



NERCON

www.nerconconveyors.com

CASE ELEVATOR INSTALLATION AND SERVICE MANUAL

ISSUE DATE: 11/5/2013

NERCON PROPRIETARY STATEMENT

The following information is proprietary information of NERCON and must not be used except in connection with our work, nor in any manner disclosed to any third party without the prior written consent of NERCON. All rights of design and invention are reserved.

Recipient of this manual acknowledges that they will abide by the instructions contained in this manual and in any optional training classes purchased from NERCON. Installation and startup supervision services are also available for purchase from NERCON. Recipient will not tolerate any operation that is contrary to these instructions. If the recipient observes equipment that presents a hazard, he will promptly inform NERCON so that a solution can be achieved.

Table of Contents

Section 1: Introduction	
How to Use This Manual	1-1
Integration	1-2
Operational Concepts	1-3
Section 2: Safety	
General Safety	2-1
Mechanical Safety Guidelines.....	2-2
Electrical Safety Guidelines	2-3
Electrical Code.....	2-3.1
Control Stations	2-3.2
Safety Devices	2-3.3
Emergency Stops and Restarts	2-3.4
Application Safety	2-4
Transfer, Loading and Discharge Points.....	2-5
Section 3: Installation	
Installation	3-1
Unloading	3-1.1
Standing Up	3-1.2
Completing Assembly	3-1.3
Wiring	3-1.4
System Sensors.....	3-1.5
Section 4: Initial Start-up Check List	4-1
Section 5: Description of Electrical and Pneumatic Devices	
Description of Standard Electrical and Pneumatic Devices	5-1
Description of Optional Electrical and Pneumatic Devices	5-2
Section 6: Basic Mechanical Operation and Adjustment	
Adjustment for Case Size	6-1
Section 7: Basic Electrical Operation	
Description of Operator Interface Pushbuttons.....	7-1
Description of Operation in Auto Mode	7-2
Description of Purge Mode	7-3
Manual Mode Operation	7-4
Section 8: Periodic Inspection Guide	
Introduction.....	8-1
Purpose.....	8-2
Periodic Inspection	8-3
Cleaning.....	8-4
Non-Washdown Elevators.....	8-4.1
Washdown Elevators.....	8-4.2
Section 9: Troubleshooting Guide	
Electrical and Pneumatic Troubleshooting	9-1
Mechanical Troubleshooting.....	9-2
Section 10: Support Drawings	
Case Elevator Nomenclature.....	10-1
Case Elevator Standing-Up Procedure.....	10-2
Case Elevator Electrical Components.....	10-3

Section 11: Spare Parts List 11-1

Section 12: Supplemental Manuals

Intralox Belting 12-1
Demag Brakemotor 12-2
Dodge Reducer 12-3
Dodge Bearings 12-4
Guardian Coupling 12-5
Bimba Cylinders 12-6

Section: 1 - Introduction

1-1: How to Use this Manual

This manual is supplied to assist you in installing, maintaining, and servicing NERCON CASE ELEVATORS. It is essential for safe and efficient operation that the information and guidelines presented here are properly understood and implemented. Following is a brief description of the information contained in each section:

1. Introduction: Basic information about the manual and the system and trademarks/servicemarks (if any) used in the manual.

2. Safety: Safety precautions for Case Elevator operation and maintenance.

3. Installation: Mechanical and Electrical information about the installation of the Case Elevator.

4. Initial Start-up: Checklist of required items and settings needed for a Case Elevator start-up.

5. Basic Operation and Adjustment: How to make adjustments and what to look for when making adjustments.

6. Periodic Inspection Guide: One of the most important factors in the overall cost effectiveness of your Case Elevator is the periodic inspection; that is, eliminating the cause of potential trouble before the trouble occurs. This concept makes it possible to perform maintenance and repair operations on a predetermined schedule rather than according to chance. Implementing a periodic inspection program on your NERCON equipment serves to increase its dependability, longevity, and efficiency, all of which add up to lower operating costs.

7. Troubleshooting: Despite the best operating techniques and preventive maintenance program, machines do sometimes fail. This section contains suggested step-by-step methods to aid in detecting the cause or causes of these failures.

Observe the equipment when it is functioning properly in order to detect failure and/or to perform maintenance or adjustment on the equipment.

1-2: Integration

- The Case Elevator is designed to move cases from one conveyor to another at a higher elevation with little horizontal motion. This process allows for

accumulation on the upstream end but not the downstream end. If the equipment directly downstream of the elevator is no longer taking product away, the elevator must be stopped or paused.

- The elevator may come with a downstream and upstream conveyor, one of the two, or neither depending on the design.
- Whether or not a downstream conveyor is provided, Nercon will provide a photo eye to detect any backups on the discharge conveyor. If an infeed conveyor is not provided by Nercon then it is recommended that photo eyes be used to detect open flaps on cases before they enter the elevator.

