Manual Number: MCRUSB01
Edition (ECN): 2021172

Controller Reference

MILRAIL™ Simple Loop Controller System

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Contents

Figures

Tables

1 Preface

1.1 About This Reference Guide and This MILRAIL™ Simple Loop Rail System Controller

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This controller reference guide explains how to manage and troubleshoot your MILRAIL™ simple loop rail system controller. It is for supervisors involved in production oversight and maintenance technicians involved in the troubleshooting of the system. A separate operator guide, MKRUSO01, explains routine operation.

WARNING: **Careless use** — can cause death or serious injury and property damage.

▶ Read the machine manuals before you install, operate, service, or clean the machine.

The staff at Milnor configured your MILRAIL™ simple loop rail system controller interface to represent your unique rail system. Users are not responsible for configuring or programming the controller.

1.1.1 Rail System Terminology

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The following list of terms can help you identify the different parts of your rail system.

Slings— Bags full of goods that will be discharged to the CBW® washer's chute. Slings are also commonly referred to as bags.

Mast Lift— The device that lifts slings and transfers them to the rail loop. It consists of the carriage, the flight bar, and the floor scale. The mast lift is also commonly referred to as the elevator. The mast lift has four positions. See Section 1.1.2 .

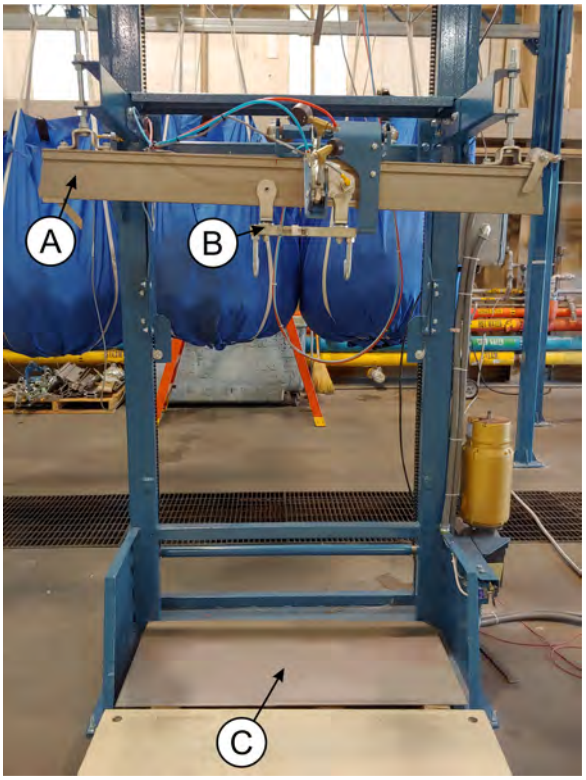
Carriage (item A in Figure 1)— The piece of rail on the mast lift that holds the flight bar until it transfers the flight bar to the rail loop.

Flight Bar (item B in Figure 1)— The device used to carry a sling along the rail loop. The operator manually attaches a sling to the flight bar. The flight bar is also commonly referred to as the trolley.

Floor Scale (item C in Figure 1)— A scale built into the bottom of the mast lift used to weigh goods.

PVC— An optional device used to raise slings from a low rail to a higher rail on the rail loop. PVC stands for Pneumatic Vertical Conveyor.

Figure 1. Parts of the Mast Lift



Discharger— The device that discharges goods from a sling to the CBW® washer's chute.

Stop— A device used to temporarily stop and allow the progression of a sling along the rail, break the momentum of a fast-moving sling, or hold a sling in a particular position (such as on the discharger).

Buffer— A stop used to temporarily hold one or more slings, to prevent slings from progressing when a line (or device, such as discharger) is already full. For example, the full bag buffer prevents slings from entering the full bag storage line when the full bag storage line is full.

Lift Bar— A device located before a stop, which the controller uses to determine if a line is full.

Empty Bag Buffer— A storage location on the rail loop where the flight bar carrying an empty sling waits after the sling discharges its goods. Here, the operator removes the empty sling from the flight bar, and the flight bar waits to be retrieved by the mast lift's carriage.

Full Bag Buffer— A storage location on the rail loop where slings transferred from the mast lift to the rail loop wait to enter the full bag storage line.

Full Bag Storage Line— A storage location on the rail loop where slings wait to enter the discharger.

1.1.2 The Mast Lift Positions

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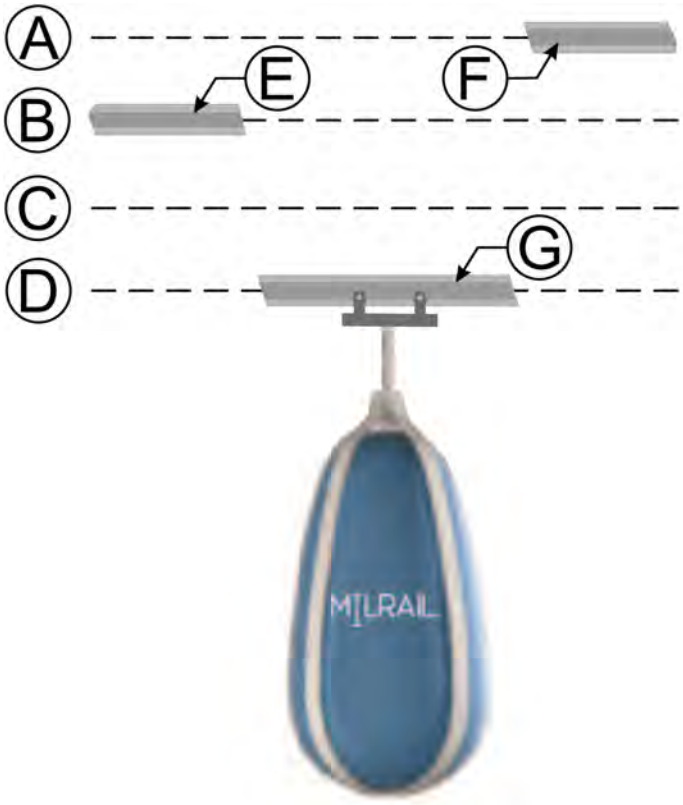
The mast lift has four different positions, as explained below. The following figure shows an example rail system layout with the different mast lift positions.

