iREL
INTELLIGENT
REL SYSTEMS

Safe • Robust • Controlled

World Class Equipment

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iREL Systems

Material Handling Reference Information

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Warning and Disclaimer

Correct usage of this machine is important to assure the expected machine functionality as well as operator safety. Read this manual thoroughly.

The information in this document is subject to change without notice and should not be construed as a commitment by REL, Inc. REL, Inc. assumes no responsibility for any errors that may appear in this manual.

In no event shall REL, Inc. be liable for incidental or consequential damages arising from use of this manual or of the software and hardware described in this manual.

For questions, comments, or concerns please contact REL, Inc. during normal business hours: Monday through Friday, 8:00 am to 5:00 pm EST.

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Contents

Chapter 1 – Overview

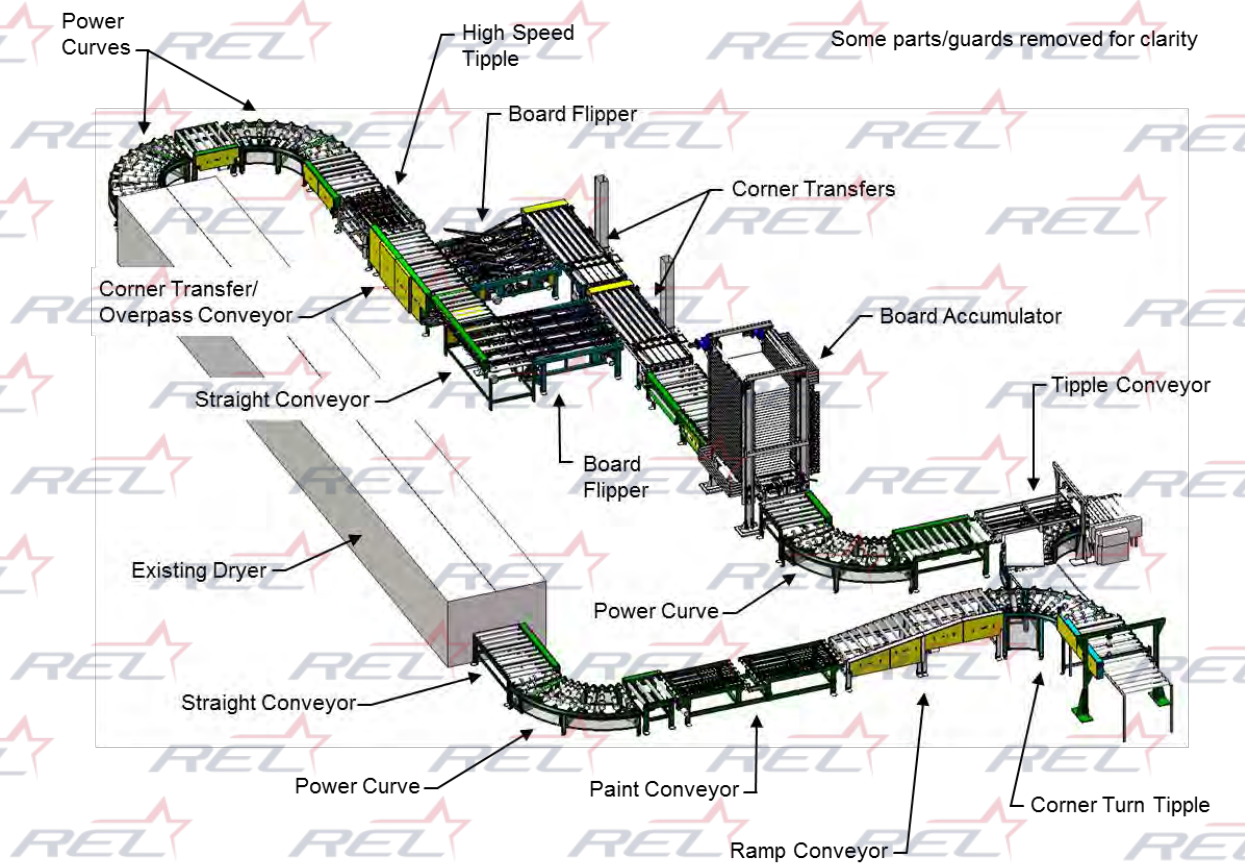

Figure 1: Example Overall Line Layout

REL, Inc. builds conveyor systems for manufacturing processes. This example project consists of a new corner turn tipple, ramp conveyor, paint conveyor, powered corner turn and straight conveyors, high speed tipple, two flipper conveyors, two high speed corner transfer conveyors, a board accumulator, and tipple conveyor. Included in this project is a new board dryer that was supplied and installed by others. The conveying system is designed to process boards from 30" x 60" to 52" x 120". Following is a brief description of each piece of equipment supplied and built by REL.

Corner Turn Tipple Conveyor

The REL Corner Turn Tipple Conveyor is manufactured to smoothly transition the board to either the new paint line or to by-pass the paint line and continue to the existing main line. The board rides on lineshaft driven rollers on this conveyor.

Ramp Conveyor

The REL Ramp Conveyor is manufactured to smoothly transition the board from the 70" elevation of the Quarter Turn Power Curve to the 42" height of the Paint Conveyor. The board rides on lineshaft driven rollers on this conveyor.

Paint Conveyor

The REL Paint Conveyor has driven infeed and outfeed belt beds with a gap provided to accept the curtain coater provided by others. The infeed and outfeed conveyors are linked with a timing belt to ensure constant speed through the paint conveyor. The paint is applied with the board completely flat. The corner turn conveyor following the paint conveyor is positioned such that the board will not start turning until the tail end has exited the paint stream.