Note: for more information on provided sensors see System Sensors: 3-1.5

1-3: Operational Concepts

- The elevator is powered by two (2) brake motors. Each motor drives one of the vertical conveyors which work together to lift the case. These conveyors do not run constant. Instead they index each time a new case enters the infeed end.
- The two vertical conveyors have belting with flights. A flight from each of these conveyors catches the case to simultaneously lift it upward.
- At the top of the elevator a large air cylinder pushes cases onto downstream equipment. The air cylinder activates shortly after each index.
- The Case elevator has a back stop which stops cases to allow them to be picked up by the flights. The elevator may have an automatically retractable back stop which allows select cases through. Nercon recommends that sensors be added upstream to ensure only desired cases get elevated.
- For different size cases, adjustments can be made using the hand wheel near the bottom of the elevator. Turning this wheel moves the two vertical conveyors closer together or further apart. Other adjustments can be made for case length and case height.
- The case elevator waits for a case to enter the infeed before it indexes. The case elevator has a purge aspect built into the program. After a predetermined amount of time passes without a new case at the infeed, the case elevator will discharge all cases within itself assuming the discharge conveyor is clear.

Section: 2 - Safety

2-1: General Safety

Note: The safety procedures/policies listed in this chapter are not intended to address fire-related considerations. Your system must comply with any applicable national, state, and local codes.

Follow safety precautions for industrial work at all times. With any piece of industrial equipment, conditions exist that might cause injury to you or your co-workers. Because it is not possible to describe each potentially hazardous situation that might develop, you must be alert at all times for unsafe conditions. To avoid injury, use maximum possible care and common sense and adhere to all safety standards.

Take special care while maintaining and inspecting electrical equipment and devices. All personnel working on or around the system should be aware of, and adhere to, all CAUTION, DANGER, and WARNING signs. These signs are posted to reduce the risk of injury to all personnel. Maintain signs in a legible condition. Contact your supervisor to post additional safety signs if you feel they are necessary.

Follow these general safety rules, as well as specific regulations and guidelines listed in this publication:

2-2: Mechanical Safety Guidelines

- Do not touch moving parts.
- Do not ride or climb the case elevator.
- Do not operate the case elevator with the protective guards removed or with personnel inside a customer defined safety perimeter.
- Keep jewelry, clothing, hair, etc., away from any and all moving parts.
- Know the location and function of all start/stop devices and keep those devices free from obstruction.
- Clear all personnel from the equipment before starting.
- Do not attempt to clear product jams while elevator is running.
- Do not attempt to make width, length, and height infeed adjustments while elevator is running (see Section 5-1).
- Allow only trained and authorized personnel to maintain or repair the elevator.

- Do not load the elevator beyond the specified design limits.
- Do not attempt to make repairs to the elevator while it is running
- Do not modify equipment without checking with the manufacturer.
- Do not operate or perform maintenance on the equipment when taking any type of drug or sedative, or when over fatigued or under the influence of alcohol.
- Do not operate the elevator if any part is damaged or improperly installed.
- Be sure that all replacement parts are interchangeable and of equal quality as original parts supplied.

When the elevator is stopped for maintenance or repair purposes, you must lock out or tag out the starting devices, prime movers, or powered accessories in accordance with a formalized procedure designed to protect everyone involved against an unexpected restart. Also, alert all personnel to the hazard of stored energy, which can exist after the power source is locked out. For additional information, refer to the latest issue of ANSI Z244.1-20--, American National Standard for Personnel Protection - *Lockout/Tagout of Energy Sources - Minimum Safety Requirements*. Also, OSHA 29CFR Part 1910.147 "*Control of Hazardous Energy sources (Lockout/Tagout)*", which includes requirements for release of stored energy.

2-3: Electrical Safety Guidelines

When an equipment problem occurs, the first priority is to ensure that power is disconnected from the affected area, as well as from the control panel where troubleshooting and repairs are performed.

Once you verify that power is locked out (LOTO), make sure you inform other personnel in the area of the situation so they do not unexpectedly restore power.

After you inform your co-workers, recheck the power supply to ensure that power is disconnected in the affected control panel. Remove fuses only with insulated fuse pullers and check terminal strips for current-carrying wires. Before you perform any repairs with an exposed conductor or terminal, use an approved voltmeter to check for continuity to ground and continuity between other current-carrying conductors.

When you perform any kind of maintenance or repair involving electrical components, follow the guidelines listed below:

- **NEVER** reset a circuit breaker or replace an open fuse before determining and correcting the cause of the circuit interruption.
- **NEVER** bypass or use a jumper to replace any limit switch, fuse, circuit breaker, or other circuit protection or safety device.
- **NEVER** replace an open fuse with another that is not rated at the proper current and voltage. Always double check correct fuse specifications rather than replace the open fuse with one of the same current and voltage rating.
- **NEVER** rest tools on motors, transformers, terminal strips, or other control panel or electrical components. All tools used should be kept in a tool box or pouch.
- **NEVER** restore power or restart equipment before verifying that all tools, spare parts, etc., are removed from the work area and are safely stored.
- **NEVER** restore power or restart equipment before verifying that ALL personnel are aware of the condition and are safely clear of the equipment.
- **ALWAYS** replace any safety devices or guards removed during maintenance or repair before you restore power or restart equipment.
- **ALWAYS** use extreme caution and follow recommended safety procedures while you perform any electrical inspection or maintenance operations

2-3.1: Electrical Code

All electrical installations and wiring must conform to the National Electrical Code (Article 670 and other applicable articles) published by the National Fire Protection Association and approved by the American National Standards Institute, Inc.

2-3.2: Control Stations

Arrange control stations so that equipment operation is visible from the stations and clearly mark or label each station to indicate its function.