Figure 2. Mast Lift Positions



Legend

A . . . Top level— The highest lift position, where the lift transfers slings onto the rail loop.

B . . . Empty-bag level— After a sling discharges its goods, the lift waits at this position to retrieve the flight bar from the empty bag buffer.

C . . . Safety level— The operator raises the lift to this position after he/she attaches a sling to the flight bar. At the safety level, the system transitions to automatic mode.

D . . . Bottom level— The lowest lift position, where the operator attaches a sling to a flight bar. This position is also commonly referred to as the loading level.

E . . . Rail connecting to the empty bag buffer (rail loop exit).

F . . . Rail connecting to the full bag buffer (rail loop entrance).

G . . . The carriage with a flight bar and full sling attached

2 Using the MILRAIL™ Simple Loop Controller Inferface

2.1 How to Use the MILRAIL™ Simple Loop Controller

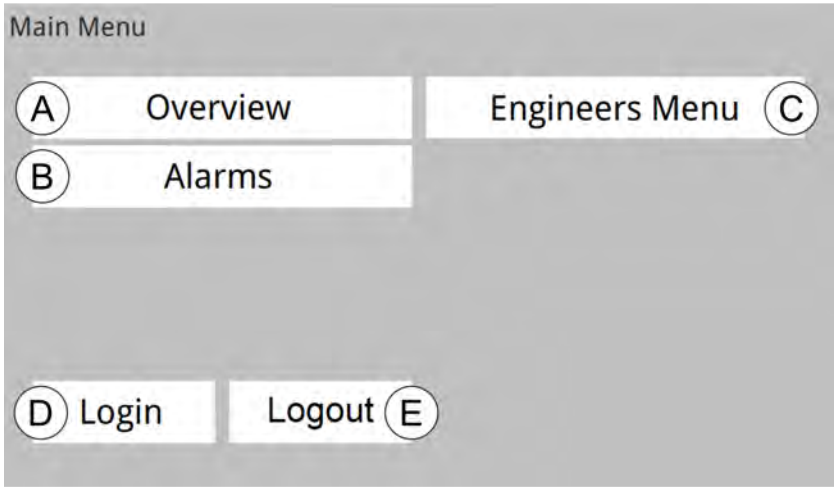
The MILRAIL™ simple loop controller uses a touch-sensitive display screen to operate the system.

CAUTION: **Excessive pressure** — can damage the display screen.

- Do not push hard on the glass.
- Use only a finger to touch the glass. Do not touch the screen with a tool.

The Main Menu is the default display on the MILRAIL™ simple loop controller. It is used to log in and access all the other menus, as shown below.

Figure 3. Main Menu



Legend

A . . . Access the Overview display (see Section 2.1.2).

B . . . Access the Alarms Menu (see Section 3.1.2 : The Alarms Menu, page 14).

C . . . Access the Engineers Menu (see the separate reference manual, MCRUSB01, for more information).

D . . . Access the Login window (see Section 2.1.1).

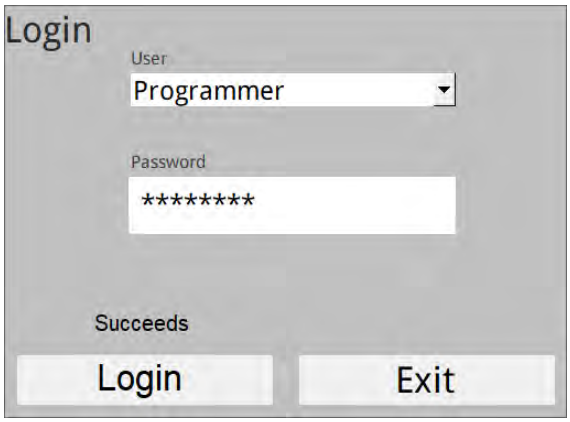
E . . . Log out of the current user's account

2.1.1 Select a user and log in.

Select a user and log in to use the MILRAIL™ simple loop controller. There are four types of users, each with access to different features.

1. On the Main Menu, touch the button labeled “Login” at the bottom of the screen. The Login window appears, as shown in the following figure.

Figure 4. Login Window



2. Select a user from the dropdown menu. There are four choices:
   - Operator—Has access to most displays but cannot access the PLC Sequences display and cannot edit sling data.
   - Manager—Has access to all displays except the PLC Sequences display.
   - Engineer—Has access to all displays.
   - Programmer—Has access to all displays.
3. Touch the text box labeled “Password.”
4. Use the keypad to enter the password for the user you selected.
5. Touch the button labeled “Login” in the bottom-right of the window to log in.

