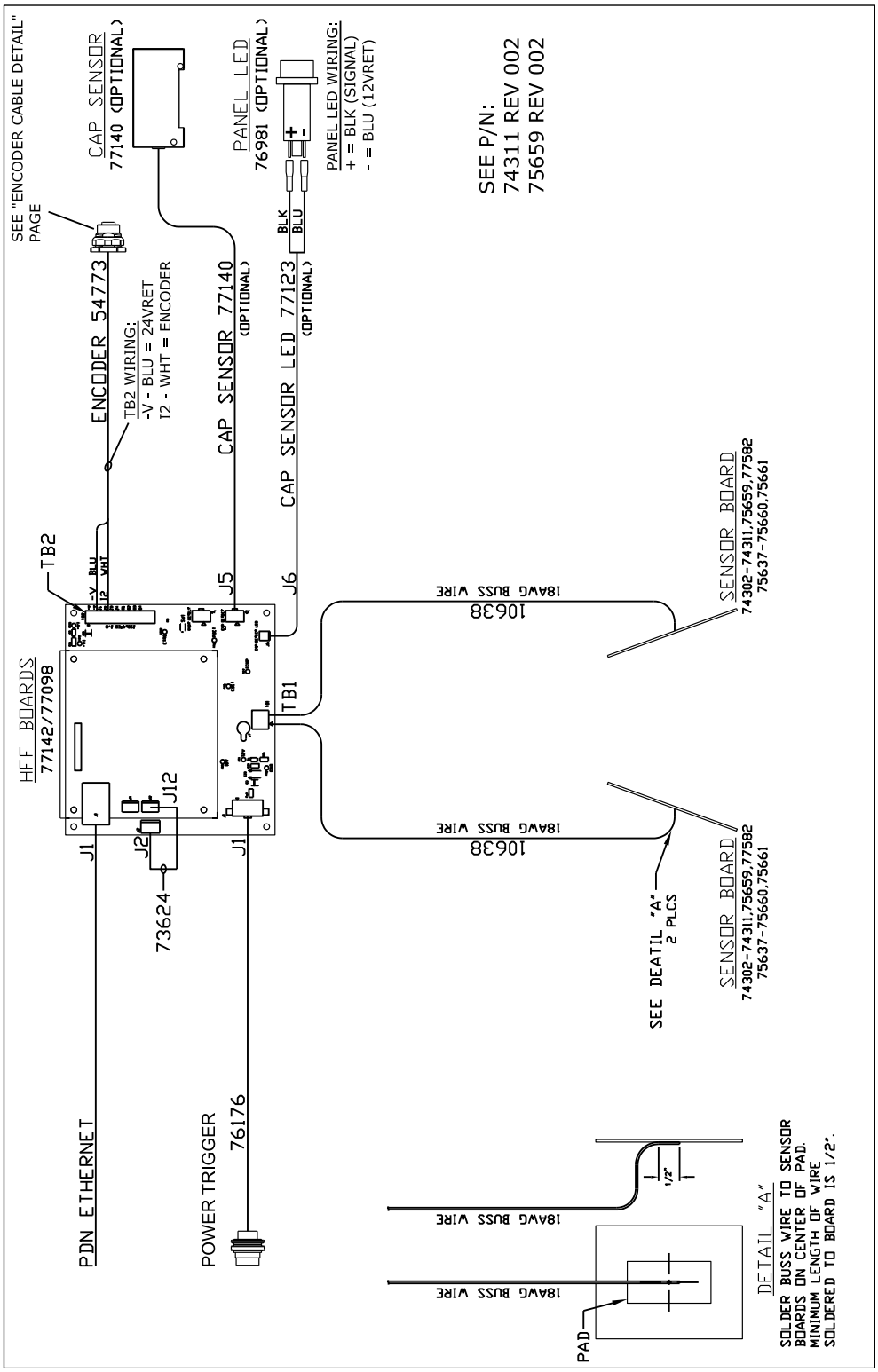


1) Part Detector

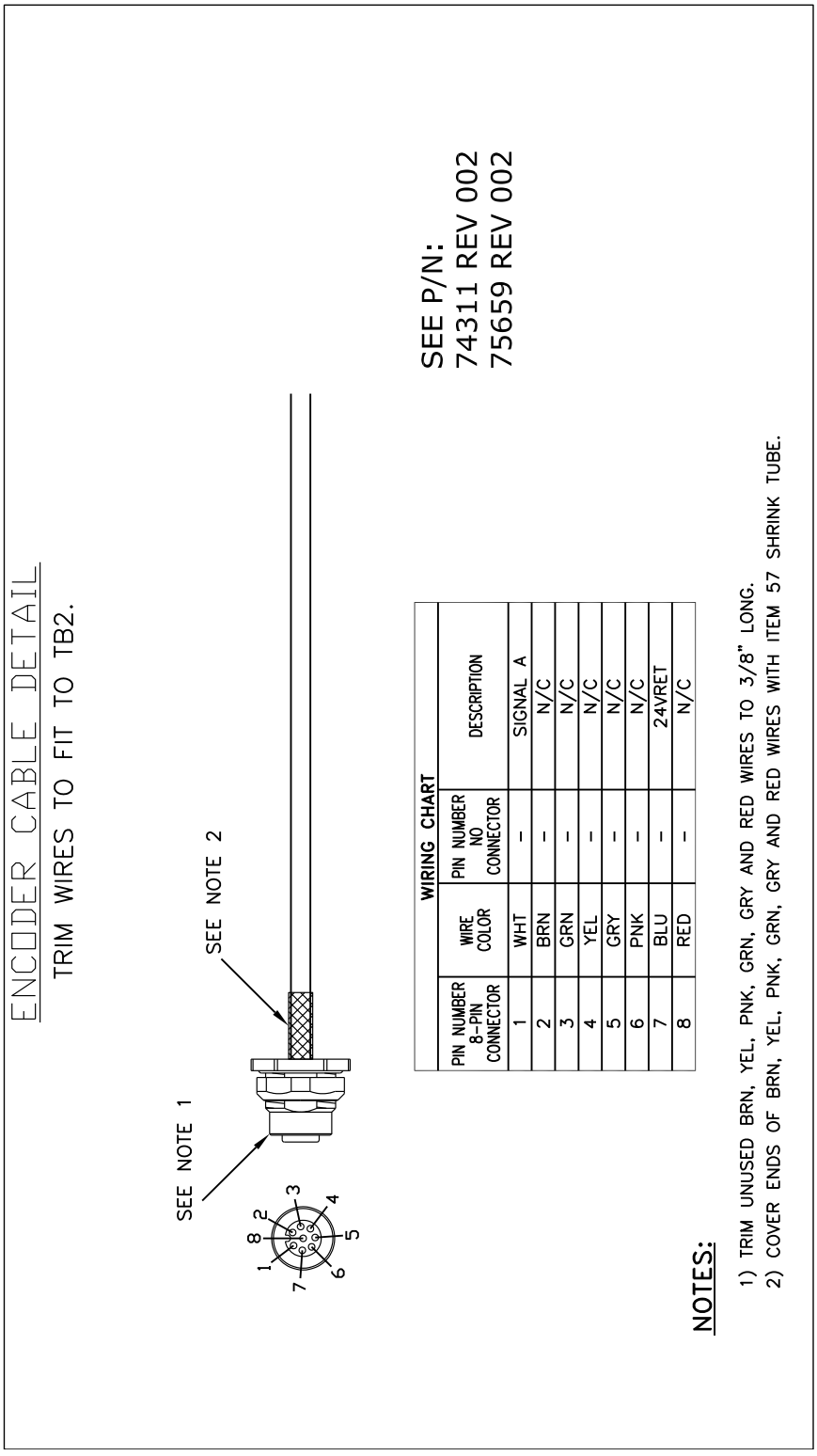
2) Reflector

Wiring Diagram - High Frequency Module

F1766W revision 4



Wiring Diagram - High Frequency Module Encoder Cable



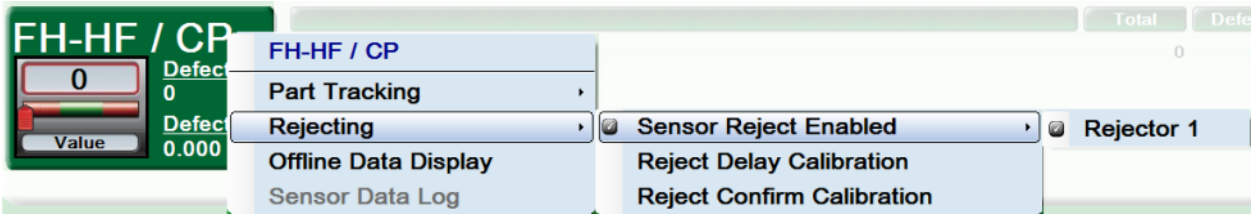
Chapter 2

Software Setup for High Frequency Inspection Module

This information is valid as of Intellispec software version 6.0.023

High Frequency Sensor Menu

Right-click over the High Frequency sensor button to see menu items specific to this sensor.



Part Tracking

- ***Part Present Delay Calibration*** (on page 15)
- ***Part Width Calibration*** (on page 18)

Rejecting

- **Sensor Reject Enabled** - (Toggles to Reject Disabled) Enables or disables the rejector for the Sensor only. If you put the system online, you will see a message that it is disabled.
- ***Reject Delay Calibration*** (on page 19)
- ***Reject Confirm Calibration*** (see "***Reject Confirm Calibration (Optional)***" on page 20)

Offline Data Display

Offline Data Display (on page 23) - This menu displays sensor readings when the lane is offline. It can be used for troubleshooting.

Sensor Data Log

This is used by Pressco Engineering.

Part Present Delay Calibration

Part Present Delay is the distance (in encoder pulses) from the part detect sensor to the center of the part. The Part Present Delay ensures that your part is in the center of the sensor when the system takes its samples. A Part Present Delay calibration needs to be done for each mass sensor in the system.