The emergency stop devices installed with your system are designed so that they cannot be overridden from other locations. Keep the area around your control station clear. Remove all miscellaneous equipment (such as inactive and unused actuators, controllers, and wiring) from control stations and panel boards, as well as obsolete diagrams, indicators, control labels, and other material that might confuse the operator.

2-3.3: Safety Devices

All safety devices, including wiring of electrical safety devices, are designed to operate in a "fail-safe" manner; that is, if power or the device fails, a hazardous condition will not result.

2-3.4: Emergency Stops and Restarts

In case of an emergency stop, first determine the cause of the stoppage and correct the situation that warranted the stop. To resume operation after a stoppage, manually reset or start at the location where the emergency stop occurred.

Note: Before you try to correct the situation, lock out or tag out the starting device, unless it must be operated to determine the cause or to safely remove the stoppage. For additional information, refer to the latest issue of ANSI Z244.1-20--, American National Standard for Personnel Protection Lockout/Tagout of Energy Sources - Minimum Safety Requirements.

2-4: Application Safety

The equipment used in your system is designed to convey specified commodities or materials within a certain rate and speed. It might not be possible to safely use the equipment outside of the intended capacities or speeds. Check with your supervisor if you have questions regarding the safe operation of the equipment.

2-5: Transfer, Loading, and Discharge Points

Prevent free-falling material that might result from flooding, ricocheting, or uncontrolled free-fall from occurring.

At transfer, loading, and discharge points, prevent unconfined and uncontrolled free-fall of material resulting from flooding, ricocheting, overloading, trajectory, leakage, or a combination thereof, if the material would create a hazard to personnel.

Warning

*Failure to follow these rules can
result in injury*

Note: The safety standards outlined in this section have NOT been exactly duplicated from the latest issue of the ANSI booklet, *Safety Standards for Conveyors and Related Equipment B20.1-20--*. We recommend that all operators and maintenance personnel review this booklet, which you can obtain by contacting the American Society of Mechanical Engineers at the following address:

*American Society of Mechanical Engineers
United Engineering Center
345 East 47th Street
New York, NY 10017*

Section 3: Installation

Note: All equipment must be installed to conform to the National and Local Safety Codes. In the event that any caution or warning labels affixed to the equipment are damaged in shipping or obscured from vision because of the position of the equipment on site, you should order the appropriate replacement labels before operating the equipment.

3-1: Installation

Nercon pre-assembles and pre-tests all case elevators prior to shipment. This allows us to ship the unit nearly completely assembled. The units are laid down on their sides, resting on the support structure. Additional bracing is added to support any critical non-removable parts. To protect certain areas during shipping they will be removed and packaged separately. This often includes any infeed and discharge conveyor sections as well as any protruding guarding. These sections are clearly labeled when shipped and can be easily installed per the detail drawings provided.

3-1.1: Unloading

The case elevator will arrive on a single skid and it is recommended to be pushed or pulled with a fork truck. Each unit is custom and an estimated weight will be provided so that the installation contractor may plan for appropriate fork truck capacity. The detail drawings provided indicate acceptable points of connection for moving/or lifting the units (See section 8-2). Use straps to connect to these locations as well as the skid and move the unit as required.

Note: Case Elevator Nomenclature (8-1) and Case Elevator Stand up Procedure (8-2) may show a case elevator that appears different than what is shown in the project drawings. These drawings are for instructional purposes only and do not represent actual design drawings. Any additional job specific instruction will be provided by Nercon.

3-1.2: Standing Up

Once the unit is located near its final position, and all cross bracing and tie down straps have been removed the unit can be stood up. The proper and most common method to stand these units up is shown in drawing of section 8-2.

Note: Adequate ceiling clearance is critical to allow the elevator to swing to an upright position. Typical nominal clearance required is 5 feet. Special care and consideration should be taken when clearances are less than 5 feet.

3-1.3: Completing Assembly

Connect all remaining joints, carefully check infeed and discharge conveyors for correct elevation and level, and then tighten the fasteners to secure the section being installed. Once the elevator is positioned as required, the infeed and discharge elevations have been verified, the unit should be lagged to the floor and any other bracing added.

3-1.4: Wiring

As noted above in section 2-5, be sure to follow all National Electrical Code and any local stated codes. Also be sure to follow all recommendations noted above in sections 2-3 through 2-8.

Nercon will provide local enclosures that will house the VFD's for the vertical conveyor drives. These will be mounted on the structure and both motors will be wired back to this enclosure. The customer will be responsible for connecting the power and control wiring at this location.

*Note: Brake Motors
Brake motors will be prewired and programmed accordingly to the Nercon supplied enclosure.*

The wiring, programing, and sequencing for all the drives in the case elevator system should be aligned with the recommendations noted above and all provided schematics. Failure to do so will lead to premature belt wear and possible product or equipment damage.

3-1.5: System Sensors

The case elevator unit has multiple sensors that monitor the unit's conditions and allow it to function properly while in operation. These sensors include retro reflective photo eyes, diffuse photo eyes, and inductive proximity sensors. These sensors are designed to monitor faults and to be used in the function of the unit. See Section 5: Description of Electrical and Pneumatic Devices for more information.

