

Customer:
Job Number:

CV and DCV Series | Cartveyor® Shopping Cart Conveyor

Owner's Manual

Important:



**Read this entire manual.
Important safety information
is included.**

The illustrations depicted in this manual are not to scale or detail. The illustrations are for reference only.



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e-mail: cartservice@pflow.com



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For a list of contact personnel visit the Cartveyor® website at:
<https://www.cartveyor.com/contact-us/>

Documentation

PFlow Industries, Inc. reserves the right to make changes or improvements to the standard model line at any time. PFlow Industries, Inc. reserves the right to make changes to subsequent editions of the manual without prior notice to holders of this edition.

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System Modifications/ Disclaimer

Mechanical or electrical modifications performed on the equipment not approved by PFlow Industries, Inc. may void any warranty and/or service agreements. Please contact the PFlow Customer Support Department for assistance with service modifications.

Training

Training is available upon request from the Customer Support Department. Half-Day, Full-Day, and Two-Day sessions are customized to fit specific needs - either for a single equipment type or for the entire product line.

On-site Supervision

On-site supervision services are available from the Field Service Department. Contact our Field Service Manager for more details.

Source Language

This manual is written in American English.

Section 1 | Contact Information



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Introduction This manual provides information about the PFlow Industries, Inc. custom designed Cartveyor[®] shopping cart conveyor. As the nations' leading manufacturer of vertical material handling equipment, PFlow Industries, Inc. is confident that this new shopping cart conveyor will provide many years of reliable service.

General Overview The Cartveyor[®] provides a safe and simple means of moving PFlow Industries, Inc. approved shopping carts from one level to another. The simplicity of design requires less space than a moving walkway while moving large numbers of shopping carts more efficiently than an elevator.

Basic Operation When a shopping cart is pushed through the infeed gates of the Cartveyor[®] a "V-shaped guide, positioned at the machines entrance, funnels the tow bar into proper position. The Cartveyor[®] senses the presence of the shopping cart and activates the conveyor drive system.

The special tow bar mounted to the bottom front of the shopping cart framework is engaged by the Cartveyor[®] conveyor chain and transports the cart to the next floor. The customer uses an adjacent escalator to accompany the cart to the next floor. When the shopping cart arrives at the discharge area, the shopping cart tow bar releases a lock and allows the shopping cart to move through the discharge gates. If additional carts are in the Cartveyor[®], it will continue to operate until all carts are discharged. If after a predetermined period of time, no additional carts have entered through the infeed gates, the system pauses, entering a "sleep-mode" until another cart activates the Cartveyor[®].

Disclaimer Please note that although PFlow Industries, Inc. includes various features (see Special Features) on each Cartveyor[®] to account for certain contingencies, these features can be bypassed. In addition, not **all** contingencies can be logically accounted for. Each Cartveyor[®] device is **not** "fool-proof".

If an accident occurs (or has the potential to occur) involving injury to persons and/or damage to equipment and property, due to the misuse and negligence of this equipment (said equipment being the Cartveyor[®] and any related equipment) PFlow Industries, Inc. **can not** be held liable or accountable.

Also, any maintenance work performed on said equipment by anyone **not** authorized or trained by PFlow Industries, Inc., which directly or indirectly **is** the cause of or the potential cause of an incident (said incident being the injury to persons and/or damage to equipment and property), PFlow Industries, Inc. **can not** be held liable or accountable.

PFlow Industries, Inc. has designed, engineered, and manufactured what it believes to be safe and reliable equipment to transport shopping carts from one level to the next, providing it is **used in a safe** and **responsible manner** as described in this manual.

NOTICE In the event of any malfunction of the Cartveyor[®] or in the event of any incident involving the Cartveyor[®] that results in property damage or personal injury, the Cartveyor[®] should not be operated until PFlow Industries, Inc. has determined the cause of any such malfunction or incident and all remedial measures have been performed on this equipment.

Special Features

Each Cartveyor[®] incorporates various mechanical and electrical features that provide a safe and efficient way of moving shopping carts from one level to another. In summary, these features include the following:

- A Programmable Logic Controller (PLC) provides computer-based control over all electrical functions of the conveyor.
- A Human-Machine Interface (HMI) [sometimes called a Touch-Screen Interface] on each infeed gate displays system status and some options, customer instructions, as well as direct control of the Cartveyor's[®] functions by authorized personnel.
- An exclusive "Sleep Mode" conserves power and wear on the equipment by causing the machine to pause when no shopping carts are present or detected.
- A High-Efficiency Electric Motor uses less power than a conventional motor.
- Gates with one-way swinging panels and warning signage discourage customers from entering the shopping cart tow area.
- Photo-Electric Sensors (Photo Eyes) at various locations stop the conveyor motion as well as initiate other functions when the shopping cart or foreign objects are detected.
- An exclusive Conveyor Chain with lugs tows the shopping cart from level to level by means of the tow bar feature mounted to the bottom front framework of each cart.
- A Red Light (LED) at each discharge gate remains lit if a fault condition is detected. Note that this is an option, and not present on all units.
- A Signaling Buzzer at each gate alerts store personnel to a fault.
- An Emergency Stop Push-button on each gate and in the lower pit stops the conveyor's motion immediately.
- Auto Mode is the default mode for Cartveyor[®] operation when used by the general public. This mode safely conveys a customer's shopping cart from one level to the next automatically and goes into a suspended state of movement after a predetermined amount of idle time.
- Associate Mode allows only **authorized personnel** to reset faults and manually operate the conveyor in forward motion via the HMI.
- Manager Mode is similar to Associate Mode, but with additional control over certain functions and access to usage counters.
- Factory Mode is used to operate the conveyor during service and maintenance by PFlow Industries, Inc. service personnel only!
- Locking Gates are standard safety devices located in the infeed and discharge areas. The locking gates are designed to prevent non approved shopping carts from entering the Cartveyor[®]

Code Requirements The Cartveyor® is an incline tow conveyor—public use intended device in compliance with ASME B20.1 National Safety Standard for Conveyors and Related Equipment, Section 6.17.2.

NOTICE ASME A17.1/B44 does not apply to this equipment.

The Cartveyor® is **not** an escalator. The Cartveyor® is designed for handle only shopping carts approved by PFlow Industries, Inc. up to its' rated weight capacity. Cartveyor™ devices have their own national code designation: ANSI/ASME B20.1. All electrical designs and components are in accordance with National Electric Code (NEC) requirements. Local codes may require initial inspection of the installation and periodic inspection and testing of the Cartveyor®. Contact PFlow Industries, Inc. for more information in the event an inspection is required.

Some states require special components as part of any installation and have specific guidelines regarding how the equipment must be installed, inspected, and tested. If we know in which state the equipment will be located, and kept informed of state and local requirements, PFlow Industries, Inc. incorporates the components into the order as approved by the customer and also provides any pertinent information on the general arrangement drawing related to the installation of the equipment. PFlow Industries, Inc. will not be on site for the inspection stage, but strongly advise that the installer be present.

If at any time there are questions about the state's requirements or more information is needed in the event an inspection is required, please call the PFlow Industries, Inc. Customer Support Department.

NOTE *The information and illustrations in this manual are intended only as an aid to understanding the general installation or operation of the Cartveyor®. The information and illustrations do not cover every possible contingency or circumstance regarding nonstandard options or site conditions.*

If there is a problem, call PFlow Industries, Inc. at (414) 352-9000, during normal business hours, 8:30 a.m. to 5:00 p.m. central standard time, Monday through Friday. Outside of those hours, see the Contact Information page on the Cartveyor® website for additional information. Please have the Model and Serial number handy before contacting PFlow Industries (The information can be found on the General Arrangement (GA) drawing number).

Parts

Equipment damage resulting from modification in any manner from the original model, including the substitution of parts other than factory authorized parts, will void the warranty. Furthermore, PFlow Industries, Inc. will not be liable for any loss, injury, or damage to persons or property, nor for direct, indirect, or consequential damage of any kind resulting from modified or substitution of parts other than factory authorized parts of said material or equipment.

PFlow Industries, Inc. maintains a complete stock of, or has access to, all replacement components. Detailed records of all equipment sold are kept. If a component is damaged in shipment, is defective or missing, contact PFlow Industries immediately.

Service

The PFlow Industries, Inc. Customer Support Department will assist maintenance and service personnel with any questions or problems regarding the equipment or installation.

Feedback

Your feedback is important. Please help PFlow Industries, Inc. understand if the equipment has met expectations. Please complete the questionnaire in this manual. The questionnaire will help address any comments and/or concerns.

Parts and Labor

Parts:	Labor:
Manufactured Components 1 Year	Manufactured Components 1 Year
Purchased Components 1 Year	Purchased Components 90 Days

Definitions

- Manufactured components are defined as those components manufactured and or assembled by PFlow Industries, Inc.
- Purchased components are those components that are used as supplied by vendors.

Warranty

PFlow Industries, Inc. expressly warrants to the original purchaser that this product will be free from defects in material and workmanship under normal, intended use. The warranty period begins two (2) months after shipment or Cartveyor® start-up, whichever comes first.

Exclusions

This warranty does not apply to:

1. Equipment or components damaged or broken in transit or shipping.
2. Replacement of wear parts.
3. Equipment failures caused by use of shopping carts not approved by PFlow Industries, Inc., misuse, abuse, exceeding capacities, improper installation, unskilled maintenance, or inadequate maintenance.
4. Exposure to a corrosive or abrasive environment or exterior elements unless specifically built for that environment.
5. Equipment that has been repaired, altered or modified in any manner outside of the manufacturing facility, substitution of parts other than factory authorized parts, removal of any parts, or addition of any parts without prior written permission by PFlow Industries, Inc.
6. Any losses or damages resulting from loss of revenue or profits, incidental or consequential damages, delays, or expenses incurred by failure of said part or parts even if advised of the possibility thereof.
7. Lost time and/or additional trips for missing or damaged components.
8. Expedited freight charges.

Obligation

The obligation for PFlow Industries, Inc. is limited to only the replacement or repair of defective components that received prior authorization. This is the owner's sole remedy.

PFlow Industries, Inc. will bear normal labor charges performed by an authorized PFlow Industries, Inc. service agent during standard business hours, excluding overtime, holiday rates, or any additional fees.

This warranty applies to all models and no person except an officer of PFlow Industries, Inc. is authorized to modify this warranty or to incur on behalf of PFlow Industries, Inc. any other obligation or liability in connection with PFlow Industries, Inc. equipment.

Liability PFlow Industries, Inc. believes, to the best of our knowledge, that the information in the equipment manuals are accurate. In the event that technical or typographical errors exist, PFlow Industries, Inc. reserves the right to make changes to subsequent editions of the manual without prior notice to holders of this edition. The reader should consult PFlow Industries, Inc. if errors are suspected.

Warranty Procedures All billing must be in accordance with our Warranty Procedures. Replacement of defective parts will be handled in accordance with the Return Materials Authorization (RMA) policy for PFlow Industries, Inc.

- Pre-Authorization**
- All warranty work must be pre-authorized by PFlow Industries, Inc. Customer Support Department prior to starting work.
 - Where distance and or experience may be more cost-effective, PFlow Industries, Inc. reserves the right to use alternate organizations.
 - Labor is defined as a maximum of two hours travel per call, plus reasonable on-site repair time as determined by PFlow Industries, Inc.
 - Local purchase of components must be pre-authorized.

1. Notify the PFlow Industries, Inc. Customer Support Department of the problem for authorization.
2. PFlow Industries, Inc. will determine:
 - The cause of the problem.
 - Who will do the repair work.
 - The repair details involved.
3. If PFlow Industries, Inc. decides that your organization or your subcontractor will do the work, an authorization number will be assigned which must be referenced on all subsequent paperwork.

NOTE *Notify PFlow Industries, Inc. by phone, FAX, or e-mail during the next business day if an event occurs during our non-working hours. Issuance of an authorization number does not guarantee approval and/or payment.*

- Invoices**
1. Submit an invoice for approval within 30 days after the date the work was completed. Payment is made 30 days after the date of approval.
 2. A deduction from outstanding payments to PFlow Industries, Inc. for warranty is never authorized.
 3. Invoices received without sufficient information will be returned. Invoices will be reconsidered for approval when complete documentation is received. All invoices must include, in detail, the following:

<input type="checkbox"/> PFlow serial number.	<input type="checkbox"/> Labor hours expended resolving the problem.
<input type="checkbox"/> Date the work was performed.	<input type="checkbox"/> Rates per hour.
<input type="checkbox"/> Description of the problem.	<input type="checkbox"/> Copies of receipts for materials purchased.
<input type="checkbox"/> Travel time incurred.	<input type="checkbox"/> Detailed description of work completed.

Read the Entire Manual

Important: Carefully read the entire manual upon receipt of the Cartveyor®. Improper installation, alteration, adjustment, service, cleaning, or maintenance could result in death, severe injury, or property damage. Instructions and warnings must be read and thoroughly understood by all owner’s representatives. PFlow Industries, Inc. recommends that the owner conduct regular staff training including safety instructions on a regular basis to avoid the risk of accident or damage to the Cartveyor®.

Following procedures other than those indicated in this guide to install, use, and maintain the Cartveyor® is considered inappropriate and may cause fatal accidents, personal injury, or property damage, in addition to invalidating the warranty.

Intended Purpose

The intended purpose of the PFlow Industries, Inc. Cartveyor® shopping cart conveyor is to provide a safe and simple means of moving approved shopping carts and their merchandise only, up to the rated capacity of the Cartveyor® from one level to another. Cartveyors are **not** escalators and not intended to transport people. The Cartveyor® is exclusively intended for use in establishments where all owner’s representatives have been trained to understand the purpose, limitations, and associated hazards of the Cartveyor®. Any other use of the Cartveyor® is strictly forbidden.

Safety Alert Symbols

To ensure your safety and the safety of those around you, it is important that you read, observe, and understand ALL safety precautions relative to a particular task. Safety precautions in the manual are labeled with an alert symbol followed by the word **DANGER, WARNING, or CAUTION**.



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a hazardous situation that, if not avoided, will result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

Used to address practices not related to physical injury.

 **DANGER**

- Stay within the rated capacity.
- Make sure all safety devices are in place and operable before using the equipment. If any safety device is missing or inoperable, immediately remove the equipment from service.
-  High Voltage! A qualified electrician must install all electrical connections and permanent wiring in accordance with applicable local or national electrical codes. Make sure the equipment is properly grounded in accordance with local electrical codes or, in the absence of local codes, with the current edition of the National Electrical Code NFPA No. 70.
- Falling materials hazard! Make sure all components are properly supported during installation. Illustrations may show components unsupported in order to make the equipment and installation instructions clearly understood.

 **WARNING**

- Passengers are not permitted. Riding may result in death or serious personal injury.
- This equipment can be dangerous if not used properly. Allow only competent adults who have been properly trained and authorized personnel to operate this equipment and the Human Machine Interface (HMI).
- This equipment must be maintained to ensure safety. Allow only properly trained personnel to service the equipment. Implement a routine safety inspection plan and follow the recommended preventive maintenance schedule in the owner's manual. **Note:** Maintenance materials have been delivered to the store manager to facilitate record keeping of the preventative maintenance performed.
-  Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1, OSHA 29 CFR 1910.147, or Ontario Elevating Devices Regulation for minimum requirements for a lockout/tagout system. There may be additional country, state, or local requirements.
-  Components and accessories may be heavy. To prevent serious injury, use the appropriate lifting apparatus when handling the components and installing the Cartveyor®.

 **WARNING**

- If any defects relating to operating safety and reliability are detected or if any damage occurs, the Cartveyor[®] must be taken out of operation immediately.
- Before the Cartveyor[®] is put into operation, all Cartveyor[®] parts must comply with all relevant health and safety directives and regulations.
- Do not switch the main power supply on or start the Cartveyor[®] when persons are in contact with the Cartveyor[®].
- Make sure that no persons or objects are within the range of any moving parts of the Cartveyor[®].
- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.
- If this Cartveyor[®] needs to be modified in any way, contact PFlow Industries, Inc. for assistance. Do not make any unauthorized changes.
- Lockout/tagout the Cartveyor[®] before removing jammed objects. Be aware that stored energy in the conveyor components may move or shift when the jam is removed. De-energize any circuit before work is begun.
- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor[®].



 **CAUTION**



- Inform owner's representatives about the location and operation of emergency stops and power disconnection points.
- During operation, the surfaces of some components may become hot. Avoid touching hot surfaces or wear protective gloves.
- If any unsafe or unusual conditions are observed, stop the equipment and remove it from service. Report the condition to the store manager.

Electrical
Safety
Precautions

 **DANGER**



High Voltage! Personnel servicing or maintaining Cartveyors may be exposed to death or serious personal injury if hazardous energy is not properly controlled. De-energize any circuit before work is begun. Follow your facilities procedures or OSHA lockout/tagout (LOTO) procedures anytime maintenance or service is being performed on any electrical box or component.

 **CAUTION**

The incoming voltage source must match the voltage identified on the rating tag. The rating tag provides essential technical information required for any installation, maintenance, or repairs. Do not remove, damage, or modify the rating tag.

De-energize
the Circuit

1. Lockout/tagout whenever any work, maintenance, or service is performed on any electrical box or component. Make sure circuits are de-energized before starting work, using a functional, properly rated, and well maintained multimeter or voltage sensing device. Make sure the device is rated for the level of voltage being measured and is sensitive enough for the application.
2. Use fuse pullers to change a fuse; **never** use bare hands, pliers, or screwdrivers.
3. Install covers on exposed electrical devices or wires to protect personnel from serious injury.
4. Ground all metal connection boxes, switch boxes, starting boxes, transformers, motors, limit switches, interlocks, HMI display panel, and emergency stops to prevent shock to personnel.
5. When using a portable meter, never leave one lead dangling with the other lead connected. Anyone touching the lead may receive a shock through the meter.
6. Make sure that all is clear following lockout/tagout procedures before applying power to a circuit. This is necessary in order to protect personnel from injury and to prevent damage to the equipment.
7. Avoid accidental contact with equipment or conductors which are known to be energized or are **not** known to be de-energized. If it is necessary to work on equipment while it is energized, use extra care. Always test and repair equipment that appears damaged or delivers an electric shock.

Take time to be careful! Follow all safety precautions to prevent death or personal injury.

Electrical
Safety
Precautions

 **DANGER**



High Voltage! To prevent serious injury, death, or property damage, all electrical connections and permanent wiring must be installed by a qualified electrician in accordance with applicable local or national electrical codes. Arc flash and shock hazard appropriate PPE is required. This equipment must be adequately grounded in accordance with local electrical codes or, in the absence of local codes, with the current edition of the National Electrical Code NFPA No. 70.

Working on
Energized
Circuits

1. When electrical repair or maintenance work is required that prohibits de-energizing the circuits involved, extreme caution must be used. The work should be completed only by authorized, well trained and supervised personnel who are fully aware of the dangers involved. All practical safety measure must be used to protect the personnel performing the required work. In addition to the NFPA No. 70 codes, the following precautions **must** be taken:
2. Remove all wristwatches, watch chains, rings, necklaces, metal appendages to clothing, oversized metallic belt-buckles, metal piercings, or loose clothing. These items have the potential to make accidental contact with energized surfaces. In addition, secure long hair with a hair net or cover with a plastic helmet.
3. Remove all hair barrettes or bobby pins. These items are electrically conductive and accidental contact may cause serious personal injury.
4. Wear dry clothing and shoes. Moisture should not be present on the soles of shoes. Water is electrically conductive and accidental contact may cause death or serious personal injury.
5. Insulate the worker from the ground. Cover any adjacent grounded metal surfaces with an insulating material. Suitable insulating materials are dry wood, rubber mats, dry canvas, dry phenolic material, or heavy, multi-ply paper (cardboard). Make sure that the insulating material has no holes present and there are no conductive materials (e.g., staples) embedded. Cover a sufficient area with the insulating material to make sure that adequate space is permitted for worker movement.
6. Use insulated tools when working on energized circuits or fuse box. These insulated tools must be rated to withstand the voltage of the energized circuits.

Notes for the
Installation
Electrician

The installation electrician must take the following precautions:

1. Locate and review the electrical schematics furnished with the equipment.
2. Verify the proper fit-up, wiring and operation of all required electrical components.

Unique Descriptions and Names

PFlow Industries, Inc. has incorporated, as well as created, a number of unique descriptions, names, and terminology for parts, components, and devices included in the Cartveyor[®]. This glossary includes these unique terms and other common terms to help understand this manual and the information it contains. In addition, the glossary will aid the user in communicating the correct information during troubleshooting and service situations. Although the wording and descriptions may sound familiar to the person who has read the manual, other terms and descriptions might not. It is recommended by PFlow Industries, Inc. that this glossary be reviewed before reading the remainder of this manual.

Anti-slip tape or Grip tape

An adhesive-backed non-skid strip with a sandpaper-like texture that provides grip and stability on inclined surfaces.

ANSI

American National Standards Institute: www.ansi.org

ASME

American Society of Mechanical Engineers: www.asme.org

Associate mode

An operating mode used to clear faults and jog the chain forward using the Human Machine Interface (HMI). Not all safeties are active. **For use by authorized personnel only!**

Authorized personnel

Trained or qualified personnel approved to perform a specific duty or duties.

Auto mode

The normal operating mode established for a Cartveyor[®]. The HMI screen appears green with animation. This allows fully automatic transport of shopping carts with all safeties functional.

Balustrade

The vertical partitions of a Cartveyor[®] structure located at the infeed and discharge gates of the Cartveyor[®].

Capacity

The maximum load for which the Cartveyor[®] is designed.

Cart blocker

A mechanical device that detects and blocks the entry of carts not designed for the Cartveyor[®] or those carts with a broken or missing tow bar. Used exclusively on the "down" Cartveyor[®].

Cart

A retail basket-like container mounted on wheels.

Cartveyor[®]

The registered trade name of the shopping cart conveyor made by PFlow Industries, Inc. An electromechanical tow conveyor built to move merchandise in PFlow Industries, Inc. **approved** shopping carts with tow bars, from one level to another. This device is not meant to be used for pedestrian traffic. (Reference ANSI/ASME B20.1)

CEMA

Conveyor Equipment Manufacturers Association: www.cemanet.org

Chain

See Drive chain.

Chain guide or Chain track

An extruded metal channel covering and/or guiding the Cartveyor[®] chain.

Control Panel	An enclosure housing various electrical components that control the Cartveyor [®] system.
Control voltage	The control voltage is typically provided by the control transformer and DC power supply and is used to energize the various low voltage electrical devices.
CV	Single track Cartveyor [®]
DCV	Dual track Cartveyor [®]
Discharge area	The area where a shopping cart exits the Cartveyor [®] system.
Drive Chain	A continuous, flexible chain assembly composed of steel sections, chain, and plastic lugs. This is the key component of the Cartveyor [®] .
Electrical cables	Electrical cables consist of at least two conductors contained within a protective outer cover.
Escalator	An inclined, continuous moving stairway that transports people from one level to another.
Factory mode	An operating mode used during maintenance to set up and test the Cartveyor [®] . Factory mode can be initiated from the Human Machine Interface (HMI) only. Many safety features are disabled in Factory mode. Note: Factory mode is restricted to PFlow Industries, Inc. service personnel only!
Fault	The sudden cessation of movement initiated by the programmable logic controller (PLC) due to a disruption of normal operational parameters. Normal functions can continue when the disruption is resolved and the system is reset.
Floor guides	See Infeed guides.
Floor plate	The paneling that covers the open floor space at the infeed and discharge areas of the Cartveyor [®] .
Foreign object	Any object other than a PFlow Industries, Inc. approved shopping cart that enters the Cartveyor [®] .
Foreign object sensor	A sensor that detects a foreign object in the infeed or discharge areas. When blocked, this sensor stops the movement of the Cartveyor [®] .
Gate	A component of the Cartveyor [®] comprised of a left-hand and right-hand balustrade, swinging door panels, various sensors and electronic devices and an optional archway. There are two gates per Cartveyor [®] , an infeed and a discharge gate.
General Arrangement (GA) drawing	The drawing produced by PFlow Industries, Inc. which shows the Cartveyor [®] , gates, infeed, and discharge areas. The drawing may show but does not specify building details.

HDCV	Heavy-duty Cartveyor®.
HMI (Human Machine Interface)	The user interface in the control system that provides graphic control of the Cartveyor®. The HMI communicates with the programmable logic controller (PLC).
Infeed area	The area where the shopping cart enters the Cartveyor®.
Infeed guides	Floor mounted “V-shaped” blocks of UHMW/PE blocks used to guide the tow bar attached to a shopping cart into the Cartveyor® infeed area. Then the cart is captured by the Cartveyor® drive chain.
Jog	Using the constant pressure controls to move the Cartveyor® chain while in any mode other than Auto Mode.
Junction box	An electrical enclosure used to join, centralize, and distribute wiring from different locations.
Limit switch	An electromechanical device which is used to monitor various mechanical devices.
Lug	Plastic protrusion on the Cartveyor® drive chain that engages the shopping cart tow bar.
Manager mode	An operating mode similar to Associate Mode, but with additional controls such as changing pass codes, monitoring usage, reverse, etc. For use by authorized management personnel only!
Photo eye	Photoelectric sensor that uses a focused beam of light. The Cartveyor® controls receive a signal when the reflected beam of light is detected by a sensor.
Programmable Logic Controller (PLC)	A micro-processor based device that controls the Cartveyor® through a resident software program and communicates with the HMI.
Qualified person	A person, who by possession of a recognized degree, certificate, professional standing, or skill, and who by knowledge, training and experience, has demonstrated the ability to deal with problems relating to the subject matter, the work, or the project.
Reflector	A plastic, prismatic object used to reflect a beam of light emitted from a photo electric sensor.
Rogue cart	An unauthorized, defective or damaged shopping cart used in the Cartveyor®.
Side guides	UHMW/PE plastic guide strips located along the interior side walls.
Sleep-mode	A period of non-activity as the result of non-use over a predetermined period of time while in Auto Mode.
Specification sheet	PFlow Industries, Inc. informational data sheet providing general information on a specific Cartveyor®.

Tee	See Tow bar.
Touchscreen	See HMI.
Tow bar	A “T”-shaped bar attached to the underside of the front of each shopping cart that engages the Cartveyor [®] drive chain lug and advances the shopping cart within the Cartveyor [®] .
Truss	A fabricated support structure of steel angles, tubing, etc., spanning between two fixed load bearing points and designed to carry all live and dead loads.
UHMW (Ultra-High Molecular Weight)	An abrasion-resistant, high-impact, polyethylene material used throughout the Cartveyor [®] to protect and/or guide moving parts.

Field Electrical Wiring Standards

All electrical wiring and craftsmanship completed in the field shall be in accordance with existing state, local and National Electrical Code (NEC) standards.

Definitions

In-field electrical wiring

All hard wiring of all electrical devices external of control panel.

Control circuit

The control circuit refers to all circuits and devices at 120 VAC and below.

Power circuit

Power circuit refers to all circuits and devices at 208 VAC and above.

Systems

Systems refers to automated vertical and horizontal conveyors.

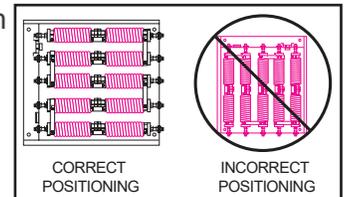
Requirements

1. It is recommended that all control circuit wiring is #14 AWG, copper, stranded, type THHN or equal, 600 VAC.
2. It is required that all power circuit wiring is #12 AWG minimum (sized appropriately for the load), copper, stranded, type THHN or equal. A green grounding wire shall be provided to power devices.
3. Per NFPA 79, the colors of individual conductors shall be:

Power wiring - Black	24 VAC neutral - White
115 VAC - Red	24 VDC - Blue
115 VAC neutral - White	0VDC - White/blue
24 VAC - Red/black	Ground - Green or green/yellow

Note: These colors only apply to individual conductors. These colors do not apply to prefabricated cables.

4. All wires must be labeled on each end with the wire number from the electrical drawing using a machine or computer generated label, utilizing black characters on a white background.
5. All field devices must be individually terminated in the control panel.
6. Screw on solderless connectors (wire nuts) shall be of the insulated type, spring lock, and of the proper size to accommodate wires.
7. Terminal lugs shall be of the insulated type, crimp style, and of the proper size to accommodate wire(s) and terminal fasteners.
8. Conduit and related hardware shall conform to local, state, and NEC standards. The minimum size shall be 1/2". Connectors and couplings shall be appropriate for conduit type.
9. Flexible conduit shall be a minimum of 1/2", shall be of the liquid-tight type, and shall be installed with compatible liquid-tight connectors.
10. The customer shall locate and install a fused disconnect switch within the line of sight of the control panel. The customer shall ensure accessibility to the disconnect switch with regard to existing electrical codes and standards.
11. Control wiring and conduit shall be separate from the power wiring and conduit.
12. When mounting resistor banks, make sure the resistor elements are horizontally positioned.
13. Drop cords (flexible cords) shall be multi-conductor festoon-type cable where applicable.



Resistor Bank Positioning

Electrical Ruling Bodies

NEMA	National Electrical Manufacturers Association provides national testing and manufacturing standards body of electrical apparatus.
UL	Underwriters Laboratories, Inc. is an independent testing laboratory. Many local codes require UL control panels and electrical apparatus.
JIC	Joint Industry Council is an advisory group that provides standards for production equipment, safety, and dependability.
NFPA	National Fire Protection Association is the ruling board of NEC and sets national fire and safety standards for equipment and manufacturing facilities.
CSA	Canadian Standards Association is a regulatory agency of Canada.
ANSI	American National Standards Institute oversees the creation, promulgation, and use of thousands of norms and guidelines that directly impact businesses.
ASME	American Society of Mechanical Engineers is a leader in technical innovation with a focus on advancing and applying engineering knowledge and communicating the excitement of engineering. This group is the Secretariat for ANSI.
NEC	National Electrical Code is an advisory board to NFPA with recommendations and codes usually adopted throughout the United States.

PFlow's Standard

NEMA 12 classification is to be used in a general purpose, indoor only application.

All PFlow Industries, Inc. control systems are built to a NEMA 12 minimum classification. All PFlow Industries, Inc. control systems conform to the following standards:

- **NFPA 70 (NEC):** The National Electrical Code.
 - **NFPA 79:** Electrical standard for industrial machinery.
-

Outdoor Application

Outdoor equipment or electrical devices exposed to severe weather conditions should not be rated less than NEMA type 4. This is a watertight, dust-tight, indoor-outdoor classification that will provide protection against splashing water, seepage of water, falling or hose-directed water, and severe external condensation.

Corrosive Application

The chemical industry on the whole usually specifies a minimum NEMA type 4X. A NEMA 4X rating is similar to a NEMA 4 with added corrosion resistance.

PFlow's Standard
(continued)

Hazardous Location Hazardous locations are an extremely specialized electrical classification. Few electrical experts exist in this field. All hazardous locations must be handled as defined by the class, division, and group designator for the job site condition.

The NEC has three classes (I, II, III), - two divisions, (1 and 2) and seven group designations (A, B, C, D, E, F, and G).

Class Definitions

Class I locations: Locations in which flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II locations: Locations that are hazardous because of the presence of combustible dust.

Class III locations: Locations that are hazardous because of the presence of easily ignitable fibers or where materials producing combustible flyings are handled, manufactured, or used, but in which such fibers/filings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixture.

Division Definitions

Division 1 is an extremely dangerous explosive condition that exists normally.

