Intellispec R-FIFO Hardware Addendum

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Chapter 1 R-FIFO Module

The R-FIFO is used for rejecting parts when they are transferred from one part handling type to another. Example: the transfer from a starwheel to a conveyor or from one conveyor to another via a crab-over. During this transfer, the system loses track of the exact location of the part because the part motion does not stay in sync with the encoder.

The R-FIFO is used in applications such as with the labeler for plastic bottles, and in conjunction with the necker for cans in metal applications, among other applications.

What is R-FIFO?

R = Reject. FIFO = First In, First Out. This is a shift register.

Operation

During normal operation, the only action you need to take is to pay attention to the light tree. If the red light comes on, this indicates a fault. For light tree indications, see "R-FIFO Signal and LED Definitions" on page 11

All the installation, setup, and calibration is performed by Pressco Service in your plant, and the system is ready to operate.

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Chapter 2 Included Components

There are several components included with the R-FIFO assembly:

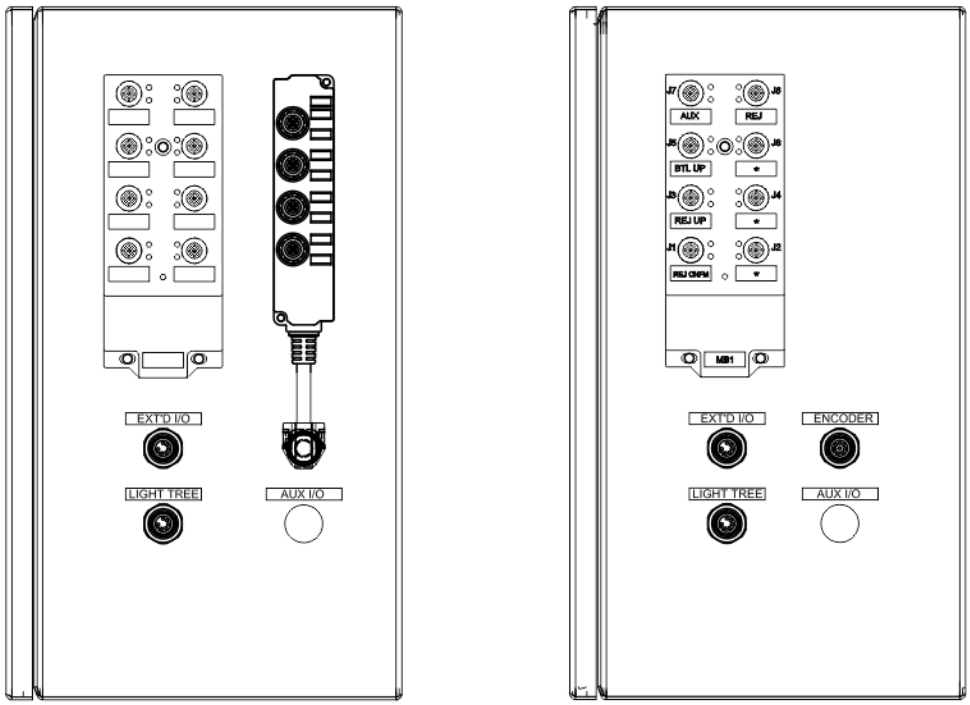
- "Control Box - R-FIFO" below
- "Light Tree - Reset FIFO box" below
- Three sensors - "Sensors - R-FIFO" on the next page
- Rejector
- "R-FIFO Counter box" on page 9

To see the connections between components, refer to the wiring diagrams: "R-FIFO Wiring Diagram" on page 26

Control Box - R-FIFO

The control box contains the PCB Assy that controls the R-FIFO functionality. All connections are made here through various connectors and cord grips. The PC board inside contains a dip switch and rotary switches to set up the R-FIFO to load and reject parts.

> *Note: your box may be either Generation 1 or Generation 2. Look at the connectors on the box to determine your version. There are different wiring diagrams for each.*



GEN 1 GEN 2

Light Tree - Reset FIFO box

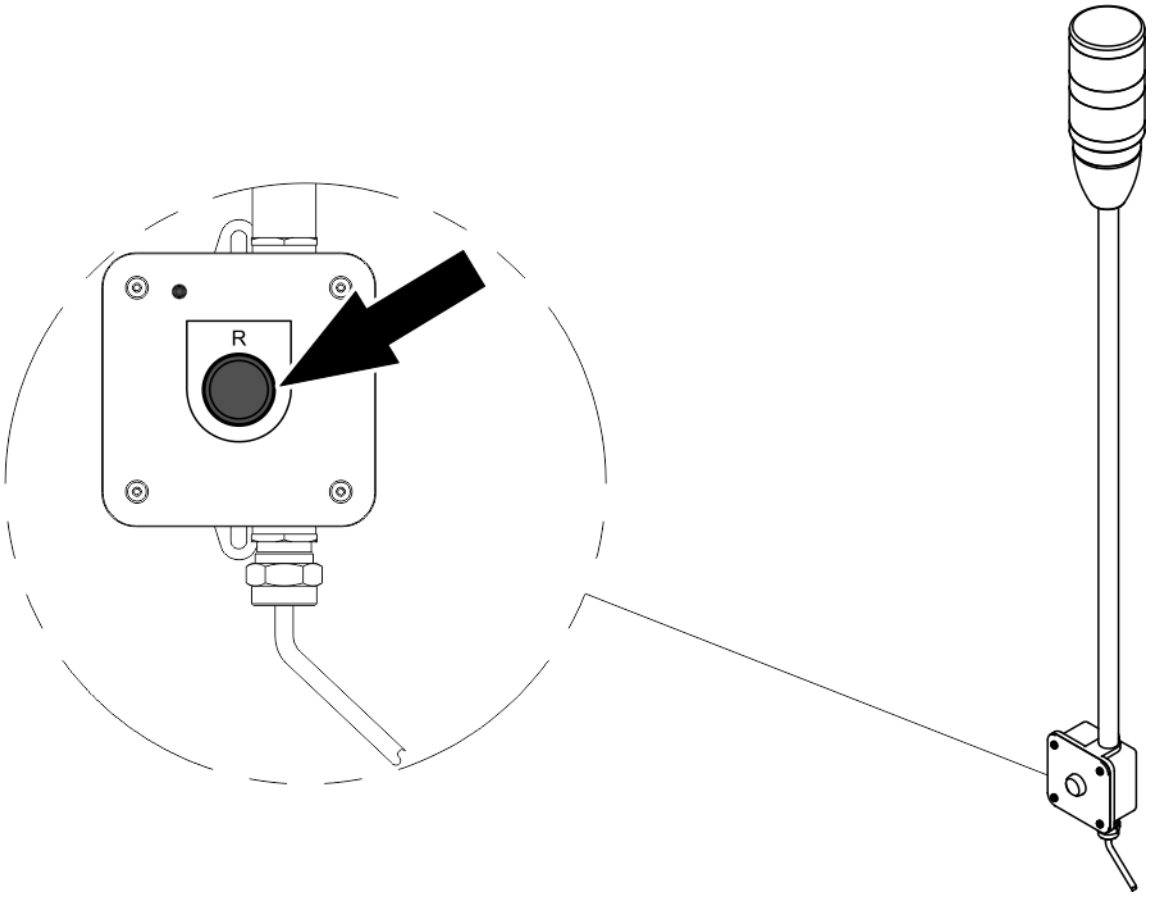
The Light Tree indicates the status of the R-FIFO:

Green light = normal operation

Red light = fault condition

A Reset pushbutton is provided to clear faults and to clear the part queue in the R-FIFO.