2.1.2 The Overview Display

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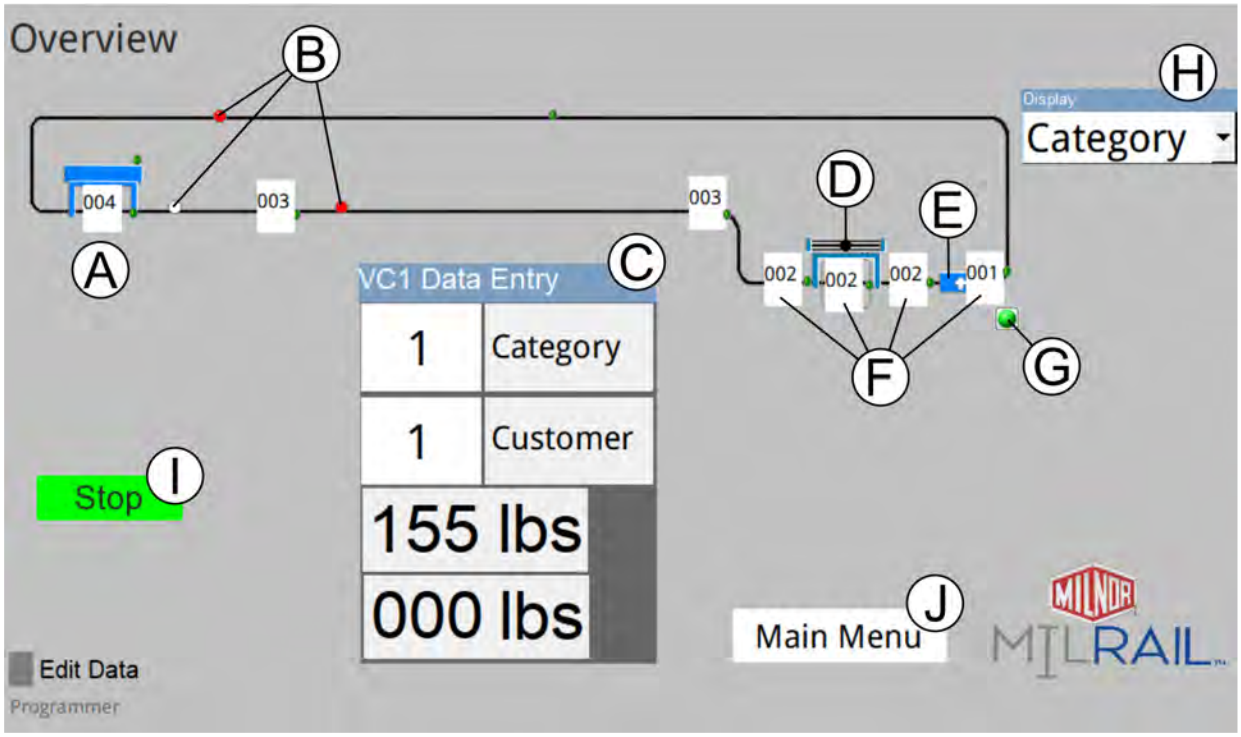
From the Main Menu, touch the button labeled “Overview” to access the Overview display. The Overview display depicts a customized, simplified version of your rail system that updates in real-time.

The display represents slings with square icons on the rail loop, and indicates how many slings are on the rail, and their locations on the rail. You can choose the data displayed on the sling icons— category, customer, weight, or destination— using the dropdown menu (item H in the following figure).

The Overview display also shows the locations and status of the mast lift, discharger, and optional PVC, and indicates if these devices have a sling.

The following figure shows an example rail system and explains how to interpret the Overview display.

Figure 5. The Overview Display (Example)



Legend

A . . . The mast lift (elevator), with a sling attached. See Figure 6 .

B . . . Lift-bar proximity switches, which indicate if a line can receive slings. White = can, red = cannot.

C . . . The data for the incoming sling (on the mast lift). The controller inputs this information automatically.

D . . . PVC, with a sling attached.

E . . . The discharger to the CBW® washer's chute, with a sling attached. The arrow icon indicates when the discharger receives a signal to release the sling contents into the tunnel.

F . . . Slings, with the Category number displayed.

G . . . Touch to pause the rail system (without cancelling production).

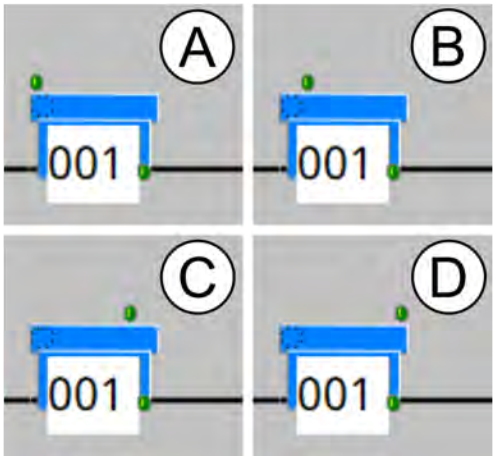
H . . . Choose the data displayed on the sling icons— category, customer, weight, or destination.

I . . . Indicates when production is stopped (when the user presses the system stop button). All devices in the rail system will stay in their current positions until operation is resumed with the system start button.

J . . . Return to the Main Menu.

The mast lift icon displays the current position of the mast lift using circular green indicators, as shown in the following figure. (See Section 1.1.2 : The Mast Lift Positions, page 3 for explanations of the different levels.) Arrows also appear on the mast lift icon to indicate its direction of movement.

Figure 6. Mast Lift Positions



Legend

A . . . Empty-bag level
B . . . Safety level
C . . . Top level
D . . . Bottom level

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2.2 To Edit and Delete Sling Data

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Slings use the same category and customer data as the previous sling, until you change this information manually. If you need to update the category or customer data for the slings, use the following instructions to edit the sling's data. You can edit a sling's data at the mast lift, or after the sling has already entered the rail loop. Furthermore, if a sling accidentally opens and spills goods, you can delete a sling's data.

To edit or delete sling data:

1. Touch a sling icon to edit its data. The Edit Sling Data window appears, shown in the following figure, which lists the current category, customer, weight, and destination data.

Figure 7. Edit Sling Data Window

Legend

A . . . Category— identifies a general type of goods, and thus can also identify the wash formula the CBW® washer will use.
B . . . Customer— identifies the customer (commercial laundry) or department (institutional laundry) the batch belongs to.
C . . . Weight— the dry, soiled weight of a batch, as measured by the floor scale, or entered manually by the operator.
D . . . Destination— identifies a storage location within the laundry to send the batch.
E . . . Undo your changes and close the window.
F . . . Confirm your changes and close the window.
G . . . Indicates which position the sling is in on the Overview display. Ex. The sling is in position #19 when it is on the mast lift.