Division 2 is a dangerous explosive condition that could exist but usually does not.

Group Designations

Group designations are given by the NFPA, State Fire Marshals, insurance companies or consulting engineering firms according to the gasses, dust, or other particles in the area and the spark or temperature needed to produce an explosion.

Section 6 | Electrical Standards and Definitions



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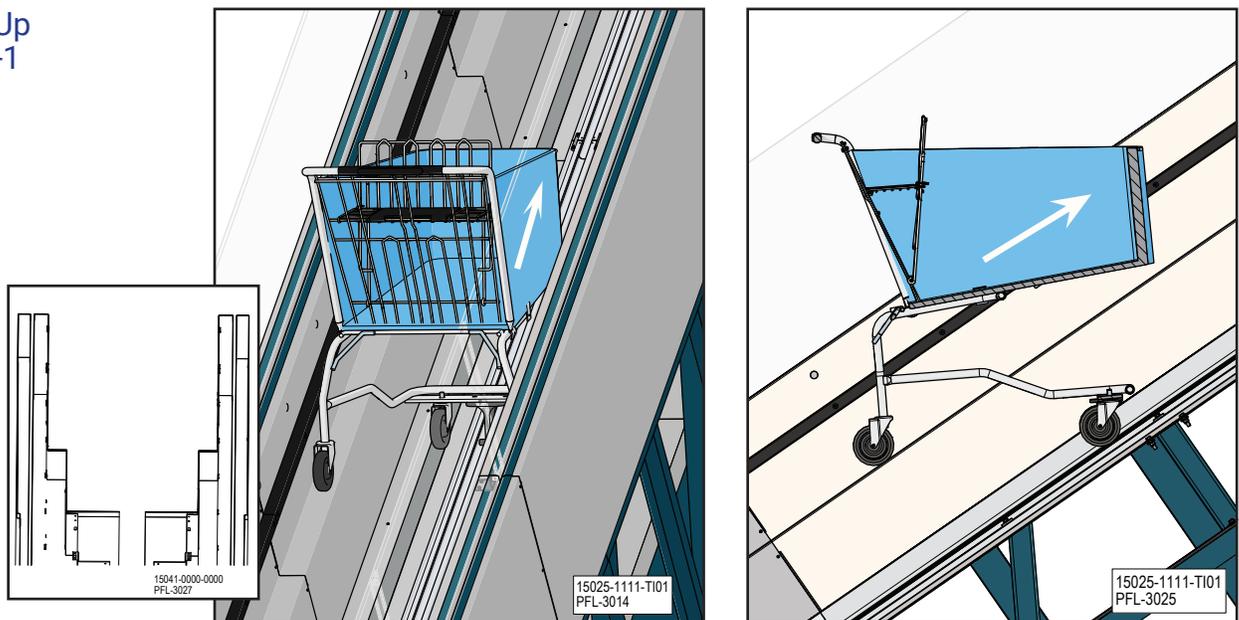
Up and Down
Transport of Carts

Each Cartveyor® is designed to transport shopping carts in a horizontal position from one level to the next. Because of this feature, two different types of Cartveyors® are specially designed for travel. Each is distinguished from the other by the shopping cart wheel location in the track as it travels within the body of the Cartveyor®.

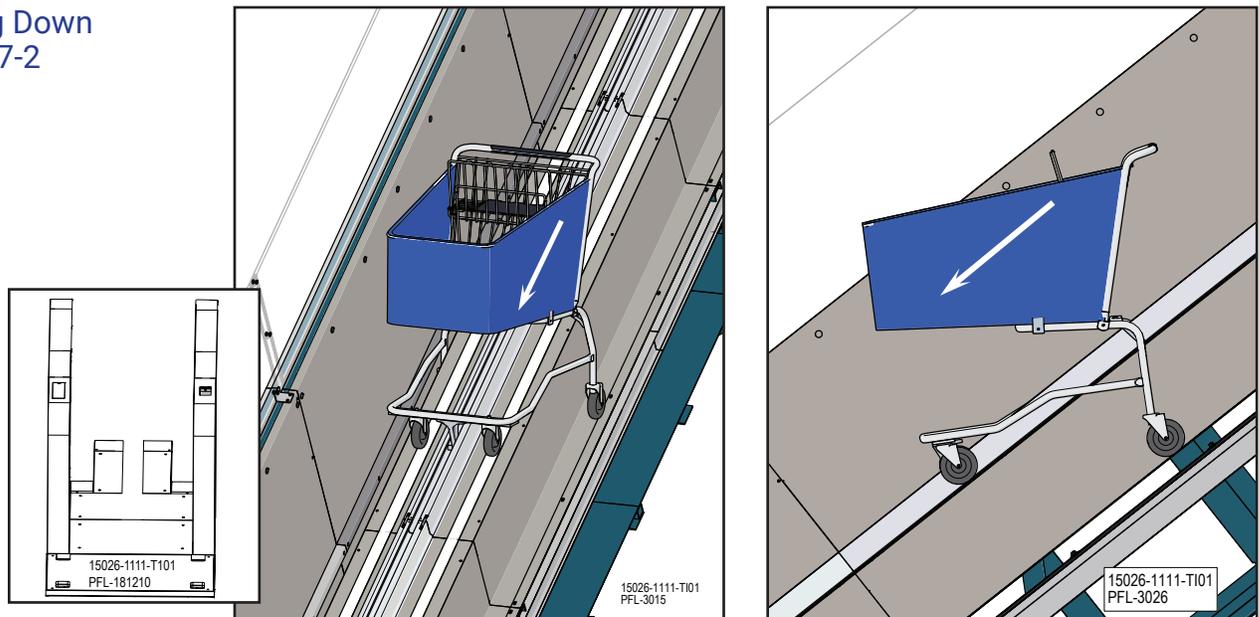
Cart front wheels are on the center low track as it travels in the up direction. See Figure 7-1.

Cart front wheels are on the center high track as it travels in the down direction. See Figure 7-2.

Moving Up
Figure 7-1



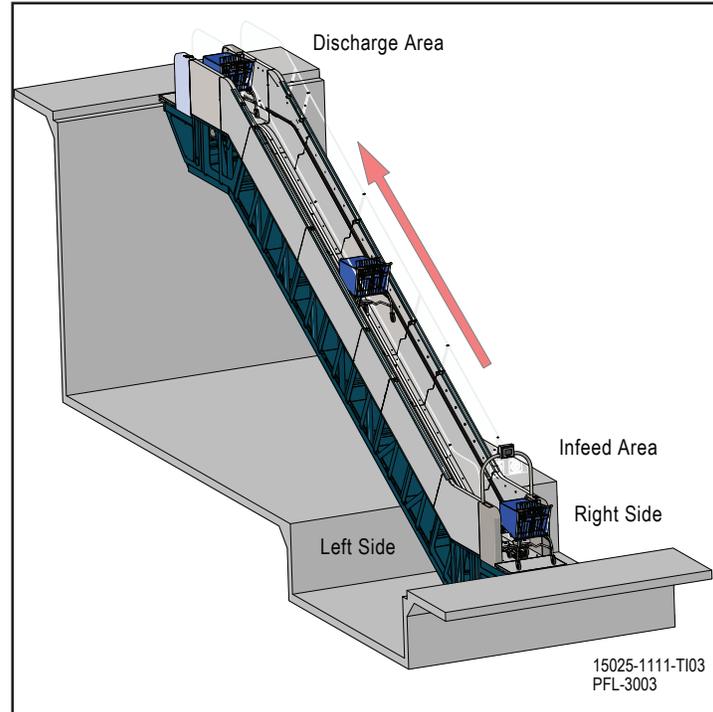
Moving Down
Figure 7-2



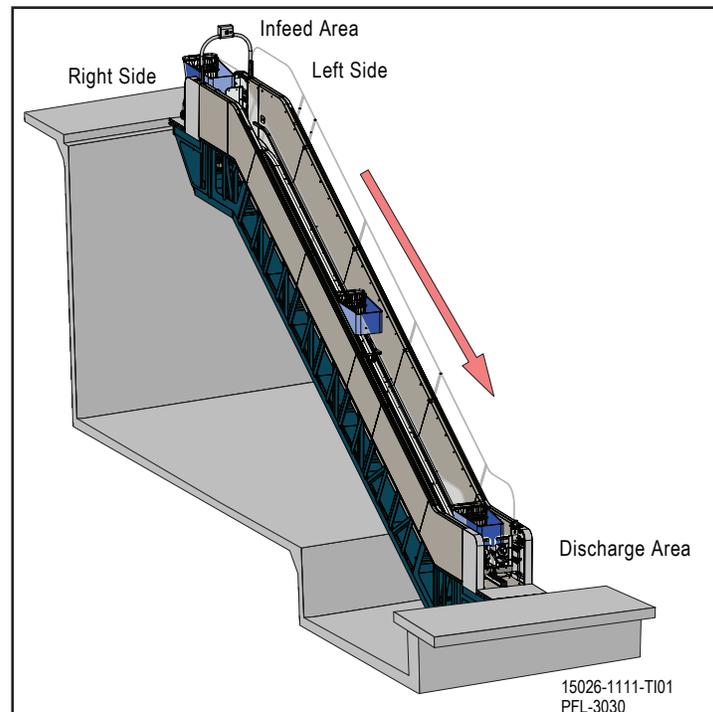
Area Designations

Both the up and down Cartveyors® have infeed and discharge areas. Infeed areas allow the customer to insert the shopping cart. Discharge areas allow the customer to retrieve the shopping cart. While facing the infeed area, the right and left sides of a Cartveyor® are determined and are referenced throughout the manual.

Moving Up
Figure 7-3



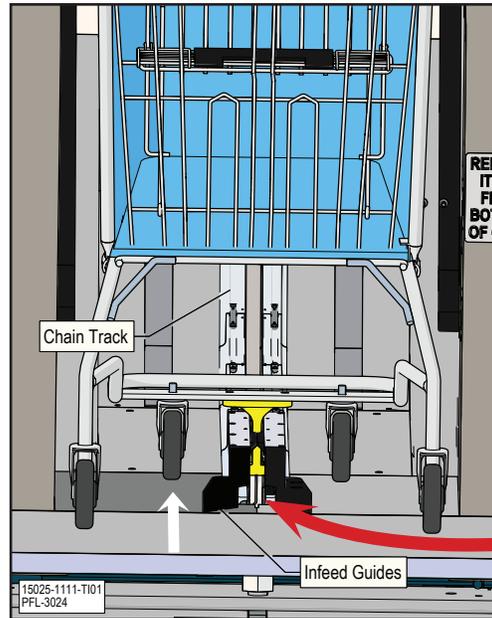
Moving Down
Figure 7-4



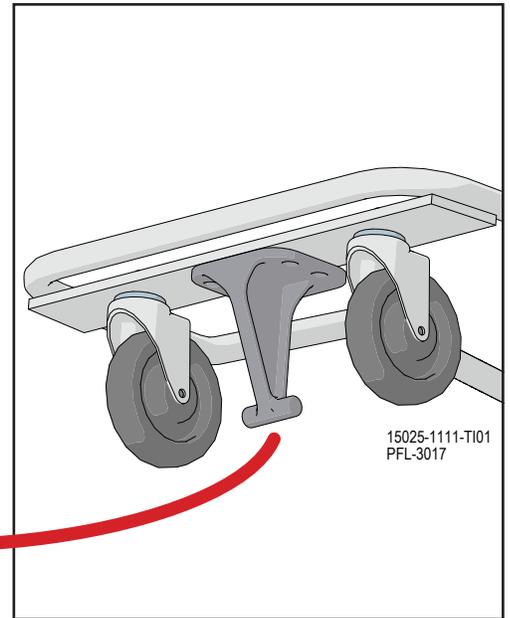
Major Component Purpose and Location

Chain Track

The chain track is composed primarily of aluminum extrusions. The chain track acts as a guide and protective guard for the Cartveyor® drive chain and as a guide for the shopping cart tow bar.



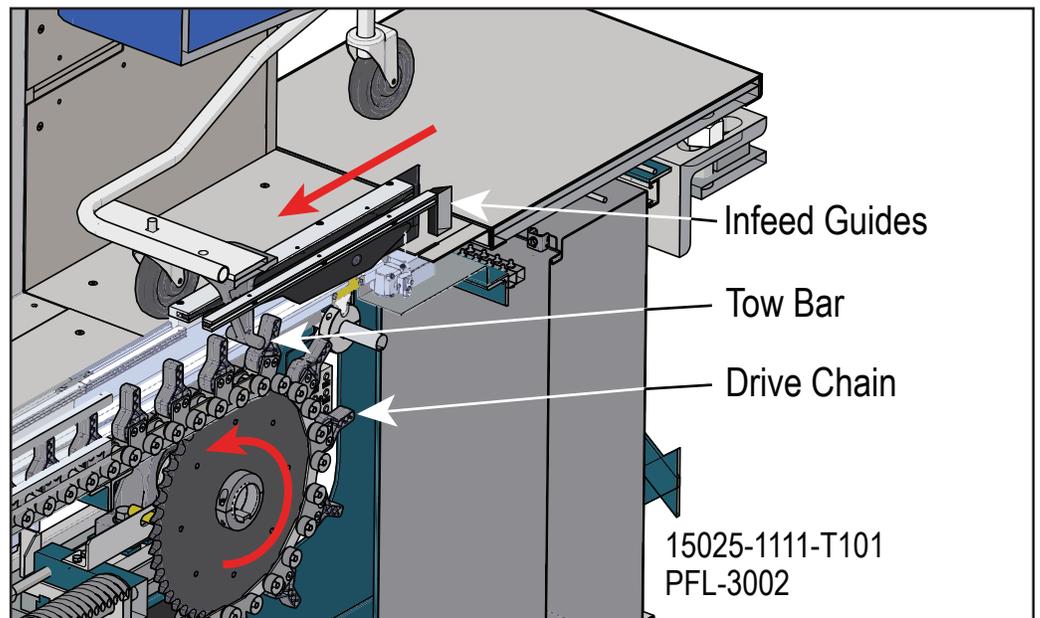
Chain Track Figure 7-5



Tow Bar Figure 7-6

Drive Chain

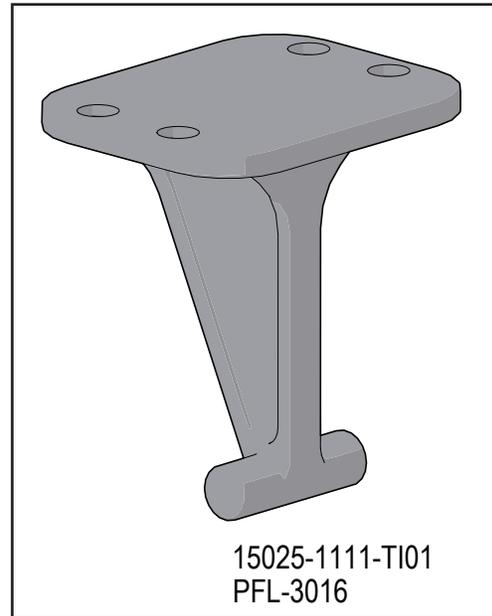
The continuous loop drive chain is a key component of any Cartveyor®. The drive chain with specially designed plastic lugs captures and tows the shopping carts to the next level.



Drive Chain Figure 7-7

Tow Bar

The tow bar is attached to the shopping cart. The tow bar engages with the drive chain for controlled movement within the chain track.



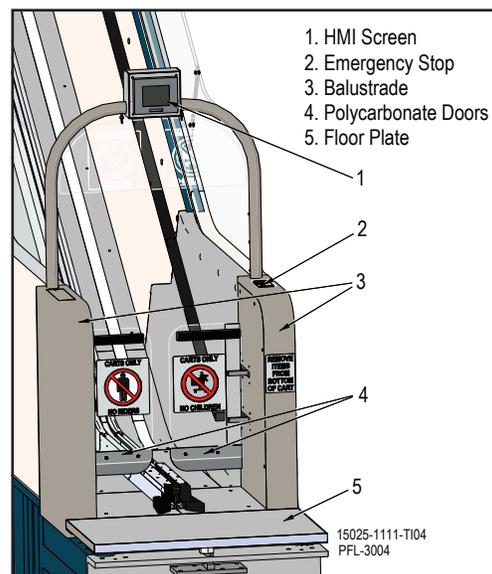
Tow Bar Figure 7-8



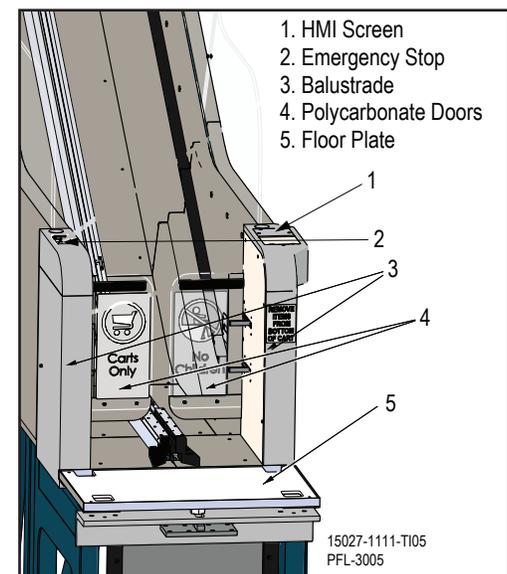
Tow Bar Engaged with Drive Chain Figure 7-9

Infeed Gate

Both the up and down Cartveyors® have an infeed gate where shopping carts are inserted. The infeed gate is easily identified by the Human Machine Interface (HMI) located in the archway atop the balustrade or within the balustrade itself. The doors are adorned with the appropriate infeed signage.



With Optional Archway Figure 7-10



Without Optional Archway Figure 7-11

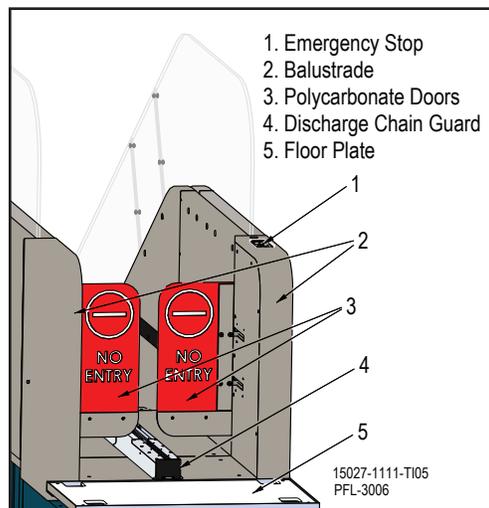
Discharge Gate

The discharge gate includes door panel discharge signage and a red fault light (on some units). The discharge area has a cart discharge chain guard mounted to the discharge aluminum extrusion and extending out to the floor plate.

As a shopping cart reaches the discharge gate, the Cartveyor[®] pushes the cart through the door panels, swinging the door panels outward and to the sides. The Cartveyor[®] drive chain continues to push the cart partway through the gate where it can easily be retrieved by the customer.

Discharge Chain Guard

The discharge chain guard is a spring-loaded trap-door mounted at the end of the chain track. The guard snaps shut when the cart tow bar exits and guards customers from coming into contact with moving components.



Discharge Gate and Chain Guard Figure 7-12

! DANGER



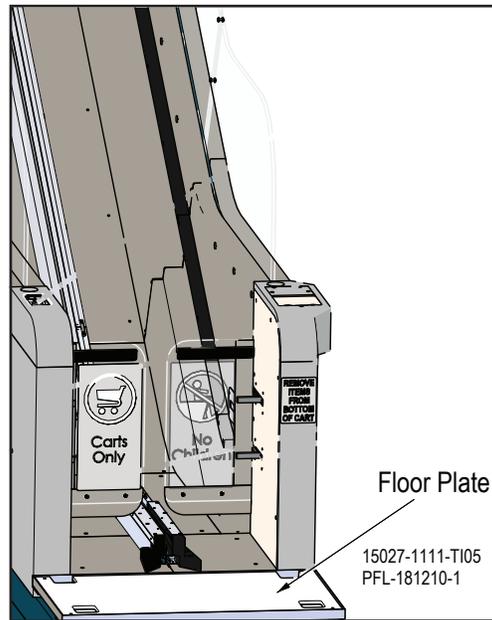
Pinch hazard! Only qualified personnel who have been properly trained and authorized to service the equipment are allowed to enter the Cartveyor[®] service areas.

NOTICE

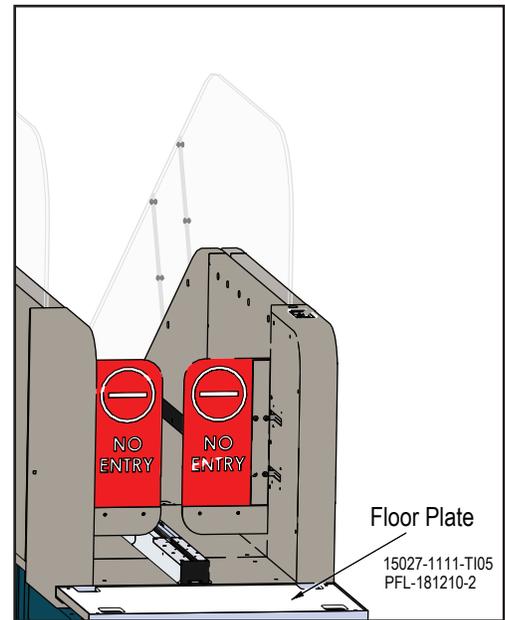
A qualified person is defined as a person who, by possession of a recognized degree or certificate of professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve problems relating to the subject matter and work.

Floor Plates

At both infeed and discharge areas, floor plates located in front of the gates allow a smooth transition from the finished flooring into the Cartveyor®. The floor plates are made of the same material as the floor plates in front of the escalators. The floor plates cover the inner framework, some areas of electromechanical components, and serve as cover panels. These can be removed to permit access by qualified personnel who have been properly trained and authorized to service the Cartveyor®.



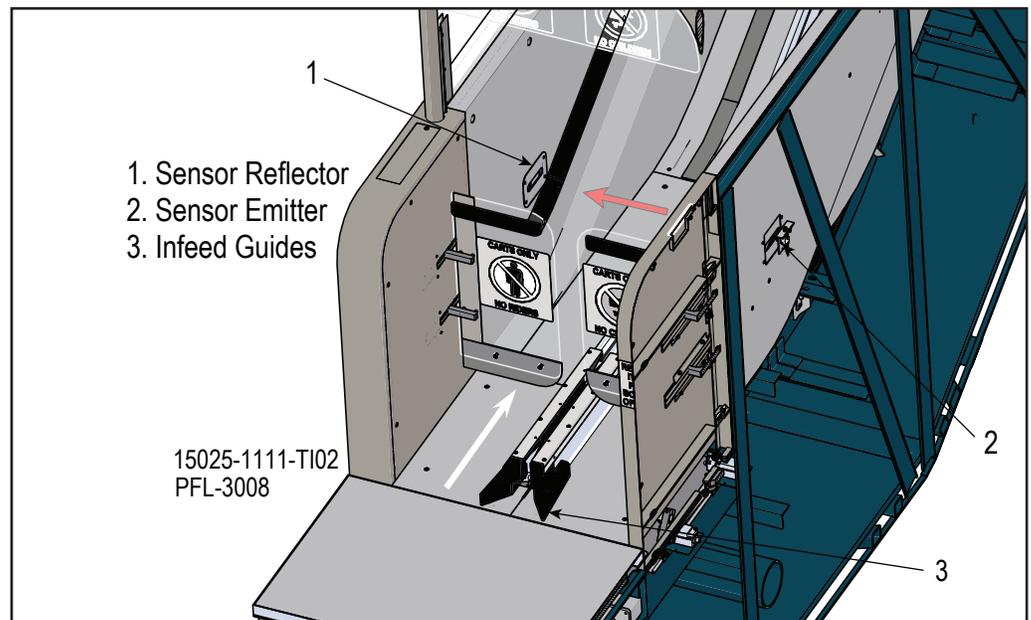
Infeed Floor Plate Figure 7-13



Discharge Floor Plate Figure 7-14

**Foreign Object
Sensor at Infeed Area**

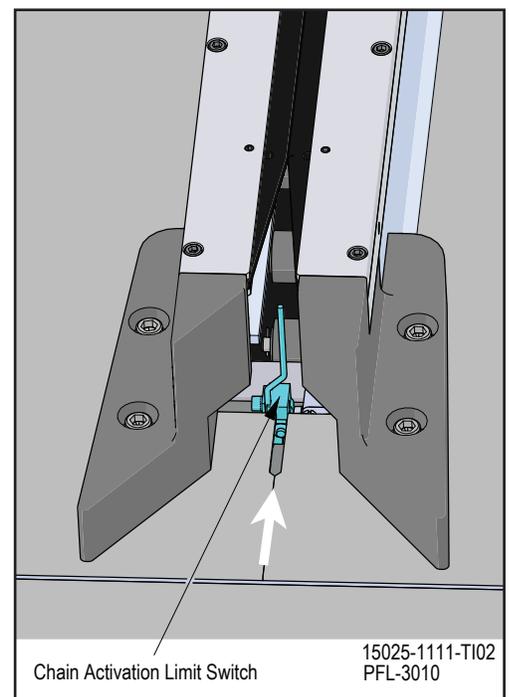
A foreign object sensor (also known as infeed foreign object eye) is located just inside the Cartveyor® infeed gate. Whenever an object other than a shopping cart is detected, all motion ceases. The infeed foreign object sensor is disabled when a PFlow Industries, Inc. approved shopping cart enters the Cartveyor® to allow the cart to pass freely into the Cartveyor. See Figure 8-1.



Foreign Object Sensor Figure 8-1

**Chain Activation
Limit Switch**

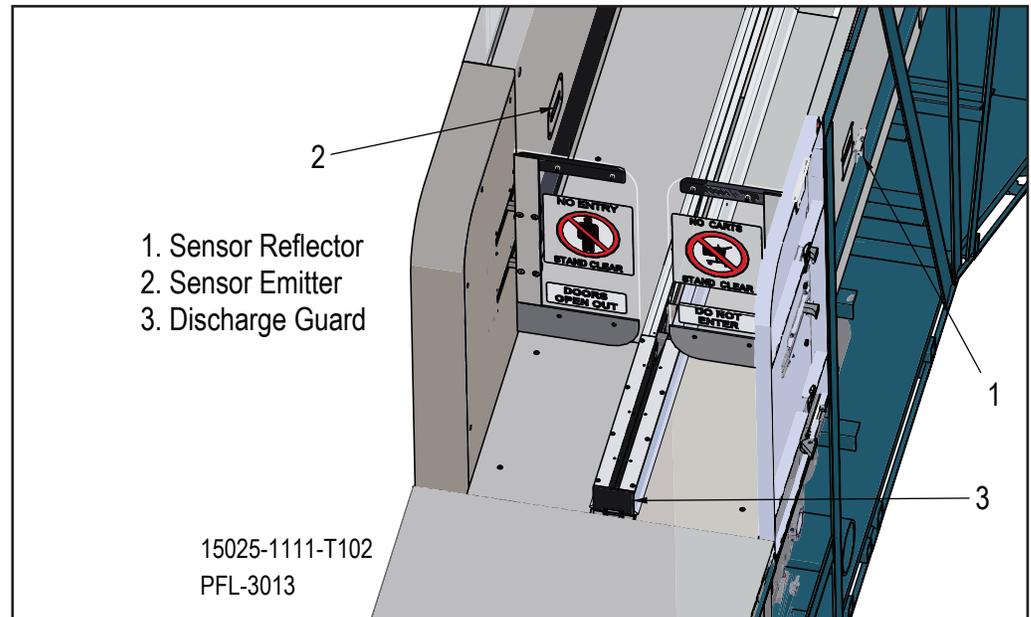
A chain activation limit switch is located inside the infeed guides. This limit switch is actuated by the tow bar of a shopping cart and activates the system. The limit switch rotates in either the forward or reverse direction to allow shopping cart removal. See Figure 8-2.



Chain Activation Limit Switch Figure 8-2

Foreign Object
Sensor at Discharge
Area

A foreign object sensor (also known as discharge foreign object eye) is located just inside the Cartveyor® discharge gate. Whenever an object other than a PFlow Industries, Inc. approved shopping cart is detected, all motion ceases. The discharge foreign object sensor is disabled when a cart is detected approaching the discharge area to allow the shopping cart to exit the Cartveyor®. See Figure 8-3.

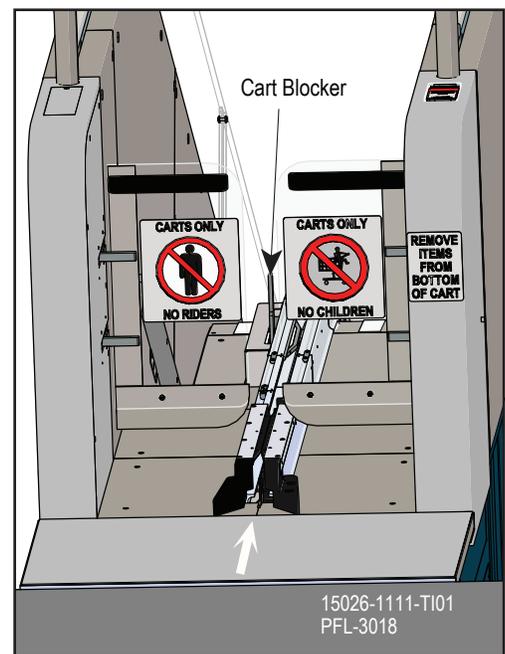


Foreign Object Sensor Figure 8-3

Cart-Blocker Device

The Cart-Blocker is a mechanism designed to deny passage to shopping carts not compatible with or not designed for the Cartveyor® (“rogue” cart). The system will not operate with makes of shopping carts not equipped with a tow bar or shopping carts with a broken or missing tow bar.

Function Located at the infeed end of a down version model, the Cart-Blocker works mechanically by blocking carts not equipped with a tow bar. PFlow Industries, Inc. approved shopping carts equipped with a tow bar enter the slotted infeed guides and make contact with internal components within the aluminum track. Those components unlock the vertical barrier (bar) and allow passage.

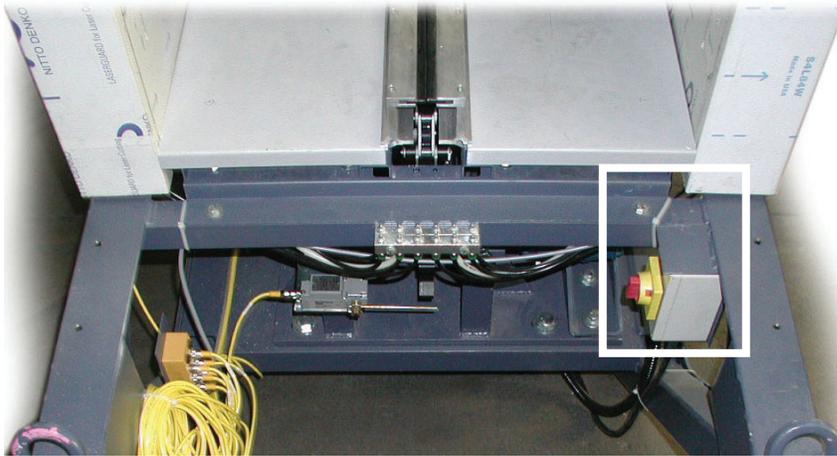


Cart Blocker Device Figure 8-4

**Drive Motor
Disconnect Switch**

The drive motor disconnect switch is located under the floor plate at the upper level of the Cartveyor®. See Figure 8-5.