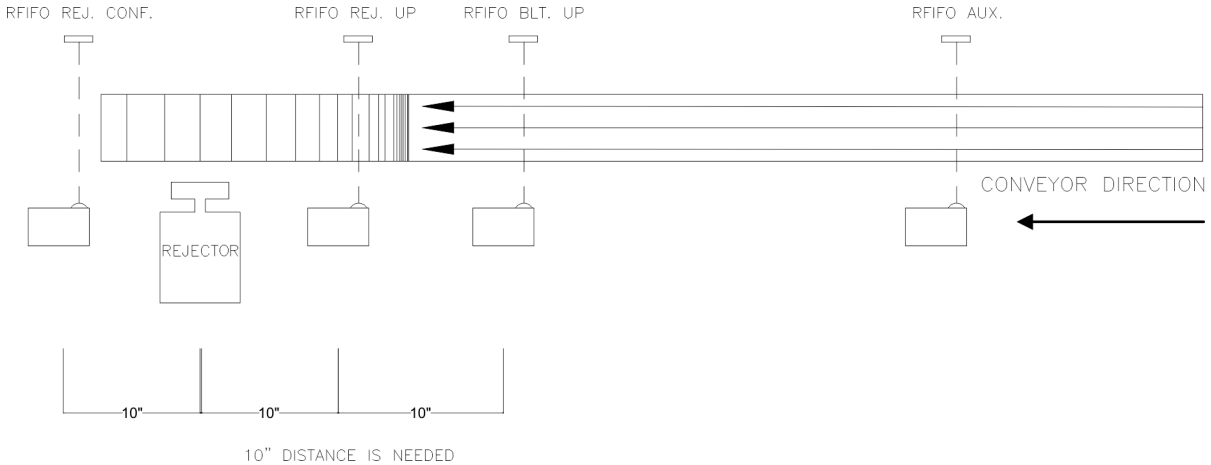
The part number is 68815. The light tree is to be mounted to the side of the conveyor in a convenient location for operator visibility and accessibility. The cable plugs into the 6-pin female receptacle labeled “LIGHT TREE”.



Sensors - R-FIFO

Three sensors are used with R-FIFO: Auxiliary, Bottle Up, and Reject Up.

For **opaque** parts, thru-beam hi-speed fiber optic sensors are used. For **clear** parts, such as some plastic bottles, clear object detection sensors are used.



Auxiliary (Aux) sensor

The purpose of the Aux. sensor is to load either a Pass or Reject status into the FIFO. The Pass or Reject status comes from the Intellispec. This status signal must be in sync with the part triggering of the Aux sensor. See "Calibration of the Aux. Signal to the Reject Signal" on page 20

This sensor is to be located at the last possible point before the part transfers to the next conveyor where the encoder will still have accurate knowledge of its position. This would be the last pocket of the starwheel before it is picked up by the vacuum conveyor or just before a crab-over from one conveyor to another.

In a starwheel application the goal is to sense the part when it is still contained by the last pocket, but such that we can guarantee that it will be transferred to the vacuum conveyor if a stop is issued.

In the crab-over application the goal is to sense the part before the crab-over while it is still in sync with the encoder signal.

Bottle Up sensor

The purpose of the Bottle Up sensor is to unload the part status from the FIFO.

The Bottle Up sensor is to be located 20 inches prior to the rejector.

Reject Up sensor

The Reject Up sensor is to be located 10 inches prior to the rejector.

The Reject Up sensor is paired with the Bottle Up sensor to provide a span in which each part is timed to determine its speed. This speed is then used in conjunction with encoder counts to determine when to signal a mechanical rejector so that it is timed properly with the part.

So the final setup has 10 inches between Bottle Up and Reject Up, and 10 inches between Reject Up and the Rejector.

Optional Reject Confirm sensor

If the optional reject confirm is purchased, one more additional sensor has to be mounted. It will go exactly 10 inches after the rejector. Thus, the final setup will have 10 inches between Bottle Up and Reject Up, 10 inches between Reject Up and the rejector, and 10 inches between the rejector and the Reject Confirm Sensor.

Rejector - R-FIFO

- For a can system, the rejector is an Air Rejector.
- For a bottle system, the rejector is a Push rejector.
- Series V - Gen 1 R-FIFO rejectors are NPN.
- Series V - Gen 2 R-FIFO rejectors are PNP.

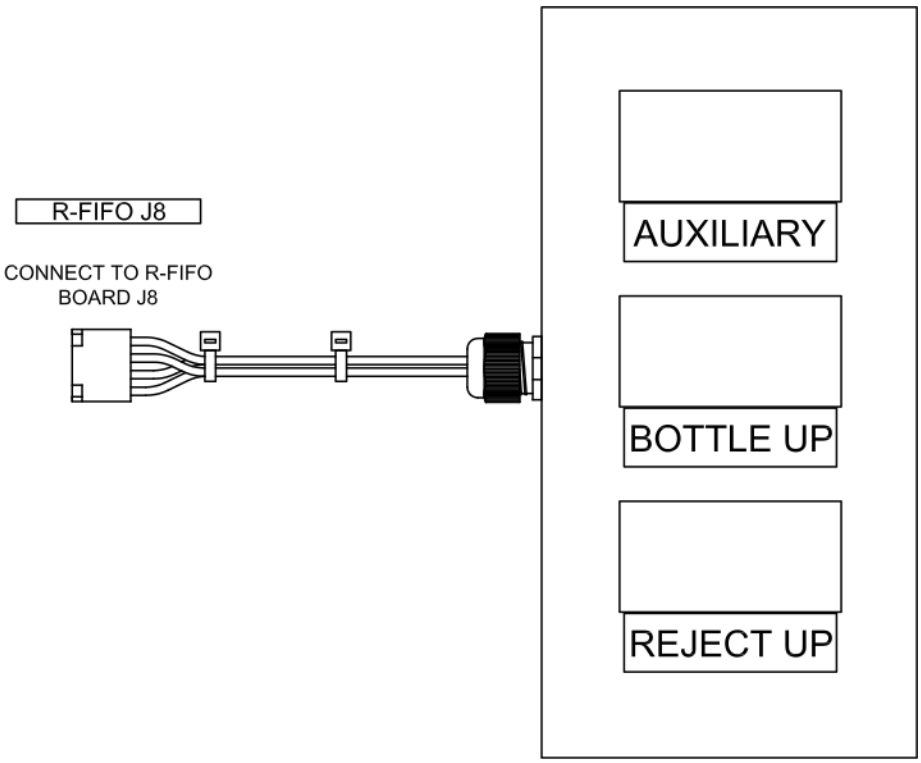
R-FIFO Counter box

Counter box 68943 is provided for diagnostics purposes. This counter box will keep track of the counts for the Aux, BTL UP, and REJ UP sensors as seen by the R-FIFO board.