2. In the window, touch the number value next to the data you want to change. For example, touch the value next to the word “customer” if you want to change the sling’s customer number. A keypad appears.
3. Use the keypad to enter a new value for the data.
4. Touch the button labeled “Enter” to confirm the new value and close the keypad.

NOTE: To delete a sling, change all the values for the category, customer, weight, and destination data to 0.

5. Touch the button labeled “Close” in the Edit Sling Data window to save your changes and close the window. If you deleted a sling, the sling’s icon will disappear from the Overview display.

3 Troubleshooting

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3.1 Errors

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When the rail system encounters an error condition, production stops, the error signal sounds, and the controller displays the error code name on a scrolling red banner at the top of the screen. See Section 3.1.1 for a list of possible error conditions.

3.1.1 The Error Codes

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The following section describes the error codes the controller can issue. Operation halts and cannot be resumed until the cause of the error is corrected. Contact a service technician if you cannot correct the error. If an error occurs because a sling is stuck, nudge the sling with a pole or gaff hook.

General Errors — The following errors are not isolated to any one part of the rail system and can occur simultaneously with more specific errors.

Emergency Stop — This error occurs when the emergency stop switch is pressed. This error also triggers the “System Not Running” error. When safe to do so, turn the switch clockwise to restore power to the system and resume operation.

System Not Running — This error occurs when the emergency stop switch or system stop button is pressed, or any time operation has been halted.

Mast Lift Errors — The following errors can occur while the mast lift receives a flight bar or transfers a sling to the rail loop.

VC1 Motor overload — This error occurs if the mast lift tries to lift a sling weighing over 500 pounds. This error also triggers the “VC1 Inverter Fault” error.

VC1 Switch fault — The controller detected a fault with one of the proximity switches at the mast lift. This error can suggest a proximity switch has malfunctioned and may need to be replaced.

VC1 Bag not arrived — The mast lift did not receive a flight bar (the "Mast lift—Bag on carriage” input X13 was not made) within the required time limit when the controller expected it.

VC1 Bag not settled — The mast lift received a flight bar, but the flight bar did not settle. (The "Mast lift—Bag on carriage” input X13 was made, but did not remain made when the controller expected it.)

VC1 Bag not released — A sling remained (got stuck) on the carriage after the controller opened the stop. (The "Mast lift—Bag on carriage” input X13 remained made when the controller expected it to be released.)

VC1 Inverter Fault — The inverter that controls the mast lift motor malfunctioned. See the inverter manual for details.

VC1 Chain Fault Up — The mast lift jammed while moving up. See Section 3.4 : Chain Fault Recovery, page 22.

VC1 Chain Fault Down — The mast lift jammed while moving down. See Section 3.4 : Chain Fault Recovery, page 22.

Full Bag Buffer Errors — The following errors can occur when a sling is entering or exiting the full bag buffer.

VC1 Full Bag Buffer Switch fault — The controller detected a fault with one of the proximity switches at the full bag buffer. This error can suggest a proximity switch has malfunctioned and may need to be replaced.

VC1 Full Bag Buffer not arrived — The full bag buffer did not receive a sling (the "Full bag buffer— Bag at stop" input X30 was not made) within the required time limit when the controller expected it.

VC1 Full Bag Buffer not settled — The full bag buffer received a sling, but the sling did not settle. (The "Full bag buffer— Bag at stop" input X30 was made, but did not remain made when the controller expected it).

VC1 Full Bag Buffer not released — A sling remained (got stuck) on the full bag buffer after the controller opened the stop. (The "Full bag buffer— Bag at stop" input X30 remained made when the controller expected it to be released.)

VC1 Full Bag Buffer Data error — The controller cannot find the sling data when the sling is at the full bag buffer stop. The controller checks for a sling's data at the full bag buffer, full bag storage line, and discharger.

Full Bag Storage Errors — The following errors can occur when a sling is entering or exiting the full bag storage line.

DC1 Full Bag Buffer Switch fault — The controller detected a fault with one of the proximity switches at the full bag storage line. This error can suggest a proximity switch has malfunctioned and may need to be replaced.

DC1 Full Bag Buffer not arrived — The full bag storage line did not receive a sling (the "Full bag storage— Bag at stop" input X32 was not made) within the required time limit when the controller expected it.

DC1 Full Bag Buffer not settled — The full bag storage line received a sling, but the sling did not settle. (The "Full bag storage— Bag at stop" input X32 was made, but did not remain made when the controller expected it.)

DC1 Full Bag Buffer not released — A sling remained (got stuck) on the full bag storage line after the controller opened the stop. (The "Full bag storage— Bag at stop" input X32 remained made when the controller expected it to be released.)

DC1 Full Bag Buffer Data error — The controller cannot find the sling data when the sling is at the full bag storage line stop. The controller checks for a sling's data at the full bag buffer, full bag storage line, and discharger.

PVC Errors — The following errors can only occur on systems equipped with the optional PVC.

PVC Switch fault — The controller detected a fault with one of the proximity switches at the PVC. This error can suggest a proximity switch has malfunctioned and may need to be replaced.

PVC Bag not arrived — The PVC did not receive a sling (the "PVC— Bag on carriage" input X36 was not made) within the required time limit when the controller expected it.

PVC Bag not settled — The PVC received a sling, but the sling did not settle. (The "PVC— Bag on carriage" input X36 was made, but did not remain made when the controller expected it.)

PVC Bag not released — A sling remained (got stuck) on the PVC after the controller opened the stop. (The "PVC— Bag on carriage" input X36 remained made when the controller expected it to be released.)