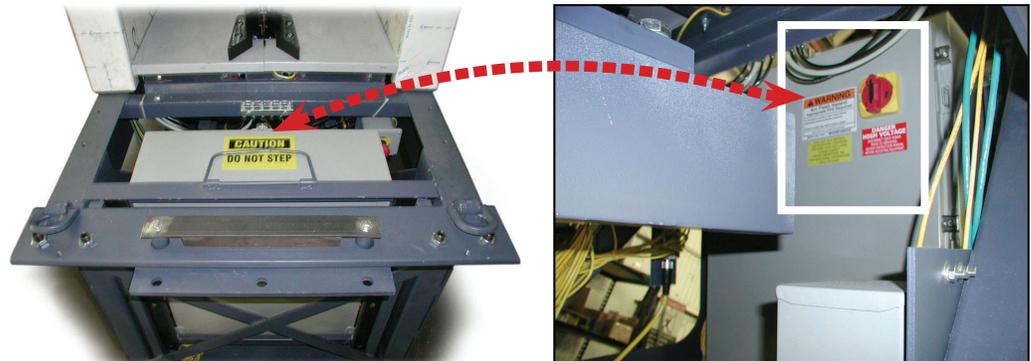
1. Open the floor plate access at the upper level of the Cartveyor® to enter the service compartment.
2. Rotate the switch clockwise to energize the drive motor. Rotate counter-clockwise to de-energize the drive motor. This action connects and disconnects power to the drive motor. The photo below shows the switch in the **on** position.



Drive Motor Disconnect Switch Figure 8-5

Other Devices

Each Cartveyor® has a main control panel and main disconnect switch located beneath the lower level floor plate. The primary incoming power (460/240/208V 3ph) and secondary power (120VAC and 24VDC) are present in this panel. All auxiliary electrical devices are connected to this control panel. See Figure 8-6.



Control Panel and Main Power Disconnect Switch Figure 8-6



Main Power Disconnect Switch Figure 8-7

⚠ DANGER



High Voltage Inside! Authorized Personnel Only. Appropriate personal protective equipment (PPE) is required!

Read Before Starting

To prevent personal injury, damage to a Cartveyor[®], and / or property, it is highly recommended that the following precautions and restrictions be read, understood, and adhered to prior to any start-up and usage.

Before Power-up

1. Only authorized personnel should initiate the start-up sequence of any Cartveyor[®].
2. No personnel, authorized or otherwise, should be within the confines of the Cartveyor[®] at the time of start-up. This means that no one should enter or be present in the area between the gates.
3. Notify anyone in the vicinity that the Cartveyor[®] will be initiating and to remain clear of the infeed and discharge areas.
4. Remove any foreign objects and / or debris within the Cartveyor[®], including shopping carts.

NOTICE

Use Manual Mode to discharge all shopping carts engaged by the Cartveyor[®] mechanism.

5. Inspect the infeed and discharge areas for any visual damage to any electrical devices (e.g., photo-electric sensors, reflectors).
6. Make sure the one-way swinging panels on each gate are not obstructed and move freely.

Cart Restrictions and Precautions



DANGER

NO RIDERS! The Cartveyor[®] is designed only for transporting shopping carts containing merchandise. Children, infants, or persons must be removed from the shopping cart before the shopping cart is transported. Never stand within the gated areas!

1. All shopping carts must be PFlow Industries, Inc. approved and equipped with a tow bar.
2. Tow bars must not be damaged.
3. All shopping carts must be able to pass freely through the gates.
4. All merchandise must be within the shopping cart upper basket and lower tray (if present). Do not place merchandise on the lower frame.
5. Merchandise must not contact the gate or panels when passing through the infeed gate.
6. Merchandise must not protrude through the shopping cart basket.
7. Merchandise extending above the top of the shopping cart basket must be able to pass underneath the archway without contacting it.
8. Merchandise **can not** be added to or removed from the shopping cart until properly discharged from the Cartveyor[®] at the next level.
9. Shopping carts with damaged wheels, wheels that do not function properly, damaged frames, damaged baskets, or any other form of damage should not be used in the Cartveyor[®]. Cartveyor[®] component failure due to the use of damaged shopping carts is not covered under the warranty.
10. All shopping carts **must be conveyed individually**. Nested shopping carts will damage the Cartveyor[®], shopping carts, or merchandise.

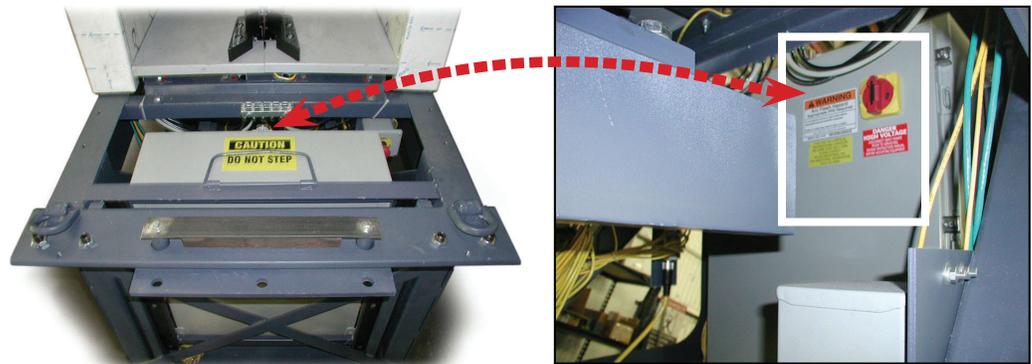
Main Power

Each Cartveyor® is designed to have power engaged at all times. Because of its unique “sleep-mode” feature, disconnect primary incoming power only when service and maintenance procedures are performed.

1. Remove the floor plate of the lower pit. See Figure 9-1.
2. Locate the main control panel inside the lower pit.
3. Rotate the main disconnect switch handle clockwise from the OFF position to ON on the main control panel. See Figure 9-2.

DANGER

Primary incoming power is present at the top of the internal control panel. Locate the remote control panel and rotate the disconnect switch handle accordingly.



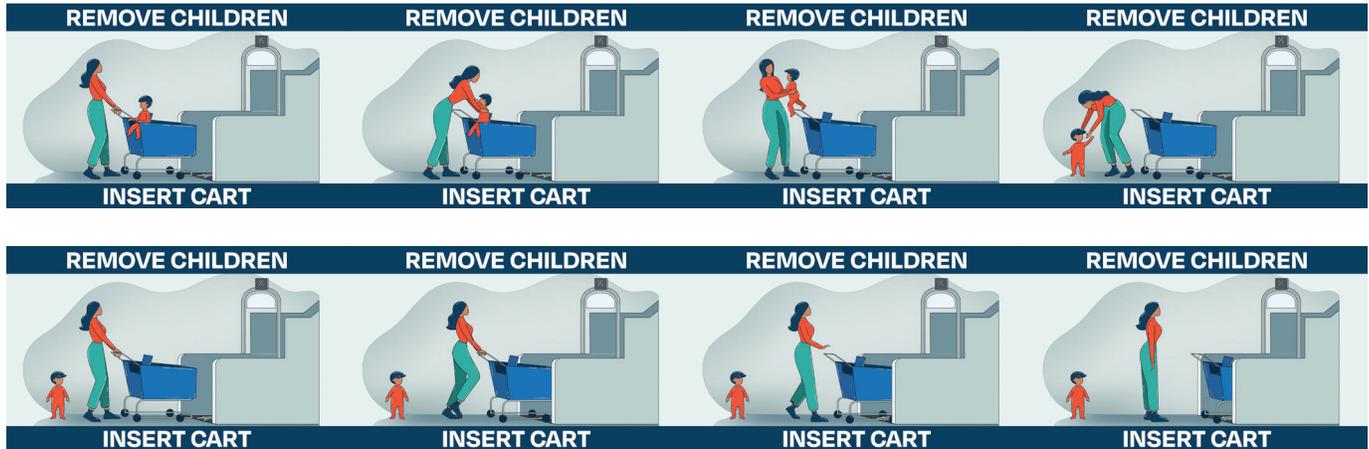
Control Panel and Main Power Disconnect Switch Figure 9-1



Main Power Disconnect Switch Figure 9-2

Power Restored

When power is restored to the Cartveyor®, the Cartveyor® defaults into a safety relay tripped fault and alarm. Clear the fault and access Auto Mode. A loop of images displays continuously on the HMI. Additional information is found in Section 11.



Continuous Loop: Remove Children, Insert Cart
Figure 9-3

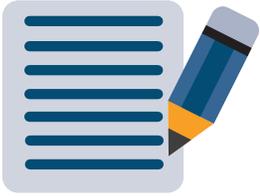
NOTICE

- Associate and manager modes can be accessed through the HMI by authorized personnel only! The maintenance mode is accessible by factory personnel only.
- If a fault condition exists prior to start-up, it must be corrected and cleared before normal Cartveyor® operation can begin. See Section 11 - User Errors, System Faults and Warnings for further information regarding faults.
- It is rarely necessary to disconnect the main power in a fault circumstance. See Section 11 - User Errors, System Faults and Warnings for further information regarding faults.

Section 9 | Precautions and Restrictions



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Before You Begin
Modes of Operation

Read this entire manual.

Each Cartveyor[®] has four modes of operation.

- Auto
- Associate
- Manager
- Factory (PFlow service access only)

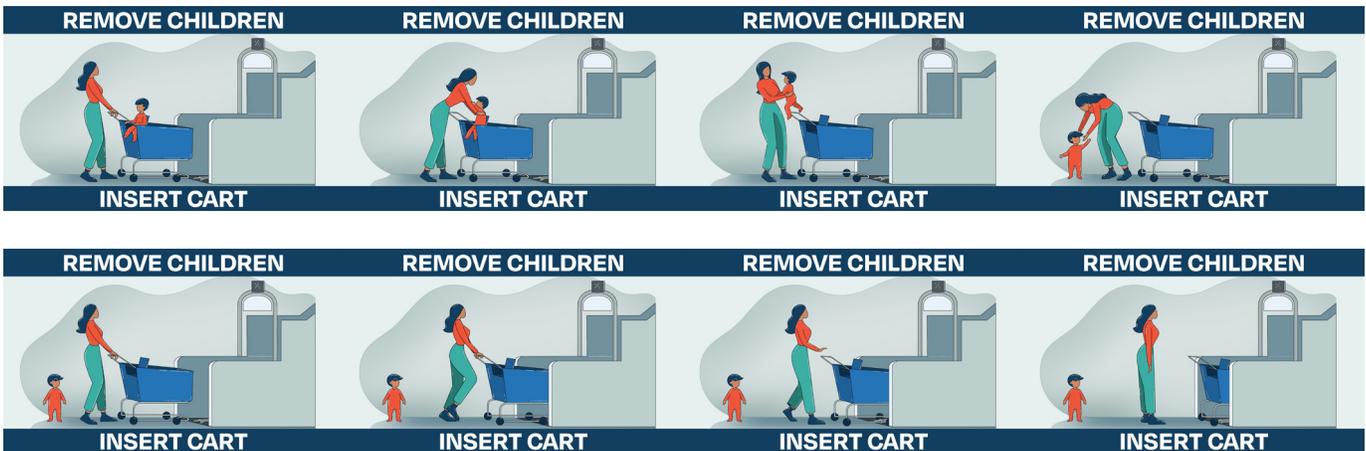
The Cartveyor is engineered to default into a safety relay tripped fault and alarm when the power is turned on. Clear the fault and access Auto Mode. Associate and Manager modes can only be accessed through the HMI at the infeed gate.

NOTE *If a fault condition exists prior to start-up, it must be corrected and cleared before normal Cartveyor operation can begin. See Section 11 - User Errors, System Faults and Warnings for further information regarding faults.*

Auto Mode

Auto Mode is for normal operation. It is the default mode for Cartveyor operation when used by the general public. Auto Mode will safely convey a customer's shopping cart from one level to the next automatically and go into a sleep mode when not in use.

In Auto Mode, the HMI at the infeed gate displays a continuous loop of images reminding the shopper to remove children from the cart before inserting the cart into the Cartveyor. **For safety, no riders are allowed under any circumstances.** See Figure 10-1.



*Continuous Loop: Remove Children, Insert Cart
Figure 10-1*

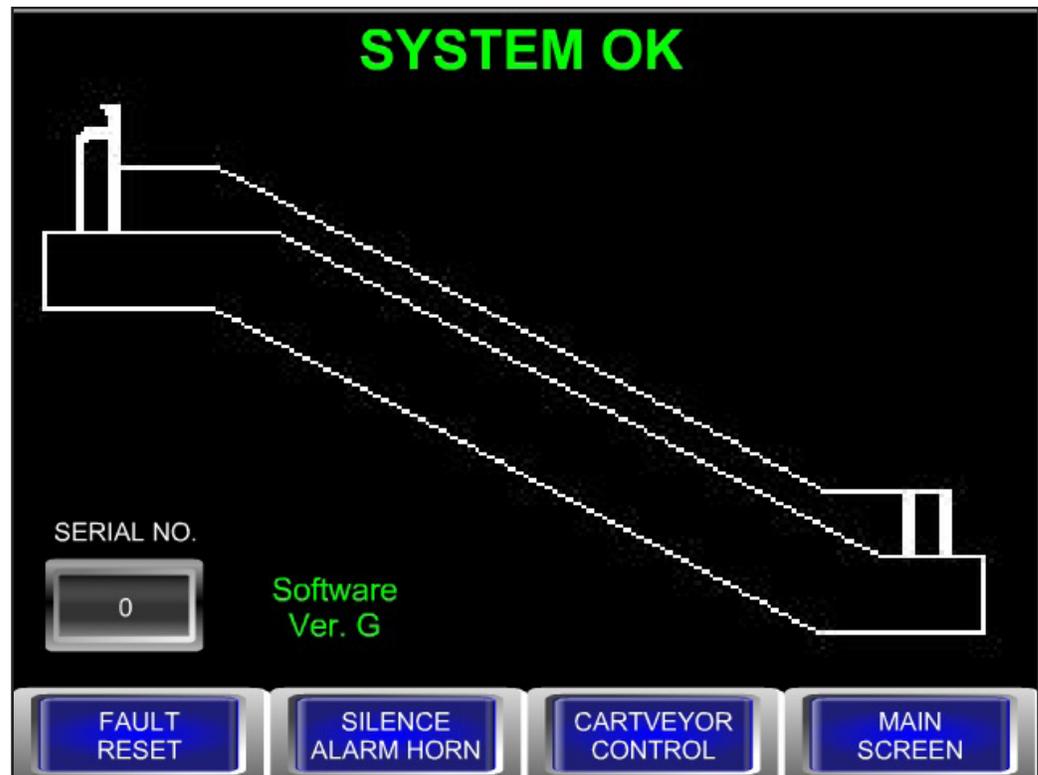
Associate Mode

Associate Mode is used to clear faults and to manually start the forward motion of the Cartveyor[®] drive chain. Generally, manual operation of the chain is used when a stuck, jammed, or idle cart cannot be normally extracted through the Auto Mode.

Example: Carts are engaged within the Cartveyor and power is lost or shut down and then later restored.

Associate Mode Operation

1. To enter the Associate Mode, enter the appropriate passcode using the keypad on the HMI.
2. Upon entering Associate Mode, the Fault Display is shown.
3. Clear or reset all faults. System OK must appear before normal operation can continue. See Figure 10-2.
4. Press the Cartveyor Control button to display the Cartveyor Control screen.
5. Press the Forward button to manually begin forward movement of the Cartveyor.



Fault Screen - System OK
Figure 10-2

Associate
Mode Operation
(continued)

6. Forward movement is sustained only while the forward button is pressed and held. See Figure 10-3.



Associate Mode Chain Forward
Figure 10-3

Manual Operation
of the Chain

If a cart or carts become jammed in the Cartveyor[®] during normal (Auto Mode) operation, the system will fault and manual operation may be required. Some faults disable the forward button. Refer to Section 11 – User Errors, System Faults, and Warnings.

Active Buttons Shown:

Forward: Pressing and holding the forward button will initiate forward movement of the chain. When the button is released the forward chain movement will stop.

Fault Screen: Pressing the Fault Screen button re-opens the Fault Screen. See Figure 10-2.

Main Screen: Pressing the main screen button will re-activate the Auto Mode and the Insert Cart screen with animated display.

NOTE

When the Main Screen button is pressed, the Cartveyor returns to Auto Mode. The chain will begin moving if shopping carts are engaged in the Cartveyor. Access to the Associate Mode must be done using the keypad.

Manager Mode

The manager mode is restricted to upper-level store personnel (store managers, assistant managers, etc.). Access is granted using a special manager passcode through the HMI keypad. Its primary purpose is to allow authorized management personnel exclusive access to certain controls and functions. Like the Associate Mode, the Manager Mode can be used to manually initiate the movement of the Cartveyor[®] chain. See Figure 10-4.



Manager Mode Chain Forward
Figure 10-4

Manager Mode Display Functions

Manager Mode screen displays buttons used to manually control the movement of the Cartveyor. It also includes buttons to access other screens.

Chain Movement Button Description and Use:

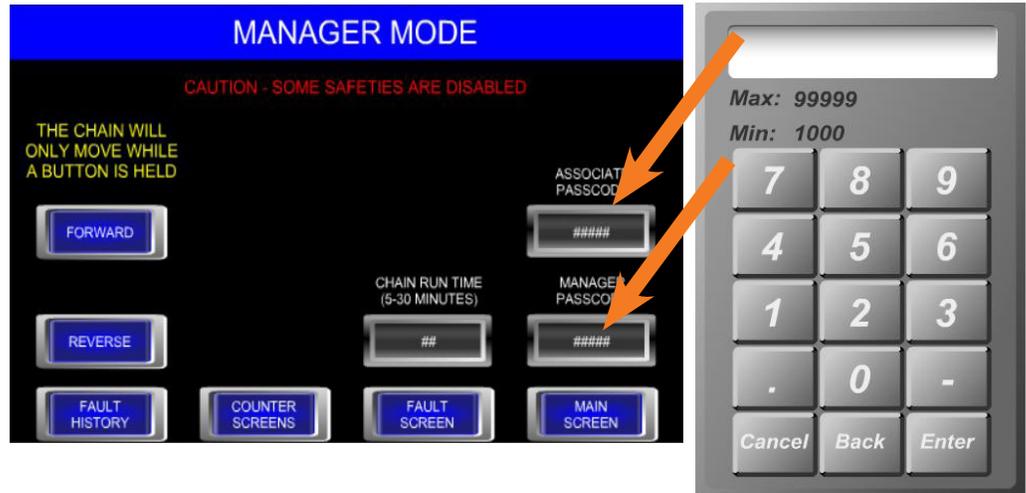
Forward: Pressing and holding the forward button will initiate forward movement of the chain. When the button is released the forward chain movement will stop.

Reverse: Pressing and holding the reverse button will initiate reverse movement of the chain. When the button is released the reverse chain movement will stop. Excessive use of this function may damage the Cartveyor.

Chain Run Time: Use the keypad screen to change the run time from 5 to 30 minutes in five minute increments.

Change Password Feature

Each Cartveyor[®] is pre-programmed with a four digit access code for Associate Mode and Manager Mode. These access codes can be changed when the Cartveyor is turned over to the customer or as needed throughout the life of the machine.



Manager Mode Change Password and Keypad
 Figure 10-5

Associate Passcode: Press the Associate Passcode button. The keypad input screen appears. Key in the new passcode and press enter. See Figure 10-5.

Manager Passcode: Press the Manager Passcode button. The keypad input screen appears. Key in the new passcode and press enter. See Figure 10-5.

If the code was entered incorrectly, the invalid password screen appears. The timer will begin to countdown to 0 seconds. See Figure 10-6.

To re-enter the passcode, touch anywhere on the HMI to display the keypad entry screen.

If the passcode has not been re-entered before the timer reaches 0, the HMI will revert to the previous screen.

NOTE

The passcode can only be four digits long. Same number passcodes such as: 1111, 2222, 3333, or 4444 are not allowed.

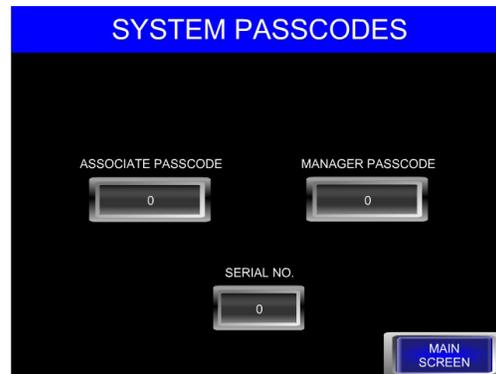
INVALID PASSWORD

**TOUCH HERE TO
 TRY AGAIN IN
 0 SECONDS**

Invalid Password Display
 Figure 10-6

Retrieving a Passcode

A forgotten passcode can be referenced through the system passcodes screen. The retrieval passcode was supplied to Management when the Cartveyor® was initially installed. Enter the code on the keypad screen. The system passcodes screen appears. Associate and Manager Passcodes are displayed. To exit this screen, press the main screen button in the lower right corner of the screen. See Figure 10-7.



System Passcodes Display
 Figure 10-7

Other Active Buttons



Manager Mode Display
 Figure 10-8



Usage Counters Display
 Figure 10-9

Fault History: Press the Fault History button to display the last 50 fault occurrences and the type of fault. The most recent fault displays first. See Figure 10-9. To download the history, insert a USB drive into one of the USB ports on the back of the HMI. Press the Backup History button. When the backup is complete, press the Cartveyor Control button and remove the USB drive from the HMI.

Counter Screens: Press the Counter Screens button to display the usage counters screen and access the fault counters.

Fault Screen: Press the Fault Screen button to display the fault screen. Refer to Section 11 “User Errors, System Faults and Warnings” for additional details.

Main Screen: Pressing the Main Screen button re-activates the Auto Mode and the insert cart display with animated display.

NOTE

When the Main Screen button is pressed, the Cartveyor returns to Auto Mode. Access to the Manager Mode must be done using the keypad.

Usage Counters
 (Manager Mode Only)



Manager Mode Display
 Figure 10-10



Usage Counters Display
 Figure 10-11

Counter Screens: Press the Counter Screens button to display the Usage Counters screen and access the fault counters. See Figure 10-10.

The initial counter screen displays the number of carts that have entered the Cartveyor® and the number of hours the Cartveyor® has been operating. See Figure 10-11.

The first column of numbers under the **total** heading displays the totals since the Cartveyor went into service. The second column under **since last reset** displays the totals since the last time the counters were reset.

NOTE *The **since last reset** category is the only counter that can be reset to zero. All other counters contain a running total from the time the Cartveyor went into service. When the counter has been reset, there is no undo function.*

Other Active Buttons

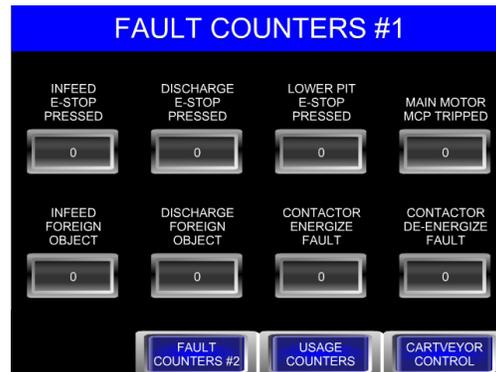
Fault Counters #1: Press the Fault Counters #1 button to display the Fault Counters #1 screen.

Fault Counters #2: Press the Fault Counters #2 button to display the Fault Counters #2 screen.

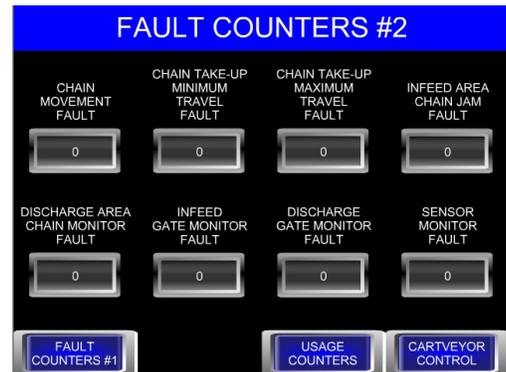
Counter Reset: Press the Counter Reset button to reset the numeric totals on the Usage Counters display screen to zero. There is no undo function.

Cartveyor Control: Pressing the Cartveyor Control button will display the Manager Mode screen.

Fault Counters
 (Manager Mode Only)



Fault Counters #1 Display
 Figure 10-12



Fault Counters #2 Display
 Figure 10-13

These screens display the number of times a particular fault has occurred. This helps the PFlow Industries, Inc. Customer Support Department monitor performance and troubleshoot areas where faults are occurring. Pressing a Fault Counter button Fault Counters #1, or Fault Counters #2 button displays that individual screen. See Figures 10-12 and 10-13.

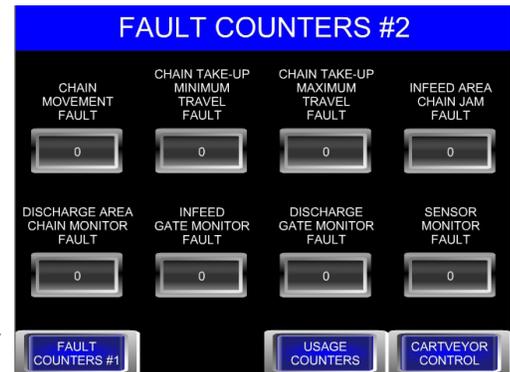
NOTE

Fault counters are absolute and cannot be reset to zero. This is the total accumulation of faults generated beginning from the time the Cartveyor® went into service. The grayed areas on the fault screens are values and are not editable.

Fault Counters #1
 Screen

Infeed E-Stop Pressed	The number of times the emergency stop located in the infeed gate was pressed.
Discharge E-Stop Pressed	The number of times the emergency stop located in the discharge gate was pressed.
Lower Pit E-Stop Pressed	The number of times the emergency stop located in the lower pit was pressed.
Main Motor MCP Tripped	The number of times the main motor MCP, located in the main control panel, was tripped.
Infeed Foreign Object	The number of times a foreign object was detected in the infeed area.
Discharge Foreign Object	The number of times a foreign object was detected in the discharge area.
Contactor Energize Fault	The number of times the main motor contactor, located in the main control panel, did not energize properly.
Contactor De-Energize Fault	The number of times the main motor contactor, located in the main control panel, did not de-energize properly.
Usage Counters Button	Pressing this button will display information on how many carts have passed through the unit and how many hours the unit has been operating since installation.

Fault Counters #2
 Screen



Fault Counters #2 Display
 Figure 10-14

Chain Movement Fault	The number of times the normal movement of the chain was interrupted.
Chain Take-up Minimum Travel Fault	The number of times the chain take-up assembly was detected at its minimum travel.
Chain Take-up Maximum Travel Fault	The number of times the chain take-up assembly was detected at its maximum travel.
Infeed Area Chain Jam Switch	The number of times the chain jam switch has been activated in the infeed area.
Discharge Area Chain Monitor Fault	The number of times the chain has extended beyond the discharge area sprocket.
Infeed Gate Monitor Fault	The number of times the infeed gate has been detected in the incorrect position.
Discharge Gate Monitor Fault	The number of times the discharge ate has been detected in the incorrect position.
Sensor Monitor Fault	The number of times the signal was received for too long of a period of time from one of the photo eyes.
Usage Counters Button	Pressing this button will display information on how many carts have passed through the unit and how many hours the unit has been operating since installation.

How it Works -
Inserting a Cart

⚠ DANGER



NO RIDERS! The Cartveyor[®] is designed only for transporting shopping carts containing merchandise. Children, infants, or persons must be removed from the shopping cart before the shopping cart can be transported. Never stand within the gated areas! The confines of the Cartveyor are unsafe. Access is limited to authorized personnel only.

1. A customer pushes a shopping cart over the floor plate, through the infed entrance, and through the one-way swinging gates. This is a one-way directional system only. If the Cartveyor is in sleep mode, a built-in sensor detects the presence of the cart, awakens, reactivates the Cartveyor, and the Cartveyor drive chain motion begins. See Figures 10-15 and 10-16.

NOTICE

Carts must be inserted into the Cartveyor one at a time! Nested carts can jam within the conveyor, cause the Cartveyor to fault, and damage the Cartveyor itself, any carts in transit, or merchandise!



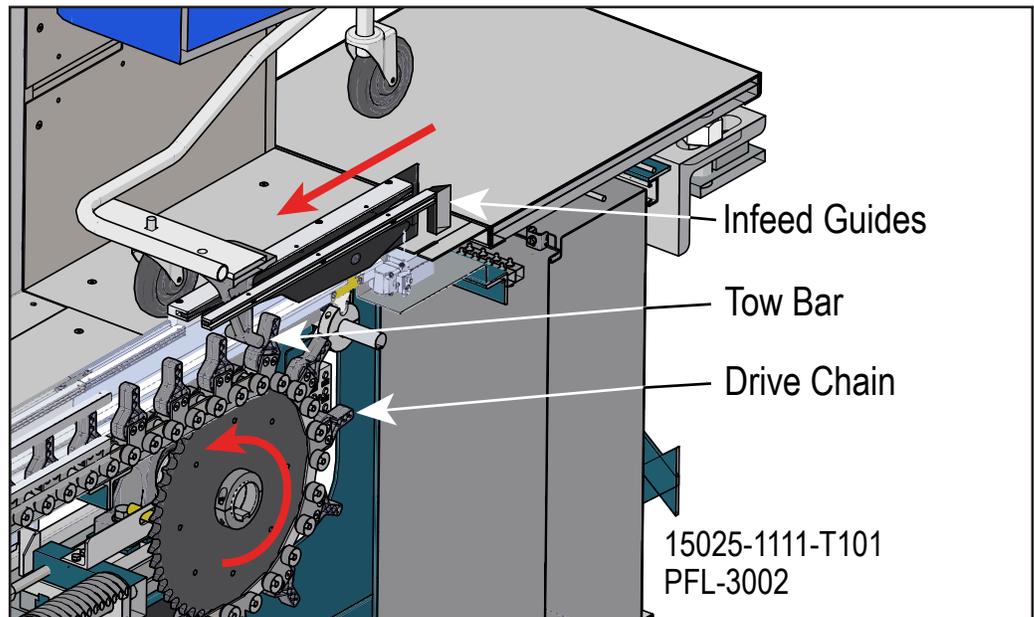
Insert Cart
Figure 10-15



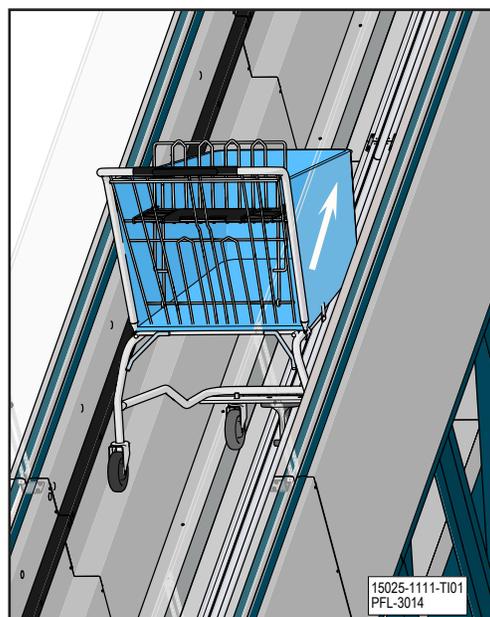
Travel Up
Figure 10-16

How it Works -
Inserting a Cart
(continued)

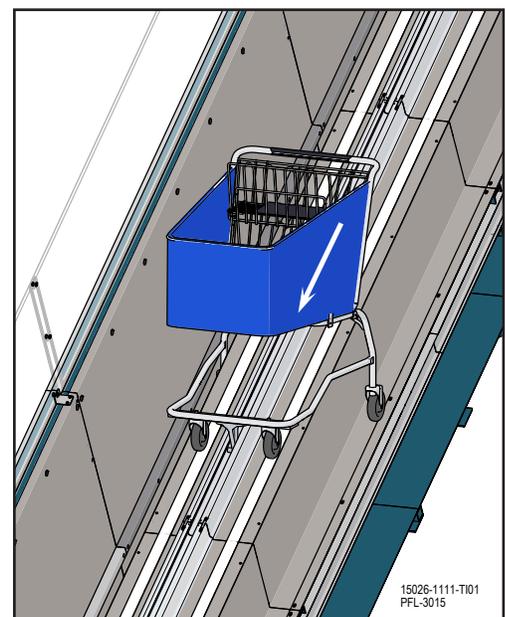
2. As the chain begins to move, the tow bar on the cart is captured between the lugs in the chain and is drawn into the Cartveyor[®], at which time the shopper releases the cart. See Figure 10-17.
3. Carts will move into the conveyor and travel up or down in a level position. See Figures 10-18 and 10-19.