Section 4: Initial Start-up

4-1: Initial Start-up Check List

- Elevator is securely fastened to the floor and all supplied cross bracing and tie brackets are mounted.
- Check the entire belt path for any obstructions, snags, or tight spots that may have been created during shipping or installation.
- Be sure there is nothing on the belt before initial on-site start-up. (i.e. tools, computers, etc.)
- Make sure power is connected to the system.
- Make sure adequate air pressure is connected to the system (verify pressure using dump valve gauge).
- Check that the sensors are functioning properly.
- E-stop relay must be reset.
- All faults must be identified and cleared.

Section 5: Description of Electrical and Pneumatic devices

5-1: Description of Standard Electrical and Pneumatic Devices

DESCRIPTION	FUNCTION	LOCATION
PUSHER EXTEND SENSOR (Magnetically Actuated Cylinder Mounted Sensor)	Detects extended position of discharge pusher pneumatic cylinder.	Sensor mounted near the rod end of the cylinder.
PUSHER RETRACT SENSOR (Magnetically Actuated Cylinder Mounted Sensor)	Detects retracted position of discharge pusher pneumatic cylinder.	Sensor mounted near the cap end of the cylinder.
CASE AT STOP SENSOR (Photo-eye)	Detects when a case is at the back stop inside the elevator and in position for the elevator to index.	Located inside the back stop.
FLIGHT POSITION SENSOR (Photo-eye)	Detects the flight position of the elevators vertical conveyor. One sensor used for right side vertical conveyor, and one sensor for the left side vertical conveyor. Detects the flight on its return path to lift another case.	Located on the outside of the vertical conveyor.
OVERTRAVEL SENSOR (Photo-eye)	Detects when a case has been elevated past the discharge push position.	Located at the top of the case elevator. Positioned a short distance above the tallest case, when the case is in the position to be pushed out of the elevator.
CLEAR TO PUSH SENSOR (Photo-eye)	Used to detect/verify that the area on the discharge conveyor is clear to push a case onto.	Located on the discharge conveyor. Positioned at an angle along the horizontal plane, as to detect a case when first pushed out of the elevator and maintain detection the case until the case has moved out of the zone required to push the next case into.
CASE DETECT SENSOR (Photo-eye)	Detects a case on the infeed conveyor before entering the elevator. Used to determine if a case is advancing to the case elevator entrance. Also may be used to detect a backlog of cases on the infeed conveyor.	Located on infeed conveyor. Typically positioned approximately four feet upstream of elevator vertical conveyor.
PUSHER SOLENOID VALVE	Extends and retracts the discharge pusher cylinder by directing air flow to either the cap end or rod end of the pneumatic cylinder.	Located near the pusher cylinder.
FILTER/REGULATOR W/SHUT OFF	The filter portion removes particles from the air supplied to the machine. The regulator is used to manually adjust the air pressure to the machine. The shut-off valve is used to manually shut-off and dump air flow to the machine. This valve is also lockable in the off position for the lockout/tagout procedure.	Assembly is located within reach at floor level.

5-2: Description of Optional Electrical and Pneumatic Devices

DEVICES PROVIDED AS PART OF PURCHASED OPTION		
<u>DESCRIPTION Of OPTION</u>	<u>FUNCTION</u>	<u>LOCATION</u>
OPEN FLAP DETECT SENSOR (Photo-eye)	Detects an open flap on the top the case.	Located on infeed conveyor.
SECOND CASE SENSOR (Photo-eye)	Detect/verify second case is in the elevator. For elevators designed to index two cases.	Located inside the elevator above the hold down plate.
SOLENOID OPERATED SAFETY AIR DUMP VALVE	When safety circuit is disrupted (e.g. Pressing E-Stop) the valve will close off the supply air and release all downstream air to atmosphere.	Located near the filter/regulator assembly.
BEACON STACK W/HORN	Annunciates machine status: Starting, Running, Stopped, Faulted, Downstream Not Ready.	Located on control enclosure.
END STOP CYLINDER RETRACTED SENSOR (Magnetically Actuated Cylinder Mounted Sensor)	Detects retracted position of end stop pneumatic cylinder.	Sensor mounted near the cap end of the cylinder.
END STOP CYLINDER EXTENDED SENSOR (Magnetically Actuated Cylinder Mounted Sensor)	Detects extended position of end stop pusher pneumatic cylinder.	Sensor mounted near the rod end of the cylinder.
END STOP CLEAR SENSOR (Photo-eye)	Used to detect/verify that the area is clear under the retractable end stop so that it can extend into position without crushing a case.	Located on the side opposite the end stop angled inward to ensure that the area under the end stop is clear as well as the area within the case elevator to ensure no cases are approaching the end stop.

Section 6: Basic Mechanical Operation and Adjustment

6-1: Adjustment for Case Size

- **Adjustment for Case Width:** Near the bottom of the case elevator there is a hand wheel (see section 8-1). This hand wheel will adjust the gap between the two vertical conveyors. The elevator is designed such that both vertical conveyors move together to keep the gap centered with the infeed and discharge conveyors. This width must be set so that the case can be elevated properly. The flights must be close enough to the infeed conveyor to pick up the case (see figure 5-1.1). The flights must also be close enough such that the case will not fall or become skewed if it shifts to one side or the other (see figure 5-1.2).

Warning: Do not attempt make width adjustments while elevator is running. Product damage or jams may occur.

Note: Components are in place to prevent mechanical interference due to width adjustment.