Discharger Errors — The following errors can occur when the discharger receives a sling or releases a sling's goods into the CBW® washer's chute.

DC1 Switch fault — The controller detected a fault with one of the proximity switches at the discharger. This error can suggest a proximity switch has malfunctioned and may need to be replaced.

DC1 Bag not arrived — The discharger did not receive a sling (the "Discharger— Bag at stop" input X26 was not made) within the required time limit when the controller expected it.

DC1 Bag not settled — The discharger received a sling, but the sling did not settle. (The "Discharger— Bag at stop" input X26 was made, but did not remain made when the controller expected it.)

DC1 Bag not released — A sling remained (got stuck) on the discharger after the controller opened the stop. (The "Discharger— Bag at stop" input X26 remained made when the controller expected it to be released.)

DC1 Load not dropped — The discharger did not drop a load (the "Discharger load dropped" input X23 was not made) within the required time limit when the controller expected it.

DC1 Data error — The controller cannot find the sling data when the sling is at the discharger stop. The controller checks for a sling's data at the full bag buffer, full bag storage line, and discharger.

Empty Bag Buffer Errors — The following errors can occur when a sling is entering or exiting the empty bag buffer. If your rail system has more than one empty bag buffer, the error code will indicate which buffer the error occurred at (ex. " VC1 Empty Bag Buffer 2 not arrived"). The empty bag buffer closest to the discharger is empty bag buffer #1.

VC1 Empty Bag Buffer Switch fault — The controller detected a fault with one of the proximity switches at the empty bag buffer. This error can suggest a proximity switch has malfunctioned and may need to be replaced.

VC1 Empty Bag Buffer not arrived — The empty bag buffer did not receive an empty sling (the "Empty bag buffer— Bag at stop" input X14 or X37 was not made) within the required time limit when the controller expected it.

VC1 Empty Bag Buffer not settled — The empty bag buffer received an empty sling, but the sling did not settle. (The "Empty bag buffer— Bag at stop" input X14 or X37 was made, but did not remain made when the controller expected it.)

VC1 Empty Buffer Bag not released — An empty sling remained on the empty bag buffer after the controller opened the stop. (The "Empty bag buffer— Bag at stop" input X14 or X37 remained made when the controller expected it to be released.)

3.1.2 The Alarms Menu

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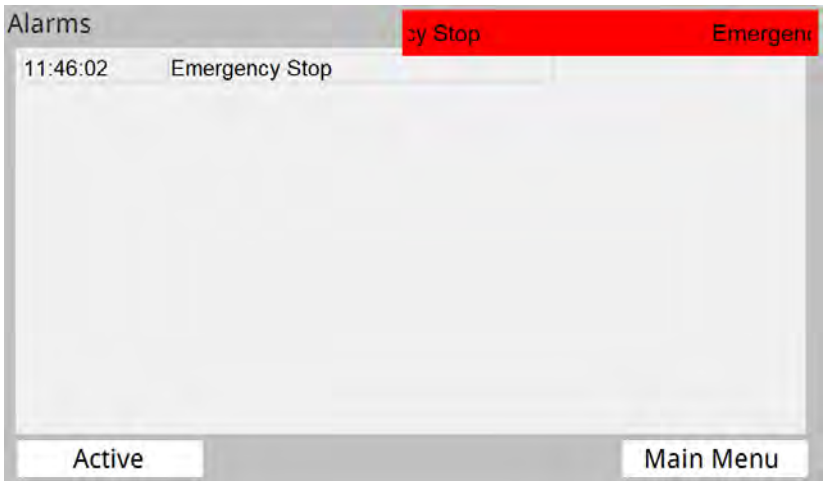
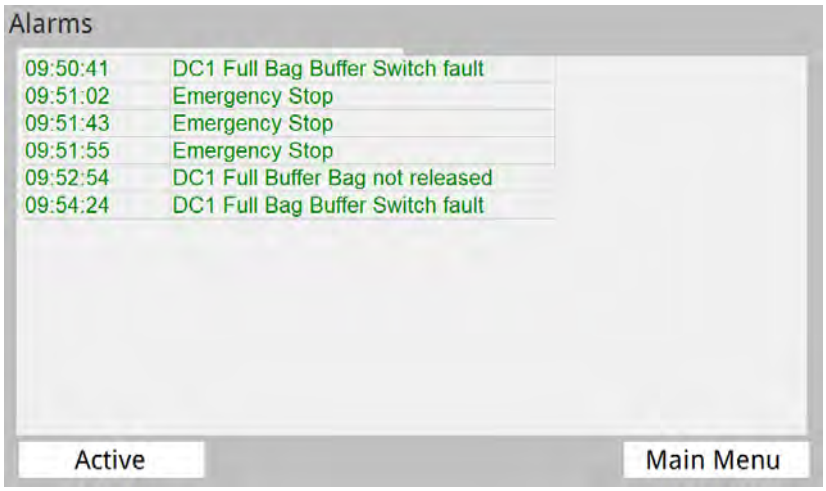
From the Main Menu, touch the button labeled “Alarms” to access the Alarms Menu, shown in the following figure. The default view of the Alarms Menu is the “Active” view. This view lists the active error codes (if any) and when they were triggered.

Figure 8. Alarms Menu— Active View



Touch the button labeled “Active” to switch to the “Error History” view, shown in the following figure. This view lists all the error codes the rail system encounters, and shows when the error was triggered.

Figure 9. Alarms Menu— Error History View



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3.2 Troubleshooting Inputs and Outputs

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WARNING: Electrified parts inside — can shock or electrocute you.