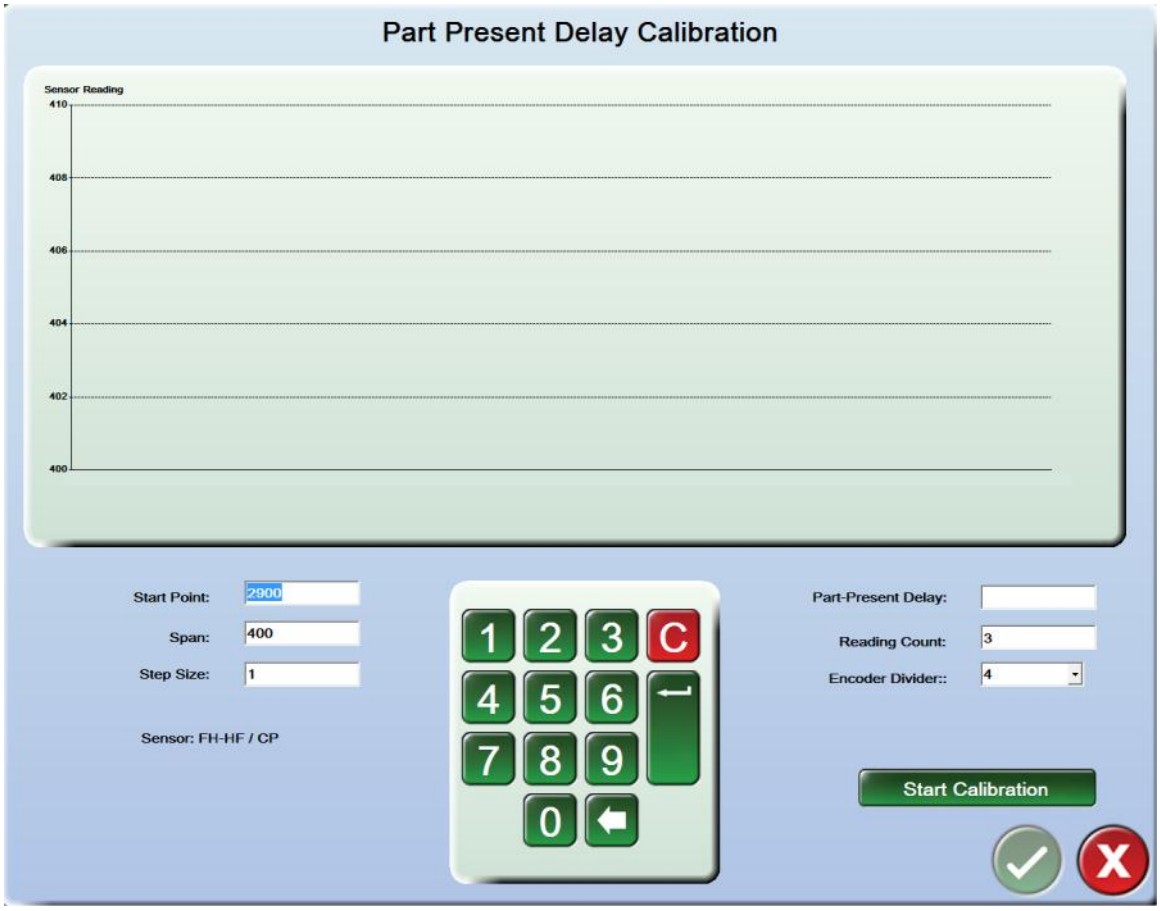
❖ *We recommend that you check Part Present Delay weekly.*

This technique takes approximately two minutes to complete.

➢ ***To calibrate the part present delay:***

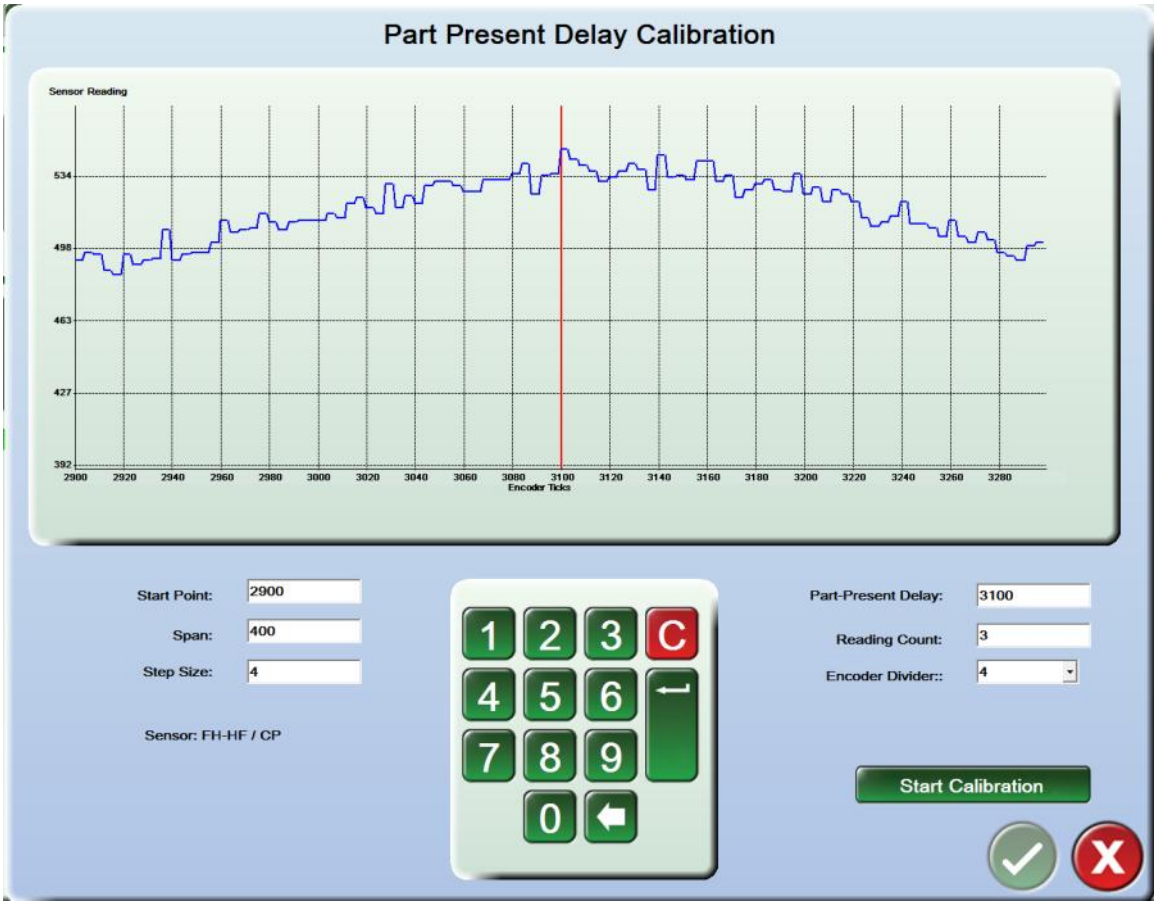
1. Make sure the lane is offline (the traffic light is red).

2. Right-click on the sensor button, select **Part Tracking** | **Part Present Delay Calibration**. The Part Present Delay Calibration screen will be displayed.