Quarter Turn Power Curves

The REL Power Curve Conveyor is manufactured to smoothly transition the board around 90 degree corners in the conveying process. The board rides on lineshaft driven rollers on these conveyors.

Straight Conveyors

The REL Straight Conveyors are manufactured to move the board in the conveying process. Edge guides are provided as needed to control product flow. The board rides on lineshaft driven rollers on these conveyors.

High Speed Tipple

The REL High Speed Tipple Conveyor consists of a tipple frame that incorporates two sets of driven belt beds. It is designed to separate the incoming product stream onto two stacked outfeed conveyors leading to the board flippers. Each board will alternately be directed to the upper level and Flipper #2 or the lower level and Flipper #1. The tipple frame pivots around a point at the outfeed end, with the infeed end moving up and down. As a board enters the tipple in the down position (top belt bed), the tipple starts indexing up before the board is completely through. The next board enters with the tipple frame in the raised position (lower belt bed) and passes completely onto the tipple conveyor before the tipple indexes back to the down position. The tipple frame is actuated by way of a rotary servo motor, raising or lowering the frame depending on the sequence.

Corner Transfer/Overpass Conveyor

The REL Corner Transfer/Overpass Conveyor is built to either feed the first board flipper or by-pass the first flipper and feed the second board flipper. The overpass portion of this conveyor consists of a stationary lineshaft driven roller bed that moves the board over the top of the corner transfer portion of this conveyor to feed the second board flipper. The corner transfer portion of this conveyor consists of a stationary lineshaft driven roller bed, and pop-up belt transfer with an integral vacuum system. The function of the corner transfer portion is to take board moving down the line and change its direction, exiting at a right angle to the infeed flow and depositing the board on the first board flipper. As the board enters the infeed end on the roller bed, sensors indicate position up against the stop fence. The belt bed then raises by way of a rotary servo motor, lifting the board off the rollers and transferring it off the conveyor. The vacuum assist on the belt bed helps in maintaining good contact with the conveyor belts to prevent slipping as the board accelerates.

Board Flipper #1 & #2 Conveyors

The REL Board Flipper Conveyors are built to flip the board from a face up orientation to a face down orientation. Flipper #1 consists of an infeed driven belt bed that transfers the board to the flipper arms that perform the flipping process, and an out-feed driven belt bed that transfers the board to the corner transfer conveyor. As the board enters the infeed end on the belt bed, sensors detect the position of the board and stop the infeed belts when the leading edge of the board reaches the pivot point of the flipper arm mechanism. The lifting arm side of the flipper tilts the board to approximately 90 degrees allowing the board to transfer to the lowering arm side of the flipper. The lowering arm then pivots down to the horizontal position and leaves the board on the outfeed belt bed which moves the panel on to the corner transfer conveyor. Flipper #2 is similar to flipper #1 with the exception that it does not incorporate an infeed belt bed. The lifting flipper arms nest with the rollers on the overpass conveyor.

Although the primary purpose of the this line is to paint the back side of the board, a secondary function is to apply a third coat of paint to the front side of the board. In this mode all board will travel through Flipper #1, but will not be flipped. The board will simply pass through on the belt conveyors.

Corner Transfer Conveyor

The REL Corner Transfer Conveyor consists of a stationary line shaft driven roller bed, and pop-up belt transfer with an integral vacuum system. The function of the corner transfer conveyor is to take board moving down the line and change its direction, exiting at a right angle to the infeed flow. As the board enters the infeed end on the roller bed, sensors indicate position up against the stop fence. The belt bed then raises by way of a rotary servo motor, lifting the board off the rollers and transferring it off the conveyor. The vacuum assist on the belt bed helps in maintaining good contact with the conveyor belts to prevent slipping as the board accelerates.

The two high speed transfer conveyors on the outfeed side of the flippers work as the traffic control conveyors for metering the two product streams back into one flow going into the board accumulator.

Board Accumulator

The REL Board Accumulator is built to remove board from the line flow, store the board in an indexed vertical stack, and finally placing the board back on the conveyor line. This accumulator has the capacity to empty the entire dryer to eliminate the risk of fire. The conveyor consists of lineshaft driven rollers to move the board through the conveyor unit, and sprocket driven chain elevator arms on both sides of the conveyor. The elevator arms lift the board from both sides, providing adequate support for the entire board. The accumulator has the capacity to store 35 boards.

Tipple Conveyor

The REL Tipple Conveyor is built to move the board running on this line, back onto the existing conveyor line. The conveyor consists of a powered belt conveyor mounted on a tipple frame that pivots at the infeed end, lowering the outfeed end to the height of the existing conveyor line elevation. The tipple frame nests with the existing power curve. With the tipple raised, board will travel through from the old ramp conveyor. Lowering the tipple frame allows product to flow from the new line.

Overall Process Line

The fully automated REL conveyors are designed and manufactured to be safe, robust and controllable, providing dependable, trouble free operation with minimal professional maintenance. All conveyors are provided with proper guarding to ensure safe operation. Chapter 6 provides equipment pictures and recommended spare parts.

Chapter 2 – Operation

Getting Started

This line is controlled from two HMI screens. One is installed in the Paint Coater control panel, CP-2000, and the other is in the Main control panel, CP-1000. The Overview screen shows the status of each motor and allows you to select board size. Each Zone screen shows the speed of each motor in that zone and with security login, allows you to manually turn on all the motors in that zone. The Alarm Summary screen shows a list of alarms. It can be accessed by pressing the "Go To Alarm" button on the Overview screen.

Overview

The Overview screen is for monitoring the system and selecting the main control functions.