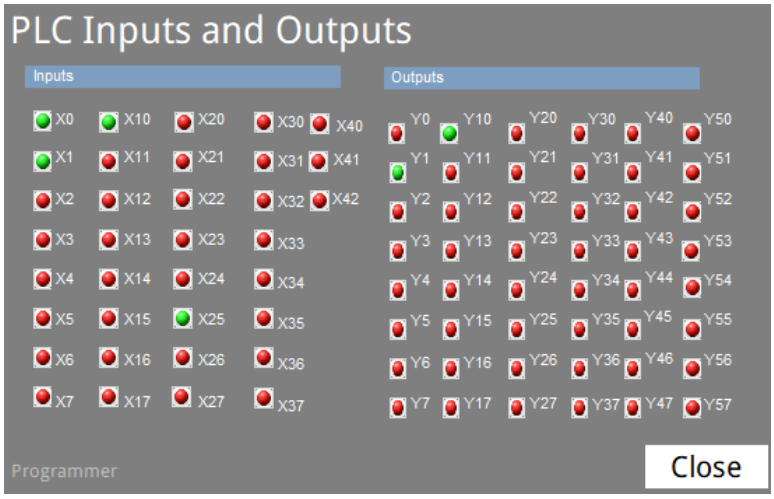
▶ Turn off and lockout/tagout electric power before you open an electrical cabinet.

If your MILRAIL™ controller displays an error message, or your rail system exhibits any abnormal behavior, your machine's inputs and outputs can help you diagnose the problem.

The PLC Inputs and Outputs display on the MILRAIL™ controller provides an accessible way for technicians to monitor inputs and outputs without opening the electrical cabinet.

From the Main Menu, touch the button labeled "Engineers Menu". From the Engineers Menu, touch the button labeled "PLC I/O" to access the PLC Inputs and Outputs display, as shown in the following figure.

Figure 10. PLC Inputs and Outputs Display



On the PLC Inputs and Outputs display, the Xs identify inputs and the Ys identify outputs, as labeled. Inputs and outputs display a green status light () when they are made, and display a red status light () when they are not made. See Section 3.2.1 to identify the different inputs and outputs.

3.2.1 List of Inputs and Outputs

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The inputs and outputs and their designations on the PLC Inputs and Outputs display are listed in the following tables, along with short descriptions of their functions. The layout drawing for your rail system can help you better visualize the locations of the stops, lift bars, and buffers.

Inputs

Table 1. Inputs

Input	Wire #	Function	Description
X0	X0	Emergency stop	This input is made when the emergency stop button is pressed.
X1	X1	"Start system" button	This input is made when the system start button is pressed and the rail system has power.
X2	X2	"Stop system" button	This input is made when the system stop button is pressed.
X3	X3	Enable keyswitch	This input is made when the keyswitch is set to  , which indicates the controller is ready to start the empty fetch recovery sequence.
X4	X4	Signal (alarm) cancel	This input is made when the operator presses the signal cancel button ().
X5	X5	Spare/unused	N/A
X6	X6	Inverter tripped	This input is made when the inverter trips, which triggers the "VC1 Inverter Fault" error.
X7	X7	Mast lift—Carriage at bottom	This input is made when the mast lift actuates the "bottom level" proximity switch.
X10	X10	Mast lift—Carriage at safety	This input is made when the mast lift actuates the "safety level" proximity switch.
X11	X11	Mast lift—Carriage at empty-bag	This input is made when the mast lift actuates the "empty-bag level" proximity switch.
X12	X12	Mast lift—Carriage at top	This input is made when the mast lift actuates the "top level" proximity switch.
X13	X13	Mast lift—Bag on carriage	This input is made when a sling actuates the "bag on carriage" proximity switch on the mast lift and the floor scale reads more than 50lbs.
X14	X14	Empty bag buffer—Bag at stop	This input is made when an empty sling is present at the empty bag buffer stop.
X15	X15	Full bag buffer— Lift bar lifted	This input is made when a sling passes or is present on the full bag buffer lift bar. There is no space for a sling on the full bag buffer when this input is made.
X16	X16	Chain fault down (chain loose)	This input signals to the controller to issue an error if a jam occurs while the mast lift is moving down.
X17	X17	Chain fault up (chain tight)	This input signals to the controller to issue an error if a jam occurs while the mast lift is moving up.

Table 1 Inputs (cont'd.)

Input	Wire #	Function	Description
X20	X20	"Move up" button	When X13– "Mast lift—Bag on carriage" is made, this input is made, which enables the "move up" button.
X21	X21	"Move down" button	This input, when made, enables the "move down" button.
X22	X22	Discharger drop load	This input is made when the discharger receives a signal from the CBW® washer, indicating that it is ready to receive goods.
X23	X23	Discharger load dropped	This input is made when the discharger receives a signal from the CBW® washer, indicating that it received goods.
X24	X24	Bag empty photocell	Currently unused
X25	X25	Discharger buffer— Bag at stop or Spare/unused	On rail systems with the optional PVC, this input is made when a sling is present on the "bag at discharger buffer" proximity switch, where it waits to enter the discharger. On rail systems without the optional PVC, this input is unused.
X6	X26	Discharger— Bag at stop	This input is made when a sling is at the discharger (actuates the proximity switch at the discharger stop).
X27	X27	Empty bag buffer— Lift bar lifted	This input is made when an empty sling passes or is present on the empty bag buffer lift bar. There is no space for an empty sling on the empty bag buffer when this input is made.
X0	X30	Full bag buffer— Bag at stop	This input is made when a sling is at the full bag buffer (actuates the proximity switch at the full bag buffer stop).
X1	X31	Full bag storage— Lift bar lifted	This input is made when an empty sling passes or is present on the full bag storage lift bar. There is no space for an empty sling on the full bag storage line when this input is made.
X2	X32	Full bag storage— Bag at stop	This input is made when a sling is at the full bag storage line (actuates the proximity switch at the full bag storage stop), where a sling waits to enter the discharger. On rail systems with the optional PVC, this is where the sling waits to enter the PVC buffer.
X3	X33	Empty bag buffer— Lift bar lifted	On rail systems with two empty bag buffers, this input is made when an empty sling passes or is present on the second empty bag buffer lift bar

Table 1 Inputs (cont'd.)