Drive Chain
Figure 10-17



Travel Up
Figure 10-18



Travel Down
Figure 10-19

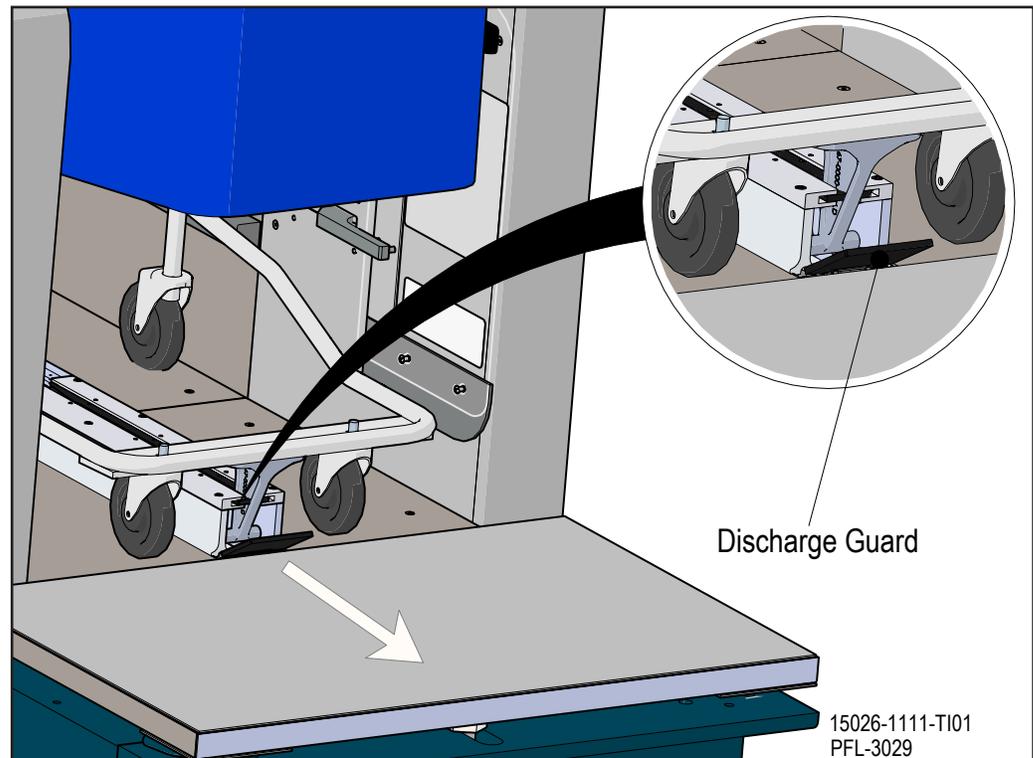
How it Works - Discharging a Cart

1. The shopping cart approaches the discharge gate. The tow bar of the shopping cart makes contact with the gate unlocking cam. The cam allows the shopping cart to continue through the one-way swing-gates of the discharge gate.
2. The tow bar of the shopping cart makes contact with the discharge guard at the end of the track. The guard closes immediately after the tow bar is free.
3. The front of the shopping cart stops even with, or just outside of, the gate. The shopper, who arrives at the discharge area via an adjacent escalator, retrieves the shopping cart and continues on their way. See Figure 10-20.
4. After a designated period of time has elapsed without a shopping cart entering the conveyor, the system enters a sleep mode.

NOTE

If more than one shopping cart is being conveyed, any shopping cart that is not retrieved and is still within the discharge gate is pushed from behind and through the gate by the next shopping cart.

If multiple carts are being removed, each cart will be ejected from the discharge gate by the cart following it until the last, which should remain within the gate. It is highly recommended that an additional person be at the discharge area to retrieve carts if there is more than one cart within the Cartveyor[®].



Discharge Cart
Figure 10-20

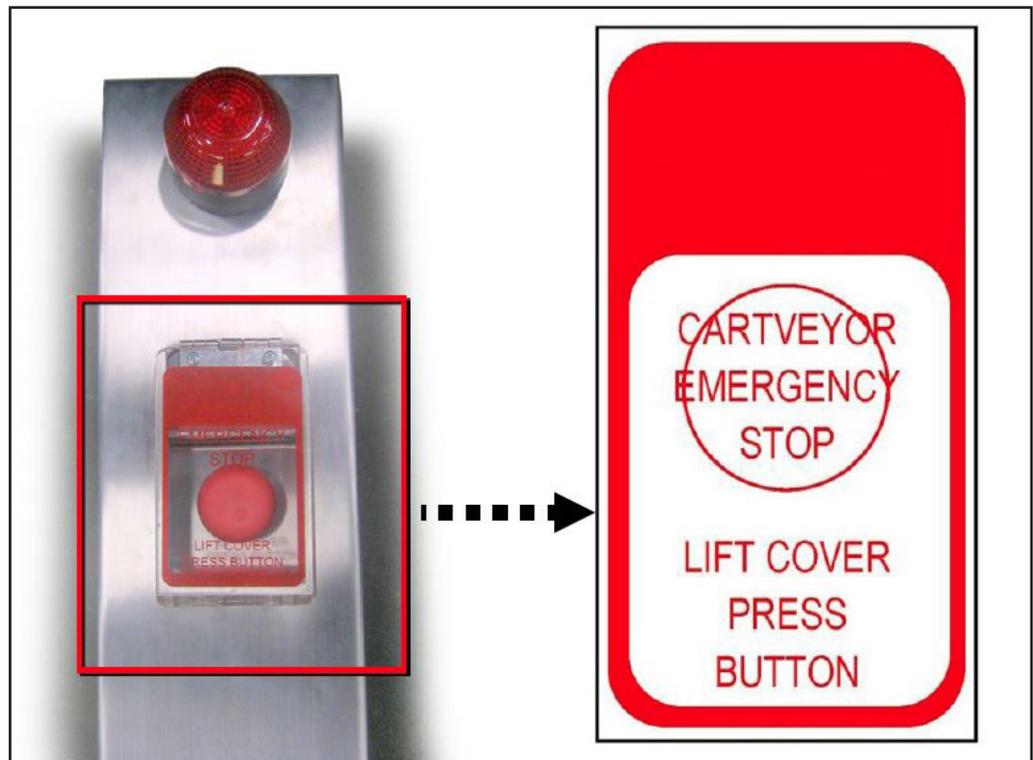
How it Works -
Emergency Stop

The emergency stop is identified by name on a cover panel on the top of the balustrade on each gate. Open the cover panel and press the emergency stop push-button located at either gate to stop the conveyor chain at any time. This action will fault the system and authorized personnel will need to reset the system before normal operation can resume. Refer to Section 11 "User Errors, System Faults, and Warnings" for additional information. See Figure 10-21.

NOTE

The location of the emergency stop push-button varies depending on the gate option.

If the emergency stop push-button, located at either gate, is pressed while holding the forward or reverse button on the HMI touch screen, the chain movement will stop, the Cartveyor[®] will fault, and need to be reset.



Cartveyor Emergency Stop Push-Button Cover
Figure 10-21

Section 10 | Modes of Operation



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Before You Begin
General Overview

Read this entire manual.

The Cartveyor[®] incorporates several devices to monitor and ensure safe operation. If one of these devices detects a condition outside of the normal operating parameters, the control system prevents the drive chain from starting, or stops the drive chain if the drive chain is already moving, and a fault is registered with the control system. These faults are broken down into two categories: User Error and System Fault.

User Error Fault

A user error fault is a stoppage caused by the user's interaction with the Cartveyor, (e.g., foreign object obstruction). When a user error fault occurs, the HMI displays the yellow User Error screen. See Figure 11-1.



User Error Screen Figure 11-1

System Fault

A system fault is a stoppage caused by the Cartveyor itself (e.g., a chain jam). When a system fault occurs, the HMI displays the red System Fault screen. See Figure 11-2.



User Error Screen Figure 11-2

NOTE *The fault screen text displayed after a fault must be read in order to determine what has happened to the Cartveyor.*

Important Safety Information

To prevent personal injury or damage to the Cartveyor[®] unit, the following restrictions and precautions must be read, understood, and adhered to prior to power-up and use.

Clearing Faults

WARNING

- Allow only properly trained personnel to reset a fault.
- Any physical activity required to clear a fault (e.g., removing a cart or a foreign object from the Cartveyor) should be completed by qualified service or in-house maintenance personnel only.
- Climbing, sitting, walking, or riding on equipment could result in death or serious injury. This includes the pit areas under the floor.
- Allow only authorized service personnel to access any mechanical or electrical areas, or mechanical or electrical devices.
- Do not attempt to replace or repair any component of a Cartveyor without first contacting PFlow Industries, Inc. Customer Support Department. Doing so will void the warranty!

Avoid the Incidence of Faults

- Observe the proper usage of the shopping carts. Do not tolerate the misuse and/or overloading of the shopping carts, or the misuse of the Cartveyor itself. Such actions jeopardize the warranty and can damage the Cartveyor.
- Proper care of the shopping carts is essential for the Cartveyor to function efficiently.
- Routinely inspect all shopping carts used on a Cartveyor for evidence of defects, damage, and abuse.
- Routinely clean, dust, and keep all stainless steel surfaces, lenses, and reflectors of the photo-electric sensors free of any debris. Use recommended cleaning products (see section on Cleaning and Care for additional information).

System Monitoring Devices

Retro-Reflective Photo Eyes: Located at each end of the Cartveyor, monitor the presence of foreign objects.

Limit Switches: Located at the infeed end, a limit switch makes contact with a shopping cart's tow bar and activates the system if dormant (sleep mode). Located on the chain take-up assembly at the bottom end of the motor drive area, several limit switches monitor linear chain movement. If abnormalities are detected, all motion stops. Located at both ends of the Cartveyor, the limit switches monitor the chain drive sprocket, and idler sprocket.

Proximity Sensors: Located at the infeed gates behind the balustrade cover, the gate proximity sensors make contact with a target flag, monitoring the opening and closing of the infeed gate doors.

Belt Movement Sensors: Monitor the movement and speed of the idler sprocket.

Diffuse Photo Eyes: The sensor located at the infeed end alerts the control system when a shopping cart exits the infeed area. The sensor located at the discharge end alerts the control system when a cart enters the discharge area.

Emergency Stop Push-buttons

An emergency stop push-button is located on each gate and in the lower pit. When pressed, the conveyor immediately ceases movement. See Figure 11-3.

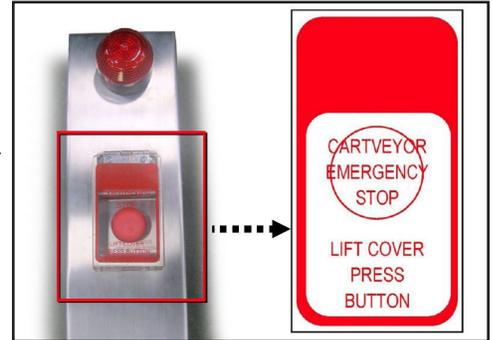
Safety Relay Reset Button

The safety relay reset button is located on the infeed balustrade emergency stop panel. The safety relay reset button is located under the emergency stop cover in front of the emergency stop button. See Figure 11-4.

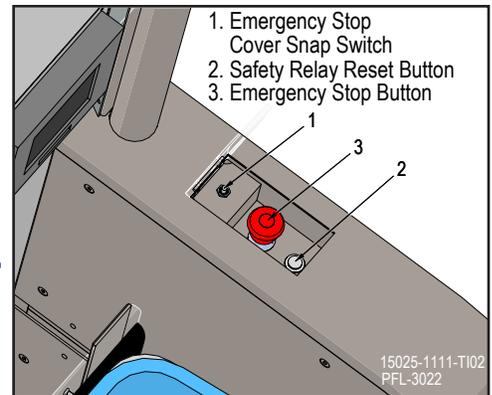
NOTE

Failure of some of these devices to function properly or send a signal to the control system cause the system to fault.

If more than one fault occurs, the HMI displays each fault message for a number of seconds, repeating the fault messages until all the faults are cleared and the system is reset.



Emergency Stop Push-button Cover
Figure 11-3



Safety Relay Reset Button
Figure 11-4

CAUTION

Allow only properly trained personnel to reset the control system of a Cartveyor®.

Resetting the System after a User Error or System Fault

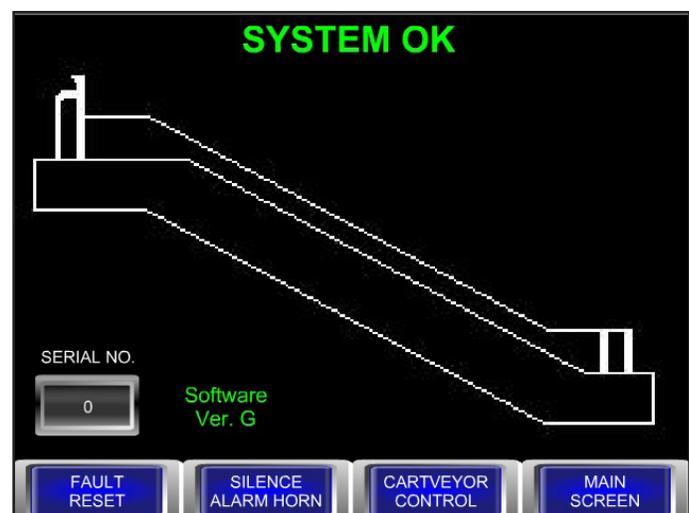
When a user error or system fault occurs, the system can be reset by using the HMI.

To reset the system, touch anywhere on the HMI. Enter the proper passcode on the keypad screen. When the correct passcode is entered, go to the fault screen if the fault screen is not already displayed.

The fault screen displays information on the status of the Cartveyor. Status messages appear on the top of the fault screen, and dot indicators showing the general location of any faults are displayed on the picture of the Cartveyor. See Figure 11-5.

- Yellow indicates a warning condition exists in that area. A yellow message also appears in the message area detailing the condition. The Cartveyor continues to function, but the user needs to be aware of a potential problem.
- Red indicates a fault condition exists in that area. A red message also appears in the message area detailing the condition. The operation of the Cartveyor stops until the fault condition is corrected and the fault is reset.
- Once the fault is identified, take the correct steps to resolve the cause of the fault. Then press the Fault Reset button. The screen displays System OK in green text. Manually operate the Cartveyor or return to auto mode.

NOTE *Press the yellow or red dot fault indicators to display a help screen. The help screen provides additional details regarding what may have caused the fault.*



Fault Screen - System OK Figure 11-5

Fault Screen Buttons **Fault Indicator:** Press each dot to display a help screen for each of the faults.

Fault Reset: Press this button to reset the system once all faults have been corrected.

Silence Alarm Horn: Press this button to silence the alarm horn.

Cartveyor[®] Control: Press this button to return to the Associate or Manager mode screens.

Main Screen: Press this button to return to the main (Auto Mode) screen at any time.

NOTE *The chain will begin moving if shopping carts are engaged in the Cartveyor.*

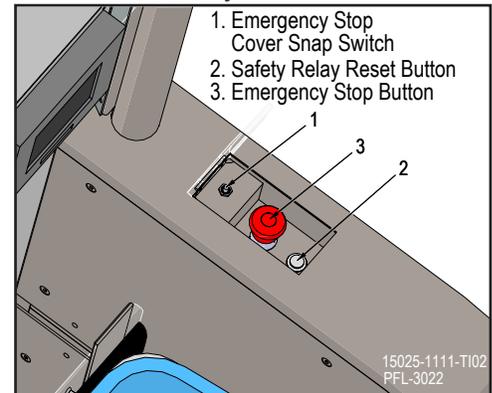
The passcode entry process must be repeated to return to the fault screen.

Identifying and Clearing Faults

If the emergency stop button has been pressed, the Cartveyor cannot be reset with only the Fault Reset button.

The safety relay will need to be reset before the safety relay fault can be reset. See Figure 11-6.

1. Pull out the emergency stop button.
2. Push the safety relay reset button located on the infeed balustrade in front of the emergency stop button.
3. Lower the Emergency Stop cover.
4. Press the Fault Reset button on the HMI screen. The screen will display System OK on the fault screen.



Cartveyor Safety Relay Reset Button
Figure 11-6

NOTE *System OK indicates that the Cartveyor is not faulted. System OK does not indicate that the Cartveyor is in auto mode.*

The alarm horn sounds continuously whenever the emergency stop button is depressed, emergency stop cover is lifted, or if the emergency stop cover is broken.

NOTICE Although most faults can be cleared by resetting the system, it is highly recommended that the cause of the fault be identified and preventive measures taken to correct the problem.

Section 11 | User Errors, System Faults, and Warnings



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User Faults

Fault	Possible Cause	Solution	Comments
Infeed Area Foreign Object Detected	A person has been detected in the infeed area.	Make sure there are no people inside the Cartveyor®. Reset the system.	
	A foreign object has been detected in the infeed area.	Remove all foreign objects from the Cartveyor. Reset the system.	Must be performed by authorized personnel only!
	The infeed foreign object sensor and/or reflector is dirty.	Clean the photo eye. Clean the reflector. Reset the system.	Must be performed by authorized personnel only!
	The infeed foreign object sensor and/or reflector is misaligned.	Contact maintenance. Realign the sensor. Realign the reflector. Reset the system.	Must be performed by authorized personnel only!
	The infeed foreign object sensor and/or reflector is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
Discharge Area Foreign Object Detected	A person has been detected in the discharge area.	Make sure there are no people inside the Cartveyor. Reset the system.	
	A foreign object has been detected in the discharge area.	Remove all foreign objects from the Cartveyor. Reset the system.	Must be performed by authorized personnel only!
	The discharge foreign object sensor and/or reflector is dirty.	Clean the photo eye. Clean the reflector. Reset the system.	Must be performed by authorized personnel only!
	The discharge foreign object sensor and/or reflector is misaligned.	Contact maintenance. Realign the sensor. Realign the reflector. Reset the system.	Must be performed by authorized personnel only!
	The discharge foreign object sensor and/or reflector is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!

**Section 11 | User Errors, System Faults,
and Warnings**



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User Faults (continued)

Fault	Possible Cause	Solution	Comments
Infeed Area Emergency Stop Pressed	The infeed area emergency stop push-button was accidentally pressed.	<p>Make sure the Cartveyor® is free of damage and people are not in the Cartveyor.</p> <p>Pull out the emergency stop push-button.</p> <p>Press the safety relay reset push-button.</p> <p>Reset the system.</p>	
	The infeed area emergency stop push-button was pressed to prevent possible injury to people or damage to the Cartveyor.	<p>Determine how to properly correct the situation.</p> <p>Pull out the emergency stop push-button.</p> <p>Press the safety relay reset push-button.</p> <p>Reset the system.</p>	Evaluation and correction of the situation must be performed by authorized personnel only!
	The infeed area emergency stop push-button was pressed due to injury to people or damage to the Cartveyor.	<p>Determine how to properly correct the situation.</p> <p>Pull out the emergency stop push-button.</p> <p>Press the safety relay reset push-button.</p> <p>Reset the system.</p>	Evaluation and correction of the situation must be performed by authorized personnel only!
	The infeed area emergency stop push-button is defective.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!

Section 11 | User Errors, System Faults, and Warnings



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User Faults (continued)

Fault	Possible Cause	Solution	Comments
Discharge Area Emergency Stop Pressed	The discharge area emergency stop push-button was accidentally pressed.	<p>Make sure the Cartveyor® is free of damage and people are not in the Cartveyor.</p> <p>Pull out the emergency stop push-button.</p> <p>Press the safety relay reset push-button.</p> <p>Reset the system.</p>	
	The discharge area emergency stop push-button was pressed to prevent possible injury to people or damage to the Cartveyor.	<p>Determine how to properly correct the situation.</p> <p>Pull out the emergency stop push-button.</p> <p>Press the safety relay reset push-button.</p> <p>Reset the system.</p>	Evaluation and correction of the situation must be performed by authorized personnel only!
	The discharge area emergency stop push-button was pressed due to injury to people or damage to the Cartveyor.	<p>Determine how to properly correct the situation.</p> <p>Pull out the emergency stop push-button.</p> <p>Press the safety relay reset push-button.</p> <p>Reset the system.</p>	Evaluation and correction of the situation must be performed by authorized personnel only!
	The discharge area emergency stop push-button is defective.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!

Section 11 | User Errors, System Faults, and Warnings



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User Faults (continued)

Fault	Possible Cause	Solution	Comments
Lower Pit Emergency Stop Pressed	The lower pit emergency stop push-button was accidentally pressed.	Make sure the Cartveyor® is free of damage and people are not in the Cartveyor. Pull out the emergency stop push-button. Press the safety relay reset push-button. Reset the system.	
	The lower pit emergency stop push-button was pressed to prevent possible injury to people or damage to the Cartveyor.	Determine how to properly correct the situation. Pull out the emergency stop push-button. Press the safety relay reset push-button. Reset the system.	Evaluation and correction of the situation must be performed by authorized personnel only!
	The lower pit emergency stop push-button was pressed due to injury to people or damage to the Cartveyor.	Determine how to properly correct the situation. Pull out the emergency stop push-button. Press the safety relay reset push-button. Reset the system.	Evaluation and correction of the situation must be performed by authorized personnel only!
	The lower pit emergency stop push-button is defective.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
Safety Relay Tripped	One or more of the emergency stop push-buttons has been pressed.	Determine how to properly correct the situation. Pull out the emergency stop push-button. Press the safety relay reset push-button. Reset the system.	
	The emergency stop push-buttons are released, but the safety relay was not properly reset.	Press the safety relay reset push-button. Reset the system.	
	The safety relay was properly reset, but the Cartveyor was not.	Reset the system.	
	The safety relay reset push-button is defective.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	The Cartveyor was powered down and powered back up.	Press the safety relay reset push-button. Reset the system.	

Section 11 | User Errors, System Faults, and Warnings



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System Faults

Fault	Possible Cause	Solution	Comments
Infeed Gate Monitor Fault (proper infeed gate movement has not been detected)	The proximity sensor is misaligned.	Contact maintenance. Realign the sensor. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The proximity sensor is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	The target is damaged or missing.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	There is a mechanical problem with the infeed gate mechanism.	Contact maintenance. Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
Discharge Gate Monitor Fault (proper discharge gate movement has not been detected)	The proximity sensor is misaligned.	Contact maintenance. Realign the sensor. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The proximity sensor is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	The target is damaged or missing.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	There is a mechanical problem with the infeed gate mechanism.	Contact maintenance. Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!

Section 11 | User Errors, System Faults, and Warnings



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System Faults (continued)

Fault	Possible Cause	Solution	Comments
Infeed Cart Logging Sensor Fault (the signal from the infeed area cart logging diffuse sensor has been lost)	A foreign object has been detected in the path of the infeed area cart logging sensor.	Remove all foreign objects from the Cartveyor®. Reset the system.	Removal of any and all foreign objects must be performed by authorized personnel only!
	The infeed area cart logging sensor is dirty.	Clean the photo eye. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The infeed area cart logging sensor is misaligned.	Contact maintenance. Realign the sensor. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The infeed area cart logging sensor is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
Discharge Area De-activation Sensor Fault (the signal from the discharge area de-activation diffuse sensor has been lost)	A foreign object has been detected in the path of the discharge area de-activation sensor.	Remove all foreign objects from the Cartveyor. Reset the system.	Removal of any and all foreign objects must be performed by authorized personnel only!
	The discharge area de-activation sensor is dirty.	Clean the photo eye. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The discharge area de-activation sensor is misaligned.	Contact maintenance. Realign the sensor. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The discharge area de-activation sensor is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
Infeed Chain Jam Switch (the chain monitor limit switch located beneath the chain jump guides on the left-hand side of the opening in the infeed track pan has tripped)	The limit switch is misaligned.	Contact maintenance. Realign the limit switch. Reset the system.	Limit switch maintenance must be performed by authorized personnel only!
	The limit switch is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	There is a mechanical problem with the drive chain.	Contact PFlow Industries, Inc. Customer Support.	

Section 11 | User Errors, System Faults, and Warnings



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System Faults (continued)

Fault	Possible Cause	Solution	Comments
Discharge Area Chain Monitor Fault (the chain monitor limit switch at the discharge area sprocket has tripped)	The limit switch is misaligned.	Contact maintenance. Realign the limit switch. Reset the system.	Limit switch maintenance must be performed by authorized personnel only!
	The limit switch is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	There is a mechanical problem with the drive chain.	Contact PFlow Industries, Inc. Customer Support.	
Chain Take-up Minimum Travel Fault (the chain take-up in the lower pit has reached its minimum allowable travel)	The limit switch is misaligned.	Contact maintenance. Realign the limit switch. Reset the system.	Limit switch maintenance must be performed by authorized personnel only!
	The limit switch is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	There is a mechanical problem with the drive chain.	Contact PFlow Industries, Inc. Customer Support.	
Chain Take-up Maximum Travel Fault (the chain take-up in the lower pit has reached its maximum allowable travel)	The limit switch is misaligned.	Contact maintenance. Realign the limit switch. Reset the system.	Limit switch maintenance must be performed by authorized personnel only!
	The limit switch is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	The chain has stretched.	At least one link must be removed from the drive chain. Contact PFlow Industries, Inc. Customer Support.	Chain has stretched to the maximum allowable length. Cartveyor® operation is stopped until a link of chain is removed to prevent damage to the Cartveyor conveyor sections and chain components.
	There is a mechanical problem with the drive chain.	Contact PFlow Industries, Inc. Customer Support.	
Chain Take-up Mid Travel (the chain take-up in the lower pit has reached the approximate middle of its allowable travel)	The limit switch is misaligned.	Contact maintenance. Realign the limit switch. Reset the system.	Limit switch maintenance must be performed by authorized personnel only!
	The limit switch is damaged.	Contact PFlow Industries, Inc. Customer Support.	
	The chain has stretched.	At least one link must be removed from the drive chain. Contact PFlow Industries, Inc. Customer Support.	Although the Cartveyor will continue to run, contact PFlow Industries, Inc. Customer Support to make arrangements for the chain to be shortened.

Section 11 | User Errors, System Faults, and Warnings



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System Faults (continued)

Fault	Possible Cause	Solution	Comments
Chain Movement Fault (the proximity sensor that detects the proper movement of the chain is not detecting the target)	The proximity sensor is misaligned.	Contact maintenance. Realign the sensor. Reset the system.	Sensor maintenance must be performed by authorized personnel only!
	The proximity sensor is damaged.	Contact PFlow Industries, Inc. Customer Support for replacement components.	Replacement components must be replaced by authorized personnel only!
	One of the rotating targets is damaged or missing.	Contact PFlow Industries, Inc. Customer Support.	
	There is a mechanical or electrical problem with the drive chain.	Contact PFlow Industries, Inc. Customer Support.	
Main Motor MCP Tripped (the main motor MCP has detected a problem with the power to the main motor and has tripped)	There is a problem with the power to the main motor.	Contact PFlow Industries, Inc. Customer Support.	
Contactor Energize Fault (proper operation of the main motor contactor has not been detected)	There is a problem with the main motor contactor.	Contact PFlow Industries, Inc. Customer Support.	
Contactor De-energize Fault (proper operation of the main motor contactor has not been detected)	There is a problem with the main motor contactor.	Contact PFlow Industries, Inc. Customer Support.	
Chain Jam Fault (a stoppage caused when normal movement of the drive chain is interrupted)	A shopping cart tow bar or foreign object has engaged the drive chain.	See bulletin 15751-0031 and 15715-0032 .	A chain jam must be cleared by authorized personnel only.
Major Chain Jam Fault (a severe stoppage caused when normal movement of the drive chain is interrupted)	A shopping cart tow bar or foreign object has engaged the drive chain.	Contact PFlow Industries, Inc. Customer Support.	

Section 11 | User Errors, System Faults, and Warnings



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⚠ WARNING

- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional state or local requirements.

- Electrical components should not make contact with water or other liquids.



- Wear dry clothing and shoes. Moisture should not be present on the soles of shoes. Water is electrically conductive and accidental contact may cause death or serious personal injury.



- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any cleaning task on a Cartveyor®.

- Do not use any corrosive or flammable solvents or cleaning agents on the machine that contain TRI, PER, TETRA, or FCHC. Read the instructions on the packaging when use is made of chemical substances (cleaning agents).



- Do not use any petroleum-based cleaning agents. Fumes are toxic and flammable.
- Do not clean the Cartveyor® or any of its components with compressed air or water under high pressure.
- Do not use abrasive cleansers, paper products, steel wool, wire brushes, or metal scrapers when cleaning. Cleansers such as Bon-Ami®, Comet®, Soft Scrub® are abrasive. SOS Cleaning Pads and Scotch Brite's™ more abrasive cleaning pads are too abrasive.

- Avoid parts made of rubber or plastic, such as cables and gaskets, from making contact with oil, solvents, or other chemicals.



- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.

- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor®.



- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor®.

NOTE *Apply grip tape to the floor covers to help prevent slips and falls on the incline. Grip tape is available for purchase through PFlow Industries, Inc. Parts & Service Department.*

Clean each Cartveyor® on a regular basis. Certain areas of the Cartveyor® need cleaning more often than others depending on the amount of traffic experienced during a normal working day and the environment where the Cartveyor® is located.

What Needs to be Cleaned and Recommended Cleaning Materials
 See Figure 12-1.

CAUTION



Pinch Hazard! Do **not** clean any part of the Cartveyor® chain drive components. This is not necessary and can cause personal injury.

Stainless Steel Plating The majority of the Cartveyor® is covered with stainless steel because of its durability, resistance to corrosion, and appearance. Although it is durable, any stainless steel on a Cartveyor® is susceptible to abrasion, especially from abrasive type cleaning products.

For general cleaning and polishing of stainless steel surfaces, use **3M Stainless Steel Cleaner and Polish®**, and a soft, absorbent cloth. For deeper cleaning (light scrubbing) of stainless steel surfaces, use a plastic scraper or **Scotch-Brite Light Duty Commercial Scouring Pad #98CC** (9" x 6"; white).