Indicating Functions:

- Motor Status:
  - Each motor will be green if it is running, grey if it is off, or red if it is faulted

- Servo Motor Status:
  - The servo motors will be green if they are ready and grey if they are off or faulted

- Alarm/faulted motors/servos:
  - In the event that a motor faults, an alarm will be triggered and it will turn red on the Overview screen
  - All active alarms will scroll across the bottom of the Overview screen and across the top of its respective Zone screen.
  - Alarms can also be viewed on the Alarm Summary screen

- Zone STATUS
  - There is an indicator for each zone, this will show gray when the zone is not active and it will show green when the zone is enabled (or active)

- ESTOP Status
  - This indicator will show green when an ESTOP is not tripped and it will show red when an ESTOP is tripped
  - ESTOP NOTES:
    - There are (3) ESTOPs on the system, one each in CP-1000, CP-2000, and on the Stacker/Accumulator Area guarding inside of the line

- System Restart
  - After ESTOP:
    - To restart the line after an ESTOP was pressed use the start zone ## motors button in all the zones starting with zone 7 and counting down
  - After Zone Fault:
    - To restart after a Zone fault start the zones that stopped from the highest number to the lowest
  - During a startup sequence:
    - If a zone faults out during a startup sequence fix the fault and start the faulted zone and the startup sequence will continue.
  - Zone 5 or Zone 6 Lock out:
    - If Zone 5 or 6 is locked out each of the servo motors will have to be reset using the reset popup accessed by clicking on each servo.

Control Functions:

- REMOTE/LOCAL Mode selection
  - This button is security protected, you have to be logged in to change it
  - During normal run the line will be in REMOTE mode
  - In REMOTE mode the line will be started/stopped from the main plant DCS/Control System
  - In LOCAL mode the line can be started/stopped from the (2) local HMIs
    - A “START SYSTEM” button will be visible in Local mode
- PRODUCT SIZE selection
  - This button is NOT security protected
  - This button selects the board size (4’ x 8’ or 4’ x 10’)
  - Note: The product size cannot be changed when the stop fence is down.
- NO FLIP/FLIP selection
  - This button is NOT security protected
  - This changes the mode of the system to flip the boards or NOT flip the boards
  - In FLIP mode the button will be light gray and will read “PRESS FOR NO FLIP MODE”
  - In NO FLIP mode the button will be dark gray and will read “PRESS FOR FLIP MODE”

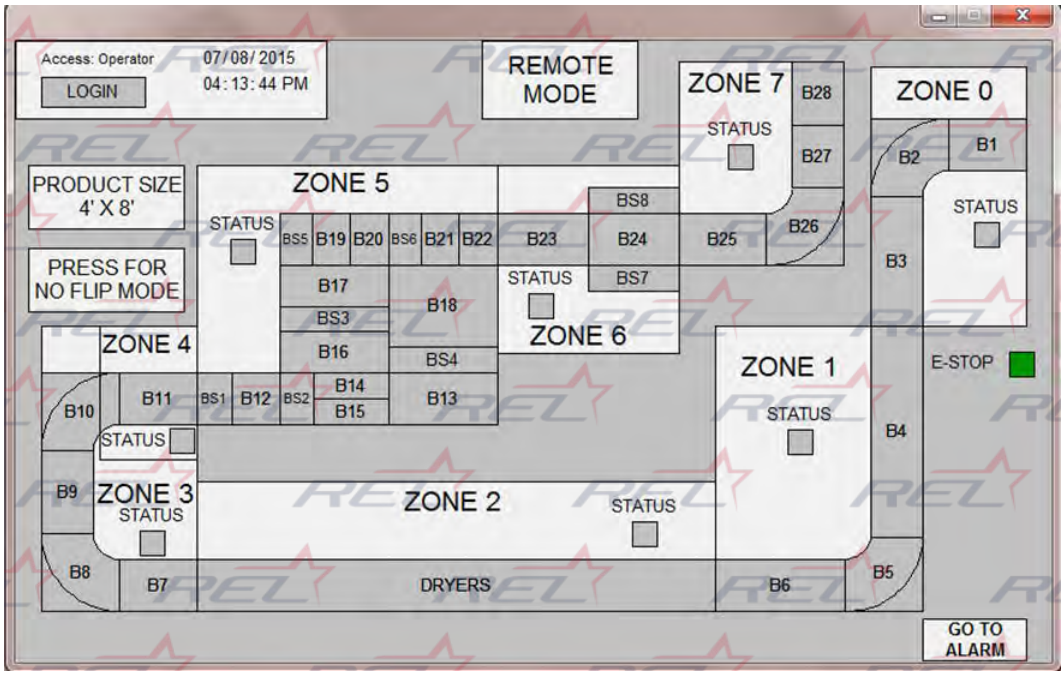

Figure 2: Overview Screen

Login Page

Pressing the “Login” button on any screen allows the user to select Access Level and login and logout. Entering an incorrect password will cause the system to logout of the current Access Level.