3. If this is your first time using this screen, set the parameters (**Start Point, Span, Step Size**). For information about these parameters, see below.
4. Make sure bottles are running through blow molder (or conveyor) and click **Start Calibration** to begin the calibration procedure. This could take several minutes and hundreds of bottles depending on the values entered. To cancel this procedure during acquisition, click **Cancel Calibration**. Otherwise, the system will continue to take measurements until all points have been plotted and the button will change back to **Start Calibration**.
5. A bottle profile should appear on the graph, similar to the one shown below. The graph should have a peak towards the center of the graph. If you cannot see all parts of the profile, consider calibrating again, but first change the Start Point, and possibly the Number of Points and/or Step Size to allow the entire profile to appear on the graph.
6. The system will determine the approximate center of the bottle, using the profile. An example is shown below.
7. Set the Part Present Delay parameter to the Encoder Tick value at the peak of the bottle profile graph. It would be 3100 in the example below.

8. Click the OK button to save changes and exit the menu. Note: the OK button is grayed out until you change the value for Part Present Delay. If you want the value for Part Present Delay to remain the same, then click the exit button to cancel changes and exit.



Parameters

Start Point

The number of encoder pulses after the part detector that the system will start taking measurements. Pick a number lower than the estimated Part Present Delay, as the beginning of a range.

Span

Define the end of the range of measurements. If Span is 250, and Start Point is 1300, the system plots 250 readings on the graph beginning at 1300 (Start Point), at increments of 1, and ending at 1550.

Step Size

Specify where the system should take the next reading. We recommend a step size of 1 to 3. If Start Point is 1300 and Step Size is 1, the next reading will be recorded at encoder pulse 1301. A smaller number takes a longer time to calibrate, but will probably be more accurate.

Part Present Delay

The number of encoder pulses from the part detect sensor to the center of the part. After calibration, enter the peak value from the graph (where the red line falls).

❖ *Note: Reading Count and Encoder Divider are used by Pressco Engineering. You should not have to change these values.*

Reading Count

We recommend leaving this number at three. This is the number of readings that the module will take for each part, and compute the average of those three readings. If set to three it will take three readings for each part. Readings are taken in sync with the encoder signal based on the Encoder Divider.

Reading Count and Encoder Divider work together to allow taking a span of readings across the liquid level of a bottle, and then averaging those readings to compute a single merit value for that bottle. **Example**, if a bottle has a part width measurement of 64 counts (measured at the cap; full bottle width would be approximately 150 counts), and you set Encoder Divider to 32, Reading Count to 3, then the system would take readings at -32, 0, and +32, and then average them. For this example, this range of points spans the cap. If you change Reading Count to 5, then the readings would be taken at -64, -32, 0, +32, and +64. This range of 128 spans more of the bottle. If you increase the Reading Count to 7, the system takes readings spanning -96 through +96. Some of those points are 'off' the bottle, yielding erroneous results. The best practice is to acquire a tighter span of points within the cap limits. For this example, the Encoder Divider = 32; Reading Count = 3. This is a span of 64. For higher resolution (more readings), Encoder Divider = 4; Reading Count = 17. This also yields a span of 64.

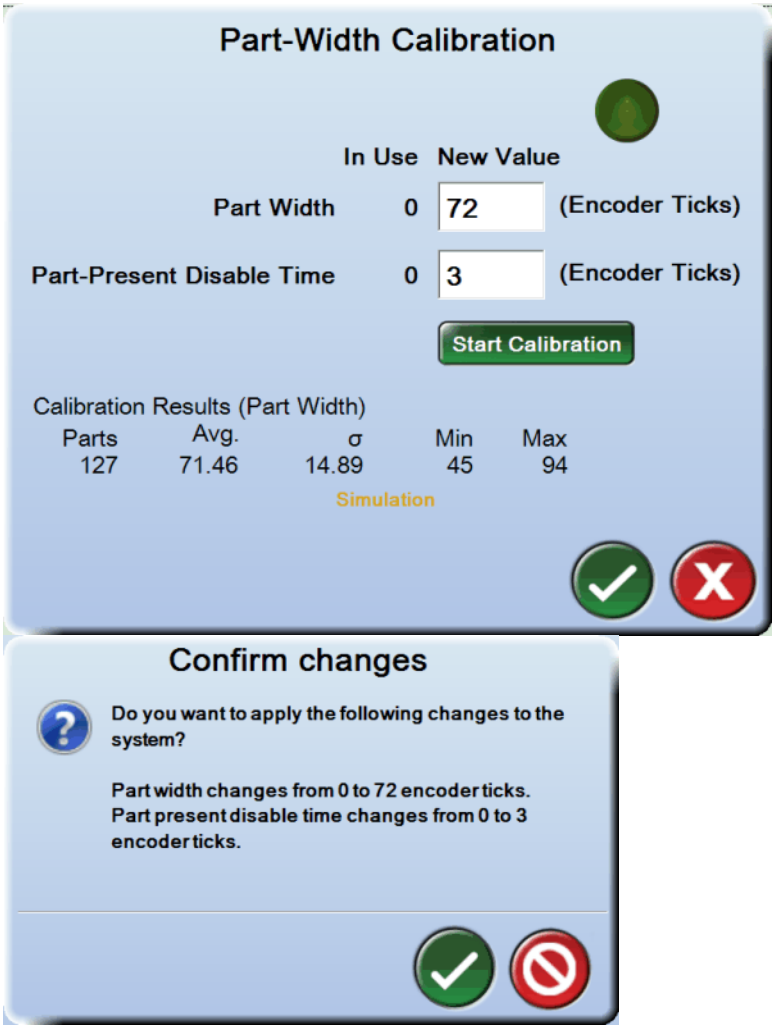
Encoder Divider

This number sets the timing of the Readings with the encoder signal. If set to one it will take a reading every encoder pulse. If set to four, it will take a reading every fourth encoder pulse. It will stop taking readings when it equals the Reading Count parameter. Valid settings are: 1, 2, 4, 8, 16, and 32.

Part Width Calibration

Part Width is the number of encoder ticks that the part detect sensor "sees" the part. To perform the calibration you must be running parts past the part detect sensor.