- **Adjustment for Case Length:** On the opposite side of the infeed, the back stop can be found (see section 8-1). The back stop inhibits the case's horizontal motion due to the infeed conveyor so that it can be elevated. Proper adjustment of the back stop is essential to prevent damage to cases. Adjust the back stop so that the side of the case opposite the stop is slightly outside of the flights (see figures 5-1.3 and 5-1.4). Since accumulation is possible this is necessary so that the case to be elevated strips away from the next case, otherwise case damage or jams may occur.

Warning: Do not attempt to adjust back stop while elevator is running. Product damage, jams, or serious injury may occur.

- **Adjustment for Conveyor Height:** On the infeed side of the elevator is the hold down (see section 8-1). The hold down prevents the next case from moving upward while the case in front of it is being stripped away (see figures 5-1.3 and 5-1.5). Adjust the hold down so that it is slightly above the case (about 1/8")

Warning: Do not attempt make height adjustments while elevator is running. Product damage or jams may occur.

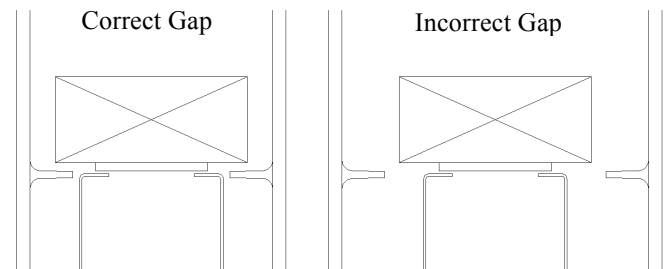


Figure 6-1.1: Width Adjustment

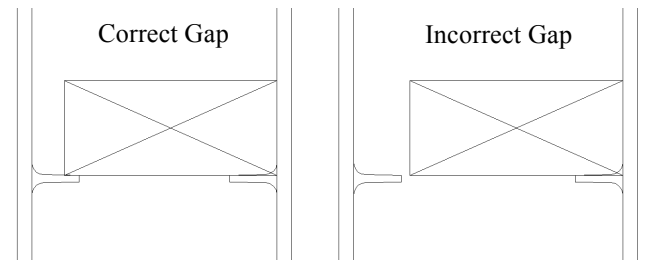


Figure 6-1.2: Width Adjustment

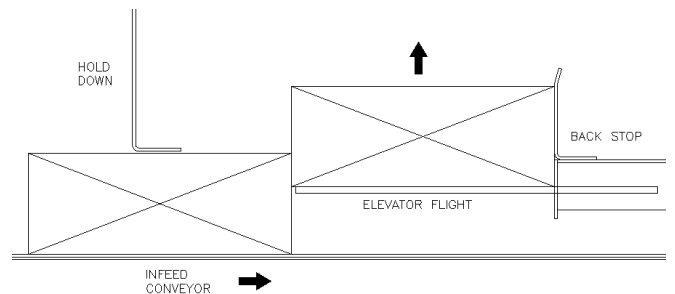


Figure 6-1.3: Correct Length and Height Adjustment

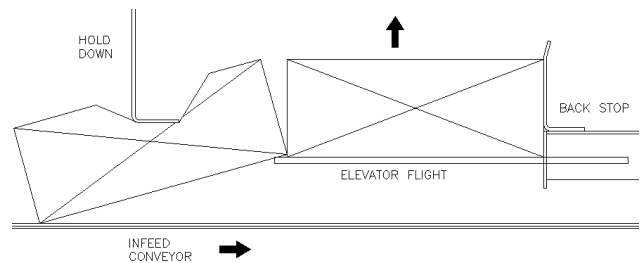


Figure 6-1.4: Incorrect Length Adjustment

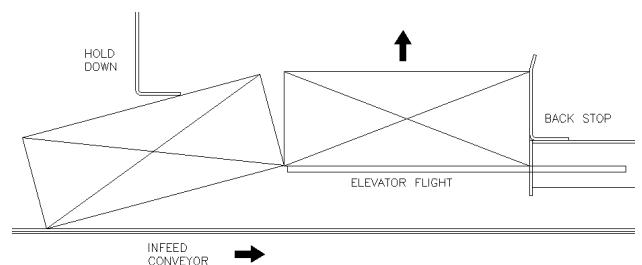
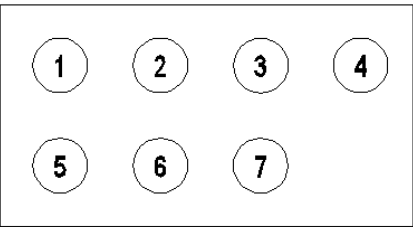


Figure 6-1.5: Incorrect Height Adjustment

Section 7: Basic Electrical Operation

7-1: Description of Operator Interface Pushbuttons

<u>PUSHBUTTON DESCRIPTION</u>	<u>PUSHBUTTON FUNCTION</u>
E-STOP (Red Illuminated)	Emergency stop: Press to remove hazardous motion and place machine into safe state.
RESET (Blue Illuminated)	Reset safety circuit: Press to reset. Pushbutton illuminates when safety circuit is reset. Reset Fault: Press to reset. Flashes when fault is present.
START (Green Illuminated)	Start machine: Press to start. Pushbutton flashes when initiating start and illuminates solid when running.
STOP (Red Non-Illuminated)	Stop machine: Press to cycle stop.
MANUAL/AUTO (Selector Switch)	Elevator control: Select “Manual” position to manually jog/index elevator flighted conveyor. Select “Auto” position to run machine in auto mode.
ELEVATOR LEFT/BOTH/RIGHT (Selector Switch)	Elevator control: Operational only when manual mode is selected. Select the side of the elevator to manually jog/index.
JOG (Black Non-Illuminated)	Elevator control: Operational only when manual mode is selected. Before pressing the jog pushbutton, verify the selector switch (Left/Both/Right) is in the desired position. Press to jog/index the elevator flights.
Retractable End Stop (Selector Switch Option)	Cylinder Control (Option): Select “Up” position to retract the end stop. Select “down” position to extend the end stop. Select “Auto” position to run in auto mode.