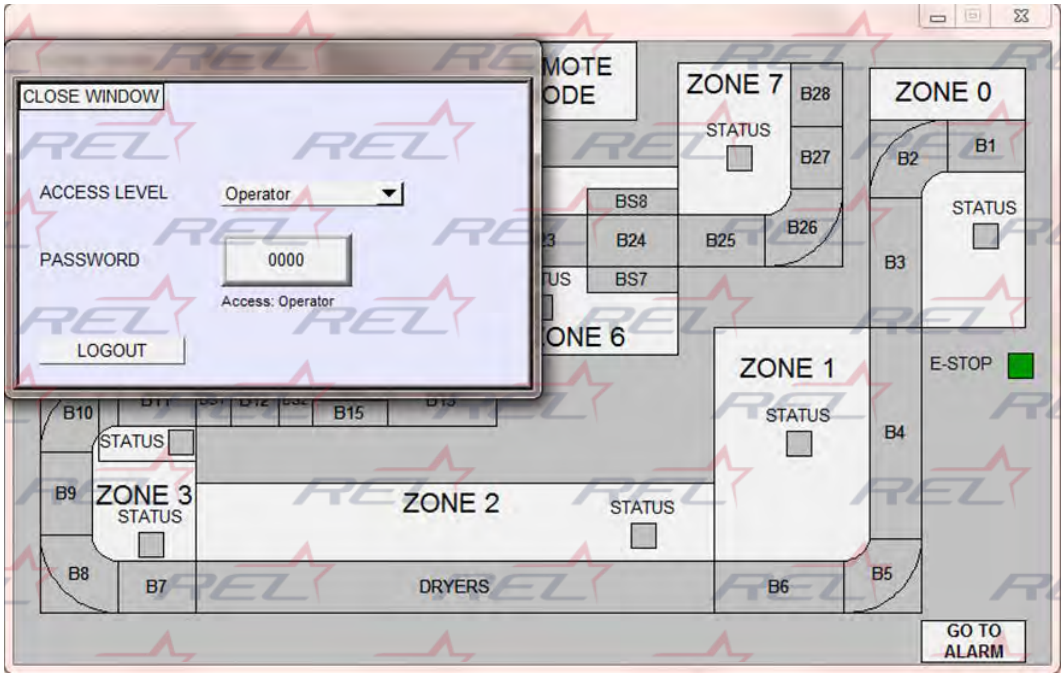

Figure 3: Login Screen

Zone Screens

The screens for Zone 0, Zone 3, Zone 4, Zone 6 and Zone 7 are all very similar. They show each motor in its respective zone, and the number below each motor represents the percentage at which it is running. The "Start/Stop Zone XX Motors" button allows users with access to start an individual zone. The box on the top of the screen is where alarms just for that respective zone will scroll. The status box next to each motor reflects the mode that each motor is in, which are described below:

- Grey → Set to Auto Mode → Off
- Green → Set to Auto Mode → On
- Orange → Set to Manual Mode → Off
- Yellow → Set to Manual Mode → On
- Red → Fault

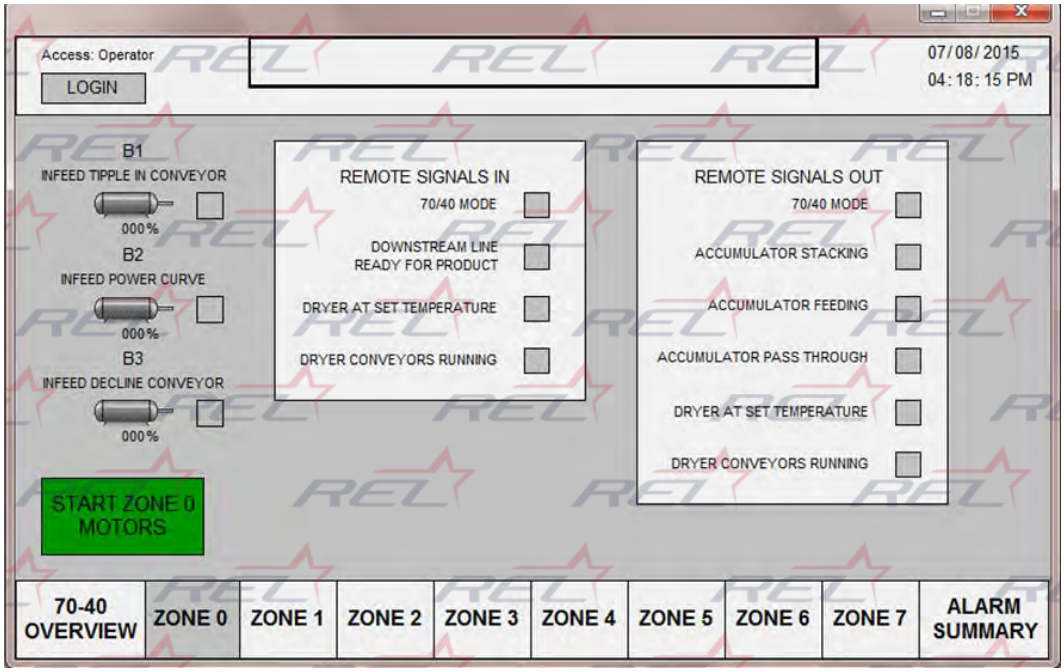

Figure 4: Zone Screen

The Zone 0 screen also has indication for the signal between our control system and the main plant control system upstream and downstream from this system. The signals will show gray when they are off and green when they are on.

Signals into our system from the plant:

- 70/40 MODE – this is the main start/stop signal for REMOTE mode. This is also the signal that will shift the tipples down at the infeed and outfeed of the line
- DOWNSTREAM LINE READY FOR PRODUCT – This is on when the downstream system is ready to accept product from our line. If this is not on the system will go into "STACK" mode on the accumulator
- DRYER AT SET TEMPERATURE – This is a signal from the dryer that indicates that the dryer is at temperature
- DRYER CONVEYORS RUNNING – This is a signal from the dryer that indicate the dryer conveyors are running
    - NOTE about this signal – this signal will turn on the dryer out feed motor B7 as long as our system is powered up

Signals from our system out to the plant:

- 70/40 MODE – this indicates that our system is ready to accept board from the plant. This signal will drop out anytime there is a problem in one of our zones
- ACCUMLATOR STACKING – indicates that we are accumulating board, stacking it up
- ACCUMLATOR FEEDING – indicates that the accumulator is being unloaded, feeding the downstream system
- ACCUMLATOR FEED THRU – indicates that the accumulator is not stacking or feeding/unloading, board is passing thru the accumulator
- DRYER AT SET TEMPERATURE – This is a signal from the dryer that indicates that the dryer is at temperature
- DRYER CONVEYORS RUNNING – This is a signal from the dryer that indicate the dryer conveyors are running

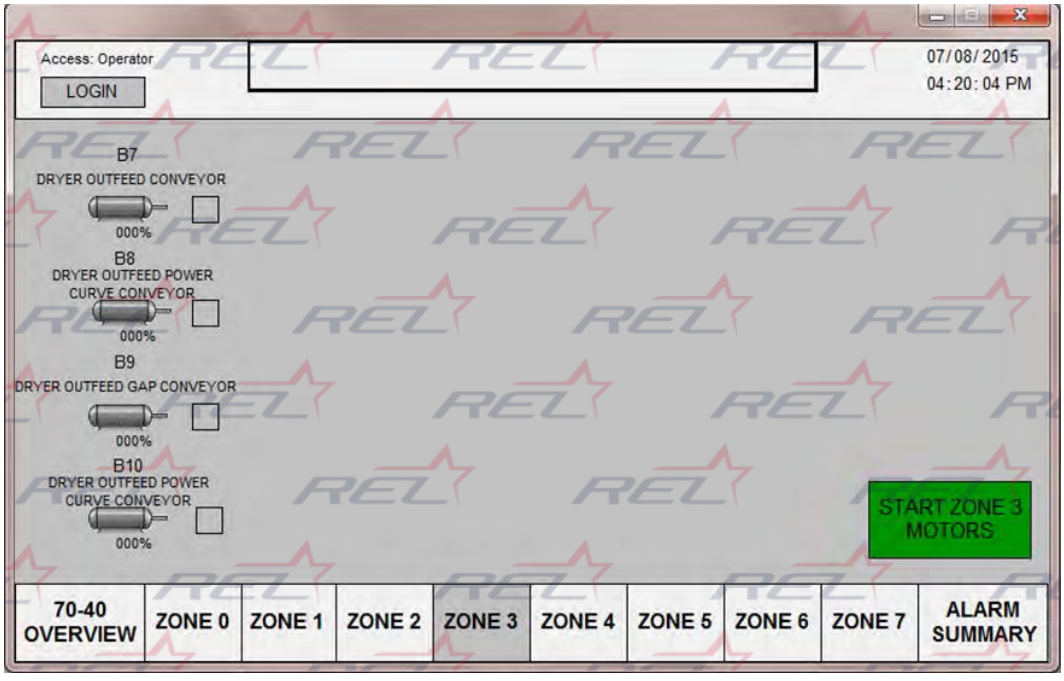

Figure 5: Zone 3

Figure 6: Zone 7

All of the above regarding Zone screens also applies to Zone 1. However, the Zone 1 screen also allows you to turn on the paint system and manually turn on/off the paint motors.

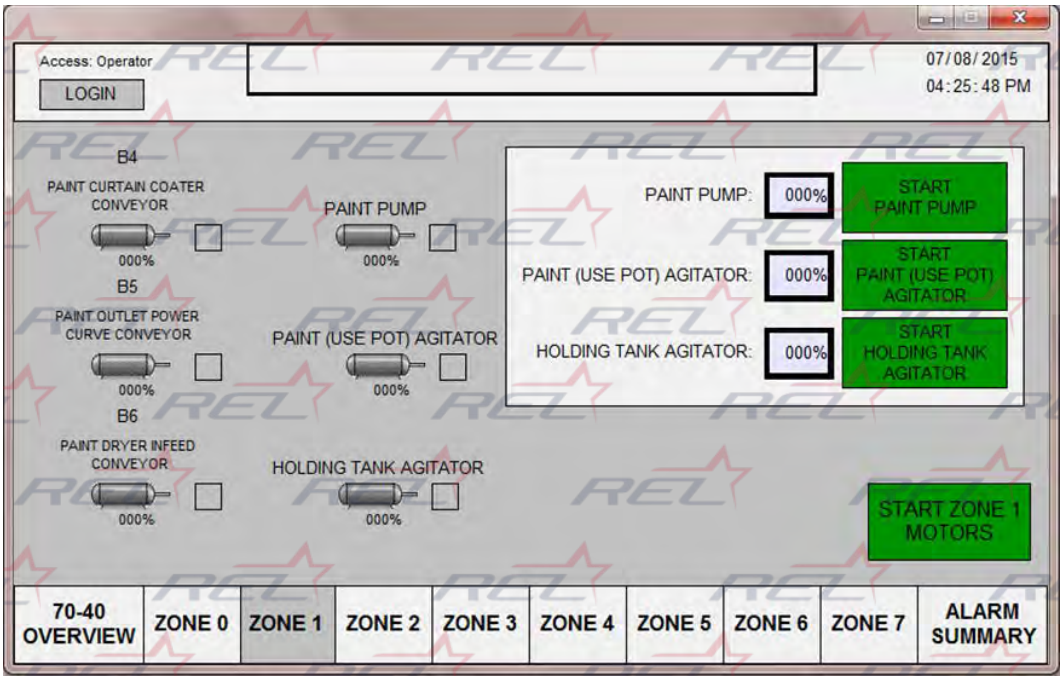

Figure 7: Zone 1

The Zone 5 screen has the same features as the other screen with the ability to reset faulted servos and turn the blowers on and off. If a servo remains grey instead of starting with the rest of the servos it can be reset by pressing on the servo and pressing the reset button on the popup screen.