Input	Wire #	Function	Description
		or PVC buffer—Bag at stop or Spare/unused	(the empty bag buffer closest to the mast lift). There is no space for an empty sling on the second empty bag buffer when this input is made. On rail systems with the optional PVC, this input is made when a sling is at the PVC buffer (actuates the proximity switch at the PVC buffer stop), where a sling waits to enter the PVC. This input is unused on rail systems that do not include these options.
X4	X34	PVC— Carriage at bottom	This input is made when the PVC actuates the “bottom level” proximity switch. This input is unused on rail systems without the optional PVC.
X5	X35	PVC— Carriage at top	This input is made when the PVC actuates the “top level” proximity switch. This input is unused on rail systems without the optional PVC.
X6	X36	PVC— Bag on carriage	This input is made when a sling actuates the “bag on carriage” proximity switch on the PVC carriage. This input is unused on rail systems without the optional PVC.
X7	X37	Extra empty bag stop	This input is used as an additional empty bag stop on some rail systems.
X0	X40	Bag entered full bag buffer (Time reset 1)	This input is made when a sling passes the proximity switch before the full bag buffer lift bar (X15). This input ensures the current sling is settled before the mast lift can transfer a new sling to the full bag buffer.
X1	X41	Bag entered full bag storage (Time reset 2)	This input is made when a sling passes the proximity switch before the full bag storage lift bar (X31). This input ensures the current sling is settled before the full bag buffer can transfer a new sling to the full bag storage line.
X2	X42	Spare/unused	N/A

Outputs

Table 2. Outputs

Input	Wire #	Function	Description
Y0	YC0	Discharger— Bag ready	This output signals to the CBW® washer that the sling is ready to be discharged.
Y1	YC1	Mast lift— Low speed	This output restricts the mast lift speed to "low speed". The mast lift moves in "low speed" mode except when moving from the safety level to the top level, and when moving from the top level to the empty-bag level.
Y2	YC2	Mast lift— Move carriage up	This output moves the mast lift up and is made when the operator presses the "move up" button.
Y3	YC3	Mast lift— Move carriage down	This output moves the mast lift down and is made when the operator presses the "move down" button.
Y4	YC4	Empty bag buffer— Open stop	This output opens the stop at the empty bag buffer (X14). If your rail system has two empty bag buffers, this output opens the stop at the second empty bag buffer (the empty bag buffer closest to the mast lift).
Y5	YC5	Mast lift– "Move up" button lamp	This output illuminates the status light on the "move up" button when input X13– "Mast lift— Bag on carriage" is made. The light illuminates to indicate when the "move up" button is enabled.
Y6	YC6	Mast lift– Open carriage stop	This output opens the stop on the carriage (X13), which releases the sling onto the rail loop.
Y7	YC7	Full bag buffer— Open stop	This output opens the stop at the full bag buffer (X30).
Y10	YC10	System running indication	This output illuminates the "system running" status light.
Y11	YC11	System alarm indication	This output illuminates the alarm indication status lights.
Y12	YC12	System alarm signal external	This output sounds the external alarm.
Y13	YC13	Discharger buffer— Open stop or Spare/unused	On rail systems with the optional PVC, this output opens the stop at the discharger buffer (X25). On rail systems without the optional PVC, this output is unused.

Table 2 Outputs (cont'd.)

Input	Wire #	Function	Description
Y14	YC14	Discharger– Close bag	This output locks the flight bar in place so that the discharger can open the sling.
Y15	YC15	Discharger– Open bag	The output opens the sling (releases the cinch rope) to discharge the sling's goods to the CBW® washer's tunnel.
Y16	YC16	Spare/unused	N/A
Y17	YC17	Discharger— Open stop	This output opens the stop at the discharger (X26).
Y20	YD0	PVC— Move carriage up	This output moves the PVC carriage up. This output is unused on rail systems without the optional PVC.
Y21	YD1	PVC— Move carriage down	This output moves the PVC carriage down. This output is unused on rail systems without the optional PVC.
Y22	YD2	PVC— Open carriage stop	This output opens the stop on the PVC carriage (X36). This output is unused on rail systems without the optional PVC.
Y23	YD3	Extra open stop	This output opens an additional stop on some rail systems.
Y24	YD4	PVC buffer— Open stop	This output opens the stop on the PVC buffer (X33). This output is unused on rail systems without the optional PVC.
Y25	YD5	Full bag storage— Open stop	This output opens the stop on the full bag storage line (X32).
Y26	YD6	Spare/unused	N/A
Y27	YD7	Spare/unused	N/A
Y30-37	YE0-7	Weight 1-128	Weight bits used to pass the batch weight data from the MILRAIL™ controller to the CBW® washer's Mentor® controller.
Y40-47	YF0-7	Customer 1-128	Customer code bits used to pass the customer data from the MILRAIL™ controller to the CBW® washer's Mentor® controller.
Y50-57	YG0-7	Goods 1-128	Goods code bits used to pass the category data from the MILRAIL™ controller to the CBW® washer's Mentor® controller.

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3.3 The Empty Fetch Sequence

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Occasionally, flight bars can get stuck on the rail and interrupt the flow of normal operation. If a flight bar is unable to reach the empty bag buffer stop, the mast lift is unable to retrieve it, and the mast lift descends to the safety level for manual operation.

When the operator frees the flight bar, he or she must use the empty fetch sequence to retrieve the flight bar and return the machine to normal operation. The empty fetch sequence can also be used to return the system to normal operation if a flight bar needs to be removed from the rail system for maintenance.