Optional Gates and Barrier Panels Clear plastic surfaces on gates and barrier panels are made of high-impact material known for durability and safety. The surface area is available for necessary signage. Because the gates and barrier panels are transparent, cleaning is needed more often. The surface is also more susceptible to abrasion.

Use **Original Formula Windex® by SC Johnson** and a soft, absorbent cloth. Other cleaners leave a film that attracts dust and dirt.

UHMW Guide Strips All of the black plastic shopping cart guide strips installed into each Cartveyor® need to be cleaned. This type of plastic is abrasion-resistant but can be damaged by solvents and petroleum-based cleaning agents.

Use **Simple Green® All-Purpose Cleaner**, or a similar product and a soft, absorbent cloth.

Photo-Electric Sensor Lens The plastic lens on the sensor accumulates dust that hinders the performance. The plastic is easily scratched. Take care not to move a sensor out of alignment while cleaning the lens.

Use **Original Formula Windex® by SC Johnson** and a soft, absorbent cloth. Other cleaners leave a film that attracts dust and dirt.

Photo-Electric Sensor Reflectors The reflector located directly across from the emitter device accumulates dust that hinders the performance. The plastic is easily scratched. Take care not to move a reflector out of alignment while cleaning the reflector.

Use **Original Formula Windex® by SC Johnson** and a soft, absorbent cloth. Other cleaners leave a film that attracts dust and dirt.



Recommended Cleaning Supplies
 Figure 12-1

**Avoid these
Cleaning
Materials**

Alcohol-based Cleaning Products These include Acetone, Benzene, other chemical derivatives, and all other cleaning agents in this class.

Solvent-based Cleaners and Degreasers Lacquer thinner, naphtha, turpentine, xylene, etc. can break down the plastic panels (including the ink used for the signage), the UHMW plastic, and affect the composition of the chain lugs and rollers.

Chlorine (bleach)-based Cleaning Products These can cause discoloration and breakdown of the drive chain and plastics of the Cartveyor®.

Muriatic Acid or Hydrochloric Acid These can corrode stainless steel surfaces.

NOTE *PFlow Industries, Inc. can not be held accountable or liable for damage due to negligence and failure by authorized personnel to care for and maintain the equipment as recommended in this manual.*

During periods of inclement weather, the Cartveyor® conveyor will accumulate more water, dirt, and mud from the shopping carts coming from the parking lot. It's important to keep the Cartveyor® clean in these situations.

**Cleaning
Procedures**

1. Remove all shopping carts from the Cartveyor®.
2. Place caution floor signs at each end of the Cartveyor® indicating the equipment is being serviced. See Figure 12-2.
3. Disconnect power to the Cartveyor® at the power source.
4. Lockout the Cartveyor® in accordance with the facility lockout/tagout program.
5. Examine and be aware of nearby equipment (escalators) for potential interference with the cleaning operation.
6. Remove floor plate at top of the Cartveyor® to access the lifting rings.
7. Wear harness and attach lanyard to the lifting rings to rappel down the Cartveyor®. See Figure 12-3.
8. Wear safety glasses, gloves, and non-slip shoes.
9. Test equipment controls to make sure the controls are de-energized, in a zero energy state, and cannot operate the Cartveyor®.
10. Report any unsafe condition or damage to the personnel responsible for the Cartveyor® and make sure that any damage is remedied before restarting the Cartveyor®. Do not allow the Cartveyor® to operate when unsafe conditions arise.



Caution Floor Signs Figure 12-2



Lifting Rings Figure 12-3

**Emergency
Debris Clean-Up**

Identify the source of debris and use proper cleaning procedures, methods, and materials.

Stainless Steel Covering

1. Vacuum dry areas thoroughly. An extended attachment may be needed.
2. Spot-clean heavily soiled areas (if any) with a recommended cleaner and plastic scraper.
3. Remove spills, any heavy soil, and dirt by hand.
4. Damp mop the floor area and covers with a **Swiffer Professional® by P&G Professional** with a telescoping handle and **Swiffer** wet cloth cleaning pad. Begin at the top of the Cartveyor® and work dirt and debris downward to the lower level. **Do not allow water to seep into the chain area.**
5. Remove any heavy soil at the lower level by hand or vacuum as necessary.
6. Apply a recommended stainless steel cleaner to a soft, absorbent cloth and wipe the stainless steel on the gate. Avoid applying the stainless steel cleaning fluid to the plastic panels.

Photo-Electric Sensor Lenses and Reflectors

1. Apply a recommended cleaner to a soft, absorbent cloth (not the object).

NOTE *Avoid saturating the cloth with cleaning fluid. Excess cleaner from direct application or overspray can cause potential problems with the electrical components inside the sensor casing.*

2. Wipe the lens of the reflector gently. Take care not to rub excessively to avoid moving a sensor out of alignment or scratching while cleaning the lens.

Plastic Panels and UHMW Strips

Apply a recommended cleaner to a soft, absorbent cloth and wipe the plastic panels and UHMW strips clean.

Cleaning Schedule

	Daily	Weekly	Monthly
Stainless Steel Landing	✓		
Stainless Steel Trim and Panels	✓		
Midsection		✓	
UHMW Strips		✓	
Photo-electric Sensor Lens		✓	
Photo-electric Reflector		✓	
Plastic Panels		✓	
Visual Inspection			✓



Section 13 | Cartveyor® Preventive Maintenance and Troubleshooting



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The Cartveyor® requires minimal attention on a regular basis to prevent equipment failures or accelerated wear and tear. **Cartveyors® with an average usage of 50,000 to 100,000 cycles per year should have preventive maintenance performed every 3 months.** This section is provided for the assistance of qualified and trained service technicians only and is not intended for use by untrained or unauthorized service personnel. Make sure all steps are completed. A record of regular, properly conducted preventive maintenance provides a running history of any issues the Cartveyor® may have. The reports will identify trends, and help anticipate expected wear and tear repairs. Sign and return to PFlow Industries, Inc. Customer Support Department via e-mail to psd@pflow.com

NOTICE

A qualified person is defined as a person who, by possession of a recognized degree or certificate of professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve problems relating to the subject matter and work.

WARNING



- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional state or local requirements.

- If any defects relating to operating safety and reliability are detected or if any damage occurs, the Cartveyor® must be taken out of operation immediately.



- Wear dry clothing and shoes. Moisture should not be present on the soles of shoes. Water is electrically conductive and accidental contact may cause death or serious personal injury.



- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any cleaning task on a Cartveyor®.

- Make sure that no persons or objects are within the range of any moving parts of the Cartveyor®.



- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.

- If this Cartveyor® needs to be modified in any way, contact PFlow Industries, Inc. for assistance. Do not make any unauthorized changes.

- Before the Cartveyor® is put into operation, all Cartveyor® parts must comply with all relevant health and safety directives and regulations.



- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor®.

NOTE

Apply grip tape to the floor covers to help prevent slips and falls on the incline. Grip tape is available for purchase through PFlow Industries, Inc. Customer Support Department.

Detailed Schedules and Maintenance Log Book

All schedules start from the initial turnover date of the equipment to the customer. To assist in keeping accurate maintenance records, a “Maintenance Log Book” is provided with the Cartveyor® and includes itemized forms for recording inspections, repairs and usage/fault counts as follows:

- Daily visual inspection/maintenance forms.
- Monthly visual inspection/maintenance forms.
- Quarterly visual inspection/maintenance forms.
- Data collection - Usage/Fault Count “Fax-Back” forms.

Equipment and Component Performance

When properly and pro-actively maintained, the Cartveyor® will perform reliably for many years. While Cartveyor® maintenance is a key component in realizing maximum uptime performance, there are other factors that influence uptime. The following items are also key components;

Shopping Cart Specs, Inspection & Maintenance

- Use only carts specifically designed for use on the Cartveyor®.
- Contact PFlow Industries, Inc. for a list of approved carts and specifications.

Cart Inspection

- Frame damage due to parking lot and environmental abuse
- Caster damage and/or wear

Tow-Bar Inspection

- Damaged and/or broken tow-bars due to parking lot and environmental abuse

Cart Preventive Maintenance (PM) Program

- Consult PFlow for details and recommendations

Store Personnel Training

- HMI (touch screen) knowledge
- Pass codes
- General operational knowledge
- Fault Identification/Recovery knowledge

Customer Interaction

- General operational knowledge
- Disregard for signage
- Attempting to insert “nested” carts
- Attempting to convey improperly loaded carts

Usage – Revised/accelerated PM’s may be required if usage exceeds the following parameters – Consult PFlow Industries, Inc.

- High levels of run-time, in excess of 4,000 hours per year
- High levels of cart conveying cycles, in excess of 100,000 cycles per year
- Cart loads in excess of 150 pounds each

Operating Environment

- Indoor controlled climate - standard PM’s apply
- Outdoor uncontrolled climate - outdoor PM’s apply

Section 13 | Cartveyor® Preventive Maintenance and Troubleshooting



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✓	Action	How Often
	Operate the Cartveyor in manual mode and listen for any “unusual” noises. Lubricate chain and/or replace rollers as needed.	3 months
	Visually inspect the Cartveyor for loose screws. Tighten as necessary.	3 months
	Visually inspect the Cartveyor for foreign objects. Remove as necessary.	3 months
	Verify that all components are undamaged. Note, repair, and replace as necessary.	3 months
	Inspect all gate panels for alignment, wear, or damage. Adjust as necessary.	3 months
	Inspect infeed and discharge covers for damage or unusual wear [indicates chain problems and jams].	3 months
	Inspect for missing or loose chain lugs. Tighten as needed. If there is more than one chain lug missing in a row, the chain lugs must be replaced.	3 months
	Spray chain pins and chain side plates with LPS Labs LPS2® Heavy-duty Lubricant . Apply every 1,500 operating hours or 3 months, whichever comes first.**	**
	Remove the floor plate at each end of the Cartveyor to expose the grease blocks. Apply two (2) pumps of Lubriplate #930-AA with a slow and steady pressure into each zerk fitting to avoid bursting the grease supply lines. Apply every 1,500 operating hours or 3 months, whichever comes first.** Do not apply lithium grease. Lithium grease hardens inside the lines, damages the lines, and voids the warranty.	**
	Inspect the gear unit on indoor Cartveyors for unusual noise, oil level, and the condition of the oil. Inspect every 3,000 operating hours or 3 months, whichever comes first.***	***
	Run 3-10 carts through the Cartveyor. Observe arrestors, photo eyes, and overall operation.	6 months
	Verify that the fault light, stop buttons, touch screen, and alarm horns are functioning properly.	6 months
	Inspect the touch screen and stop button door for damage. Repair or replace as necessary.	6 months
	Verify that all gates are functioning properly on each level. Unlock the gates at the infeed and discharge areas using the unlock mechanism. Adjust as necessary	6 months
	Inspect and verify that the cart blocker on the down Cartveyor is functioning properly.	6 months
	Inspect all barrier panels for alignment, wear, or damage. Adjust as necessary.	6 months
	Visually inspect the alignment of the photo eyes at the infeed, discharge, and arrestor sections (if present). Adjust and clean the photo eye lenses and reflectors.	6 months
	Inspect the photo eye cables for damage.	6 months
	Inspect the chain rollers, pins, lower chain track and aluminum extrusions for damage.	6 months
	Inspect the noise reduction foam tape on the discharge track guard. Replace as necessary.	6 months
	Inspect the chain take up to ensure movement, the jam nuts are backed off, and that the chains are tensioned properly.	6 months
	Inspect the take up switch for proper alignment.	6 months
	Inspect for metal particles underneath the Cartveyor [an indicator that the chain is not correctly interacting with the guide components].	6 months
	Inspect all slider bed switches for placement, chain stretch, and damage. Repair or replace as needed.	6 months
	Clean beneath the Cartveyor, both pit catch pans, and the pit.	6 months
	Replace the gear unit fluid on outdoor Cartveyors using mineral oil. Replace every 15,000 operating hours or 3 years, whichever comes first depending on operating conditions.***	***
	Replace the gear unit fluid on Cartveyors using synthetic oil (used for extreme conditions). Replace every 30,000 operating hours or 5 years, whichever comes first depending on operating conditions.***	***

NOTICE *** See the gear unit manufacturer’s instructions for detailed descriptions.
www.seweurodrive.com/support/index.php

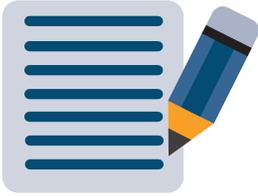
Section 13 | Cartveyor® Preventive Maintenance and Troubleshooting



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Troubleshooting

Component	What to Inspect	Solution
Conveyor Chain	Chain left to right tracking	Adjust drive and tail sprocket positions.
	Lug integrity (condition and attachment)	Replace lugs and/or bushings. If there is more than one chain lug missing in a row, the chain lugs must be replaced.
	Roller integrity (condition and attachment)	Replace rollers.
	Chain tension	Adjust chain length.
	Chain noise	Lubricate chain and/or replace rollers.
All Pillow Block Bearings	Where possible, inspect grease seals for integrity and leakage. Inspect shaft and bearing fit for looseness.	Make sure there are no people inside the Cartveyor®. Reset the system.
Main Drive	Inspect motor housing for discoloration.	Replace motor assembly.
	Brake functionality – the chain should not move when under load with the control power off.	Replace brake assembly.
	Inspect the gear unit for leakage, unusual noise, oil level and drive shaft condition.	Replace/repair/refill reducer as needed. See manufacturers maintenance schedule and lubrication information.
	Inspect the Infeed Jam Limit Switch position and functionality on Down configured Cartveyors® only.	Adjust as needed.
Chain Take-up	Inspect the limit switch position and functionality.	Adjust as needed.
	Inspect the slide travel position.	Adjust as needed.
Infeed and Discharge Areas	Inspect the gate doors for freedom of movement, speed and controlled return to the closed and locking position.	Replace springs, adjust shock absorbers and/or lubricate bearings.
	Make sure the gate doors are properly locking and unlocking.	Adjust locking collar position, re-align doors,
	Make sure gate doors are properly aligned.	Adjust turnbuckles.
	Inspect the photo eye sensor alignment/functionality.	Adjust, clean, and/or replace photo eye.
	Gently clean the photo eye sensor lenses and reflectors.	See Care & Cleaning.
	Inspect the gate door switch position/functionality.	Adjust as needed.
Cart Block Safety	Make sure the vertical stop arm is up and locking. Make sure the horizontal actuating arm has freedom of movement on Down configured units only.	Replace and/or repair as needed.



WARNING



- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional country, national, state, or local requirements.



- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any maintenance task on a Cartveyor®.



- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.
- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor.



- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor.

NOTE

Apply 2" (52mm) wide grip tape to the floor covers to help prevent slips and falls on the incline. Grip tape is available for purchase through PFlow Industries, Inc. Customer Support Department.

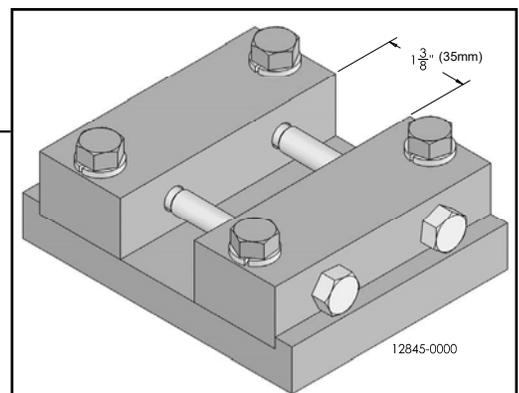
Purpose

After some time in service, the Cartveyor chain will stretch. It is necessary to remove links from the chain to maintain the proper chain tension. Evidence that the chain has stretched enough to require link removal include the following:

- Chain Take-Up Mid Travel Warning – This HMI (Human Machine Interface) warning provides an early indication that chain stretch is approaching the maximum allowable amount before the chain must be shortened.
- Chain Take-Up Maximum Travel Fault – This HMI fault indicates that the chain has stretched the maximum allowable amount. The Cartveyor chain must be shortened by removing a link.
- Increasing nuisance faults at infeed area.

Tools Required

- Chain Break Tool – See Figure 1 PFlow part number 12845-0000
- Pliers



Chain Break Tool
Figure 1

Accessing the Chains

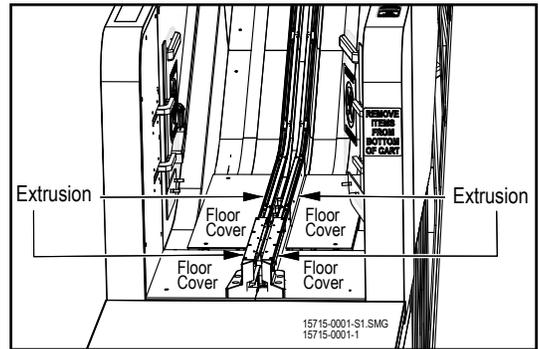
1. Remove all shopping carts from the Cartveyor®.
2. Place caution floor signs at each end of the Cartveyor indicating the equipment is being serviced. See Figure 2.
3. Lockout the Cartveyor **motor drive** in accordance with the facility lockout/tagout program.
4. Remove floor plate at the lower level of the Cartveyor to expose the extrusion hold down bolts. See Figure 3 and 4.
5. Remove the first two extrusions on the left and right sides to expose the chain.



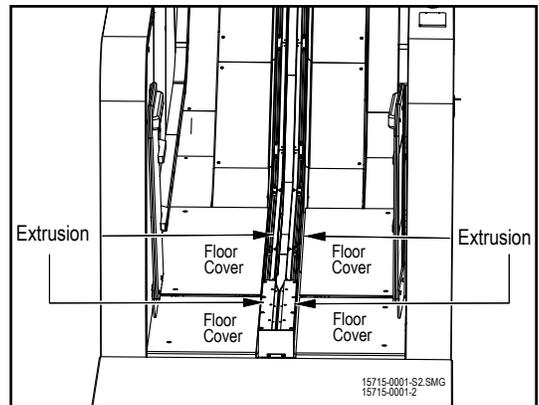
Caution Floor Signs
Figure 2

CAUTION

Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.



CV Lower Level Infeed Area
Figure 3



DCV Lower Level Infeed Area
Figure 4

Locate the Master Link

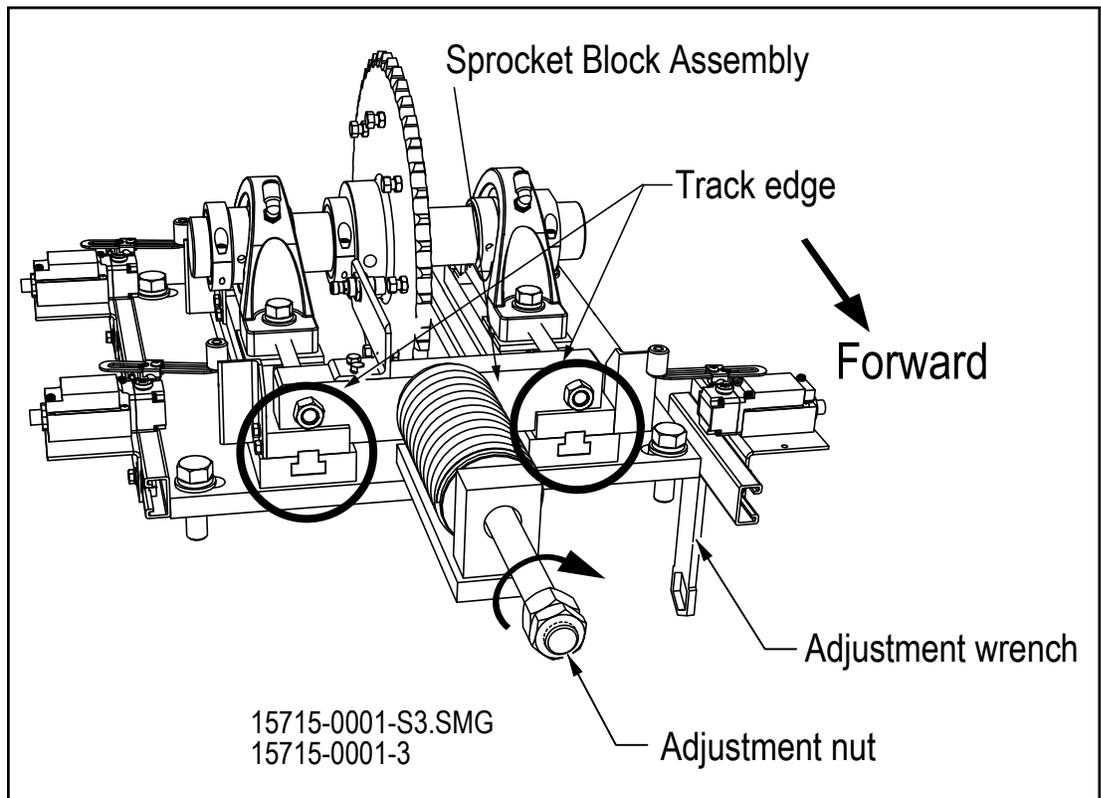
1. Use the HMI located at the infeed gate to enter the Manager Mode.
2. Use the HMI to jog the chain forward until a master link is positioned at the approximate center of the exposed chain.

New chains that have not been shortened have a section of 6 adjacent master links in addition to a master link every 10' (3,048 m). It is recommended to shorten the chain by removing a link from the 6 adjacent master links.

Master links are indicated by a grey colored lug. Older models of chain may use a white vertical line, an "M", or zinc plated chain links.

Cartveyor® chains shipped prior to approximately October 2014 do not have the 6 adjacent master links.

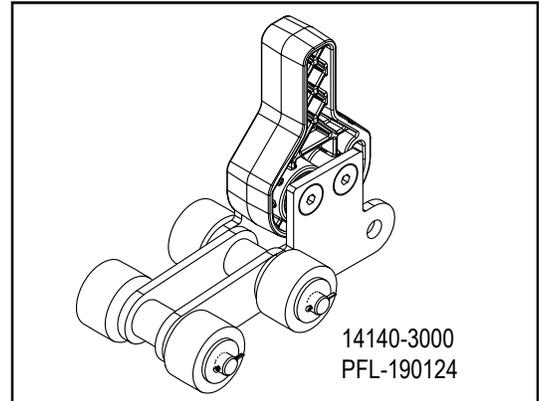
3. Lockout the Cartveyor in accordance with the facility lockout/tagout program.
4. Locate the adjustment wrench attached to the take-up assembly. See Figure 5.
5. Tighten the adjustment nut to compress the tensioner spring, pulling the sprocket block assembly forward to relieve the chain tension. Stop tightening the adjustment nut when the ends of the sprocket block assembly and the track edge are flush to each other.



Take-up Assembly
(PN# 12722-0001-01 shown)
Figure 5

Break the Chain

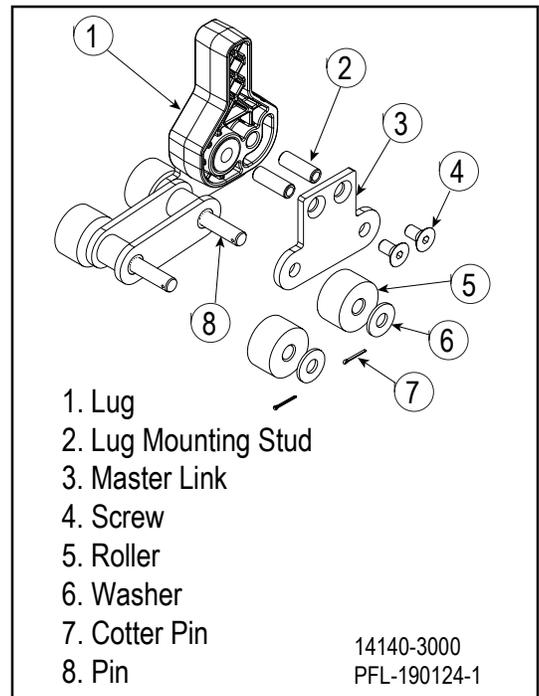
1. Remove the cotter pins with a pliers from the side of the master link. See Figure 6 and 7.
2. Slide the washers and rollers off of the pins.
3. Remove the shoulder screws and nuts or the flat head screws and internal studs and remove the lug.
4. Pry the master link side plate (without the elite metal stamped logo) off of the pins.
5. Slide the adjacent half link off of the pin to break the chain.



4" (102mm) Length of Chain and Lug Assembly
Figure 6

Remove the Chain Length

Repeat steps 1 – 5 to remove a 4" (102mm) length of chain and lug section.



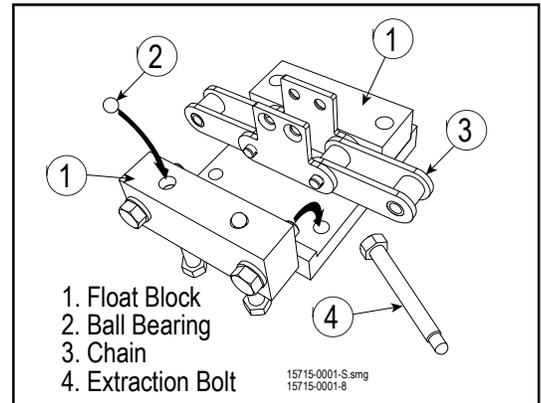
1. Lug
2. Lug Mounting Stud
3. Master Link
4. Screw
5. Roller
6. Washer
7. Cotter Pin
8. Pin

14140-3000
PFL-190124-1

Chain and Lug Assembly
Figure 7

Remove a Regular Chain Link

1. Remove the cotter pins with a pliers from the side of the chain.
2. Slide the washers and rollers off of the pins.
3. Remove the shoulder screws and nuts or the flat head screws and internal studs and remove the lug.
4. Remove one float block from the chain break tool.
5. Place the link to be removed into the chain break tool by sliding the pins into the holes on the attached float block. See Figure 8 [shown will ball bearing placement].

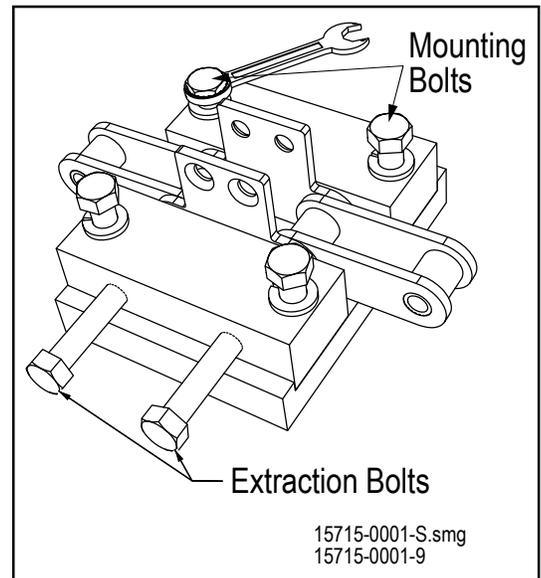


Chain Break Tool
Figure 8

NOTE

If the chain break tool has a rounded tip extraction bolt [PFlow PN# 15208-0000] skip to step 7.

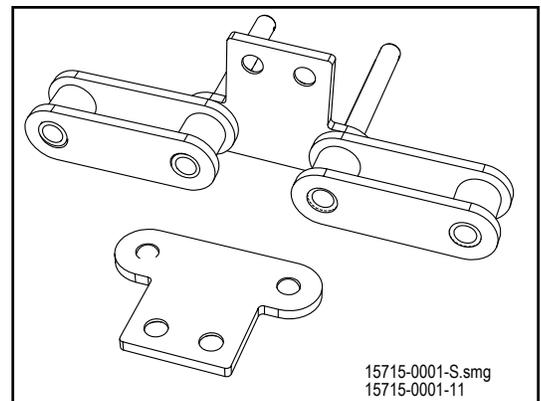
6. Thoroughly lubricate the extraction bolts with grease or **Bostik® Never Seez** lubricant.
7. Set the Ø5/16" ball bearings into the holes on the removed float block.
8. Place the float block on the chain break tool and slide forward to the exposed pins.
9. Re-attach the float block with the 3/8-16 x 1-1/2" mounting bolts. Tighten all 4 mounting bolts. See Figure 9.
10. Tighten the extraction bolts until the chain pin is clear of the outer side plate.
11. Pull or rotate the side plate to allow the adjacent half link to slide off the chain pin.
12. The chain link can now be removed and set aside. See Figure 10.



Tighten Mounting Bolts
Figure 9

NOTE

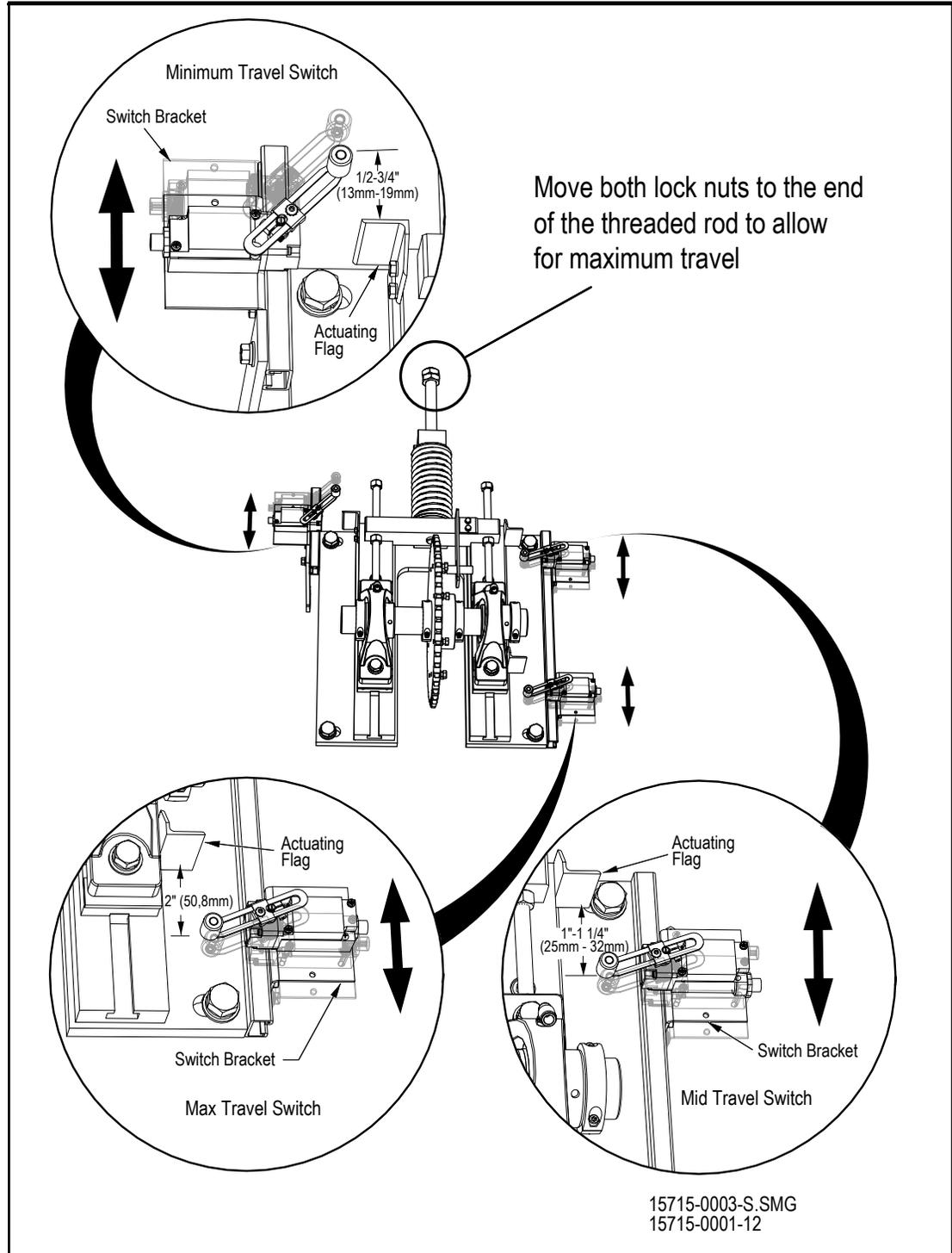
A maximum of 4" (102mm) length of chain link section should be removed each time the chain length is adjusted.