Mechanic level user and higher



➢ ***To calibrate the Part Width:***

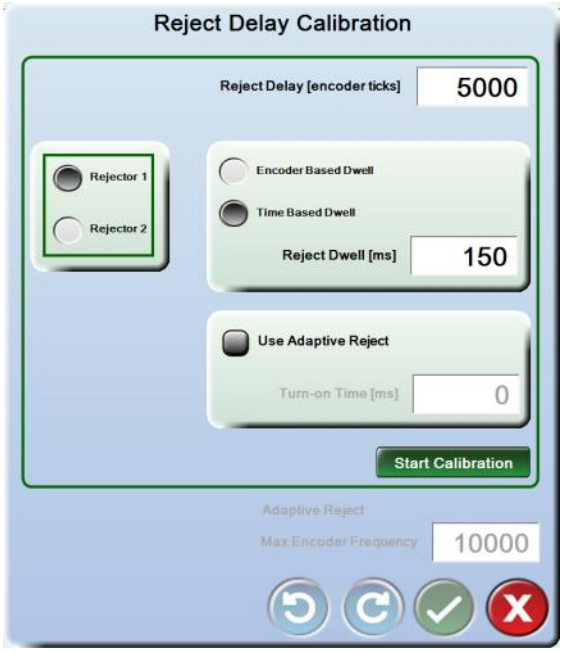
1. From Sensor Overview mode, right-click a sensor button | **Part Tracking** | **Part Width Calibration**.
2. With parts running under the camera or sensor, select **Start Calibration**. As each part goes by its width is displayed in Part Width field.
3. After a sufficient number of parts have gone by (we recommend about 10 parts), select **Stop Calibration** (same button as Start Calibration). This will display the calibration results in the lower part of the screen.
4. Examine the results; look for the **minimum** and **maximum** values to be within approximately 10 encoder ticks of each other. If the results are acceptable select OK to save the data. If the results are skewed, recalibrate the part width. To exit without saving the changes, select the exit button.
5. The system will prompt you to confirm your changes. If the results are acceptable select OK to save the data. If the results are skewed, select the cancel button and recalibrate.

Reject Delay Calibration

Calibrate the distance (in encoder ticks) from the part detect sensor to the rejector. This ensures that the correct part is rejected.

During Reject Delay calibration, the reject device will activate for each part. After calibration, ensure that adjacent parts are not being rejected (example, from too long a reject dwell time), nor being knocked off by the rejected part.

For an illustration of the Reject Time Delay within the inspection process, refer to the Sequence of Events During Inspection.



❖ *Note: you must be logged in with proper user access to calibrate the Reject Delay.*

➢ *To calibrate the Reject Delay:*

1. From Sensor Overview mode, right-click a sensor button | **Rejecting** | **Reject Delay Calibration**.
2. Select the **Start Calibration** button.
3. Place a part on the running conveyor or into the part stream. After the number of encoder ticks shown in the Reject Delay box, the rejector will be activated.
4. Make sure the correct part was rejected.
5. Continue to insert parts into the part stream.
6. Manually adjust the reject delay (encoder ticks) until the correct part is rejected every time.
7. Adjust **Reject Dwell** so that it is long enough to completely reject the part, and short enough that only one part is rejected for each reject pulse.
8. When completed, select the **Stop Calibration** button. The Reject values are saved and stored in a Lane configuration file.
9. Select the OK button to save changes and exit.

Reject Dwell

The duration of the reject signal. Dwell can be set by encoder ticks or by milliseconds. Select the correct button for your application. This signal must be long enough to ensure the part is effectively rejected, and short enough to ensure that only one part is rejected for each reject pulse.

Adaptive Reject

Adaptive Reject (optional)

Reject Confirm Calibration (Optional)

Reject Confirm can detect missed rejects. It is used with the Missed Reject Alarm. There are two types of Reject Confirm sensors, and calibration is different for each. The type used in your process depends on your plant's needs.

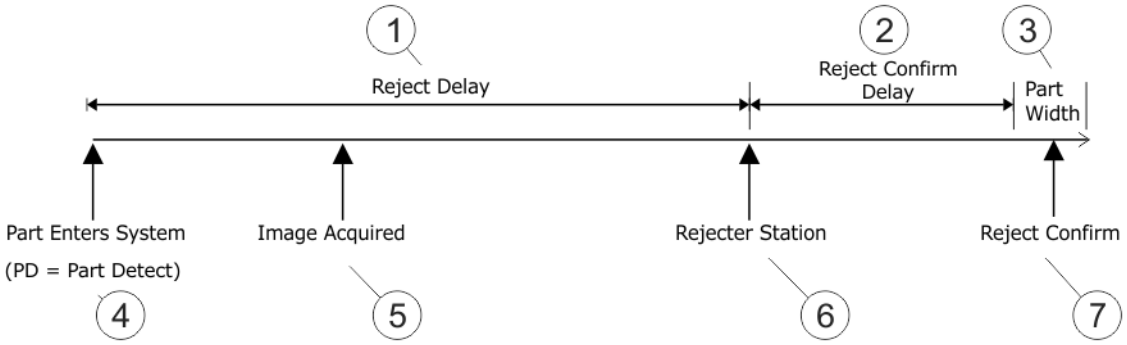
❖ *Note: Reject Confirm is an optional feature, and an additional sensor must be installed at your site.*

A. Encoder-based sensor

Reject Confirm uses a part detect sensor positioned past the normal reject mechanism to determine whether the defective part was rejected. Reject Confirm Delay must be a value of 1024 or less. This calibration method uses encoder ticks because the measurement is made along the same path as the parts.

After the rejector fires (meaning the reject delay for a part has passed), the Reject Confirm Delay starts. Once the Reject Confirm Delay has passed, the system examines the reject confirm sensor for a period of time equal to the Part Width. If the reject confirm sensor "sees" a part within that time, it means that the reject was missed. If the reject confirm sensor does not see a part, it means the part was rejected successfully.

If the reject was missed, the Missed Reject Alarm will be triggered (if enabled). Below is a timing diagram of the Reject Confirm process.