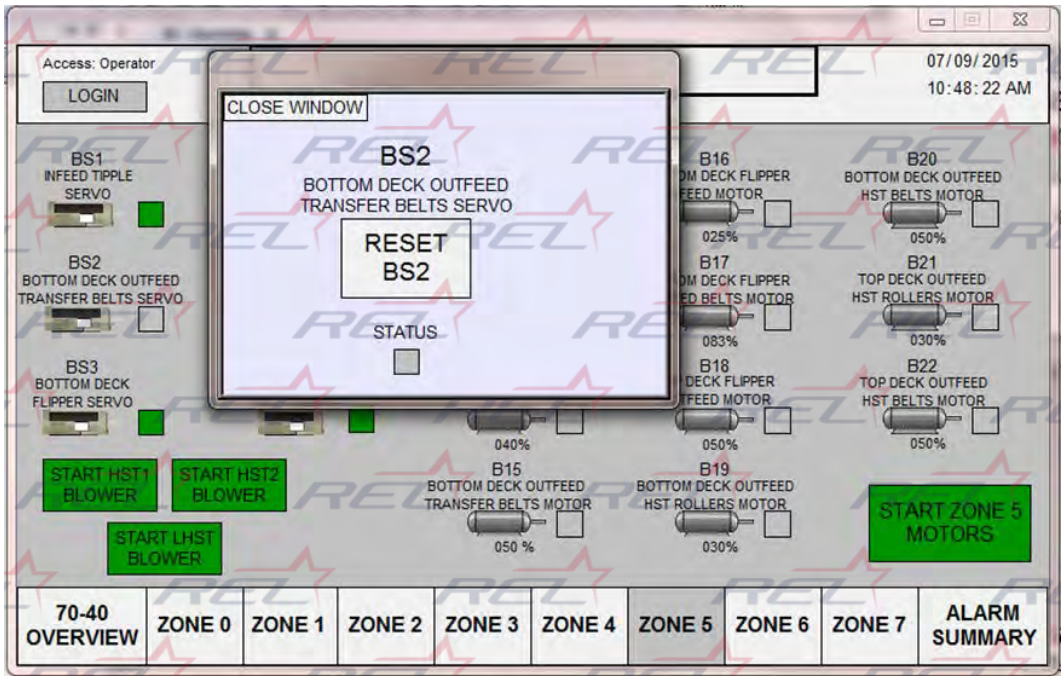

Figure 8: Zone 5

Alarm Summary

The Alarm Summary screen shows all alarms. The text of the alarm will initially be red. Alarms can be acknowledged by selecting them on this screen. The text for acknowledged alarms will be yellow, and turn to green once the alarm trigger has become false. To delete specific alarms, select the alarm and press the "Delete Selected Acknowledged Alarm" button. To clear all alarms, press the "Clear" button.

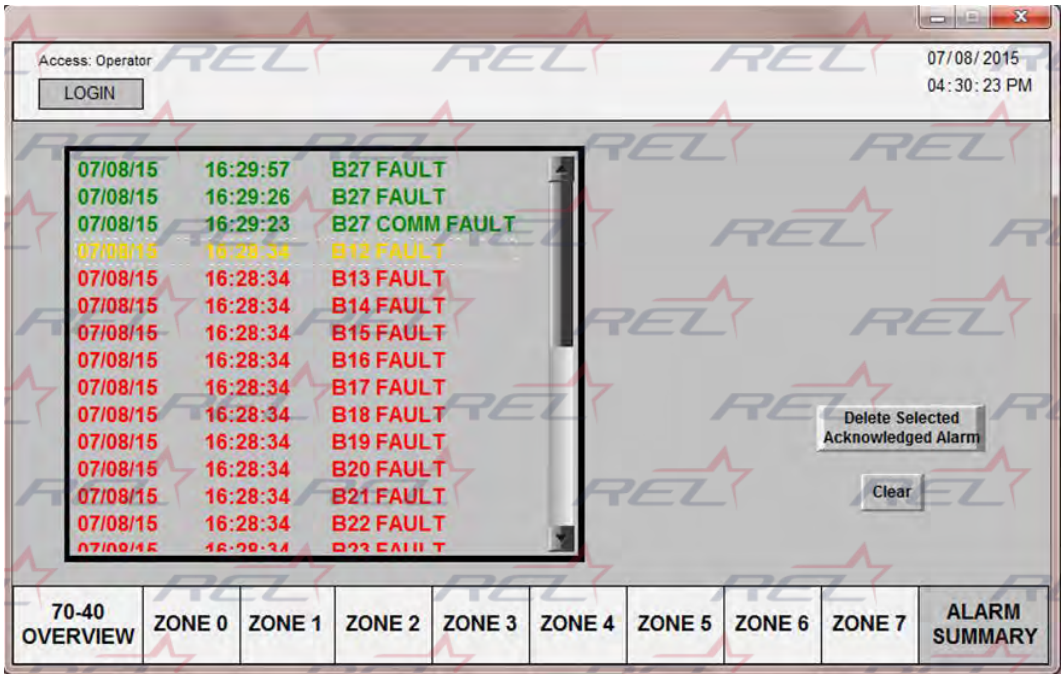

Figure 9: Alarm Screen

Motor MOA Screens

Users with access can manually operate each motor. The Manual-Off-Auto (MOA) screens can be viewed by pressing on the motor icon for the desired motor. When a motor is in Auto mode, you cannot change its speed. If the motor is in Off or Manual mode, a numeric input box will appear. Press on the box to change the motor speed.