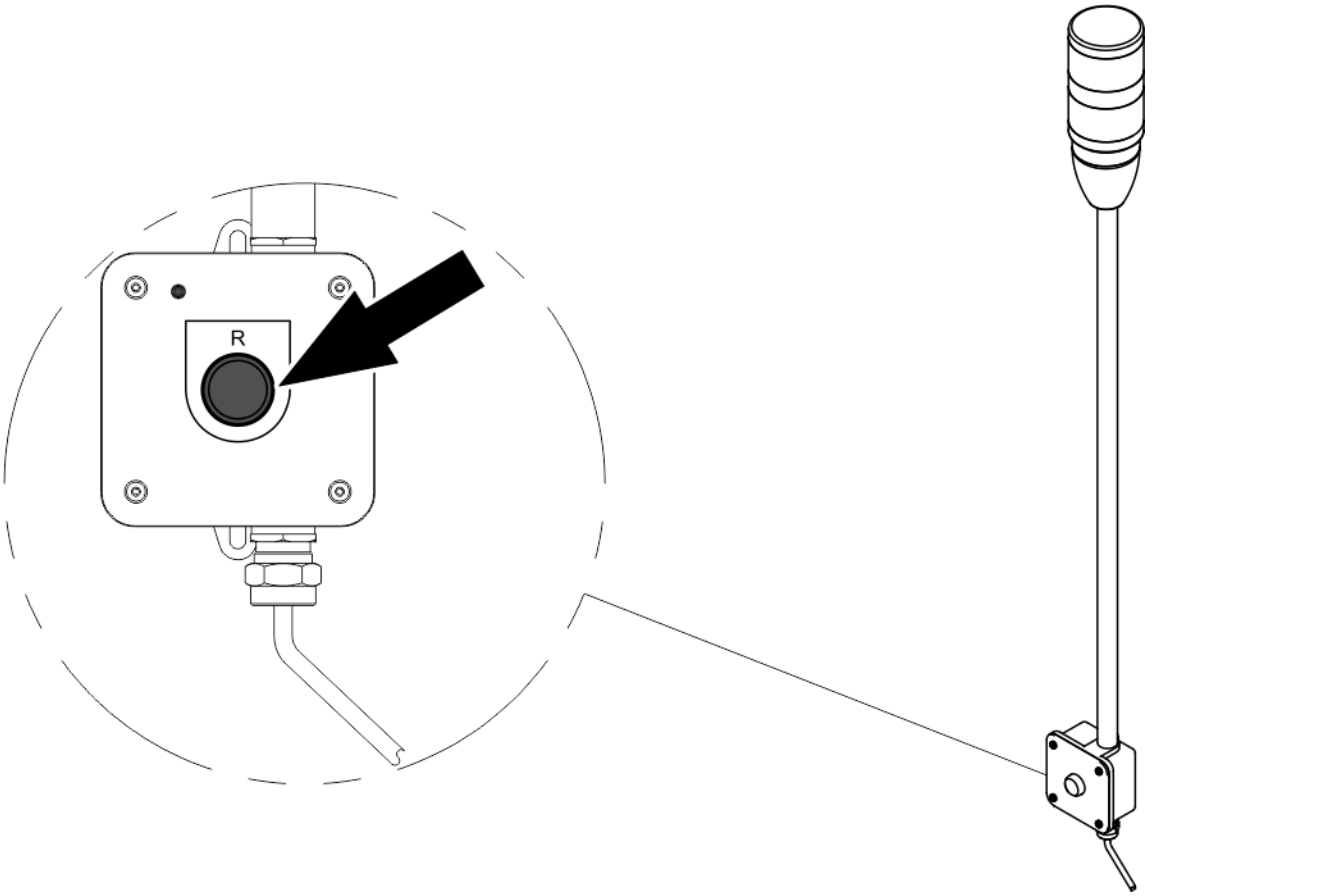
The counts will reset when the system goes from offline to online, or when you press the Reset PB on the Light Tree/FIFO Reset Box. "Light Tree - Reset FIFO box" on page 7

This box plugs into J8 of the R-FIFO PCB. It can be left permanently connected, as long as the R-FIFO box is mounted vertically so the counter box will not contact the PCB components, or it can be connected only when troubleshooting.

> *Note: this box is set up at Pressco. The default setting is for high speed lines, greater than 1800ppm.*



Chapter 3 R-FIFO Signal and LED Definitions



Run Mode

Green LED - light tree	Red LED - light tree	Definition	Operator Action	R-FIFO LED Indications
OFF	OFF	R-FIFO Offline	None	None
ON	OFF	R-FIFO Online	None	None
ON	ON for 0.5 seconds **	Automatic Reset of FIFO	None	None
OFF	ON (Note: SW3 can bypass a “Counter Dis-crepancy at Auto Reset” fault)	Sensor Fault	• Observe counts on Aux, Bottle Up, and Reject Up counters inside cabinet. • Check for problems with sensors. • Clear path from Aux to Bottle Up sensors. • Press reset button to restart.	

Green LED - light tree	Red LED - light tree	Definition	Operator Action	R-FIFO LED Indications
OFF	Flashes ON at 1Hz	Power Fault	Press reset button to restart. If problem persists, call Pressco Tech Support.	None

*** Note: for firmware versions prior to 7.1.1, this value was 2.0 seconds.*

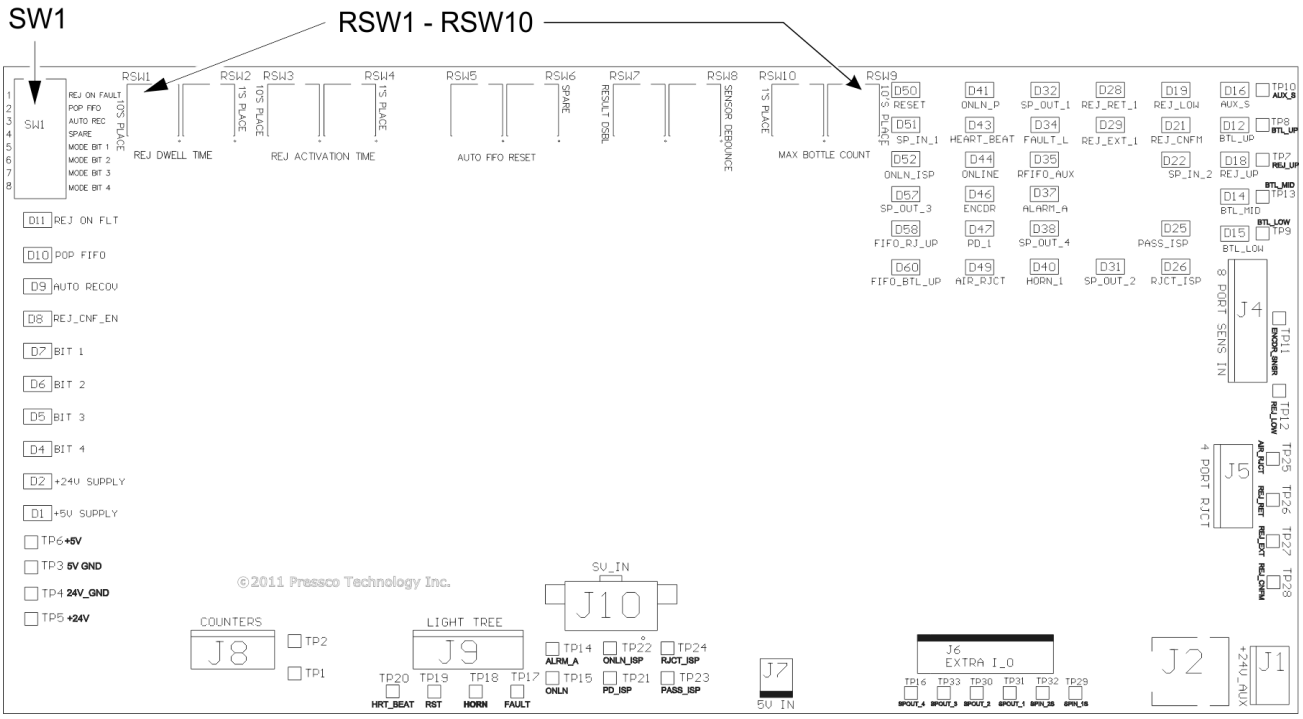
Setup Mode

Green LED on light tree	Red LED on light tree	Definition	Operator Action	R-FIFO LED Indications
Both Green and Red LED ON for 2 seconds, then both OFF		Aux/ Reject Setup Mode	Reset button was pressed > 3 seconds and R-FIFO is now in Setup Mode.	None
OFF	Flashes ON at 10Hz	Aux/ Reject Setup Mode	One bottle without label was inspected and Reject Delay is too low. Increase Reject Delay and pass another bottle through. Repeat until Green light flashes at 1Hz.	None
OFF	Flashes ON at 1Hz	Aux/ Reject Setup Mode	One bottle without label was inspected and Reject Delay is too large. Decrease Reject Delay and pass another bottle through. Repeat until Green light flashes at 1Hz.	None
Flashes ON at 1Hz	OFF	Aux/ Reject Setup Mode	Aux / Reject setup is accept-able. Press reset button to return to Production Mode.	None

Chapter 4 R-FIFO Switch Settings

The switches are located on the PC Board, which is located inside the control box.