1) ***Reject Delay*** (see "***Reject Delay Calibration***" on page 19)

2) Reject Confirm Delay, set by Reject Confirm Calibration

3) ***Part Width*** (see "***Part Width Calibration***" on page 18)

4) Part Detect (PD) - where the part is first detected by the sensor

5) Image Acquired - image is taken, inspection is performed

6) Rejector Station - standard rejection point

7) Reject Confirm - second part sensor to determine whether a defective part was rejected

B. Time-based sensor

With this method of Reject Confirm, the part detect sensor is mounted in the path of the rejected products. This calibration method measures the reject confirm delay in milliseconds, because the product is flying through the air and not related to encoder ticks. If the Reject Confirm sensor does NOT see a part, then it triggers the Missed Reject alarm.

➢ ***To set up Reject Confirm Calibration:***

1 - Enable the Missed Reject alarm

Go to Rejector Alarms - Configuration - to enable the **Missed Reject** alarm. If you are using **time-based reject confirm**, you may also want to enable the **Jam at Reject Confirm** alarm, which is triggered when the reject path has been blocked too long. That is, the reject bin may be blocked or full.

2 - Calibrate Standard Reject Delay

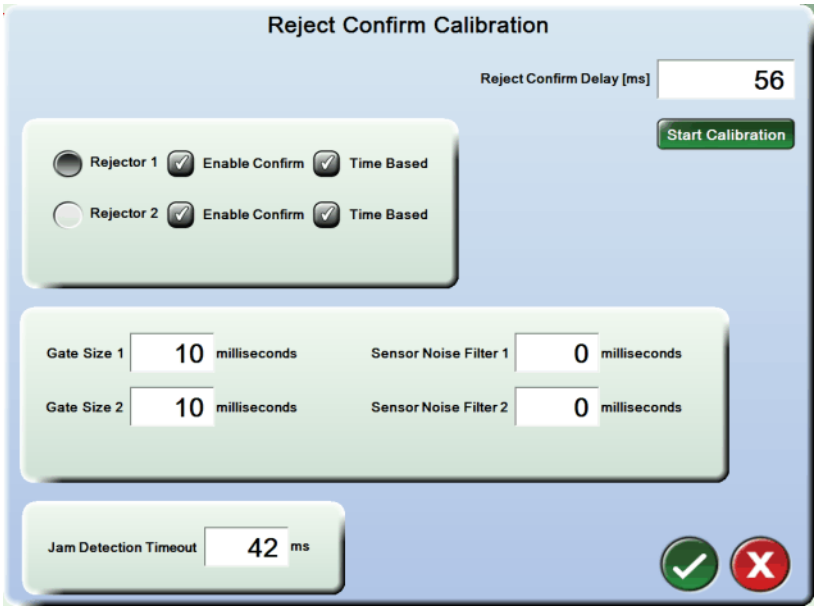
Calibrate the standard ***reject delay*** (see "***Reject Delay Calibration***" on page 19) using normal procedures.

3 - Set up Reject Confirm

Using encoder-based Reject Confirm: Mount the Reject Confirm sensor at "X" distance beyond the rejector where "X" is distance in encoder ticks. For example, if there are 70 encoder ticks per inch, and the sensor is mounted five inches beyond the rejector, the Reject Confirm Delay would be set to 350. When the Reject Confirm sensor sees a part that is not supposed to be there, it triggers the Missed Reject alarm.

❖ *Note: The maximum setting for Reject Confirm Delay is 1024. Mount the Reject Confirm sensor within that range of encoder ticks.*

Using time-based Reject Confirm: Mount the Reject Confirm sensor so that it can see parts after they are rejected. For example, in the reject chute. If the sensor is closer to the rejector, less gate and dwell time is needed. If the Reject Confirm sensor does NOT see a part, then it triggers the Missed Reject alarm.



➢ *To calibrate Reject Confirm:*

1. From Sensor Overview mode, right-click a sensor button | select **Rejecting** | **Reject Confirm Calibration**.
2. Enable Reject **Confirm**.
3. If using time-based Reject Confirm, then also check the Time-Based box, and set Gate Size, Sensor Filter and Jam Detection Timeout.
4. Select the **Start Calibration** button.
5. Run a part through the system. Tip: for best results, run about 10 parts through the system.
6. When completed, select the **Stop Calibration** button. The system will compute Reject Confirm Delay. [Reject Confirm Delay = (number of pulses from Part Detect to Reject Confirm Sensor) minus Reject Delay]
7. Select the OK button to save changes and exit.

The following parameters are used only with Time-Based Reject Confirm:

Gate Size

The time interval (in milliseconds) that the system looks for the product to pass by the reject confirm sensor. The valid range is 1 to 63 milliseconds.

Sensor Filter

The shortest pulse width (in milliseconds) that the reject confirm sensor will pass. This is used to filter out glitches or noise. This is usually set much smaller than part width, but larger than glitches or noise. The valid range is 0 to 4 milliseconds.

Jam Detection Timeout

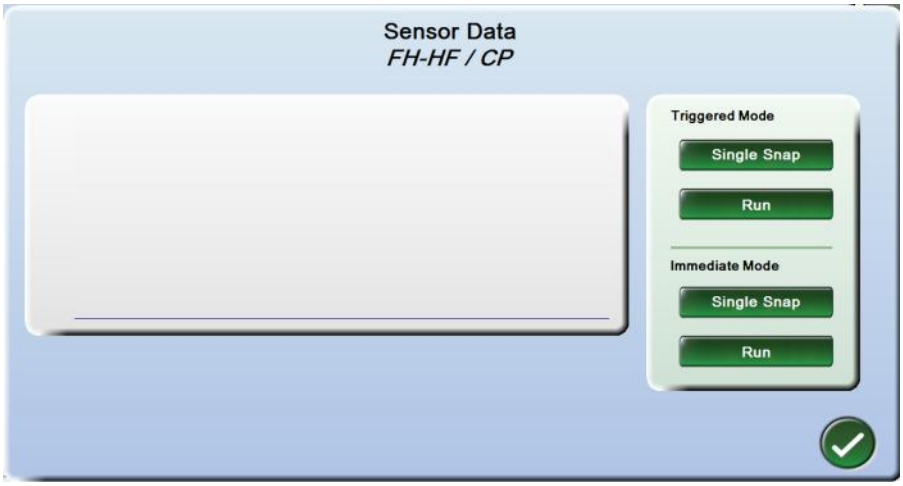
Specifies how long the sensor is blocked before the **Jam at Reject Confirm** alarm is triggered. This alarm must be enabled through Lane Alarm Configuration. The valid range is 1 to 32000 milliseconds.