Chain Link Removed
Figure 10

**Reconnect
the Chain and
Adjust Tension**

1. Slide the half link on to the exposed pin of the master link. Reconnect the chain. Reassemble the side plate, lug, and rollers. Re-insert the cotter pins and bend the pins.
2. Loosen the adjusting and locking nuts to the end of the threaded rod, allowing the spring to expand to restore chain tension. See Figure 11.



Restore Chain Tension
Figure 11

Make Final Adjustments

 **CAUTION**



Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.

1. Power-up the Cartveyor®.
2. Use the HMI located at the infeed gate to move the chain forward 1' to 2' (305mm - 610mm) and then backward 1' to 2' (305mm - 610mm) to ensure proper tension.
3. Power down the Cartveyor and lockout the Cartveyor in accordance with the facility lockout/tagout program.
4. Readjust the chain tension limit switches to the following set points:
Minimum Travel Limit Switch 1/2" (13mm) to trip
Maximum Travel Limit Switch 2" (51mm) to trip
Mid-Travel Limit Switch 1" (25mm) to trip
* See service bulletin 15715-0003, "CV Chain Take-up Limit Switch Adjustment" for detailed adjustment procedures.
5. Power-up the Cartveyor.
6. Use the HMI located at the infeed gate to move the chain forward 1' to 2' (305mm - 610mm) and then backward 1' to 2' (305mm - 610mm). Confirm the trip point distances.
7. Power down the Cartveyor and lockout the Cartveyor in accordance with the facility lockout/tagout program.
8. Reassemble the extrusions and floor plates to their original positions.
9. Clean the Cartveyor area.
10. Record the date and amount of chain removed in the blue "Cartveyor Maintenance Book" provided by PFlow Industries, Inc.
11. Remove lockout/tagout materials.
12. Power-up the Cartveyor.
13. Set the HMI located at the infeed gate to the auto screen.

Procedure is complete.

NOTE

Chain life is determined by the cumulative amount of stretch the chain undergoes while in use. Full replacement of the chain is suggested when the chain has stretched 3% of its original length.



WARNING



- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional country, national, state, or local requirements.
- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any maintenance task on a Cartveyor®.
- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.
- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor.
- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor.

NOTE

Apply 2" (52mm) wide grip tape to the floor covers to help prevent slips and falls on the incline. Grip tape is available for purchase through PFlow Industries, Inc. Customer Support Department.

Inspections

Chain life is determined by the cumulative amount of stretch the chain undergoes while in use. Replacement of the chain is suggested when the chain has stretched 3% of its original length.

Inspect the following for excessive wear or damage prior to installing a new chain:

- Infeed assembly
 - Extrusions, track pan, lock lever, and locking key
- Discharge Assembly
 - Extrusions, track pan, lock lever, and locking key
- Lower and upper curved extrusion
- Cartblocker assembly (down unit only)
- Infeed and discharge plastic "hold-downs" inside the track

Prepare the Site

A minimum of 3 people is recommended to accomplish this task.

1. Remove all shopping carts from the Cartveyor.
2. Place caution floor signs at each end of the Cartveyor indicating the equipment is being serviced. See Figure 1.
3. Lockout the Cartveyor in accordance with the facility lockout/tagout program.



Caution Floor Signs
Figure 1

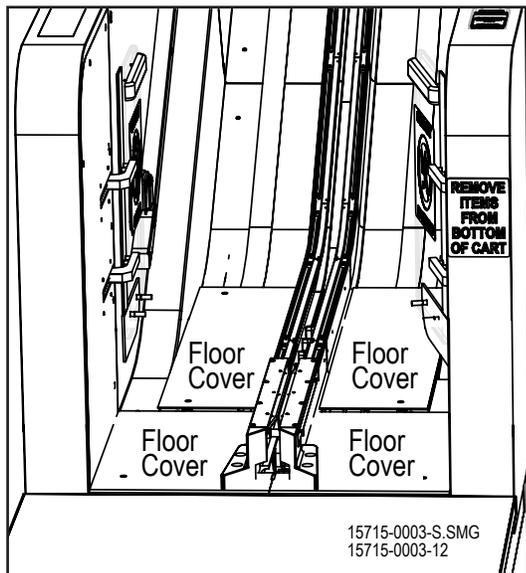
Access the Chains

1. Using the HMI (touchscreen) at the infeed gate, enter Manager Mode (see the Owner’s Manual, Section 7 - Precautions and Restrictions).
2. Access the Cartveyor® chains for maintenance at the lower level landing on both the Up and Down Cartveyor.
3. Remove the first two (2) floor plate covers on the left and right sides to expose the extrusion hold down bolts on both ends of the Cartveyor. See Figure 2 and 3.
4. Remove the first left and right side extrusions to expose the chain and infeed track pan. See Figure 4.

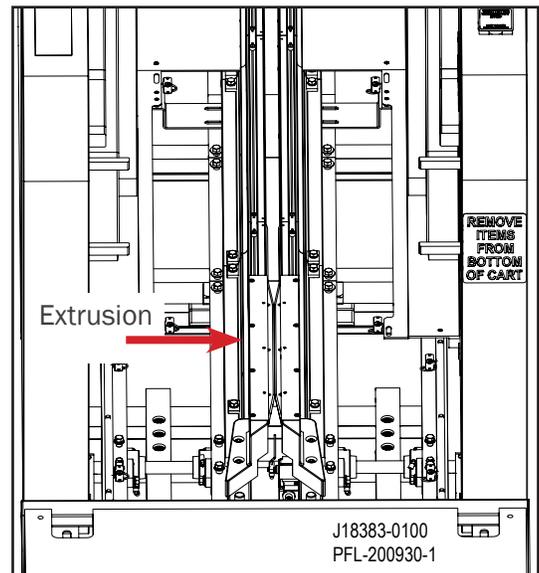


CAUTION

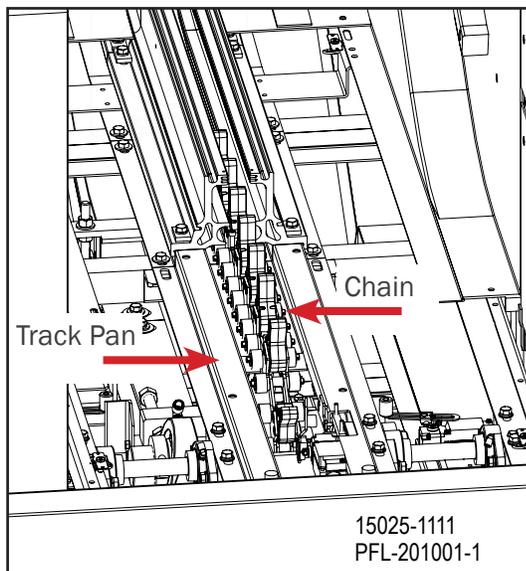
Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.



Lower Level Infeed Area
Figure 2



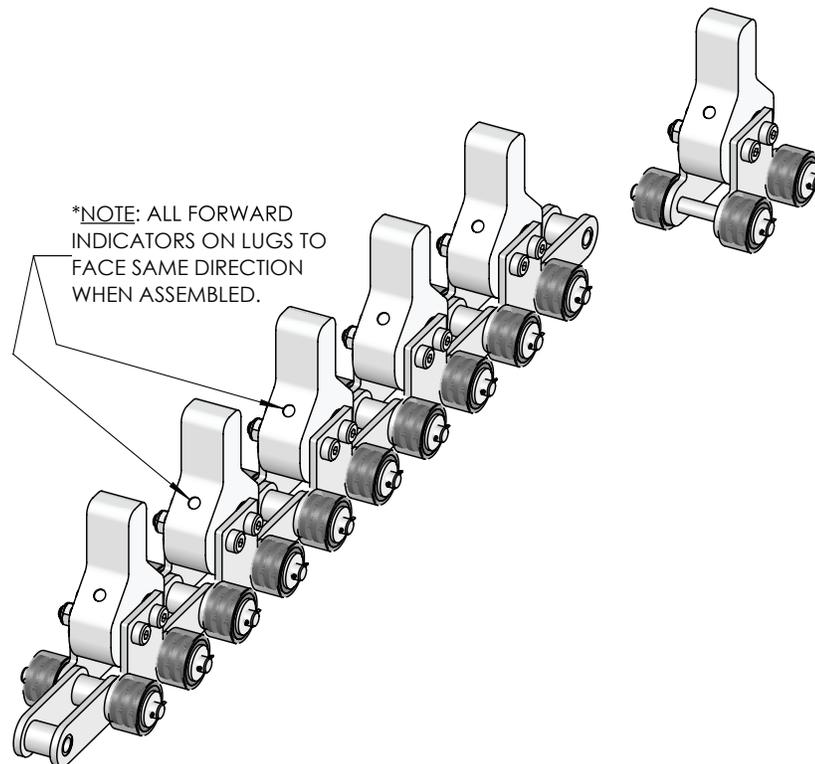
Floor Plates Removed
Figure 3



Track Pan and Chain Exposed
Figure 4

Access a
Master Link

1. Using the HMI, jog the chain forward until a master link is positioned at the approximate center of the exposed chain. New chains that have not been shortened will have a section of six (6) adjacent master links (P/N 16927-2111), also known as a “whip” in addition to a master link every 10' (3,048 m). It is recommended to shorten the chain by removing a link from the six (6) adjacent master links. See Figure 5.
2. Master links are indicated by a grey colored lug. Older models of chain may use a black lug with a white vertical line, an “M”, or zinc plated chain links.



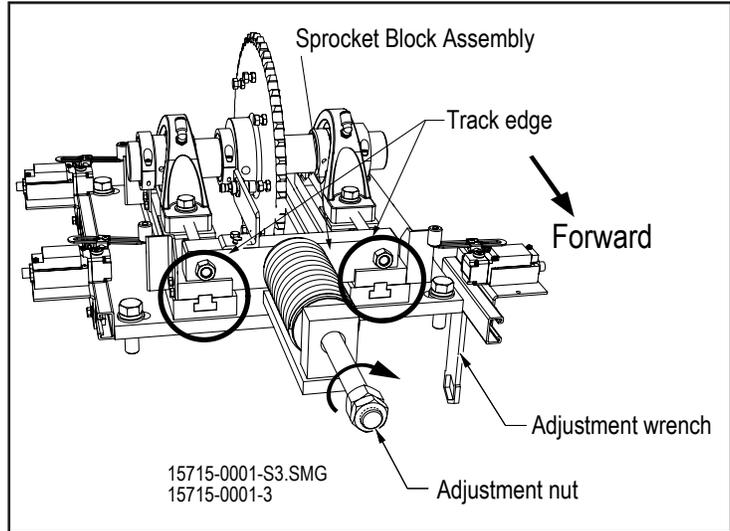
Whip Chain
Figure 5



3. Power down the Cartveyor[®] and lockout the Cartveyor in accordance with the facility lockout/tagout program.

Remove the Chain

1. Locate the adjustment wrench provided for chain adjustment. See Figure 5.
2. Relieve the chain tension by tightening the adjustment nut to compress the tensioner spring and pull the sprocket block forward. Stop when the ends of the sprocket block and the track are flush. See Figure 5.
3. Locate the master link, and disassemble the rollers and lug from the master link.
4. Disassemble the rollers by removing the cotter pins, and then sliding the roller and washer off of the pin. See Figure 6.

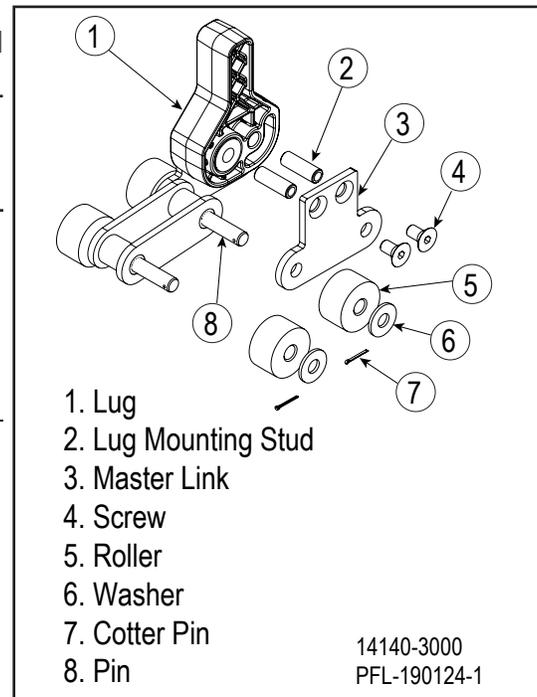


*Adjust the Chain Tension
Figure 5*

NOTE *The lug may be attached with either shoulder screws and nuts or flat head screws and internal studs.*

5. Slide the master link side plate off of the pins. See Figure 6.
6. Break the chain by sliding the adjacent half link off of the pin, exposing the link to be removed.

NOTE *Master link assemblies differ depending on the manufacturing date.
See Figure 6 for prior to May 2020
See Figure 7 for after May 2020*



*Master Link Assembly Prior to May 2020
Figure 6*

Attach New Chain

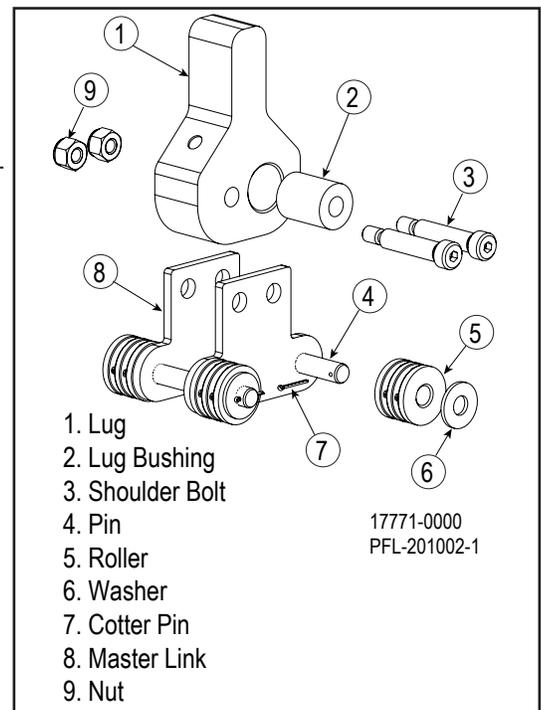
1. Position the new chain on the floor in front of the lower end of the Cartveyor®. The chain is not bi-directional. The leading edge of the lugs is identified with indentations to mark the direction of travel.
2. Center the chain to the machine on the floor with lugs oriented up and rollers on the floor. Feed the new chain over the top of the take-up sprocket and remove the old chain from the bottom of the take-up sprocket. (See Bulletin 15715-0028, "CV Chain Alignment" for detailed adjustment procedures.)

NOTE Assemble the entire length of chain prior to feeding it into the machine as floor space allows.

3. Using the chain break procedure in reverse order, attach the leading end of the replacement chain to the tailing end of the old chain.
4. Apply power to the Cartveyor.
5. Use the HMI to slowly feed the new chain into the machine while feeding the old chain out into the box that the new chain was shipped in. Make sure that the chain alignment to the sprocket is as centered as possible.
6. When the new chain has been fed completely through the Cartveyor, power down the Cartveyor and lockout the Cartveyor in accordance with the facility lockout/tagout program.
7. Disassemble the master link connecting the old and new chains, and then re-assemble the master link to connect the ends of the new chain together.



NOTE Master link assemblies differ depending on the manufacturing date.
See Figure 6 for prior to May 2020
See Figure 7 for after May 2020



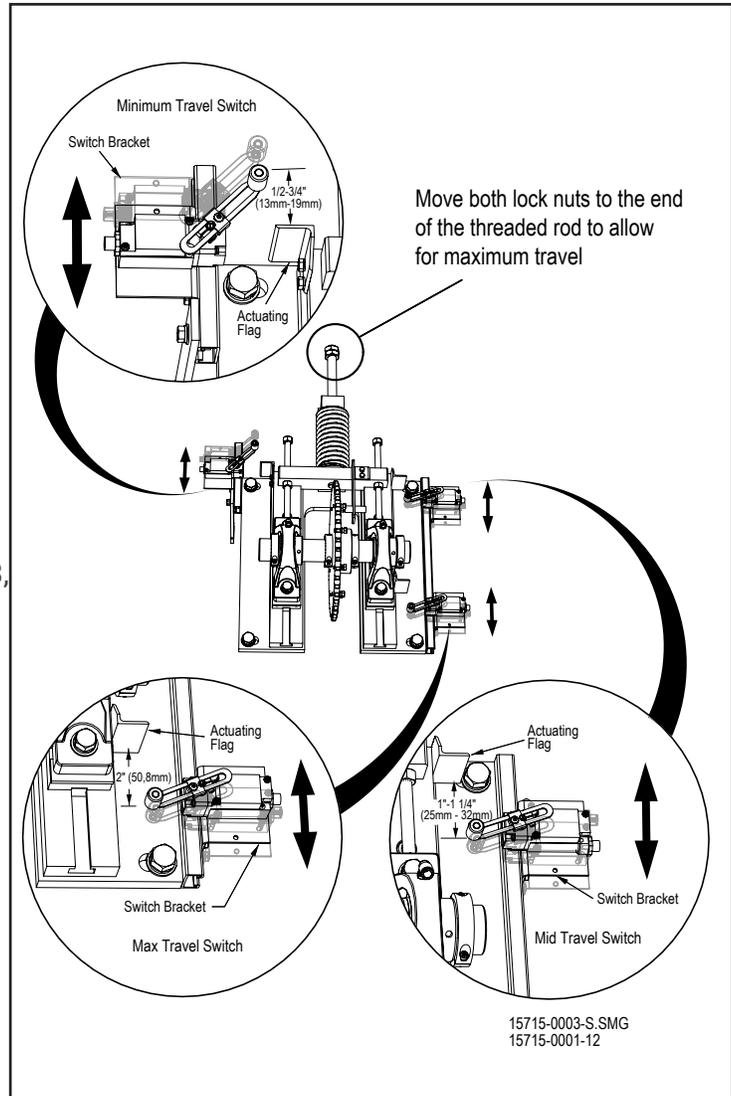
Master Link Assembly After May 2020
Figure 7

Adjust Chain Tension



1. Restore chain tension by loosening the adjusting and locking nuts to the end of the threaded rod, allowing the spring to expand. See Figure 8.
2. Power-up the Cartveyor®.
3. Use the HMI located at the infeed gate to jog the chain forward and backward at least 12" (305mm) to ensure proper tension.
4. Power down and lockout the Cartveyor in accordance with the facility lockout/tagout program.
5. Readjust the chain tension limit switches to the following set points (See Bulletin 15715-0003, "CV Chain Take-up Limit Switch Adjustment" for detailed adjustment procedures):

Switch	Distance
Minimum Travel Limit Switch	1/2" (13mm) to trip
Maximum Travel Limit Switch	2" (51mm) to trip
Mid-Travel Limit Switch	1" (25mm) to trip



*Adjust the Chain Tension
Figure 8*

6. Power-up the Cartveyor.

 **CAUTION**



Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.

Verify
Operation



1. Using the HMI at the infeed gate, move the chain forward and back at least 12" (305mm) again and then verify the trip point distances.
 2. Verify proper chain alignment. (See Bulletin 15715-0028, "CV Chain Alignment" for detailed adjustment procedures.)
 3. Power down the Cartveyor[®] and lockout the machine using the facility lockout/tagout procedures.
 4. Reassemble the extrusions and floor plates in their original positions.
 5. Power-up the Cartveyor.
 6. Set the HMI display located at the infeed gate to Associate Mode.
 7. Clean up the Cartveyor area.
 8. Use the HMI to move the chain forward to ensure that the switch does not trip during normal chain start-up. Power down and readjust if necessary.
 9. Set the HMI display located at the infeed gate to Auto Mode.
 10. Remove lockout/tagout materials.
-

Procedure is complete.



WARNING



NOTE

- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional country, national, state, or local requirements.
- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any maintenance task on a Cartveyor®.
- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.
- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor.
- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor.

Apply 2" (52mm) wide grip tape to the floor covers to help prevent slips and falls on the incline. Grip tape is available for purchase through PFlow Industries, Inc. Customer Support Department.

Inspections

Chain life is determined by the cumulative amount of stretch the chain undergoes while in use. Replacement of the chain is suggested when the chain has stretched 3% of its original length.

Inspect the following for excessive wear or damage aligning the chains:

- Infeed assembly
 - Extrusions, track pan, lock lever, and locking key
- Discharge Assembly
 - Extrusions, track pan, lock lever, and locking key
- Lower and upper curved extrusion
- Cartblocker assembly (down unit only)
- Infeed and discharge plastic "hold-downs" inside the track

Prepare the Site

A minimum of 1 person is recommended to accomplish this task.

1. Remove all shopping carts from the Cartveyor.
2. Place caution floor signs at each end of the Cartveyor indicating the equipment is being serviced. See Figure 1.
3. Lockout the Cartveyor in accordance with the facility's lockout/tagout program.



Caution Floor Signs
 Figure 1

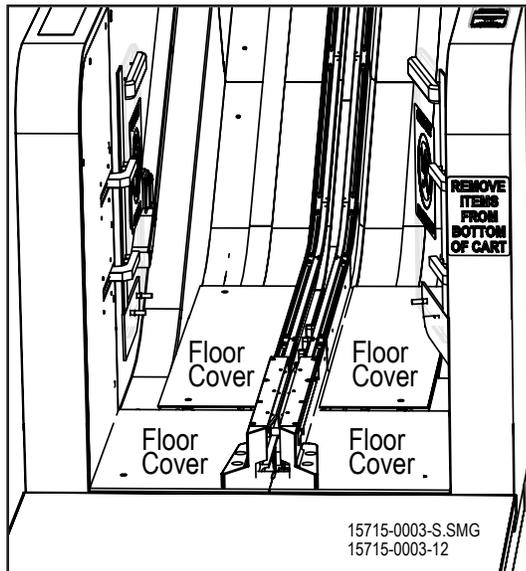
Access the Chain Sprockets

1. Using the HMI (touchscreen) at the infeed gate, enter Manager Mode (see the Owner’s Manual, Section 7 - Precautions and Restrictions).
2. Access the Cartveyor® sprockets and chain for maintenance at the lower level and upper level landings on both the Up and Down Cartveyor.
3. Remove the first two (2) floor plate covers on the left and right sides to expose the extrusion hold down bolts on both ends of the Cartveyor. See Figure 2 and 3.
4. Remove the first left and right side extrusions to expose the chain and infeed track pan. See Figure 4.

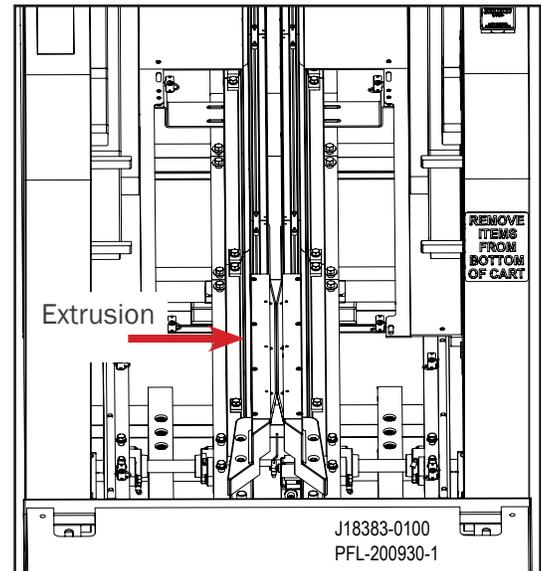


CAUTION

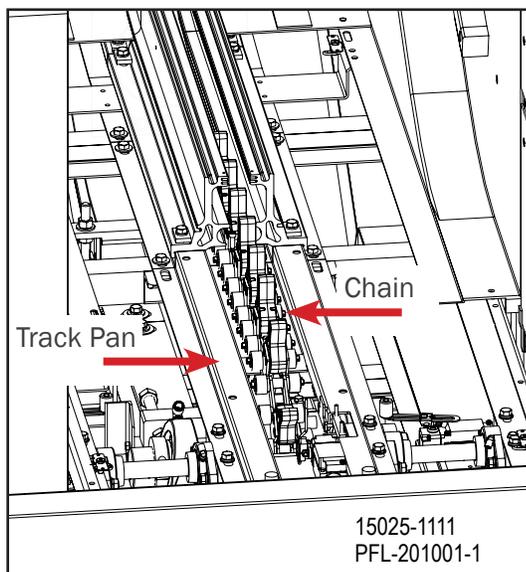
Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.



Lower Level Infeed Area
Figure 2



Floor Plates Removed
Figure 3

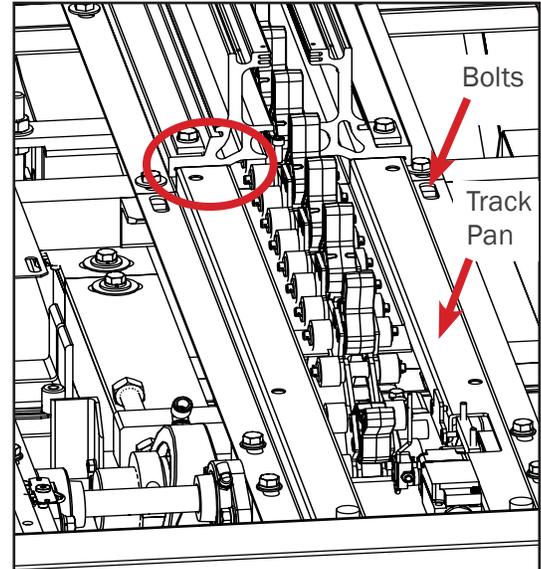


Track Pan and Chain Exposed
Figure 4

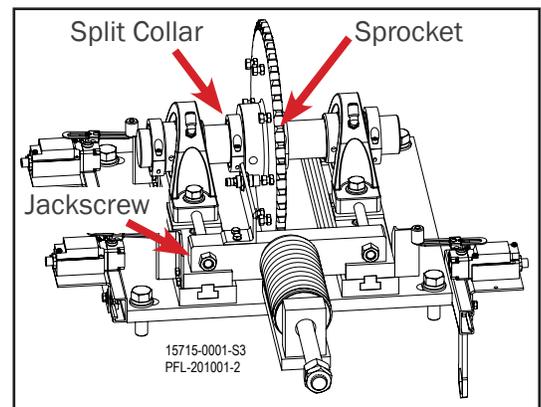
Align the Chains

The best alignment condition is achieved when the track pans are aligned with the next track pan.

1. Review alignment of infeed track pan and make sure it is in line with the previous track pan. Loosen bolts and tap into position. Tighten bolts. See Figure 5.
2. Review alignment of infeed sprocket to make sure the sprocket does not interfere with the track pan. To adjust the sprocket, loosen the split collar clamps and set screw. See Figure 6.
3. Tap the sprocket with a mallet close to the shaft to move the sprocket axially. When repositioned, reclamp and evenly tighten the screws on each side of the collars.
4. Next check that the infeed sprocket is aligned parallel with the track pan. If needed, slightly break the tension of the screws on the split collar and the sprocket. Turn the pillow block jackscrew adjusters on the drive base to make angular adjustments. See Figure 6.
5. Fully tighten the screws on the split collar and the sprocket.
6. Make sure that shims are aligned properly under the pillow block bearings.
7. Repeat steps 1-6 on the discharge end of the machine.
8. Power-up the Cartveyor.
9. Run/jog chain to view the alignment between the sides of the lugs and the aluminum track extrusions. Make sure there is no interference.



Track Pan Alignment
Figure 5



Sprocket Position
Figure 6



10. Power down the Cartveyor and lockout the machine using the facility's lockout/tagout procedures. Reassemble the extrusions and floor plates in their original positions.
11. Power-up the Cartveyor.
12. Set the HMI display located at the infeed gate to Associate Mode.
13. Clean up the Cartveyor area.
14. Use the HMI to move the chain forward to ensure that the switch does not trip during normal chain start-up. Power down and readjust if necessary.
15. Set the HMI display located at the infeed gate to Auto Mode.
16. Remove lockout/tagout materials.

Procedure is complete.



WARNING



- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional national, state, or local requirements.



- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any maintenance task on a Cartveyor®.



- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.

- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor.



- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor.

Tools Required

- 7/16" wrench

Access the Limit Switches

1. Remove all shopping carts from the Cartveyor.
2. Place caution floor signs at each end of the Cartveyor indicating the equipment is being serviced. See Figure 1.
3. Lockout the Cartveyor in accordance with the facility lockout/tagout program.



Caution Floor Signs
Figure 1

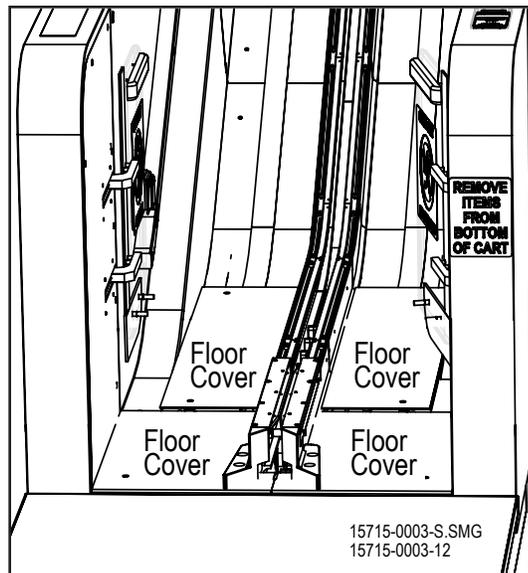
Access the Limit Switches (continued)

4. Remove two (2) floor plate covers at the lower level of the Cartveyor® on the left-hand side of the chain take-up assembly to access the minimum travel limit switch. See Figures 2 and 3.
5. Remove two (2) floor plate covers at the lower level of the Cartveyor on the right-hand side of the chain take-up assembly to access the mid-travel and maximum travel limit switches.

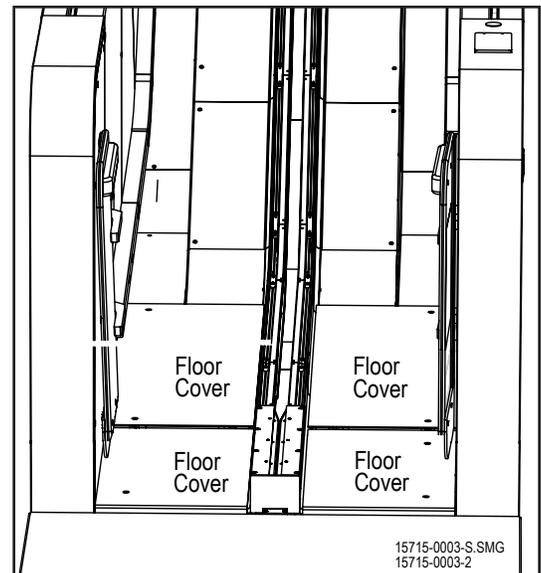
CAUTION



Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.