R-FIFO PC Board layout



R-FIFO PCB DIP Switch SW1 Settings

The board must be set to operate in the proper mode. This is done prior to shipment. Here is a brief listing of the settings.

This switch is located inside the control box.

Off (0) or Open is switch position up. On (1) or Closed is switch position down.

> *IMPORTANT: You must push the Reset push button on the Light Tree/ Reset box whenever you change a switch setting.*

SW1 has 8 switch positions. Shown below are typical settings used on most systems. Your system settings may vary.

- Position 1 – Open = Reject on Fault Disabled
- Position 2 – Open = Fallen Bottle N/A
- Position 3 – Open = Counter Discrepancy No Fault
- Position 4 – Open = Reject Confirm Disabled
- Position 5 – Closed = Mode Bit 1
- Position 6 – Closed = Mode Bit 2

- Position 7 – Open = Mode Bit 3
- Position 8 – Closed = Mode Bit 4

Position 5 through 8 represent Mode of Operation, Mode 11.

Positions 8,7,6,5 = 1,0,1,1 = Mode 11.

For a more detailed description of the settings, see "R-FIFO DIP Switch SW1 details" below

R-FIFO DIP Switch SW1 details

SW1 is read by R-FIFO firmware every time the R-FIFO goes online. Switch positions set down toward the board are Closed or “1”. Switch positions set up are Open or “0”.

Position	Description
1	***Reject on Fault*** Specifies what to do with bottles when in R-FIFO is in Fault mode 1 = Reject all parts 0 = Reject no parts
2	***Pop FIFO for Fallen Bottles - Modes 1, 3, 6, and 10 Only*** Specifies what to do with fallen bottles in the modes where five sensors can detect a fallen bottle. If it is more likely that bottles fall before inspection, there will be no PASS / REJECT results pushed onto the FIFO and thus the FIFO should not be popped when a fallen bottle is detected at rejection. However, if it is more likely that bottles fall after inspection, there will be a PASS / REJECT result pushed onto the FIFO and thus the FIFO should be popped when a fallen bottle is detected at rejection. 1 = Pop FIFO when fallen bottle is detected at rejection. 0 = Do not pop FIFO when fallen bottle is detected at rejection.
3	***Processing of Counter Discrepancy at Auto FIFO Reset*** (Refer to RSW5 for control of the Auto FIFO Reset function, including the ability to disable the function) When an Auto Reset occurs the AUX, BOTTLE_UP, and REJECT_UP counters in the firmware are compared. If all counters agree, the light tree red LED comes on for 2 seconds, noting a normal FIFO reset. If not, SW3 controls processing of the discrepancy. 1 = Treat as Fault condition, light on red LED, and light D37 - D40 as needed 0 = Ignore condition, but light D37 - D40 as needed. Note that neither the AUX, BOTTLE_UP, and REJECT_UP firmware counters nor the hardware counter attached to the R-FIFO are cleared at an Auto FIFO Reset.
4	***Reject Confirm*** 1 = Enable Reject Confirm

Position	Description
	0 = Disable Reject Confirm To use Reject Confirm, an additional Reject Confirm sensor must be placed after the rejector the same distance as BTL Up to REJ Up, and then connected to the 4-Port. When a Rejected part is detected at the Reject Confirm sensor, the Reject Confirm alarm will pulse on for 15ms.
5	Mode Bit 1
6	Mode Bit 2
7	Mode Bit 3
8	Mode Bit 4

R-FIFO Rotary Switches RSW1-RSW10 Settings

There are ten rotary switches for enabling and configuring various functions on the R-FIFO PCB. See the PCB layout: "R-FIFO Switch Settings" on page 13

IMPORTANT: You must press the Reset push button on the Light Tree/ Reset Box if you change any rotary switch setting.

Setting the Rejector Timing:

RSW1, RSW2: Rejector Dwell Time

RSW1 and RSW2 set the R-FIFO air rejector timing. This is the electrical ON time of the air solenoid. This value should be between 5 and 10 msec. If the on time is too short, there may not be enough air to blow-off the can. If too long, it could possibly blow off two parts. Example: RSW1 = 2 and RSW2 = 8 sets a dwell time of 28ms.

RSW3, RSW4: Rejector Activation Time

This is the total time from the start of the electrical pulse to when a mechanical rejector reaches full extension. Since this is an air rejector, this value should be very small, 1-5 msec. This value can be varied to achieve the proper timing. Example: RSW3 = 2 and RSW4 = 5 sets an activation time of 25ms.

RSW5: Automatic FIFO Reset

RSW5 enables the Automatic FIFO Reset function. If the FIFO gets out of sequence, this feature allows the FIFO to automatically reset itself once it determines that there are no parts between the Aux sensor and BTL UP sensor.

The “FIFO Length” is the encoder tick count from the Aux sensor to the BTL UP sensor. The R-FIFO automatically measures the FIFO Length. If no parts are detected at either sensor for (FIFO Length) x (Multiplier) in encoder ticks, then the R-FIFO will automatically reset and clear all parts loaded in the FIFO.

This feature can be disabled by setting RSW5=0. The other settings of 1 thru 9 represent different multipliers. 1=0.25, 2=0.50, 3=0.75, etc., up to 9=2.25. Be careful not to set this value too low or the FIFO could reset while parts are between the Aux sensor and the BTL UP sensor. If the FIFO resets

while parts are between the Aux sensor and the BTL UP sensor these parts will not be rejected if they were bad. A good setting to start with is 3 or 4. If the FIFO is resetting too soon, increase the multiplier.

> *RSW6 is not used.*

RSW7: ISPEC Result Lockout

RSW7 sets the Result Lockout time in ms. A good value to start with is 1. See detailed explanation here: "R-FIFO Rotary Switches RSW1-RSW10 Details" below

RSW8: Sensor Debounce

RSW8 sets the sensor debounce time in ms. A good value to start with is 1. See detailed explanation here: "R-FIFO Rotary Switches RSW1-RSW10 Details" below

RSW9 and RSW10: Max Bottle Count Allowed in FIFO

RSW9 and RSW10 set the maximum bottle count. This feature is to catch gross sensor failures quickly. To set this value properly, determine the maximum number of parts that can fit between the Aux and BTL UP sensors, and then add a safety factor of 20%. For example, if the maximum parts that can fit between the sensors is 50, set this value to 60 (RSW9=6, RSW10=0). You can disable this function by setting both switches to 0.

R-FIFO Rotary Switches RSW1-RSW10 Details

RSW1-RSW10 are read by R-FIFO firmware every time the R-FIFO goes online. Each rotary switch has positions 0 through 9.

Switch	Description
RSW1 and RSW2	**rejector Dwell Time**: Specifies the time in ms that the rejector solenoid is energized. It is the electrical signal pulse width. Example: RSW1 = 2 and RSW2 = 8 sets a dwell time of 28ms.
RSW3 and RSW4	**rejector Activation Time**: Specifies the time in ms that the rejector needs to reach full activation. The time span is from the leading edge of the solenoid electrical pulse, to when the push rejector reaches full extension. This can vary from rejector to rejector, varying air pressure, etc. 20-25ms is a good value for push rejectors. For air rejectors (no cylinder), the value will be much less. Example: RSW3 = 2 and RSW4 = 5 sets an activation time of 25ms.
RSW5	**Automatic FIFO Reset**: The bottle path controlled by the R-FIFO has starting and ending points, and the distance between them (measured in encoder ticks) is called the “FIFO Length”. In Mode 10 and 11 the starting point is the location of the Aux Sensor. In all other Modes the starting point is the location represented by the ISPEC Part Detect plus the ISPEC Reject Delay parameter. In all Modes, the FIFO Length ends at the location of the Bottle Up Sensor. Every time the R-FIFO goes online or is reset, the first bottle through the FIFO Length also acts as a “tracer” used to measure the FIFO Length. When in Run Mode the R-FIFO continuously monitors the FIFO Length.