WARNING: Descending mast lift — can crush bystanders.

- Make sure bystanders are safely away from the mast lift before you operate it.
- Do not stand near or under the mast lift while it moves under automatic control.

The following conditions must be met to initiate the empty fetch sequence:

- The mast lift is at the bottom level (X7 is made)
- There is an empty sling or empty flight bar at the empty bag buffer stop (X14 is made)
- The mast lift's carriage has no flight bar (X13 is NOT made)

To initiate the empty fetch sequence:

1. If necessary, remove the flight bar from the carriage at the safety level.
2. Press and hold the "move down" button ( ). The mast lift moves down and automatically stops at the bottom level.
3. Insert the key into the empty fetch keyswitch and turn it to the position. If there is a flight bar at the empty bag buffer stop, the "move up" button illuminates and becomes enabled.
4. Press and hold the "move up" button ( ). The mast lift rises and automatically stops at the safety level.
5. Release the "move up" button. The empty fetch sequence initiates:
   a. The mast lift automatically moves up to the top level and settles for 3 seconds.
   b. The lift moves down to the empty-bag level to fetch the flight bar from the empty bag buffer.
   c. The empty bag buffer stop opens and releases the flight bar onto the mast lift's carriage.
   d. After the flight bar settles on the carriage for 6 seconds (X13), the lift moves back down to the safety level and normal operation resumes.
6. Turn the empty fetch keyswitch back to the position to end the sequence.

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3.4 Chain Fault Recovery

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When a mast lift jam occurs, the system halts and the controller issues a chain fault up/down error. If your mast lift experiences a jam, follow these instructions to return the system to automatic operation after you resolve the chain fault error.

WARNING: Descending mast lift — can crush bystanders.

- Make sure bystanders are safely away from the mast lift before you operate it.
- Do not stand near or under the mast lift while it moves under automatic control.

The mast lift can experience four types of jams:

If the mast lift jams above the safety level while moving up…

1. The “move down” button (⇩) becomes enabled.
2. Press and hold the “move down” button. The mast lift moves down and automatically stops at the safety level.
3. At the safety level, the system transitions to automatic mode. Release the “move down” button.
4. The mast lift automatically moves down to the bottom level.
5. The mast lift returns to normal operation.
   a. If the mast lift encountered the chain fault error before it transferred a sling to the rail loop, the mast lift waits for the operator to activate the “move up” button again to transfer the sling to the rail loop.
   b. If the mast lift encountered the chain fault error in empty fetch mode, the mast lift waits for the operator to activate the “move up” button again to retrieve the flight bar.

If the mast lift jams above the safety level while moving down…

1. The “move up” button (⇧) becomes enabled.
2. Press and hold the “move up” button. The mast lift moves up and automatically stops at the empty-bag level, or the top level (depending on the position of the mast lift when the error occurred).
3. At the empty-bag/top level, the system transitions to automatic mode. Release the “move up” button.
4. The mast lift automatically moves down to the bottom level.
5. The mast lift returns to normal operation.
   a. If the mast lift encountered the chain fault error before it retrieved a flight bar, you may need to use the empty fetch procedure to retrieve the flight bar (see Section 3.3 : The Empty Fetch Sequence, page 21).

b. If the mast lift retrieved a flight bar, it waits for the operator to attach a new sling.

If the mast lift jams below the safety level while moving up...

1. The “move down” button (⇩) becomes enabled.
2. Press and hold the “move down” button. The mast lift moves down and automatically stops at the bottom level.
3. The mast lift returns to normal operation.
   a. If the mast lift encountered the chain fault error before it transferred a sling to the rail loop, the mast lift waits for the operator to activate the “move up” button again to transfer the sling to the rail loop.
   b. If the mast lift encountered the chain fault error in empty fetch mode, the mast lift waits for the operator to activate the “move up” button again to retrieve the flight bar.

If the mast lift jams below the safety level while moving down…

1. The “move down” button (⇩) becomes enabled.
2. Press and hold the “move down” button. The mast lift moves down and automatically stops at the bottom level.
3. The mast lift returns to normal operation. If the mast lift retrieved a flight bar, it waits for the operator to attach a new sling.

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3.5 How to Contact Milnor®

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Your authorized Milnor® dealer can assist you with your Milnor® machine and knows about the local conditions that may be pertinent to the installation, use, or maintenance of the machine. Contact your dealer first. For assistance from the Milnor® factory, refer to Table 3 for contact information.

Table 3. Pellerin Milnor® Corporation Contact Information

Purpose	Department	Telephone	FAX	E-mail/Web site
Order or ask about replacement parts	Parts	504–712–7775 or 800–299–1500	504–469–9777	parts@milnor.com
Get advice on installing, servicing, or using	Customer Service/ Technical Support	504–712–7780	504–469–9777	service@milnor.com www.milnor.com (Customer Service)
Learn about, request, or enroll in Milnor® service seminars	Training	504–712–7716	504–469–9777	training@milnor.com
Determine warranty eligibility or claim status	Warranty Administration	504–712–7735	504–469–9777	service@milnor.com (Attention: Warranty)

Table 3 Pellerin Milnor® Corporation Contact Information (cont'd.)

Purpose	Department	Telephone	FAX	E-mail/Web site
Ask about, comment on, or report an error in equipment manuals	Technical Publications	504–712–7636	504–469–1849	techpub@milnor.com
European contacts	Milnor® International	+ 32 2 720 5822	—	milnor@milnor.be
Ask about the shipping weight of your machine before it arrives at your facility	Logistics Department	504–712–7686	504–471–0273	—

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Pellerin Milnor Corporation
Post Office Box 400
Kenner, LA 70063-0400

Telephone: 504-467-9591
http://www.milnor.com
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