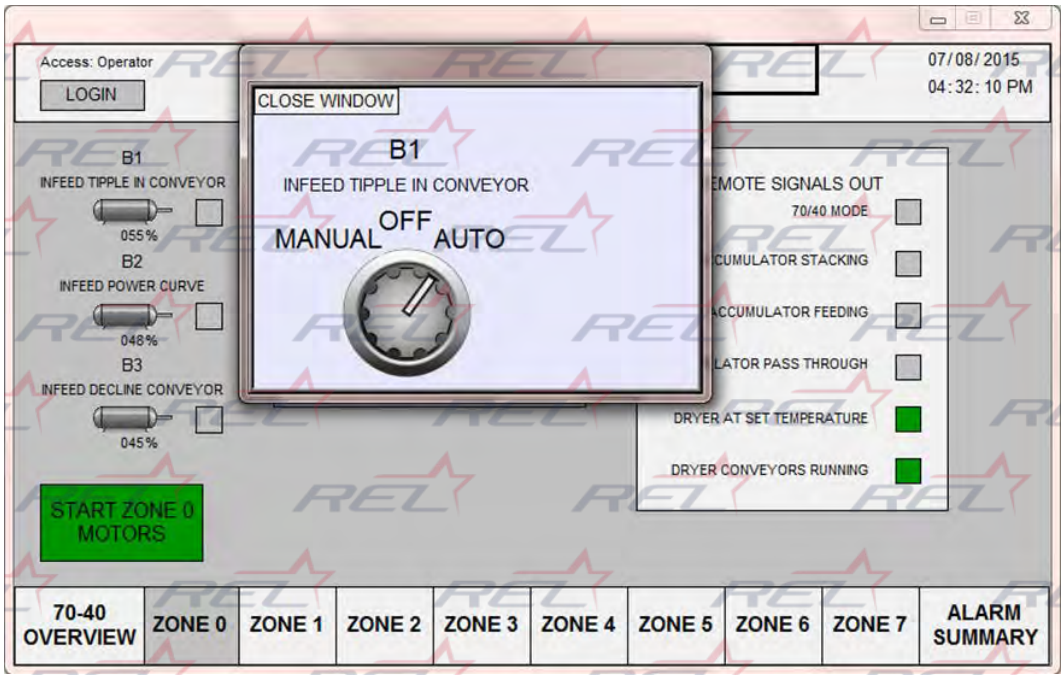

Figure 10: Zone 0 Motors

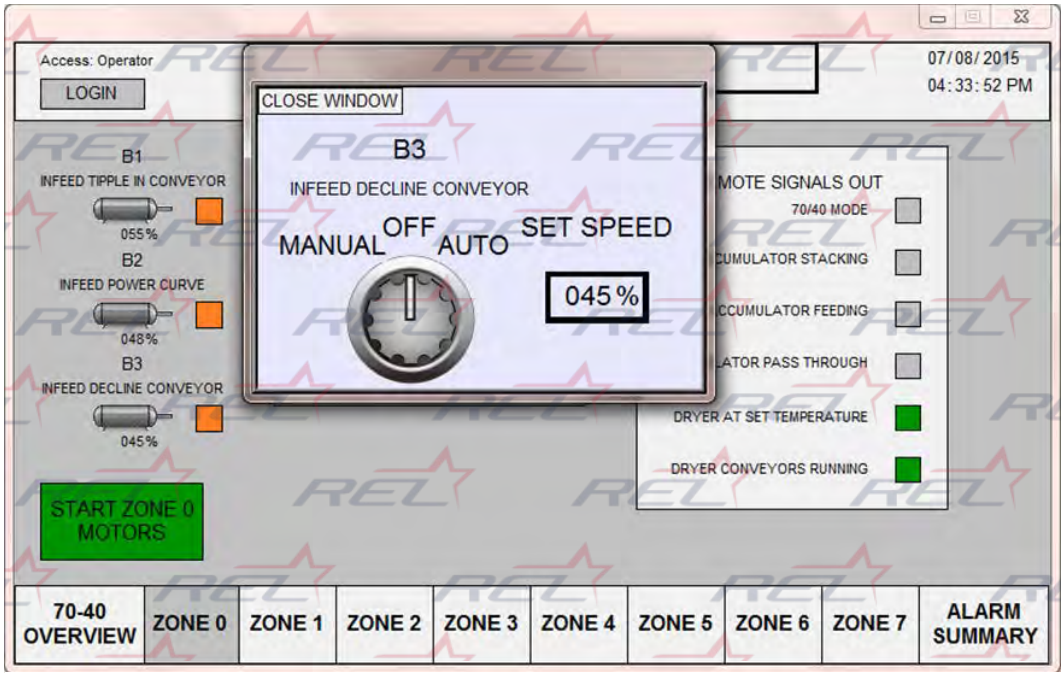

Figure 11: Zone 0 Motors

Chapter 3 – Maintenance

During the course of operation of all REL custom conveying equipment, some routine maintenance will be required. This includes such things as belt inspection, bearing lubrication, inspection of belt guides and edge guides, etc. Links to manufacturers' recommendations are included in the appendix section of this manual. Proper housekeeping/cleanliness will ensure trouble free operation.

All belt idler sheaves have lube for life sealed ball bearings. The drive shafts, conveyor rollers, and servo pivot shafts have pillow block style bearings with zerk fittings for lubrication.

A routine belt inspection would include a quick visual and noise inspection, once a month. A more complete inspection should include such things as ensuring proper belt tension, alignment, drive component wear, etc. Inspect belts for wear or damage and replace as needed.

Chapter 4 – Safety

Hazardous Materials

This equipment does not contain any mercury or mercury compounds. This equipment does not contain any asbestos or materials containing asbestos. This equipment does not have materials containing any polychlorinated biphenyl (PCB). This equipment does not contain any Class 1 Ozone Depleting Substances.