<table>
<tr><th>Switch</th><th>Description</th></tr>
<tr><td></td><td>RSW5 represents FIFO Length multipliers:
<table>
<tr><th>RSW5</th><th>Multiplier (Modes 10 and 11)</th></tr>
<tr><td>0</td><td>Auto Reset Disabled</td></tr>
<tr><td>1</td><td>0.25</td></tr>
<tr><td>2</td><td>0.50</td></tr>
<tr><td>3</td><td>0.75</td></tr>
<tr><td>4</td><td>1.00</td></tr>
<tr><td>5</td><td>1.25</td></tr>
<tr><td>6</td><td>1.50</td></tr>
<tr><td>7</td><td>1.75</td></tr>
<tr><td>8</td><td>2.00</td></tr>
<tr><td>9</td><td>2.25</td></tr>
</table>
When the R-FIFO detects no bottles at either end of the FIFO for:
[(FIFO Length) X (Multiplier) encoder counts]
the FIFO is reset and the light tree red LED comes on for 0.5 seconds, noting a normal FIFO reset. (This time was 2.0 seconds for firmware versions prior to 7.1.1)
RSW5=0 disables the Auto FIFO Reset function.
For Mode 5 (Conveyorless Cap Inspection):
Automatic FIFO Reset is still available in Mode 5, even though there is no encoder to track part location. The RSW5 table is the same, except that the value represents a straight unit of time in seconds. So, RSW=5 represents a FIFO Reset of 1.25 seconds.</td></tr>
<tr><td>RSW6</td><td>Not used</td></tr>
<tr><td>RSW7</td><td>ISPEC Result Lockout - Modes 10 and 11 Only:
Every 1ms the R-FIFO reads only the REJECT signal. A valid change of state is established by two consecutive readings of a changed state. The ISPEC Result Lockout specifies the number of ms during which the R-FIFO does not read the REJECT signal after a valid change of state was established for the REJECT signal.</td></tr>
</table>

Switch	Description
	(Note that in Modes 10 and 11 the PASS signal is never read by the R-FIFO. The Aux Sensor establishes the presence of a bottle, and if the state of the REJECT is inactive, the state of the result is assumed to be PASS.) Example: RSW7 = 5 locks out R-FIFO readings for 5ms after each valid change of state. ***ISPEC Result Lockout - All Modes except 10 and 11:*** Every 1ms the R-FIFO reads the PASS and REJECT signals (which are never simultaneously active). A valid change of state is established for one of the signals by two consecutive readings of a changed state. The ISPEC Result Lockout specifies the number of ms during which the R-FIFO does not read either the PASS or REJECT signals after a valid change of state was established for one of the signals Example: RSW7 = 5 locks out R-FIFO readings for 5ms after each valid change of state.
RSW8	**Sensor Debounce:** At every encoder tick these sensors are read by the R-FIFO: • ISPEC Part Detect • Aux Sensor • Bottle Up • Bottle Mid • Bottle Low • Reject Up • Reject Low A valid change of state is established by the Sensor Debounce number of additional consecutive readings of a changed state. Example: RSW8 = 1: A valid change of state is established by two consecutive readings of a changed state.
RSW9 and RSW10	**Max Bottle Count Allowed in FIFO** There are two FIFO fault conditions: • **underflow** - an attempt is made to pop from a FIFO that is empty • **overflow** – an attempt is made to push onto a FIFO that is filled After the first “tracer” bottle travels the bottle path following a reset or going online, an underflow fault occurs on the very first attempt to pop from an empty FIFO. The FIFO can hold 512 values, and an overflow fault occurs on the very first attempt to push onto a FIFO that already has 512 results stored. When an overflow or underflow condition occurs, the R-FIFO is considered to be in fault mode, and the light tree red LED is lit. In actual practice there may only be room for far less than 512 bottles to physically fit on the bottle path. Assume that at most only 30 bottles can fit on bottle path. In an error situation, there would have to be 482 incorrect results pushed onto the FIFO before an overflow fault condition occurs. The **Max Bottle Count Allowed in FIFO** identifies the maximum number of bottles that can physically fit on the bottle path. When the number of results stored in the FIFO

Switch	Description
	exceeds this value by one, an overflow fault occurs. Example: RSW9 = 4 and RSW10 = 3 identifies a max bottle count of 43. Example: RSW9 = 0 and RSW10 = 0 sets max bottle count to the FIFO max of 512

Chapter 5 R-FIFO Appendix - Details

This section contains additional information about setup and wiring, in case a sensor has been removed or replaced, or if you need to re-connect a cable.

Calibration of the Aux. Signal to the Reject Signal

A bottle is loaded into the FIFO every time the **Aux. signal** transitions Low to High as seen by the R-FIFO PCB.

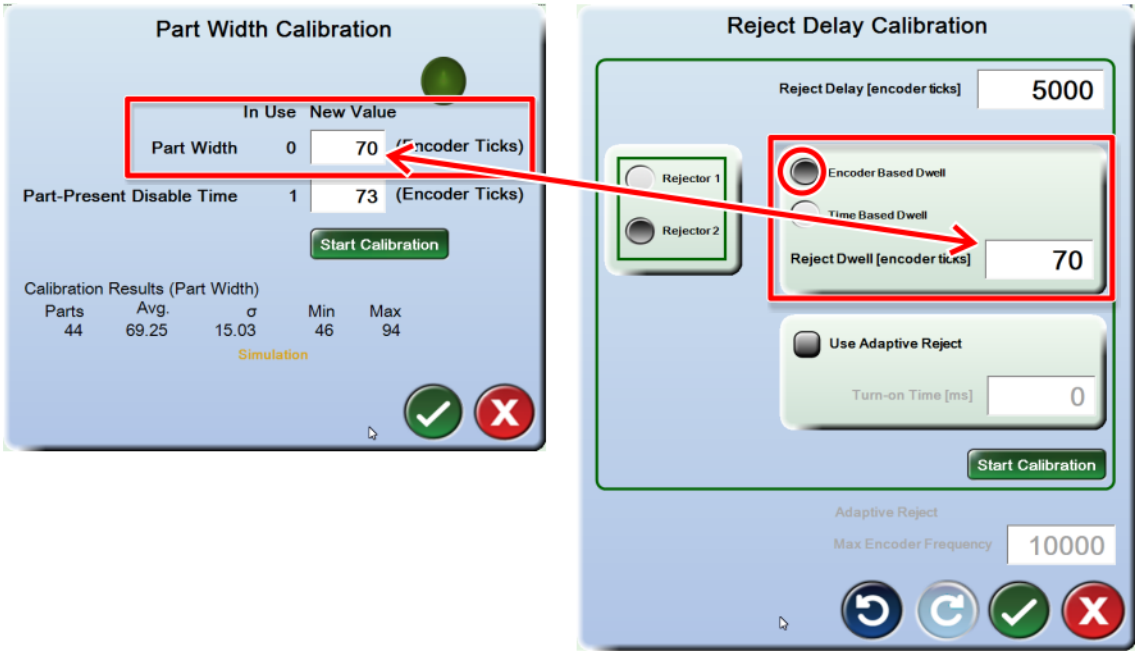
A bottle is unloaded from the FIFO every time the **BTL UP** sensor transitions from Low to High.

In order to determine if the value loaded is a Pass or Reject, the program looks at the status of the Reject signal at the leading edge of the Aux. transition. If the Reject signal is active at that time, a REJECT is loaded. If the Reject signal is inactive at that time, a PASS is loaded.

The proper operation of the FIFO depends mainly on the proper operation of the sensors, and the timing of the Reject and Aux signals. There is a “Setup Mode” provided with R-FIFO that allows you to set the timing between the Aux and Reject signals.

To calibrate Aux Signal to Reject Signal Timing:

1. In the Intellispec software, verify that the Reject pulse width is set to encoder based, versus time based.
2. Set the reject pulse width to the same number of counts as the part width (in the Intellispec software).