PUSHBUTTON LAYOUT	PUSHBUTTON DESCRIPTION
	1) RESET 2) START 3) STOP 4) MANUAL/AUTO 5) E-STOP 6) ELEVATOR, LEFT/BOTH/RIGHT 7) JOG

Selector Switch #8 Retractable End Stop may be added after #7 if a retractable end stop is present

7-2: Description of Operation in Auto Mode

- 1) Pull out E-Stop pushbutton and press Reset. Reset push button will illuminate when safety circuit is reset.
- 2) Verify “Manual/Auto” selector switch is in the “Auto” position.
- 3) Press and hold the Start pushbutton for 5 seconds. Start light flashes during the start delay.
 - a. **(Optional Device)** Green beacon will flash and the horn will sound during this sequence.
- 4) Conveyor starts running. The green light will remain on.
- 5) Case transfers from upstream equipment onto the infeed conveyor.
- 6) **(Optional Operation)** Open Flap Detection:
 - a. If open flap detected:
 - i. Creates faulted condition.
 - ii. Conveyor stops.
 - iii. Beacon
 - iv. Secure open flap or remove case.
 - v. Press Reset push button to remove fault condition
 - vi. Press Start to restart machine.
- 7) Case advances into elevator.
- 8) Case detected at the end stop.
 - a. **(Optional Operation)** Second case detected in elevator
- 9) Elevator indexes one flight.
- 10) Discharge pusher will extend then retract if downstream is clear and ready to receive.
 - a. Note: The pusher extends/retracts each time the elevator indexes.
 - b. The pusher will not push if :
 - i. Discharge conveyor or downstream equipment is not ready to receive.
 - ii. “Clear to push sensor” is blocked or out of alignment.
- 11) Purge mode automatically initiates if case or cases in elevator and no case is detected moving towards the elevator.
- 12) **(Optional Operation)** Case Pass Through
 - a. In auto mode the back stop will be raised when a specific issue arises downstream where cases need to pass through the system instead of being elevated

7-3: Explanation of Purge Mode

Purge mode will be activated if at least one case has entered into the case elevator, and a period of time has passed without another case being detected on the infeed conveyor. In purge mode the elevator will index and cycle the pusher for each set of flights. Purge mode will stop when all flights have cycled through, or a case moving towards the elevator has been detected on the infeed conveyor.

If the case elevator has the optional design to lift two cases per index, the purge mode will initiate if one case is detected at the back stop and a period of time has passed without second case being detected on the infeed conveyor.

7-4: Manual Mode Operation

- 1) Move the Manual/Auto selector switch knob to the “Manual” position.
- 2) With the Left/Both/Right selector switch, choose the desired vertical conveyor of the elevator to manually index.
 - a. NOTE: Selecting the Left or Right position should only be for maintenance purposes, such as a product jam or machine maintenance. Jogging when the “Left or Right” position of the switch is selected with a case or cases in the elevator can jam the cases and cause damage to the cases or elevator.
- 3) Verify that the desired Left/Both/Right position is selected.
 - a. Next press the “Jog” pushbutton. The elevator will move only while the Jog pushbutton is pressed or the elevator has advanced to the next loading position.
 - b. To advance the elevator again, repeat the above step.
- 4) When finished jogging the elevator and to resume running in auto mode, move the Manual/Auto switch back to the “Auto” position.
- 5) **(Optional Operation)** Case Pass Through
 - a. In manual mode the back stop can be forced up or down to let select cases through

Section 8: Periodic Inspection Guide

8-1: Introduction

NERCON equipment is designed to operate with a minimum of maintenance. Downtime on any part of a system involves both time and money. Certainly not all breakdowns or failures can be detected before they occur; however, many can be prevented if you follow a regular periodic inspection program. When you install new equipment, you should establish a schedule of periodic inspection. The inspection procedures outlined in this manual provide an easy means of determining the operational status of the equipment. This will enable you to identify possible trouble areas, so that the suspect condition does not deteriorate to the point of equipment failure.

8-2: Purpose

The objective of the periodic inspection schedule is to ensure that the equipment performs at maximum efficiency over a long period of time. This helps to eliminate costly repairs. Do not assume that trouble will occur and, therefore, pass over inspection items. Standardized procedures ensure effective control over maintenance operations and enable you to compare equipment in order to evaluate the inspection program.

Note: Replace any faulty parts immediately upon discovery during scheduled inspections.

8-3: Periodic Inspection

In the course of elevator operation, periodic inspection of the system is required to detect problems and make repairs before serious damage occurs. The important thing is to set up a regular inspections and maintenance schedule.