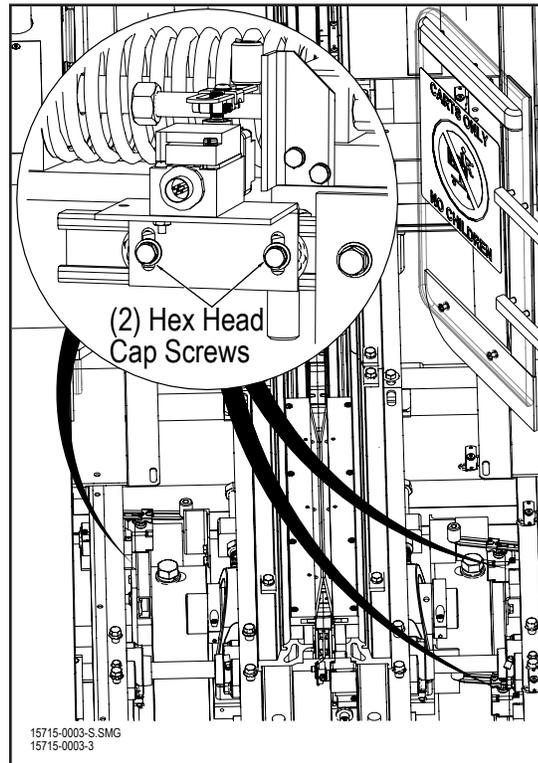
CV Lower Level Infeed Area
Figure 2



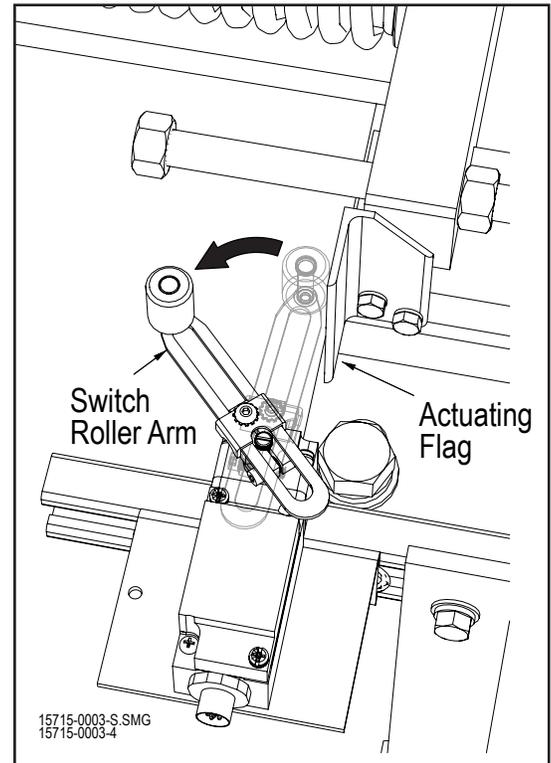
DCV Lower Level Infeed Area
Figure 3

Adjust the Limit Switch

1. Loosen two (2) hex head cap screws on the limit switch mounting bracket with a 7/16" wrench. See Figure 4.
2. Rotate limit switch arm away from the actuating flag until the switch actuation is heard. Hold the limit switch arm in position. See Figure 5.



Hex Head Cap Screw Locations
Figure 4



Rotate Limit Switch Roller Arm
Figure 5

Adjust the
Limit Switch
(continued)

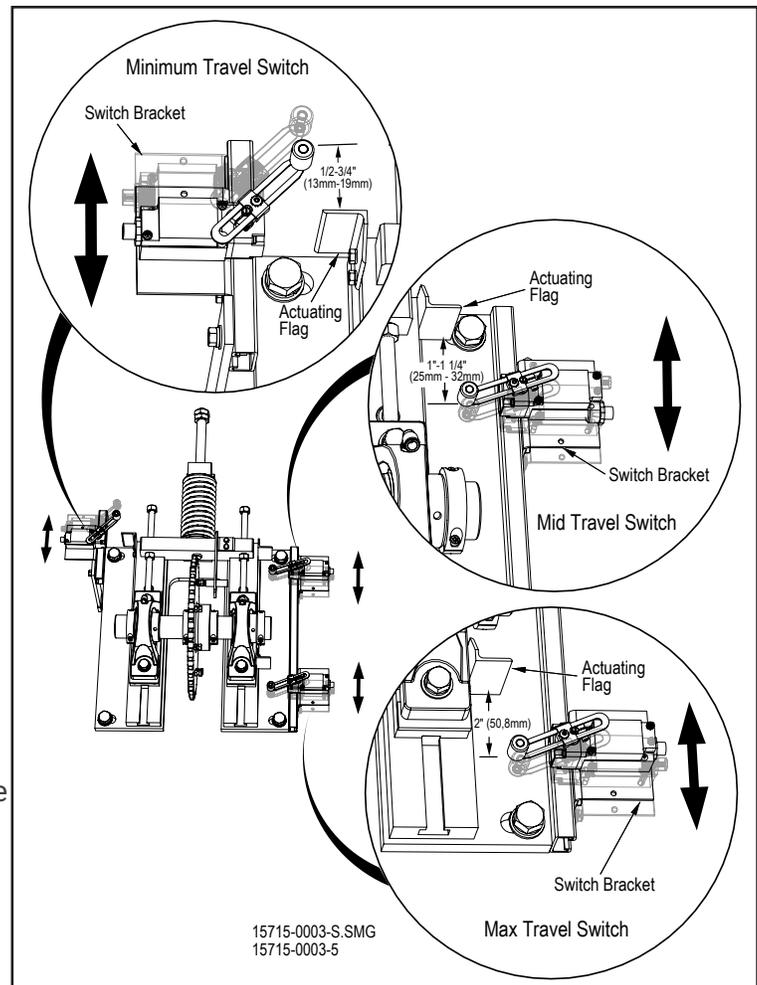
3. While maintaining the limit switch roller arm position, slide the limit switch bracket into position. The distances between the roller and actuating flag for each type of limit switch is shown in Figure 6.
4. Re-tighten the two (2) hex head cap screws using a 7/16" wrench.
5. Verify the roller to flag distance to ensure the distance was maintained.
6. Repeat steps 1-4 for additional limit switches as required.

CAUTION



Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury.

7. Power-up the Cartveyor®.
8. Use the HMI located at the infeed gate to jog the chain forward and backward to observe the switch function and ensure that the switch does not trip during normal chain start-up. Power down and re-adjust if necessary.
9. Power down the Cartveyor and lockout the Cartveyor in accordance with the facility lockout/tagout program.
10. Reassemble the extrusions and floor plates to their original positions.
11. Clean the Cartveyor area.
12. Remove lockout/tagout materials.
13. Power-up the Cartveyor.
14. Set the HMI located at the infeed gate to Auto Mode.
15. Use the HMI to move the chain forward to ensure that the switch does not trip during normal chain start-up. Power down and re-adjust if necessary.



Limit Switch Roller Arm Positions
Figure 6

Procedure is complete.

WARNING



- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional national, state, or local requirements.



- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any maintenance task on a Cartveyor®.



- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.

- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor.



- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor.

Tools Required

- 5/32" hex key
- 3/16" hex key

Access the Infeed Gate Door Switch

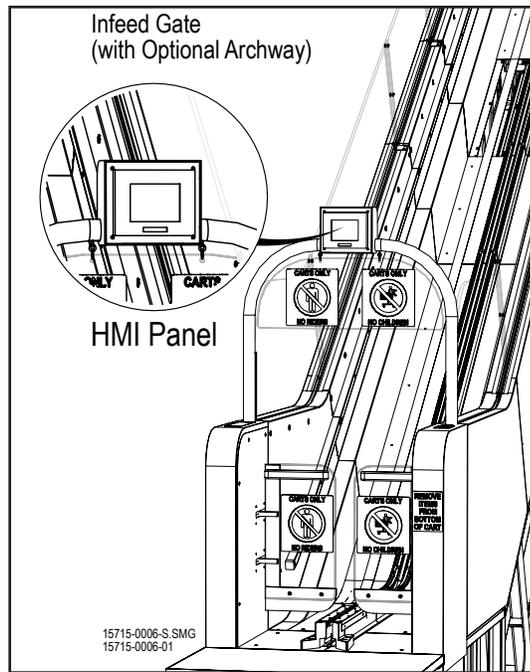
1. Remove all shopping carts from the Cartveyor.
2. Place caution floor signs at each end of the Cartveyor indicating the equipment is being serviced. See Figure 1.
3. Lockout the Cartveyor **motor drive** in accordance with the facility lockout/tagout program.



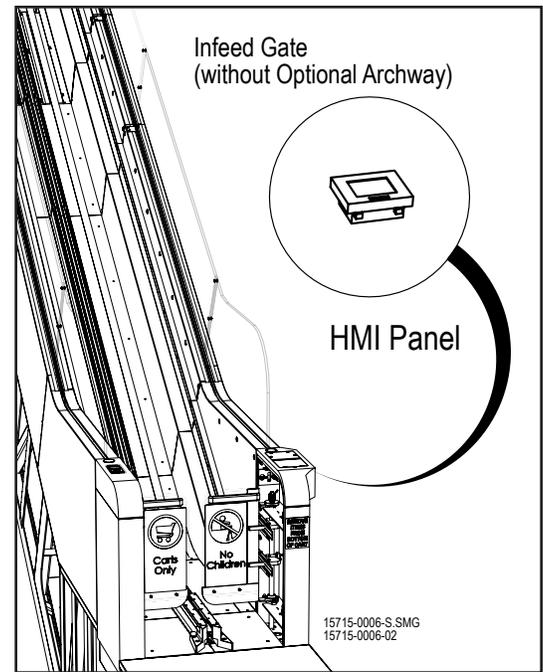
Caution Floor Signs
Figure 1

Access the Infeed Gate Door Switch (continued)

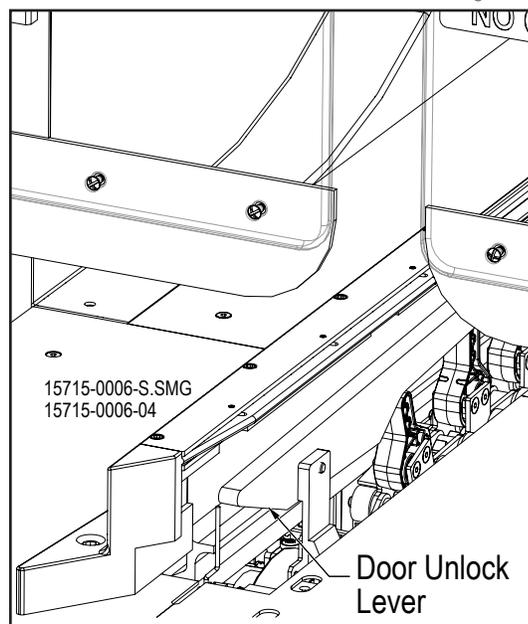
4. Locate the HMI (Human Machine Interface) panel at the infeed end of the Cartveyor® and access Manager Mode. See Figure 2 or Figure 3.
5. Lift the unlock lever located inside the infeed guides in the center of the track to unlock the gate doors manually. See Figure 4.
6. Open the gate doors and loosen the appropriate balustrade cover: Up units = right-hand, Down units = left-hand. The cover is held in place by 3/4" fasteners. Unlock the fasteners with a 5/32" hex key. See Figure 5.



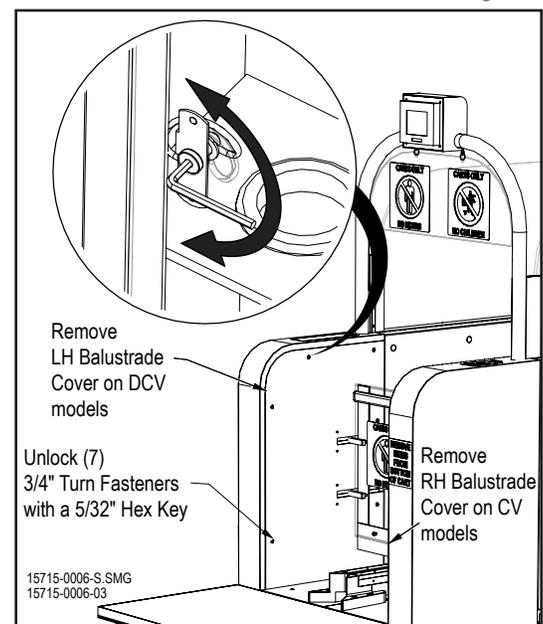
HMI Location with Optional Archway
Figure 2



HMI Location without Optional Archway
Figure 3



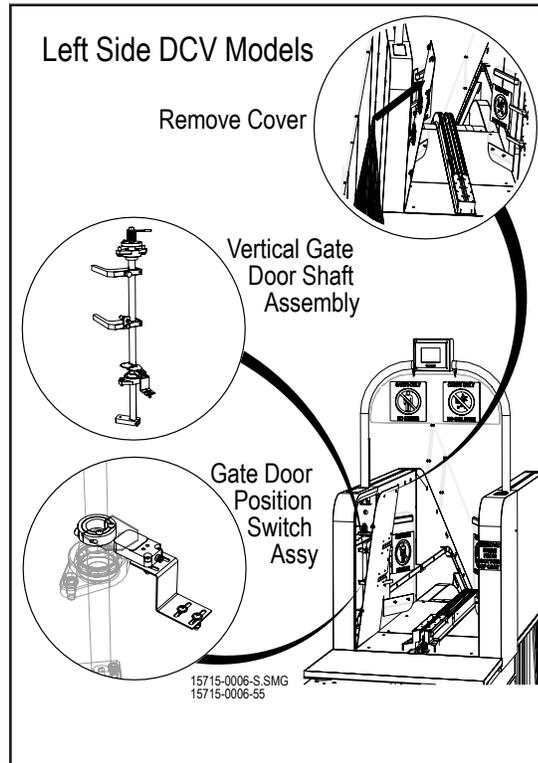
Lift Door Unlock Lever
Figure 4



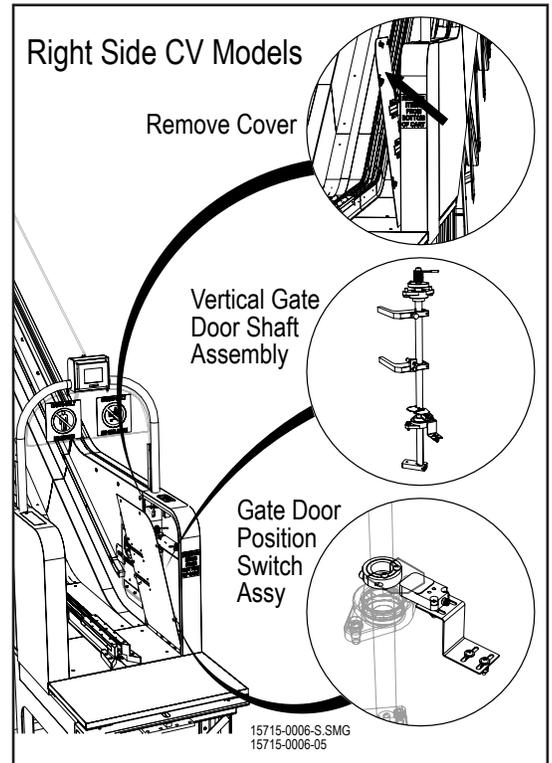
Remove Balustrade
Figure 5

Access the
Infeed Gate
Door Switch
(continued)

7. Lift the balustrade cover up, out, and away from the gate door.
8. The vertical gate door shaft assembly and gate door position switch assembly is exposed. See Figure 6 and 7.



*Down Gate Door Position Switch Location
Figure 6*

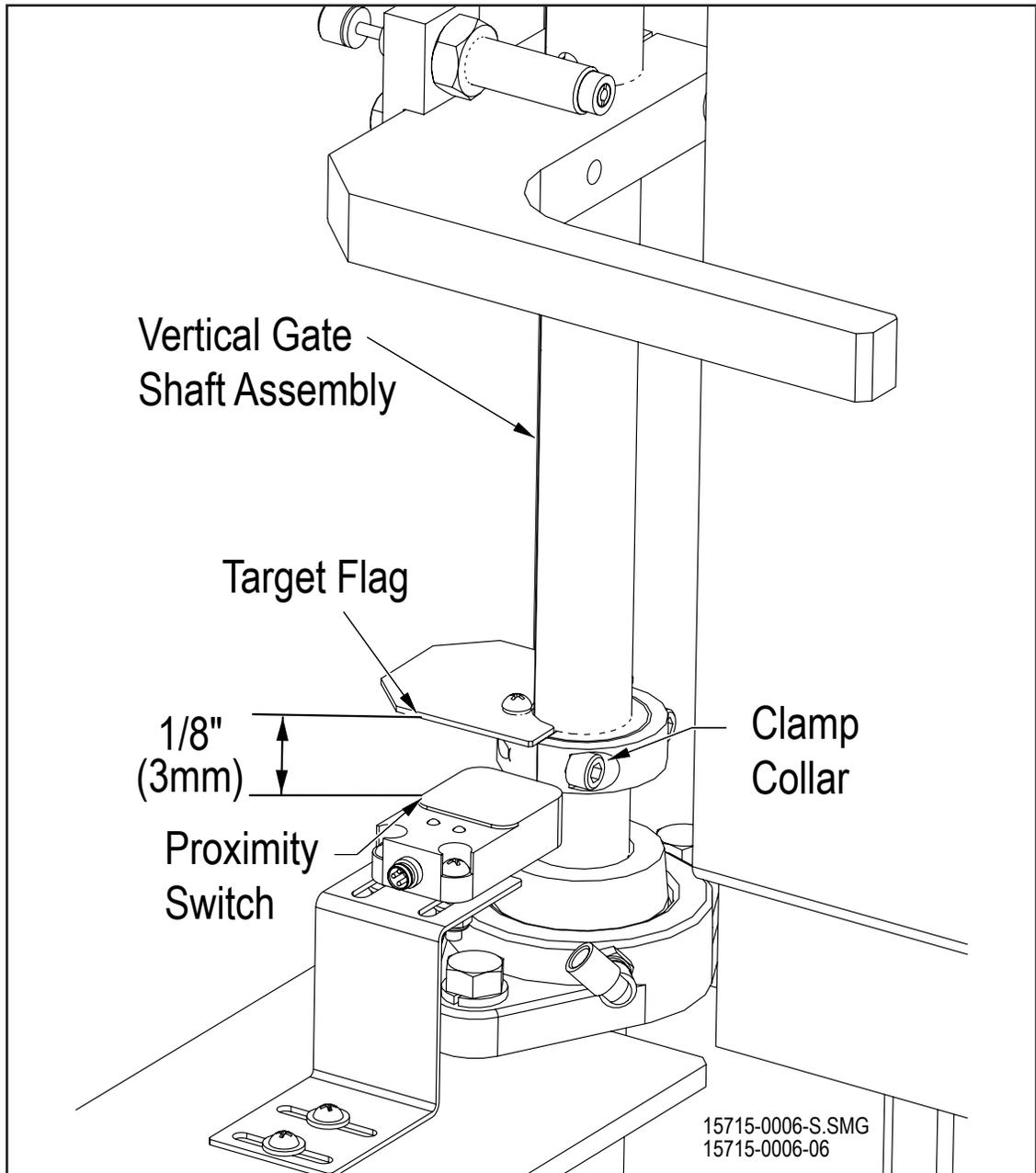


*Up Gate Door Position Switch Location
Figure 7*

Adjust the
Gate Door
Switch

The gate door position switch assembly consists of a proximity switch and a target flag. Although both of these components are adjustable, only the target flag needs to be adjusted for this procedure. The target flag is mounted to the gate door shaft with a clamp collar. See Figure 8.

1. Loosen the clamp collar with a 3/16" hex key.
2. Slide the target flag up or down to maintain a separation distance of 1/8" (3mm) between the flag and the proximity switch. See Figure 8.
3. Lightly snug the clamp collar with a 3/16" hex key just enough to keep the flag at the correct height but loose enough to be able to rotate the flag.

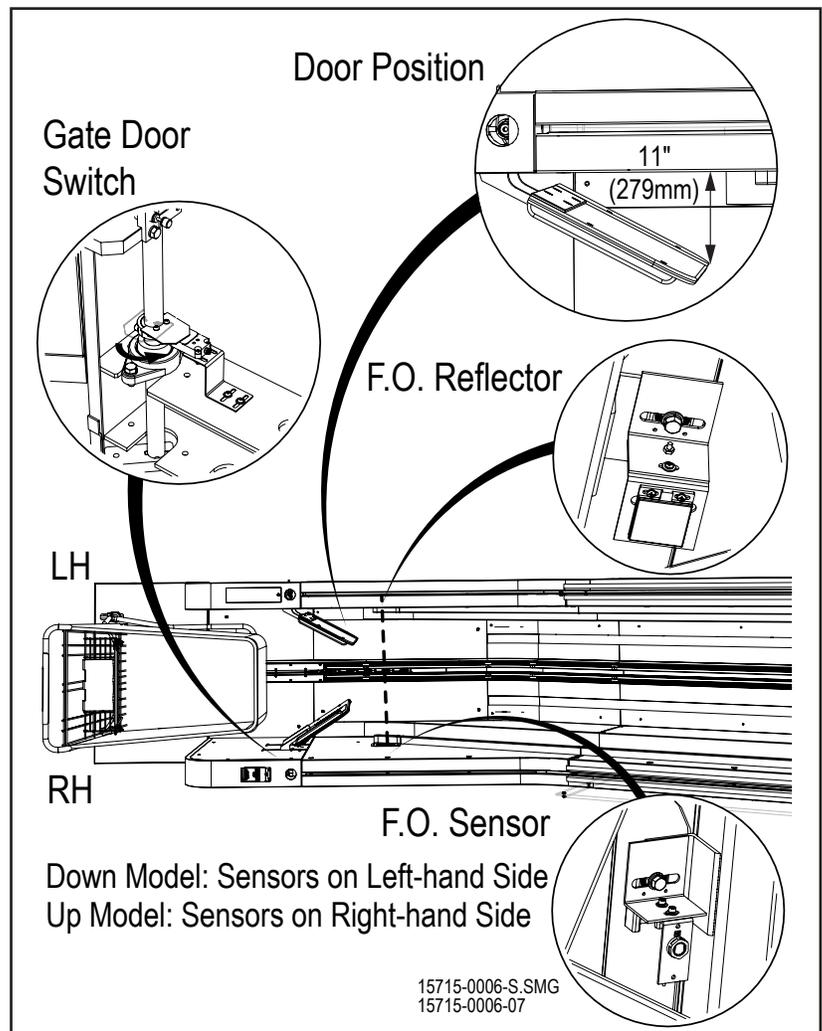


Target Flag Position
Figure 8

Adjust the
Gate Door
Switch
(continued)

4. Open the doors to the position shown in Figure 9.
5. On the door with the proximity switch, measure the distance between the apex of the door edge and the inside surface of the interior cladding. Position the door 11" (279mm) \pm 1/8" (3mm) away from the inside surface of the interior cladding.
6. Hold the door in this position and rotate the target flag until the proximity switch is activated.
7. With the door in this position, lock the target flag in place by tightening the target flag clamp collar with a 3/16" allen wrench.
8. Fully open the door and verify that the light on the proximity switch illuminates.
9. Slowly close the door until the light on the proximity switch extinguishes. This distance should be 11" (279mm) \pm 1/4" (6mm). Re-adjust the flag height if needed.
10. Hold the doors open and re-install the balustrade cover.
11. Set the HMI located at the infeed gate to Auto Mode.
12. Test and verify that the gate doors are operating properly.
13. Clean the Cartveyor[®] area.
14. Turn on the motor disconnect and remove lockout/tagout materials.

Procedure is complete.

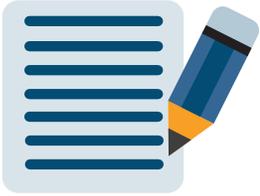


Limit Switch Roller Arm Positions
Figure 9

CV and DCV | Infeed Gate Door Switch Adjustment



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 **WARNING**



- Lockout/tagout equipment before performing any adjustments or maintenance. If the equipment is not locked out, it could start unexpectedly and cause injury or damage. **Make sure all personnel are aware of the potential for stored energy to be present even after the power has been locked out.** Refer to ANSI Z244.1 and OSHA 29 CFR 1910.147 for minimum requirements for a lockout/tagout system. There may be additional national, state, or local requirements.



- Wear appropriate Personal Protective Equipment (PPE) (e.g., gloves, safety glasses, safety harness while on incline) when performing any maintenance task on a Cartveyor®.



- Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.



- Pinch Hazard! Moving parts and pinch points are exposed and can cause personal injury.



- Only qualified personnel following proper lockout/tagout procedures are permitted to access the pit or enclosure beneath the Cartveyor.
- Entanglement hazard! Secure long hair, wear snug-fitting clothing, and avoid wearing jewelry while servicing the Cartveyor.

Purpose

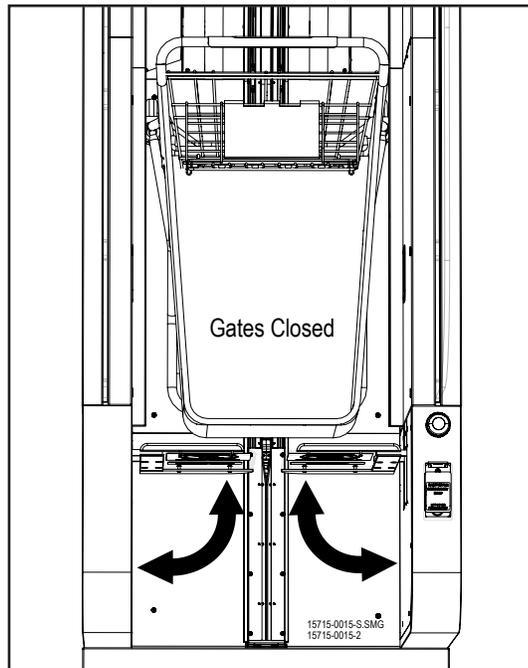
The Cartveyor is equipped with safety access doors at either end of the machine, infeed and discharge. The doors act as a gateway to allowing only specially designed carts into the machine. The doors also act as a deterrent to prevent customers from entering the machine. Each set of doors is mechanically interlocked. When unlocked, the doors open and close in unison. Furthermore, the doors only operate in the direction of travel and do not allow reverse cart travel unless manually unlocked and opened.

Tools Required

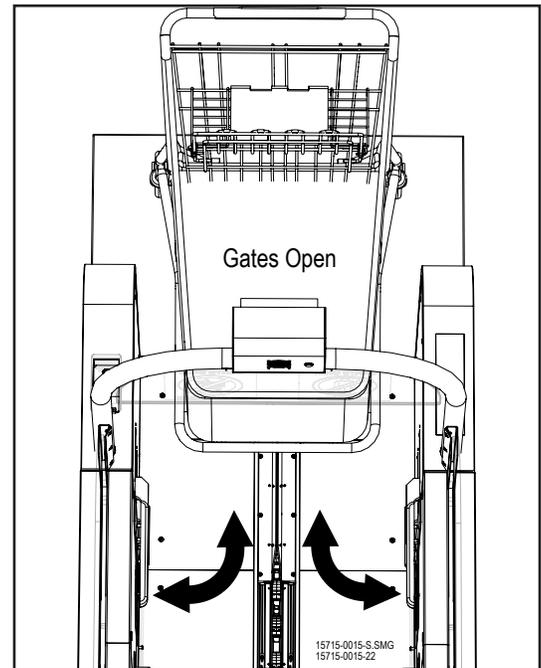
- Small screwdriver
- 5/32" hex key
- 1/4" open end wrench
- 5/8" open end wrench
- 3/4" open end wrench

How do the Gates Work?

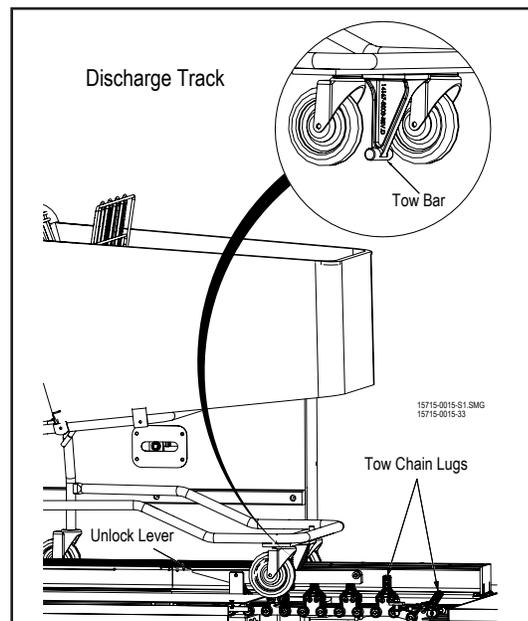
1. When properly aligned, both gate doors are parallel with each other positioned 90 degrees to the direction of travel, blocking the path of the cart. When fully opened, both doors travel in opposing arcs of 90 degrees and stop at a position parallel to the direction of shopping cart travel. See Figure 1 and 2.
2. The door interlock mechanism unlocks when an authorized shopping cart is inserted into the Cartveyor®. A tow bar on the bottom of the cart lifts the unlock lever located in the center of the track and unlocks the doors. The doors are pushed open by the shopping cart until the shopping cart is towed along the Cartveyor's center track by the tow chain lugs. See Figure 3 and Figure 4.