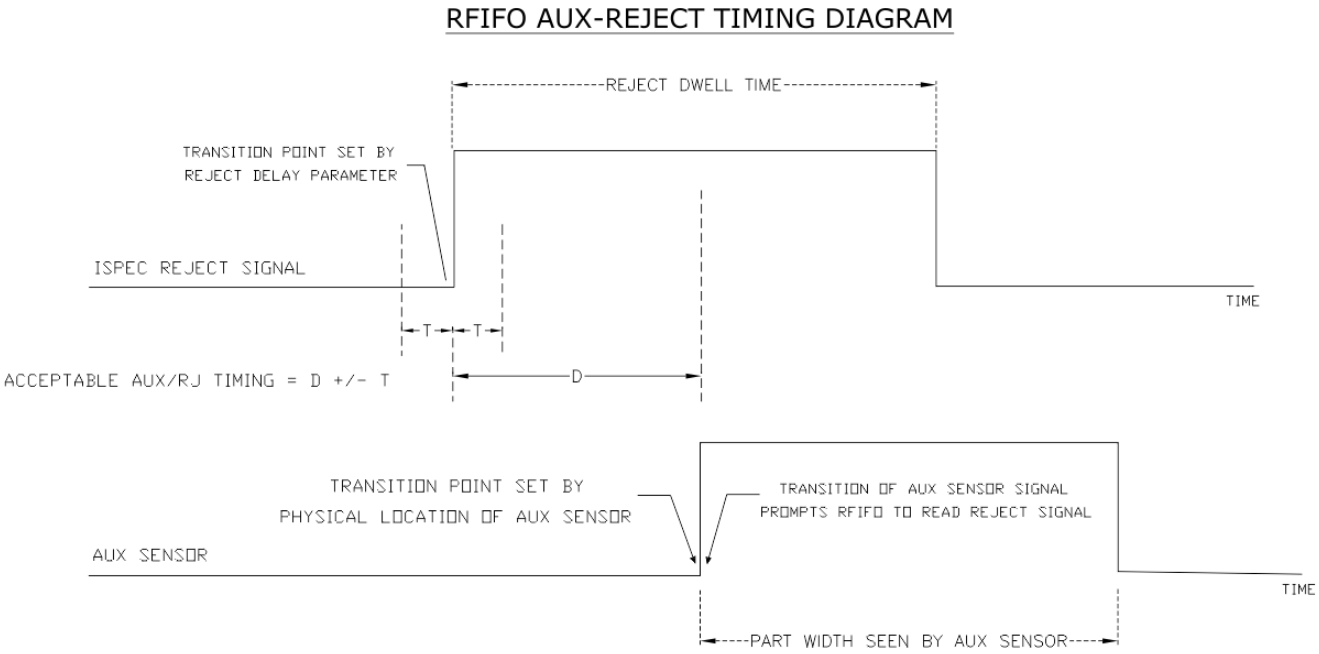
3. Follow the Setup procedure to set the Aux/Reject signal timing: "R-FIFO Setup Procedure" on page 22

R-FIFO Setup Mode

The R-FIFO is set up by the Pressco installer. You do not have to set up anything unless something has changed in your system.

Background:

In Modes 10 and 11, the leading edge of the Aux Sensor signal prompts the R-FIFO firmware to read the state of the ISPEC REJECT signal. If REJECT is active, REJECT is pushed onto the FIFO. If REJECT is inactive, PASS is pushed onto the FIFO.



NOTE: WAVEFORMS SHOWN ABOVE ARE FOR PNP SIGNALS, SERIES 5. FOR SERIES 4 SYSTEMS, SIGNALS ARE NPN, ACTIVE LOW. THE DIAGRAM IS FOR ILLUSTRATION PURPOSES ONLY.

In the above diagram, D is the absolute value of the delta between the Intellispec REJECT signal activation and AUX SENSOR. T is the acceptable tolerance on D. The goal is to adjust the ISPEC parameter REJECT DELAY so that the REJECT signal transitions to active D +/- T ms before the AUX SENSOR signal transitions to active.

Setup Mode Assumptions:

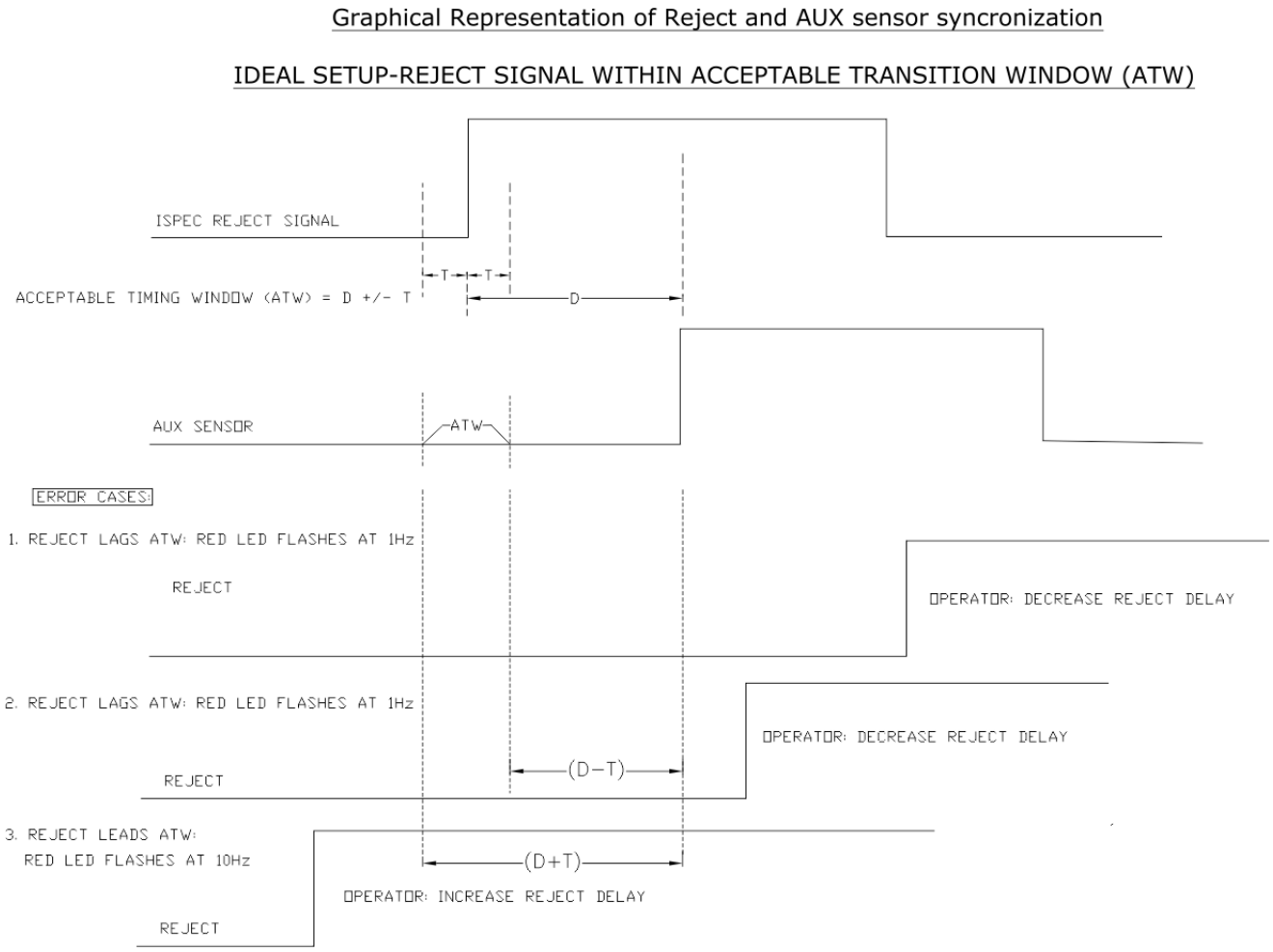
a. ISPEC parameter REJECT DWELL is correctly set during Pressco installation. This value should be set to the same encoder ticks as the part width, and it should be encoder based, not time based.

b. The outfeed conveyor is running at production speed .

c. In R-FIFO firmware versions 7.1.1 and above, Tolerance T is fixed at 3 msec. Prior to that, T was fixed at 12 msec.

d. In firmware versions 7.1.1 and above, Delta D will dynamically adjust to ½ of the Aux. signal pulse width. In previous versions, Delta D is fixed at 30ms.