Elevator Checklist: (Daily/Weekly/Monthly)

- D:** During operation monitor belt performance for any irregularities.
- D:** Check for any product spillage or build up that would affect belt performance.
- D:** Belt length / take-up position. (Daily for first 500 hours of operation only)
- W:** Belt length / take-up position. (Weekly after 500 hours of operation)
- W:** Inspect entire belt length for any damaged or missing belt modules.
- W:** Inspect entire belt for any damaged or missing flights.
- W:** Check for any foreign debris on or around the belt path.
- W:** Look for unusual wear patterns on the belt surface.
- W:** Examine sprockets for signs of dirt build-up in tooth pockets.

- M:** Examine drive sprockets for signs of excessive wear.
- M:** Check the carry way wearstrips and return way shoes for excessive wear.
- M:** Verify no buildup on cylinder shaft

8-4: Cleaning

In general, the elevator can be treated like most other conveyor in the plant. Some major differences apply based on the level of washdown you have purchased. This is directly related to the operational environment your case elevator will reside in.

8-4.1: Non-Washdown Elevators

- Non-washdown elevators are not intended to be completely sprayed down. However if absolutely required “spot” rinsing can be an effective way to clean isolated areas of contaminants. These areas should be dried immediately when cleaning is complete to prevent any unwanted corrosion.
- Non-washdown units are recommended to be wiped down with clean rags until clean.

8-4.2 Washdown Elevators

- In washdown environments it is advisable to clean the case elevator unit by means of a spraying system with a cleaning agent followed by a clean water rinse. This should be done while the unit is running to help the cleaning process. The unit should also be allowed adequate time to dry before returning to production.
- Follow belt manufacturer’s recommendations regarding appropriate cleaning compounds for the plastic belt. (Mild foaming agents recommended)
- While all electrical components used are rated for wash-down duty, it is not recommended to directly spray any photo eyes, proximity sensors, etc. with high pressure water.

Section 9: Troubleshooting

9-1: Electrical and Pneumatic Troubleshooting

Machine Faults:

When a machine fault occurs the blue Reset Button will be flashing. Press blue reset button after cause is corrected.
 Note: Optional beacon stack may be present, a red light will flash and a horn will sound in addition to the flashing reset button when a fault occurs.

<u>PROBABLE CAUSE OF FAULT</u>	<u>ITEMS TO CHECK</u>
1. A flight from one or both of the vertical conveyors has taken too long to move out of the position sensors field of detection	<ul style="list-style-type: none"> • Motor starter not energizing: <ul style="list-style-type: none"> ○ Refer to Probable Cause #7.
2. A flight from one or both of the vertical conveyors has taken too long to from one flight to the next flight	<ul style="list-style-type: none"> • Motor starter de-energized before the index cycle completed: <ul style="list-style-type: none"> ○ Refer to Probable Cause #7. • Flight detect sensor may be out of alignment and missed detecting the flight of the vertical conveyor during the index cycle. <ul style="list-style-type: none"> ○ One located on each vertical conveyor.
3. Discharge pusher: Not detected in extended or retracted position, or extend/retract cycle taking too long.	<ul style="list-style-type: none"> • Verify air supply turned on. • Check for adequate air pressure. • Not enough air volume being supplied. • Cylinder extend or retract detect sensor moved from proper position. • Cylinder extend or retract detect sensor failure. • (Optional Device) Solenoid operated safety air dump valve detected low pressure. <ul style="list-style-type: none"> ○ Refer to Probable Cause #10
4. Elevator infeed jam: Case is not detected by the “Case at stop sensor” and case have been backed up to the “Case detect sensor” for a period of time	<ul style="list-style-type: none"> • Case has jammed between the elevator hold down plate and the vertical conveyor flights. • If case is at the back stop and backed up to the “Case at stop sensor”: <ul style="list-style-type: none"> ○ The “Case at stop sensor” may not be detecting the case. • The “Second case sensor” (Optional Operation) may not be detecting the case.
5. Elevator overtravel condition	<ul style="list-style-type: none"> • Case has been raised to a point that the “Overtravel Sensor” has been blocked. • Overtravel sensor may be out of alignment. • Overtravel sensor may be set too low. • Elevator vertical conveyors discharge height may be set too high. <ul style="list-style-type: none"> ○ Flight detect sensors may require adjustment to lower the discharge height.
6. Safety contactor(s) not energizing	<ul style="list-style-type: none"> • Blown motor fuse(s).
7. Motor starter not energizing	<ul style="list-style-type: none"> • Blown motor fuse(s). • Tripped motor starter overload. <ul style="list-style-type: none"> ○ Verify overload setting is the same as motor full load amperage (FLA) specified on the motor nameplate. • (Optional Devices) Motor disconnect(s) turned off.