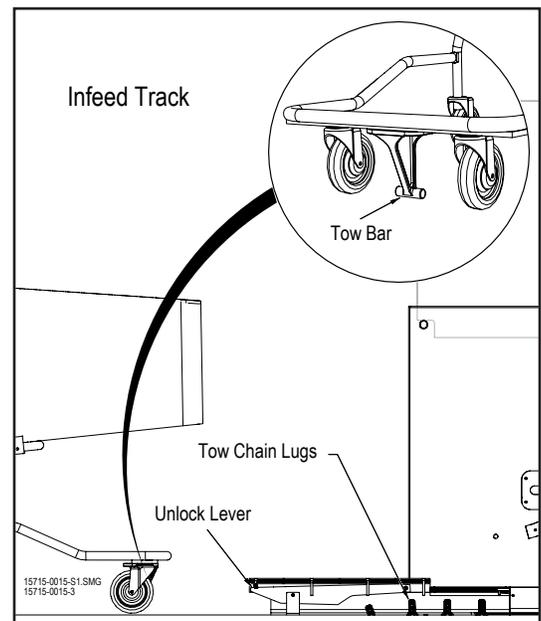
Gates Closed Figure 1



Gates Open Figure 2



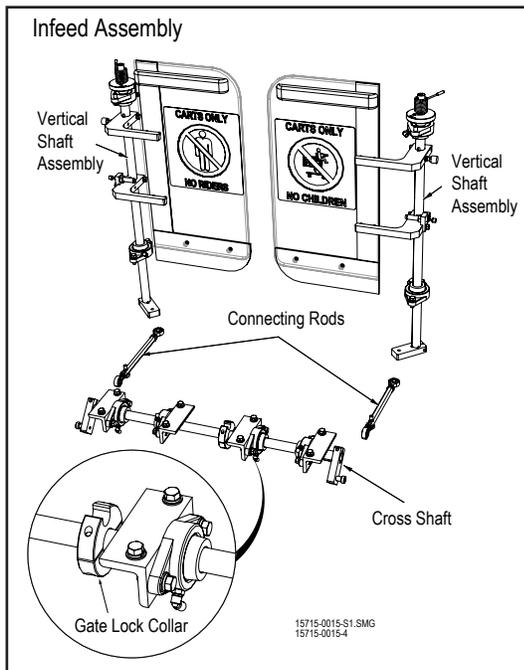
Discharge Track Figure 3



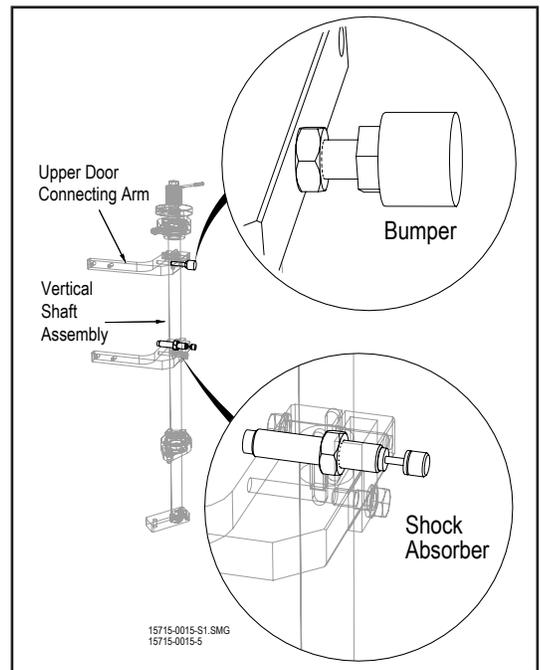
Infeed Track Figure 4

How do the Gates Work?
(continued)

3. Each gate door is mounted to a vertical shaft supported by radial ball bearings. A connector arm on the bottom of each vertical shaft links to a common cross shaft through an adjustable connecting rod (turnbuckle) assembly. See Figure 5.
4. Each gate door includes a red polyurethane bumper attached to the upper door connecting arm. The bumper is mounted to a threaded stud. See Figure 6.
5. Each gate door also includes a shock absorber to cushion the closing action. The shock absorber is mounted below the bumper on the lower door connecting arm. See Figure 6.



Infeed Assembly Figure 5



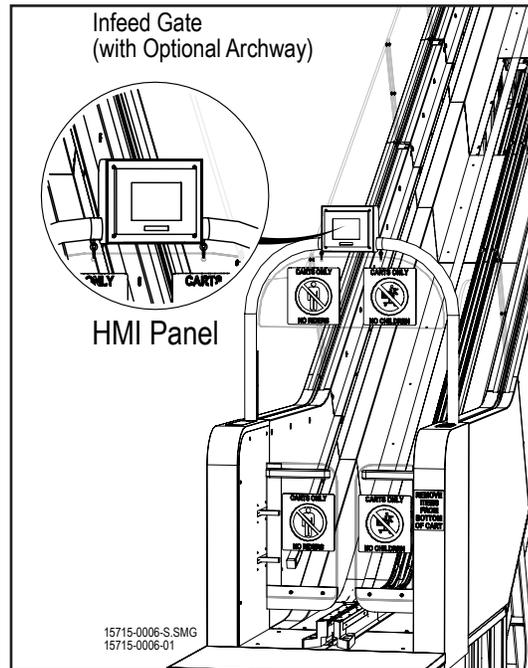
Bumper and Shock Absorber Location Figure 6

Align the Gate Doors

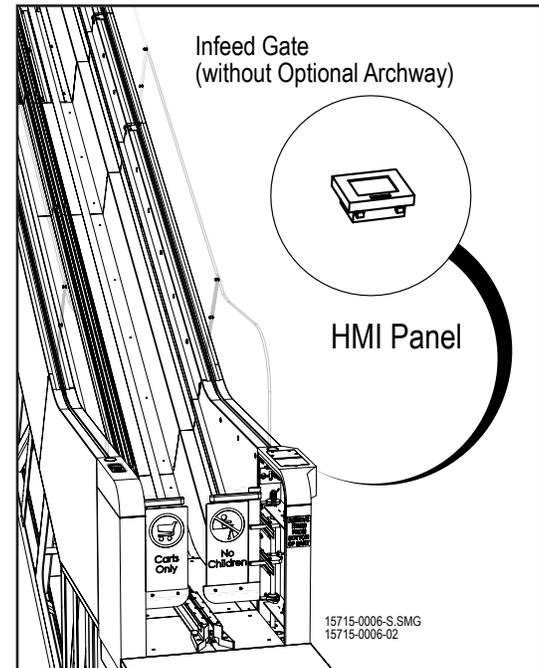
1. Remove all shopping carts from the Cartveyor®.
2. Place caution floor signs at each end of the Cartveyor indicating the equipment is being serviced. See Figure 7.
3. Lockout the Cartveyor **motor drive** in accordance with the facility lockout/tagout program.
4. Locate the HMI (Human Machine Interface) panel at the infeed end of the Cartveyor and access Manager Mode. See Figure 8 or 9.



Caution Floor Signs
Figure 7



HMI Location with Optional Archway
Figure 8

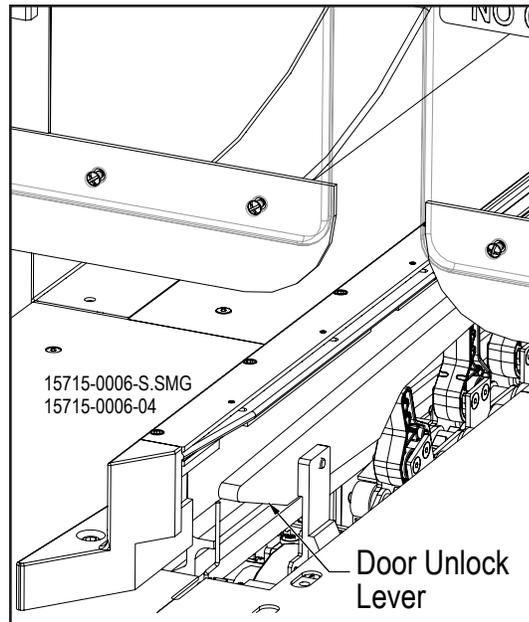


HMI Location without Optional Archway
Figure 9

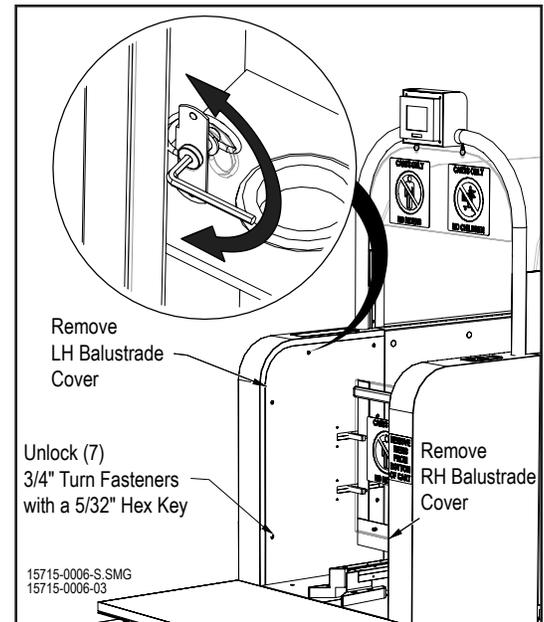
NOTE The following procedures require the gate doors to be manually locked and unlocked while the various mechanisms are being adjusted. See Figure 10.

Access the Door Close Spring

1. Open the gate doors and loosen both balustrade covers. The covers are held in place by 3/4 turn fasteners. Unlock the fasteners with a 5/32" hex key. See Figure 11.
2. Lift the balustrade cover up, out, and away from the gate door.
3. The vertical gate door shaft assembly is exposed.



Door Unlock Lever Location
Figure 10



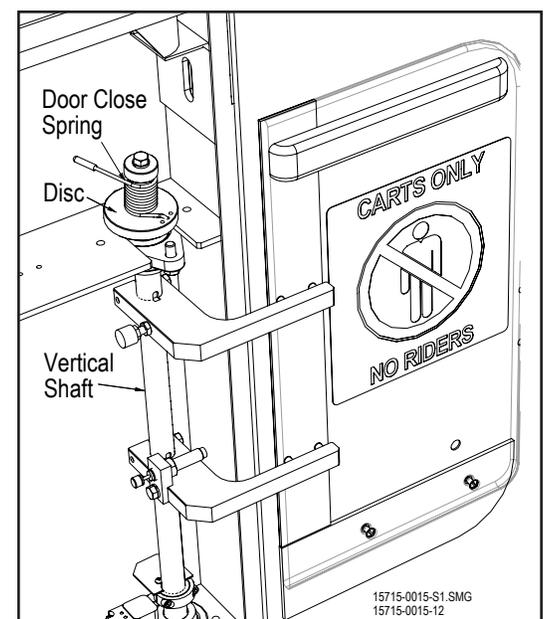
Remove Balustrade
Figure 11

Adjust the Door Close Spring

The door close spring is mounted to the top of the vertical gate shaft assembly. See Figure 12. The bottom leg of the spring is retained in a disc that is attached to the shaft. The disc has three (3) holes that are used for tension adjustment. The disc is identified with "RH" or "LH" to assist in identifying the proper disc orientation. Each door assembly has one (1) disc installed.

Make sure the spring is inserted in the center hole of the disc.

NOTE The doors must be closed to adjust the position of the spring.



Door Close Spring Location
Figure 12

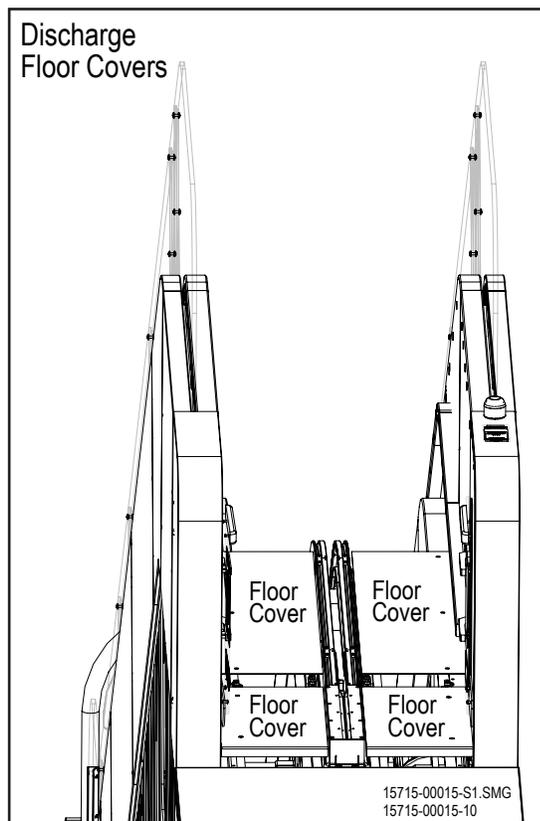
CAUTION



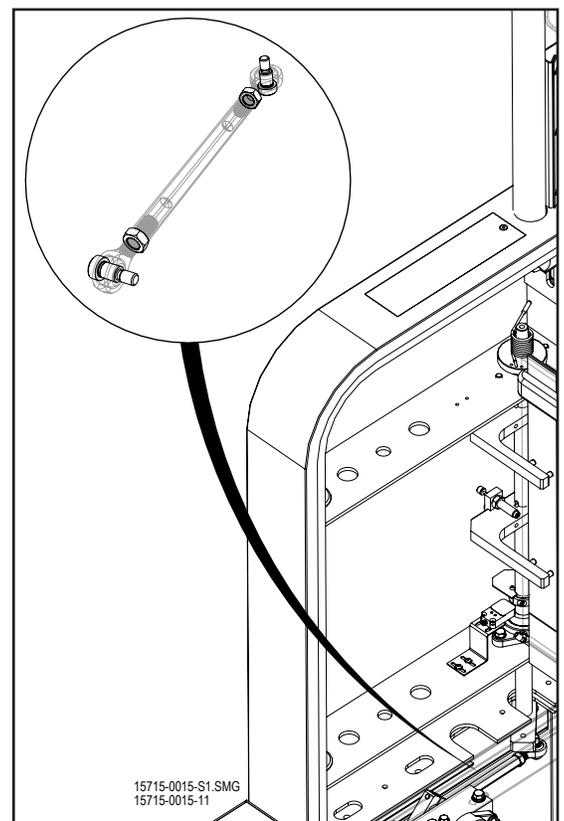
Pinch Hazard! Moving parts and pinch points are now exposed and can cause personal injury. Secure the area to prevent unauthorized access to the equipment before performing this maintenance step in accordance with the facilities' lockout/tagout program.

Adjust the Connecting Rods

1. Remove the first four (4) floor covers at the infeed area of the Cartveyor®.
2. Remove the last four (4) floor covers at the infeed area of the Cartveyor to access the connecting rods. See Figure 13.
3. Adjust the gate door angular position by lengthening or shortening each of the two (2) connecting rods that connect the cross-shaft to the vertical shafts. These connecting rods have right-hand and left-hand hex lock nuts on either end. The final length of each connecting rod will be slightly different due to variances in gate balustrade position on the truss. Use a 3/4" open end wrench to unlock the hex lock nut on the connecting rod's threaded stud to adjust the length. Continue to adjust each side as needed. See Figure 14.
4. Confirm that the door unlock lever moves without resistance. Adjust the connecting rods as needed.
5. Use a 5/8" open end wrench to adjust the turnbuckle shaft and old in place while tightening the hex lock nut to lock into position.
6. Return all floor covers to their original positions.



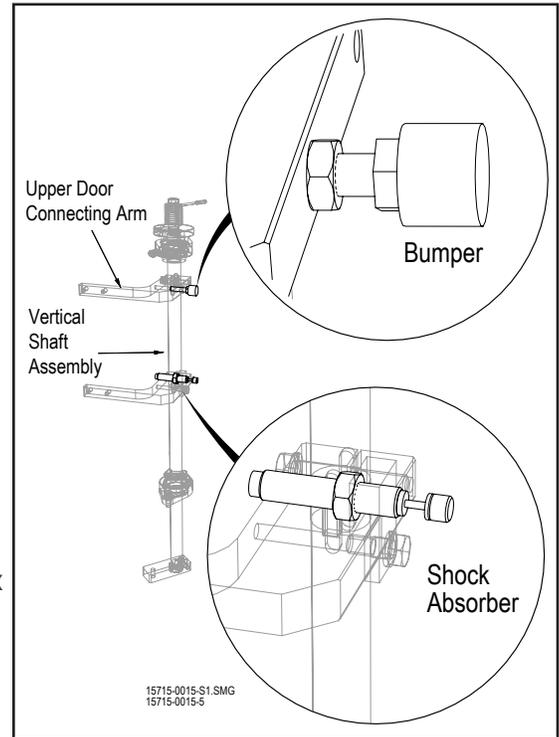
Floor Cover Location
Figure 13



Connecting Rod Location
Figure 14

Adjust the Bumper and Shock Absorber

1. Adjust the doors' closed position by lengthening or shortening the red polyurethane bumper attached to the upper door connecting arm. Use a ½" open end wrench to unlock the lock nut on the bumper's threaded stud to adjust the length. Adjust so that 1/8" (3mm) to 3/16" (5mm) of the shaft is showing when the door is closed. Tighten to lock the lock nut. See Figure 15.
2. The shock absorber is meant to stop the gate door with a minimum of bouncing. Use a 3/4" open end wrench to unlock the hex lock nut on the shock absorber's threaded stud. Adjust the shock absorber by lengthening or shortening the stud with a small screwdriver inserted in the end of the stud. The adjustment on the shock is an infinite adjustment, meaning there is no stop. The adjustment simply decreases/increases tension as you make the adjustment until the tension automatically returns to the beginning. Tighten the hex lock nut on the shock absorber's threaded stud to lock the hex lock nut. See Figure 15.
3. Hold the doors open and re-install the balustrade covers.



Bumper and Shock Absorber Location Figure 15

Complete Testing

1. Clean the Cartveyor® area.
2. Remove lockout/tagout materials.
3. Apply power to the Cartveyor.
4. Set the HMI located at the infeed gate to Auto Mode.
5. Run several shopping carts through the Cartveyor to verify that the gate doors are operating properly.

Procedure is complete.



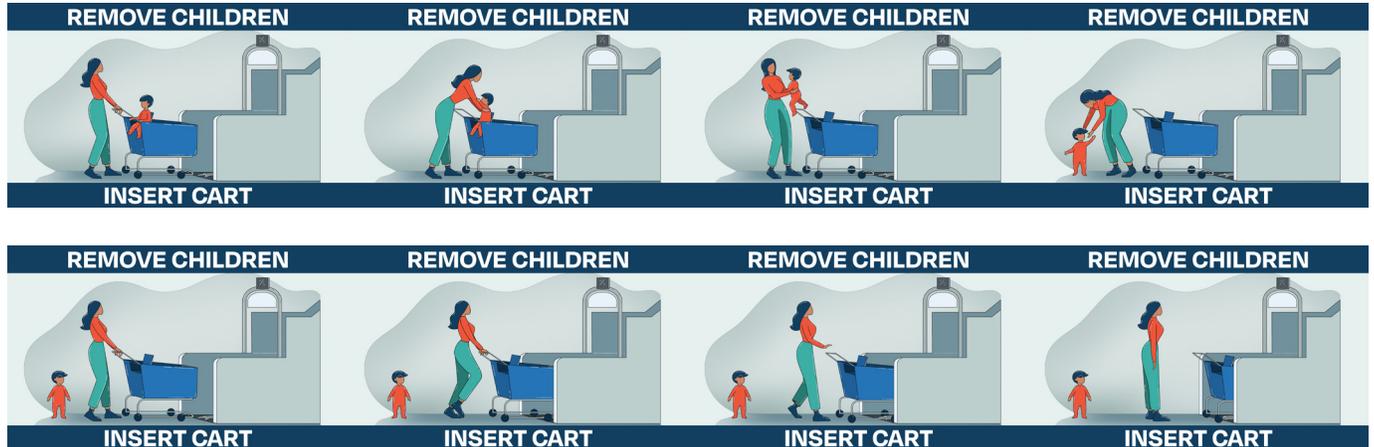
WARNING



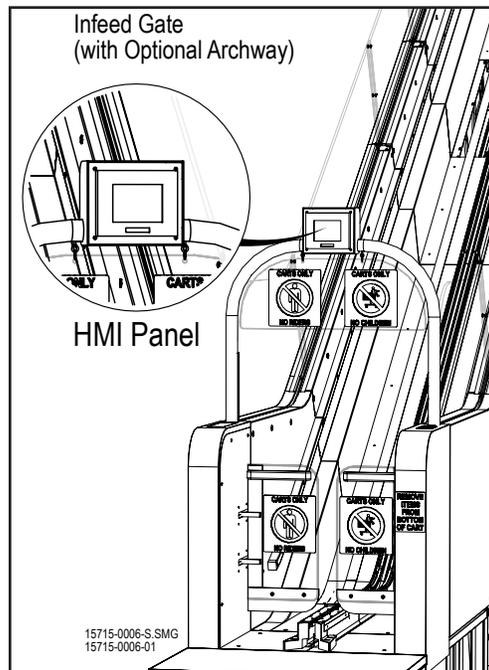
Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.

Sequence of Operation

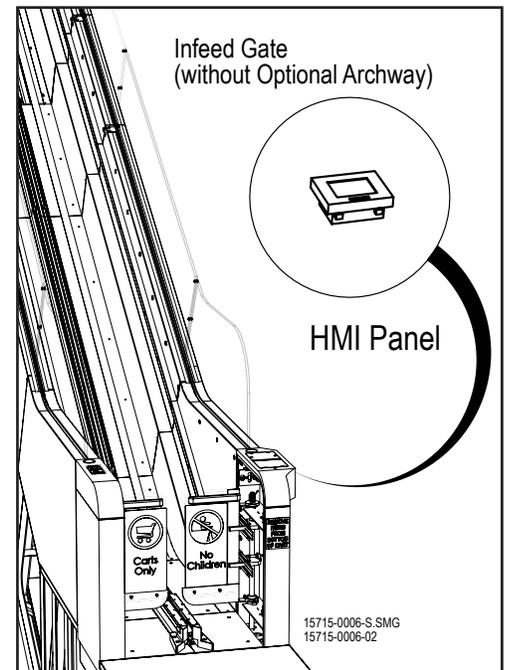
1. With the Cartveyor® in Auto Mode, position a shopping cart at the infeed end of the Cartveyor identified with a HMI (Human Machine Interface) control screen and gate door signage. See below.



Auto Mode Continuous Message Loop
Figure 1



HMI Location with Optional Archway
Figure 2



HMI Location without Optional Archway
Figure 3

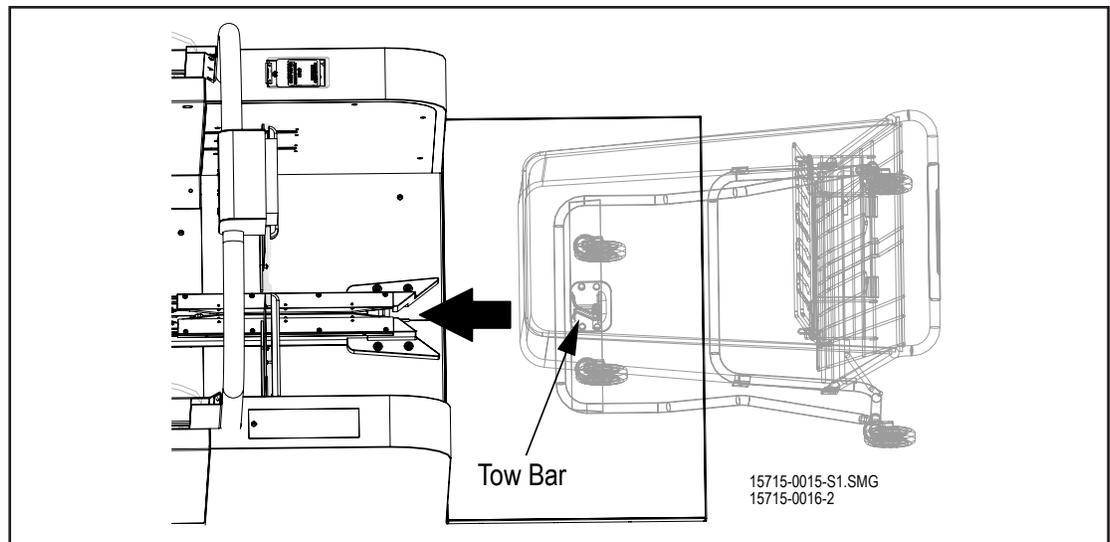
Sequence of
Operation
(continued)

2. Align the tow bar located on the center bottom front of the shopping cart with the black, tapered infeed track guides. See Figure 4.
3. Push the shopping cart into the infeed track between the guides. See Figure 5.

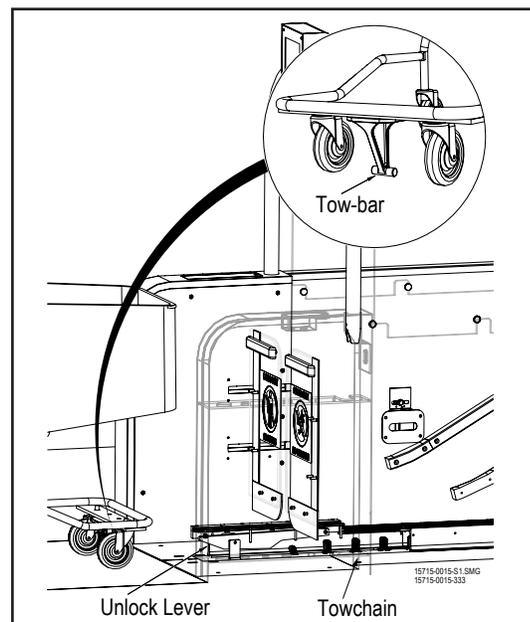
NOTE

The tow bar is sensed and starts the chain.

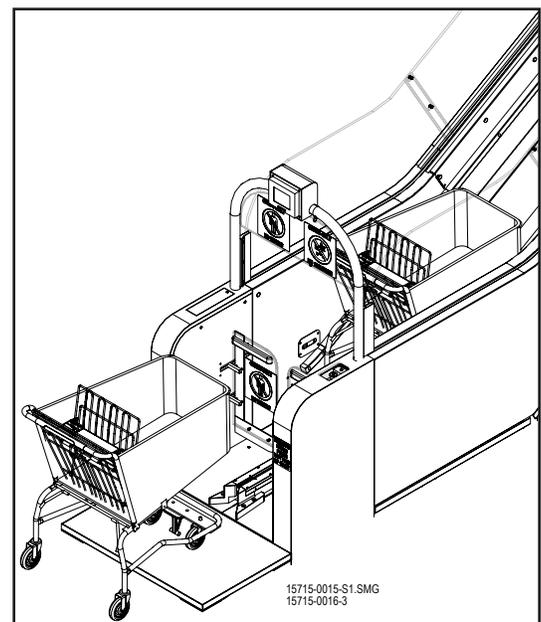
4. Continue pushing the shopping cart into the track and through the gate doors. The lug grabs the shopping cart. Let go of the shopping cart when the shopping cart has moved through the gate doors.
5. Wait for the gate doors to close completely behind the shopping cart before attempting to push the next shopping cart into the infeed track between the guides. See Figure 6.



Shopping Cart Alignment
Figure 4



Tow Bar Engagement
Figure 5



Gate Doors Closed
Figure 6

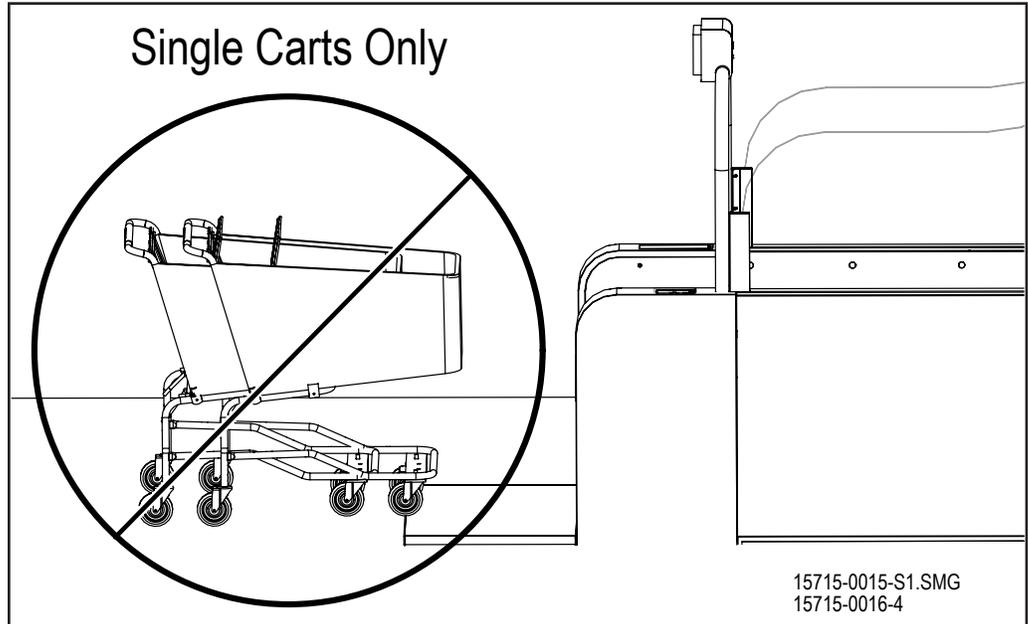
WARNING



Climbing, sitting, walking, or riding on equipment while the equipment is in operation could result in death or serious injury.

Nesting Not Allowed

Nested shopping carts are not allowed on the Cartveyor®. Shopping carts that are nested or spaced too close to each other will cause the Cartveyor to jam, creating a control fault situation that stops the Cartveyor from operating and may severely damage the Cartveyor.



Clear the Shopping Cart Jam

1. Summon an authorized store manager or in-house maintenance personnel.
2. Use the Human Machine Interface (HMI) to switch from the fault display to Manager Mode.
3. Press the Fault Reset button on the HMI screen.
4. Unlock the gate doors and manually hold the gate doors open.

NOTE *The gate doors open only in one direction and are not bidirectional.*

5. Reverse the shopping carts back through the infeed gates.
6. Return the HMI to Auto Mode.

NOTICE

Any attempt to continue moving the jammed shopping carts forward while in Manager Mode will cause severe damage to the Cartveyor and the shopping carts.



**Section 25 | Acceptance
Certification - CV and DCV**



PFlow Industries, Inc.
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6720 N. Teutonia Ave.
Milwaukee, WI 53209

Acceptance

We, the Customer, accept the equipment listed below as being properly installed, tested, and performing to our satisfaction. For the purpose of quality assurance by PFlow Industries, Inc., this form covers both the mechanical and the electrical installation of the equipment. This acceptance in no way releases either PFlow Industries, Inc. or the installing contractor(s) of any warranty obligations. If there are any exceptions or unresolved items, please include detailed information.

PFlow Serial Number:	Model Number:	<input type="checkbox"/> CV <input type="checkbox"/> DCV <input type="checkbox"/> HDCV	<input type="checkbox"/> UP <input type="checkbox"/> DOWN
Job Name:			
Site Street Address:			
Site Mailing Address:			
Site City:	State:	Zip Code:	
Customer Contact Name:		Contact Title:	
Customer Contact Phone: () Ext		E-Mail:	

Tests Performed	Initial Start-up of Equipment	<input type="checkbox"/> Yes	<input type="checkbox"/> No		Start-up Date:
	At least 10 carts run through	<input type="checkbox"/> Yes	<input type="checkbox"/> No		Customer Initials:
	All special features	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Not Applicable	Comments:
	All safety features	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
	Other Test:				

Personnel Instructed on the Operation and Preventive Maintenance:	
Name:	Company:
Name:	Company:

Accepted by:	Acceptance Date:
Name/Phone:	PFlow Rep Present:
Title:	Name:
Company:	Company:

Please return a copy of this form to the PFlow Industries, Inc. Customer Service Department.

**Section 25 | Acceptance
Certification - CV and DCV**



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Milwaukee, WI 53209



Authorized Lubricants and Paint Used in the Cartveyor®

Application	Component	Manufacturer or equal	Product Code	PFlow Document
<i>Standard Grease</i>	Pillow Block Lubricating Grease	Lubriplate 930 SERIES	0892150098001	15713-0001
<i>Indoor Lubricant</i>	Gearbox Lubricant	Shell Omala S2 G 220 (Organic Mineral Base)	01D7837	15713-0018
<i>Outdoor Lubricant</i>	Gearbox Lubricant	Shell Omala S4 GX 220 (Synthetic Base)	01D7851	15713-0004
<i>Paint</i>	Paint-Primer	Sherwin-Williams Universal White B50-WZ1	B50XXW16593-4357	15713-0012
	Paint-Finish	Sherwin-Williams Fast Dry Acrylic Enamel	F78XXL13851-4357	15713-0011
	Paint-Aerosol	Custom Color and Filling Blue Aerosol	20016 00341 F78XXL13851-4357	15713-0013

NOTICE Verify actual gearbox oil.
Oil fill capacity for SEW Eurodrive gearmotor KA 87 - M1 mounting position is 3.7 liters (1 gallon-US).*

* per SEW Assembly and Operation Instructions 16970411/EN



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