Graphical Representation of RESULT and AUX SENSOR Synchronization



R-FIFO Setup Procedure

> *Note: Setup is performed during installation. You do not need to set up the R-FIFO again, unless you have moved or replaced sensors, or if something has changed in your production line.*

This procedure is used to set up or verify an acceptable transition “window” which contains both the triggering of the Aux Sensor and the reject signal from the ISPEC.

Notes:

- To run this procedure, the Intellispec must be online and the outfeed starwheel must be running. However, normal bottle flow must be stopped so there are no bottles between the point of inspection and the Aux sensor when the procedure starts.
- You must be able to send a Rejected bottle to the FIFO. This means that you must temporarily disable the labeler so that a label does not get applied, causing a Reject.
- Authorization to take the ISPEC offline is required to run this procedure.

To set up the R-FIFO:

1. Verify that there are no bottles between the point of inspection and the Aux sensor, and that the ISPEC is online.
2. Press and hold the light tree reset button for at least 3 seconds. Both the red and green LEDs of the light tree come ON for 2 seconds, then they both go off, signaling the entry into Setup Mode.
3. (To exit Setup Mode at any time, press the light tree reset button for less than 3 seconds.)
4. Feed one bottle into the starwheel (prior to inspection with the labeler temporarily disabled).
5. Once rejected bottle has passed Aux. sensor, observe the lights on the light tree and refer to the table below.
6. Repeat steps 1 – 4 until the green LED flashes at 1 Hz.
7. Press the light tree reset button for < 3 seconds to return to Run Mode.

LED Signal	Description	Operator Action
 Red LED flashes at 1 Hz	REJECT lags the acceptable transition window	Decrease REJECT DELAY to activate REJECT sooner
 Red LED flashes at 10 Hz	REJECT leads the acceptable transition window	Increase REJECT DELAY to activate REJECT later
 Green LED flashes at 1 Hz	REJECT is within the acceptable transition window	Press the light tree reset button for < 3 seconds

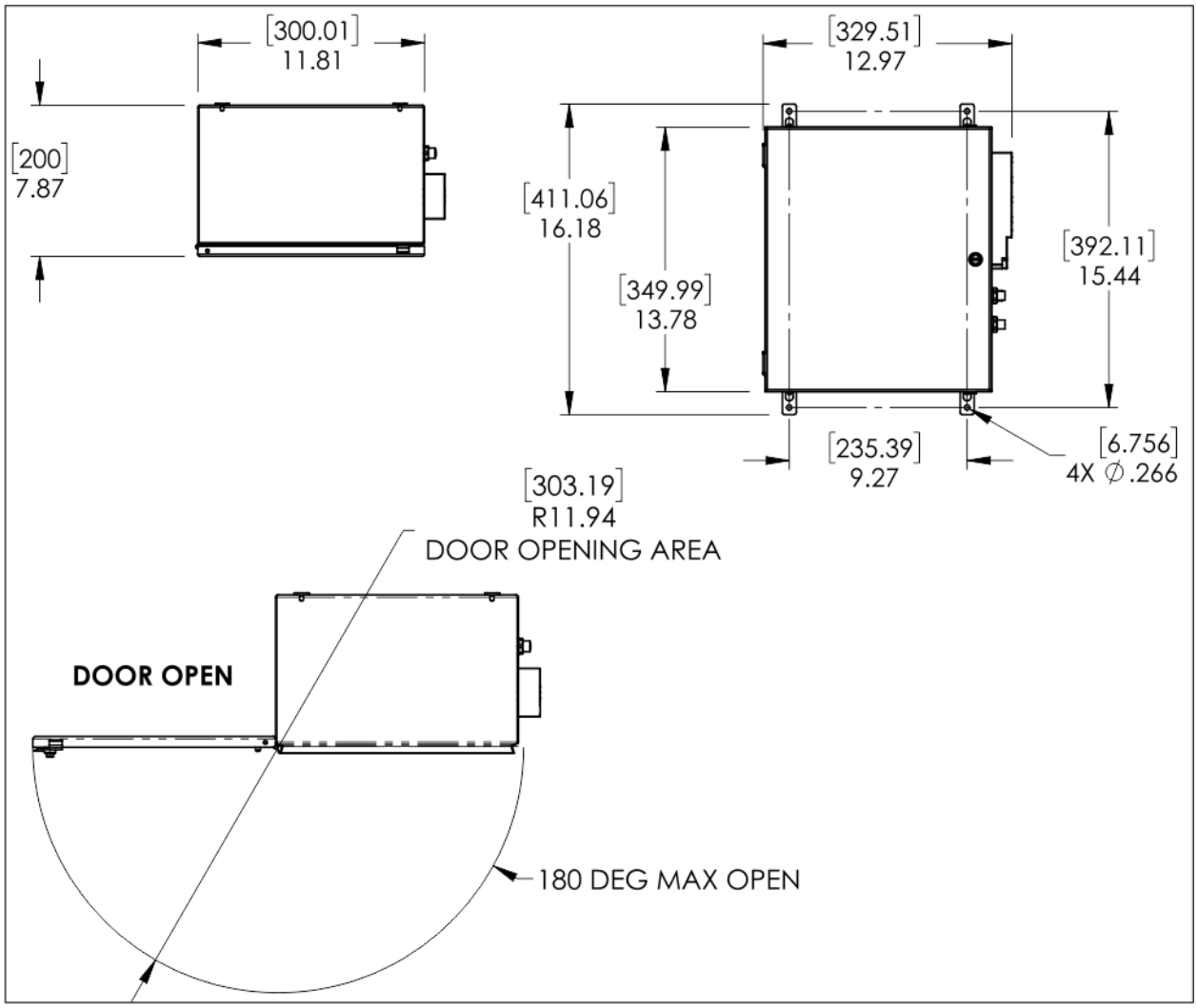
Notes:

A. Entering Setup Mode is only allowed when the Intellispec is online.
B. Setup Mode is latched. That is, once Setup Mode is entered, it is only exited when you press the reset button. Setup Mode is maintained even if the Intellispec goes offline while in Setup Mode.
C. Even if the green LED is flashing at 1Hz (indicating success) you may choose to continue running bottles, and the light tree may actually return to a flashing red LED. As noted in “B” above, Setup Mode is only exited when you press the reset button.