<u>PROBABLE CAUSE OF FAULT</u>	<u>ITEMS TO CHECK</u>
8. (Optional Operation) Open flap detected: Infeed conveyor stops with case in front of “Open flap detect sensor”	<ul style="list-style-type: none"> • Verify height of “Open flap detect sensor” is adjusted correctly. • Inspect case for a flap which has not sealed properly.
9. (Optional Device) Motor disconnect	<ul style="list-style-type: none"> • Motor disconnect(s) turned off.
10. (Optional Device) Solenoid operated safety air dump valve in lock-out condition	<ul style="list-style-type: none"> • Solenoid operated safety air dump valve: <ul style="list-style-type: none"> ○ Detected low pressure: <ul style="list-style-type: none"> ▪ If air supply was turned off or the air pressure was too low, the valve will have faulted. Reset the valve by resetting the safety circuit. ▪ Air pressure may be too low. Minimum of 30 psig is required. ▪ Inadequate air volume provided to valve may cause too much of a pressure drop in the valve. This may be due to an undersized air supply line at the valve inlet or a restriction in the supply line.
11. (Optional Device) Back Stop Cylinder: Not detected in extended or retracted position, or extend/retract cycle taking too long.	<ul style="list-style-type: none"> • Verify air supply turned on. • Check for adequate air pressure. • Not enough air volume being supplied. • Cylinder extend or retract detect sensor moved from proper position. • Cylinder extend or retract detect sensor failure. • (Optional Device) Solenoid operated safety air dump valve detected low pressure. • Refer to Probable Cause #10

Non-Fault Problems:

Below are situations which may occur when trying to start machine or machine start has been initiated and condition is not considered a fault.

<u>POSSIBLE SITUATION</u>	<u>POSSIBLE REASON FOR SITUATION</u>
1. Pressing “Start” and machine does not start.	<ul style="list-style-type: none"> • Verify E-Stop pushbutton(s) pulled out and safety circuit has been reset by pressing the Reset pushbutton. • Manual/Auto selector switch in “Manual” position: <ul style="list-style-type: none"> ○ Move switch to “Auto” position. • Discharge pusher not detected in retracted position: <ul style="list-style-type: none"> ○ Refer to Probable Cause #4. • Elevator flights not in home position: <ul style="list-style-type: none"> ○ Flight position sensor for left and right side vertical conveyors should be blocked by flight. ○ If flight(s) are out of position, manually jog flights to reposition the flight or flights.
2. Infeed conveyor not running	<ul style="list-style-type: none"> • Backup condition detected by the case detect sensor on the infeed conveyor. <ul style="list-style-type: none"> ○ Backup may be due to: <ul style="list-style-type: none"> ▪ Downstream equipment/conveyor not ready to receive cases. ▪ Discharge “Clear to push sensor” may be blocked or misaligned. ▪ “Case at stop sensor” may not be detecting the case. • Motor fuses have blown.

3. Case at stop inside elevator, but not indexing up.	<ul style="list-style-type: none"> • Downstream equipment/conveyor not ready to receive cases. • Discharge “Clear to push sensor” may be blocked or misaligned. • “Case at stop sensor” may not be detecting the case.
4. Case at discharge position in front of the pusher, but not being pushed out of elevator.	<ul style="list-style-type: none"> • Downstream equipment/conveyor not ready to receive cases. • Discharge “Clear to push sensor” may be blocked or misaligned.
5. (Optional operation) Elevator set to index two cases but indexes when one case is at the back stop.	<ul style="list-style-type: none"> • Elevator has initiated purge mode because second case was not present before set time elapsed. • Second case detect sensor is detecting back of the first case when the first case is at the back stop. Controller then assumes second case is present in the elevator. <ul style="list-style-type: none"> ○ Adjustment of “Second case sensor” may be needed.

9-2: Mechanical Troubleshooting

Problem	Possible Cause
Belt stops for a second, then snaps loose.	2
Belt, it takes a considerable force to pull the belt away from the drive more than a fraction of an inch.	6
Case not entering elevator	8, 9
Case being crushed or skewed at infeed	10, 11, 12
Case not being elevated/belt flights not moving	2, 7, 13
Belt skipping teeth	1

	Possible Cause	Corrective Action
1	Belt loose	A
2	Belt obstruction	C, E
3	Bearing Failure	D
4	High carry way friction	C, D
5	Belt Stretch/Elongation Limits	D
6	Belt too tight	B
7	Flights too far apart	F
8	Flights too close together	F
9	Hold down too low	G
10	Hold down too high	G
11	Backstop extended to far	H
12	Backstop not extended far enough	H
13	Broken coupling between Demag motor and Dodge reducer	D

Corrective Actions:

- A Extend Take-up
- B Retract Take-up
- C Clean
- D Replace with proper design component
- E Correct cause condition
- F Adjust width using handwheel
- G Adjust hold down height
- H Adjust backstop

Section 10: Support Drawings

10-1: Case Elevator Nomenclature



NERCON CASE
ELEVATOR_CASE ELE

10-2: Case Elevator Standing-Up Procedure



NERCON CASE
ELEVATOR_CASE ELE

10-3: Case Elevator Electrical Components Drawing



CASE ELEVATOR
ELECTRICAL COMPOI

Section 11: Spare Parts List

(ADD SPARE PARTS LIST ASSOCIATED WITH PROJECT NO.)

Section 12: Supplemental Manuals

12-1: Intralox Belting



Intralox Belt Manual



Intralox Series
400.pdf

12-2: Demag Brakemotor



Demag Brake
Motor.pdf

12-3: Dodge Reducers



Dodge Tigear 2



Dodge Instructions



Dodge Tigear 2
Lubricants

12-4: Dodge Bearings



Dodge EZ_Kleen
Bearings.pdf

12-5: Bimba Cylinders



BIMBA Double Wall
Cylinder General Rep



Bimba Linear
Thruster Service and