Offline Data Display

This menu displays sensor readings when the lane is offline. It can be used for troubleshooting. It is a quick indication that the sensor is working.

If the sensor is working, you will see a line and a number in the left part of the screen.

To get to this menu, right-click over the High Frequency sensor button | **Offline Data Display**.



❖ *Note: the sensor values shown on screen (example: 504) are only merit values computed by the system. They DO NOT represent volume or fill level.*

Triggered mode:

- These readings are taken when the module is triggered by a part detect.
- **Single Snap** – a reading is taken for only one part each time this button is pressed.
- **Run** – a reading is taken for each part that triggers the part detect after this button is pressed. Press the button again when you want to stop taking readings.

Immediate mode:

- These readings are made in a free-running (asynchronous) manner. If bottles are running past the sensor, the readings will jump around and be meaningless.
- If you put an object between the sensor and bottle, the number should change. If you do not see a change in these numbers under these different conditions, this could indicate that something is not set up correctly, or there is a problem with the hardware. ***Contact Pressco*** (on page 2) Service Department or Technical Support for assistance.

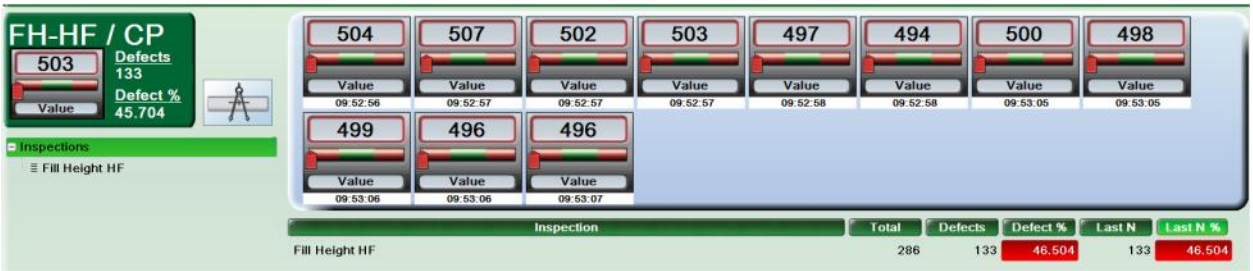
High Frequency Inspection

In the Intellispec software, the ***Fill Height HF Inspection*** (on page 24) inspection allows you to set limits for the fill height of your bottles.

When you run the inspection, the system reports a value. If that value is not within your specified limits, then the system reports it as out of range.

In the example below, the value on the sensor button, and the 'reject images' all show values that are below the specified limits. The values are in the red zone on the graphics. The system will reject those bottles if the rejecter is enabled.

❖ *Note: the sensor values shown on screen (example: 504) are only merit values computed by the system. They DO NOT represent volume or fill level.*



Fill Height HF Inspection

The FIll Height HF (high frequency) inspection sets the limits for the high frequency measurement made by the sensor.

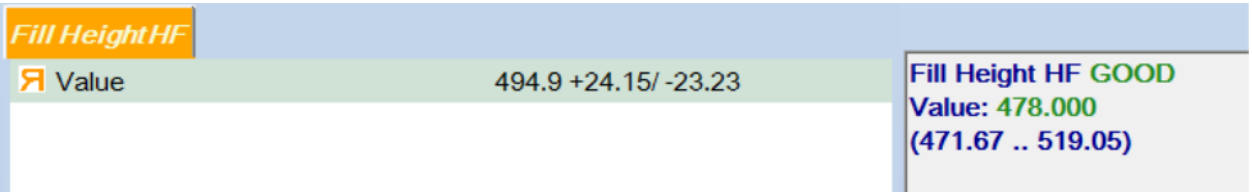
➢ To add a Fill Height HF inspection:

1. Right-click over the High Frequency button on the screen.
2. From the Inspection menu, select **Add** | **Fill Height HF Inspection**. Re-name it to something more meaningful to you, if desired. The inspection is added to the inspection tree.
3. The menu is displayed below the Retro-Spec graph. (The menu is described below) Adjust the parameters as necessary.

➢ You will need:

- A blow molder or conveyor running with parts.

Fill Height HF inspection menu



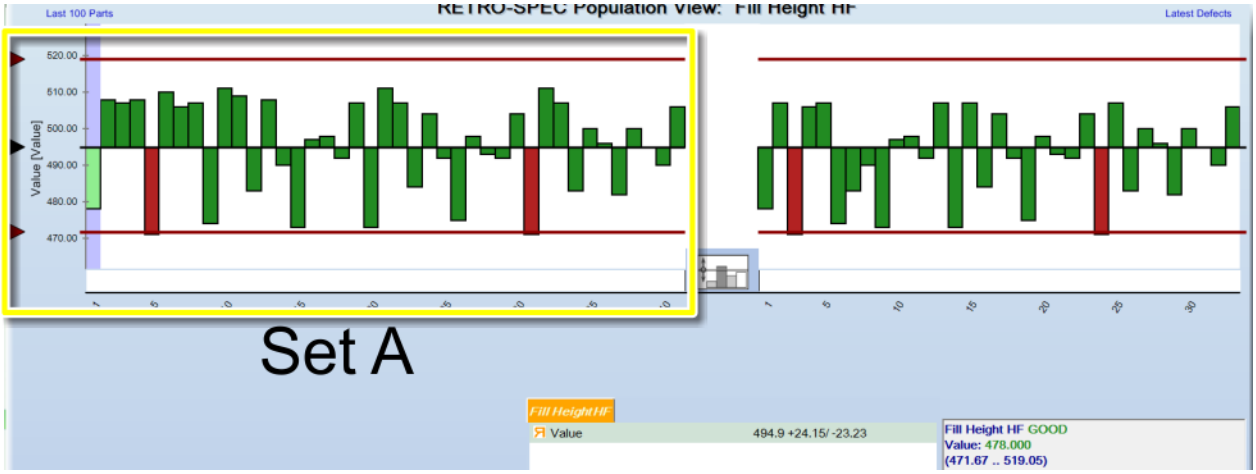
➢ To set Value:

1. Make sure there are some part readings in Set A (the left side of the Retro-Spec graph).

- If there are no part readings, exit the inspection. Put the lane online so the system sees parts passing through the inspection module. Let several bottles run through. The graph will accommodate up to 100 parts. Take the lane offline, and double-click the Fill Height HF inspection name to enter the Retro-Spec inspection window.

1. Right-click over the Retro-Spec graph to see the Retro-Spec Options menu. Choose **Auto Select Limits** from the menu. The system sets the limits based on the current population (Set A).

2. Adjust the automatically set limits if desired by moving the bars on the Retro-Spec graph, or by setting the limits through the Value menu. An example graph is shown below.



For more information about using the Retro-Spec graph and editing inspections, see the section titled Inspection Overview.

Cap Present Inspection (optional)

The Cap Present inspection determines whether a cap is present on the bottle. It is only used with High Frequency modules that are sold with the optional cap detection component (model 75659).

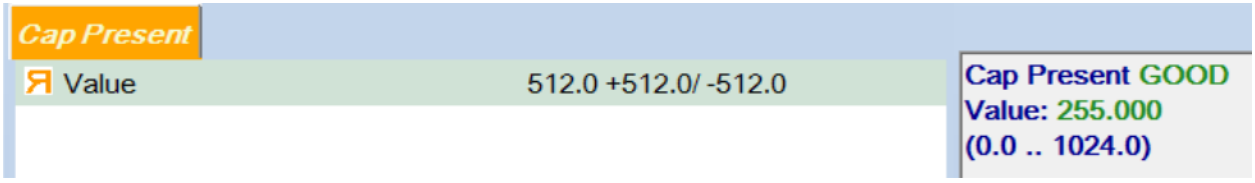
➢ To add a Cap Present inspection:

1. Right-click over the High Frequency button on the screen.
2. From the Inspection menu, select **Add** | **Cap Present.** Re-name it to something more meaningful to you, if desired. The inspection is added to the inspection tree.
3. The menu is displayed below the Retro-Spec graph. (The menu is described below) Adjust the parameters as necessary.

➢ You will need:

- A blow molder or conveyor running with parts.

Cap Present inspection menu



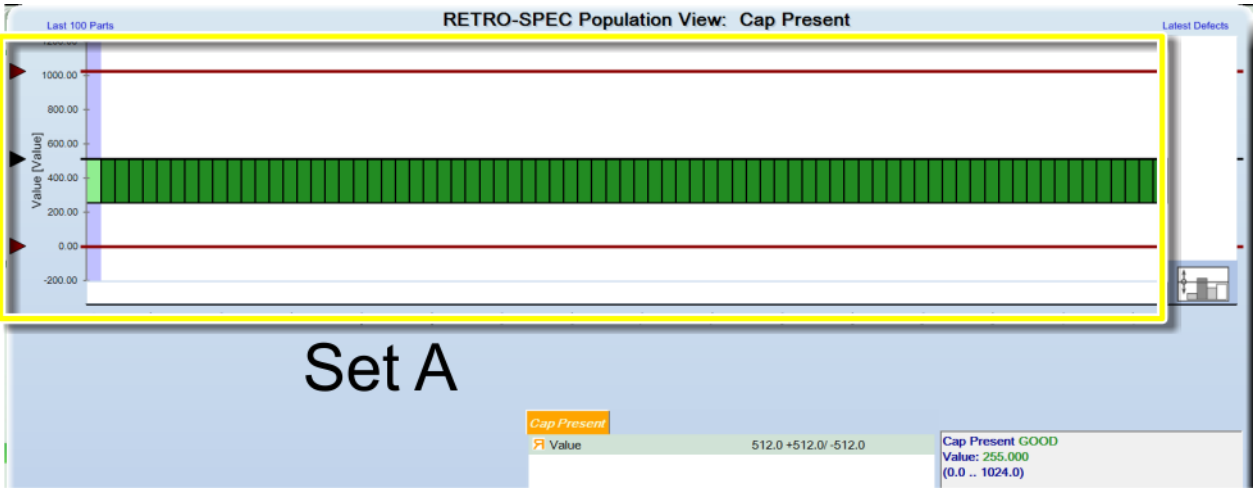
➢ To set Value:

1. Make sure there are some part readings in Set A (the left side of the Retro-Spec graph).

- If there are no part readings, exit the inspection. Put the lane online so the system sees parts passing through the inspection module. Let several bottles run through. The graph will accommodate up to 100 parts. Take the lane offline, and double-click the Cap Present inspection name to enter the Retro-Spec inspection window.

1. Right-click over the Retro-Spec graph to see the Retro-Spec Options menu. Choose **Auto Select Limits** from the menu. The system sets the limits based on the current population (Set A).

2. Adjust the automatically set limits if desired by moving the bars on the Retro-Spec graph, or by setting the limits through the Value menu. An example graph is shown below.



For more information about using the Retro-Spec graph and editing inspections, see the section titled Inspection Overview.

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