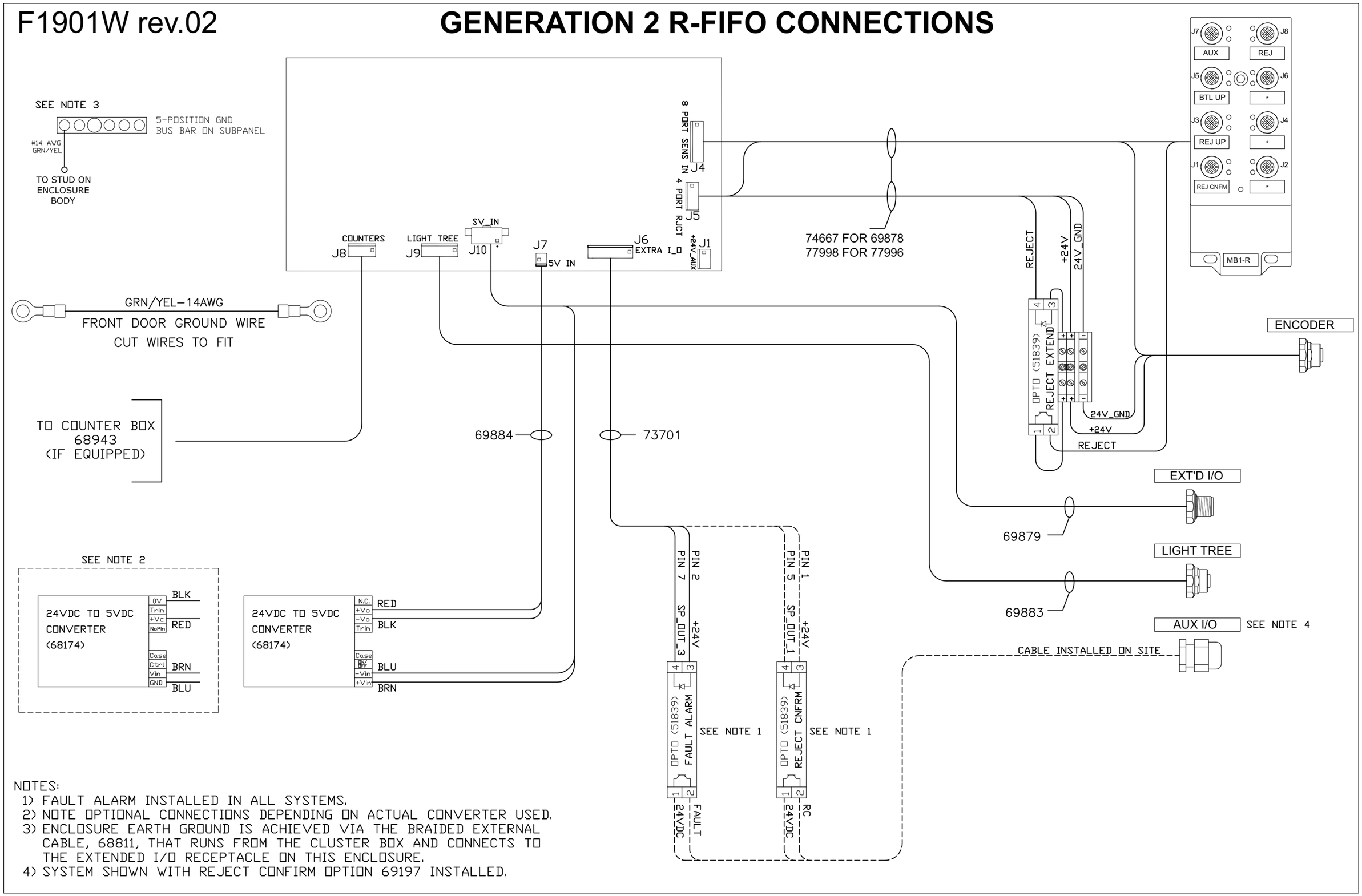
R-FIFO Dimensions

Note: measurements do not include connectors

Dimensions are in inches. Dimensions in brackets [ ] are in millimeters.



R-FIFO Wiring Diagram



NOTES:
1) FAULT ALARM INSTALLED IN ALL SYSTEMS.
2) NOTE OPTIONAL CONNECTIONS DEPENDING ON ACTUAL CONVERTER USED.
3) ENCLOSURE EARTH GROUND IS ACHIEVED VIA THE BRAIDED EXTERNAL CABLE, 68811, THAT RUNS FROM THE CLUSTER BOX AND CONNECTS TO THE EXTENDED I/O RECEPTACLE ON THIS ENCLOSURE.
4) SYSTEM SHOWN WITH REJECT CONFIRM OPTION 69197 INSTALLED.

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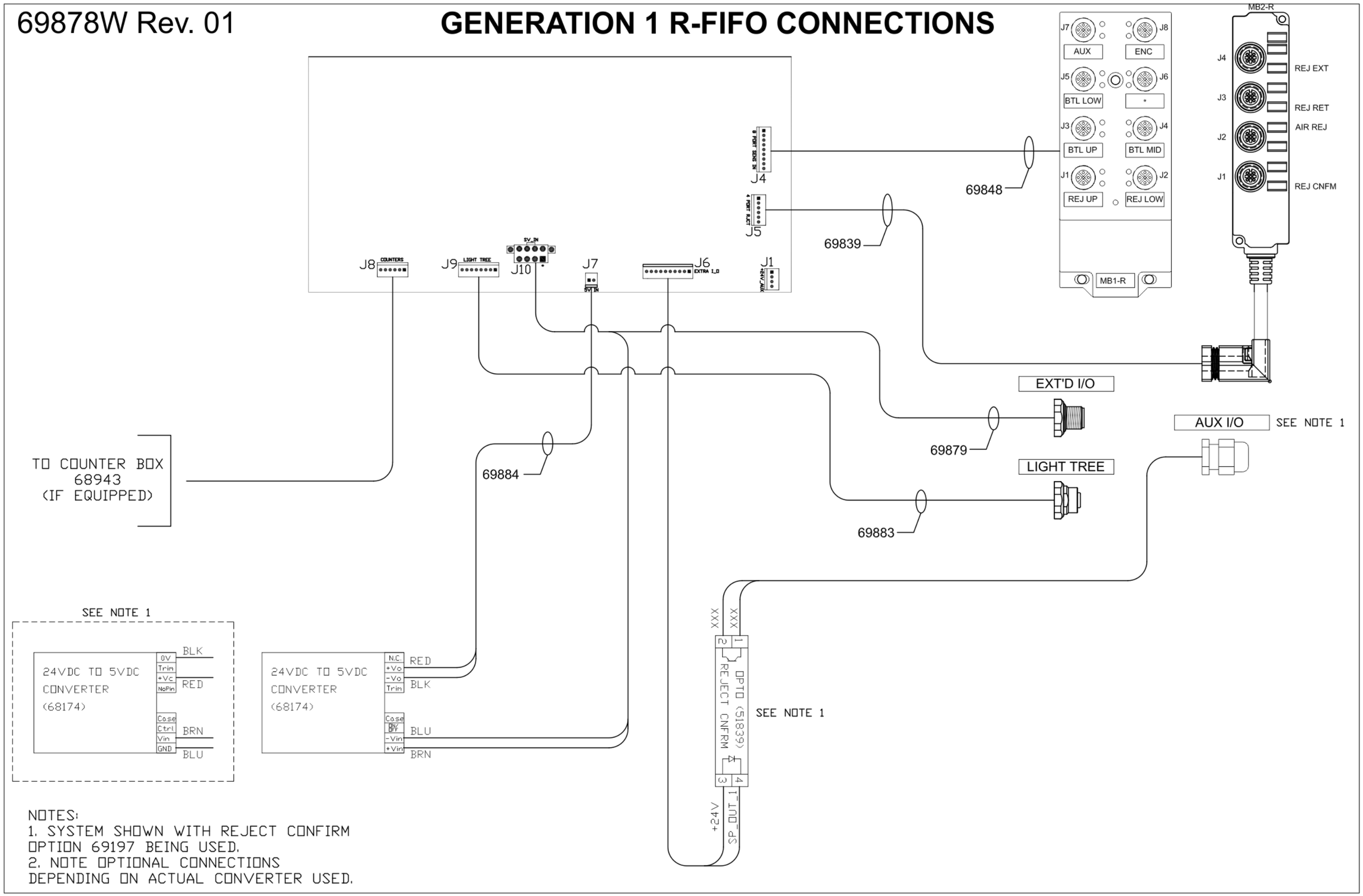
GENERATION 1 R-FIFO CONNECTIONS



NOTES:
1. SYSTEM SHOWN WITH REJECT CONFIRM OPTION 69197 BEING USED.
2. NOTE OPTIONAL CONNECTIONS DEPENDING ON ACTUAL CONVERTER USED.