General Safety

Machine owners, operators, maintenance personnel, and service personnel must know that safety practices are a vital part of the job. Whenever maintenance or repair is performed on any part of the Line, all equipment must be in a zero energy state and proper lockout/tagout procedures must be performed.

When putting equipment in a zero energy state, the operator may encounter the following energy sources:

- Electrical power
- Pressurized air
- Components that can fall
- Other potential hazards not listed here

Integrated Safety Features:

Figure 12: REL's integrated safety features- Proximity Sensors (left); Emergency Stops (middle); Light Curtains (right)

Chapter 5 – Preventive Maintenance

Introduction

Preventive maintenance (PM) is essential for the proper operation of the Line. Elements of an effective PM program include documentation, verification of proper operation, routine maintenance, inspection, spare/replacement parts, and electrical maintenance.

CAUTION!
Do not attempt to perform any maintenance on equipment until all safety instruction have been reviewed and all power sources are locked out as described in Chapter 3 - Safety.

Routine Maintenance

Lubrication of Bearings

All of the mounted bearings require grease lubrication.

Gear Box Oil

See manufactures recommendations regarding changing oil in the drive motor gearbox.

UHMW Wear Strips, on conveyors

The wear strips on each conveyor section should be inspected after every year of operation. Replace the wear strip if it shows signs of excessive wear.

Chapter 6 – Illustrated Parts Breakdown

Corner Turn Tipple Conveyor

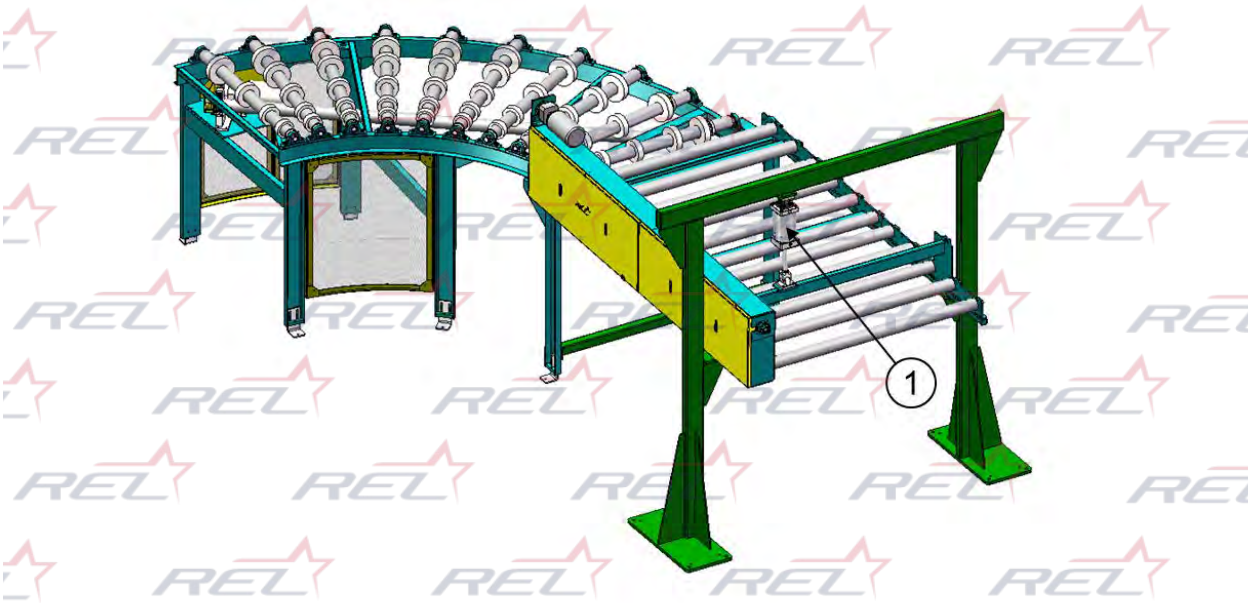

Figure 13: Corner Turn Tipple Conveyor

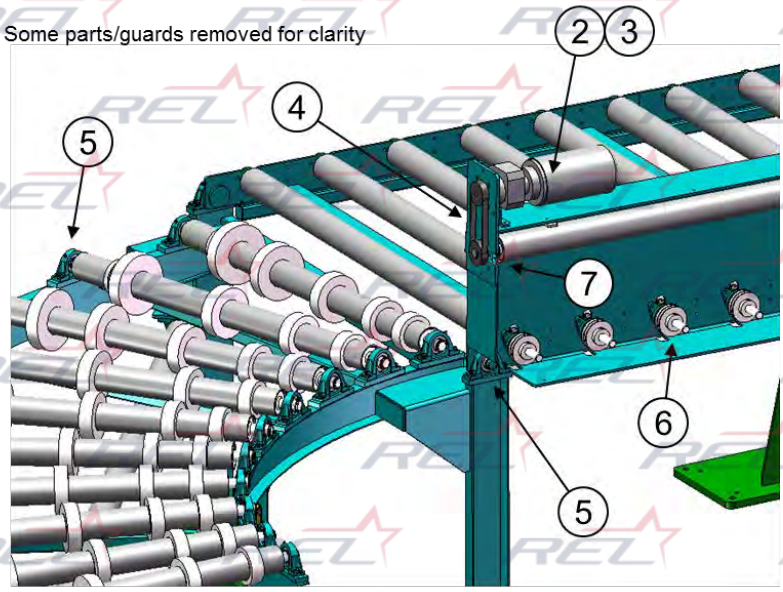

Figure 14: Corner Turn Tipple Conveyor

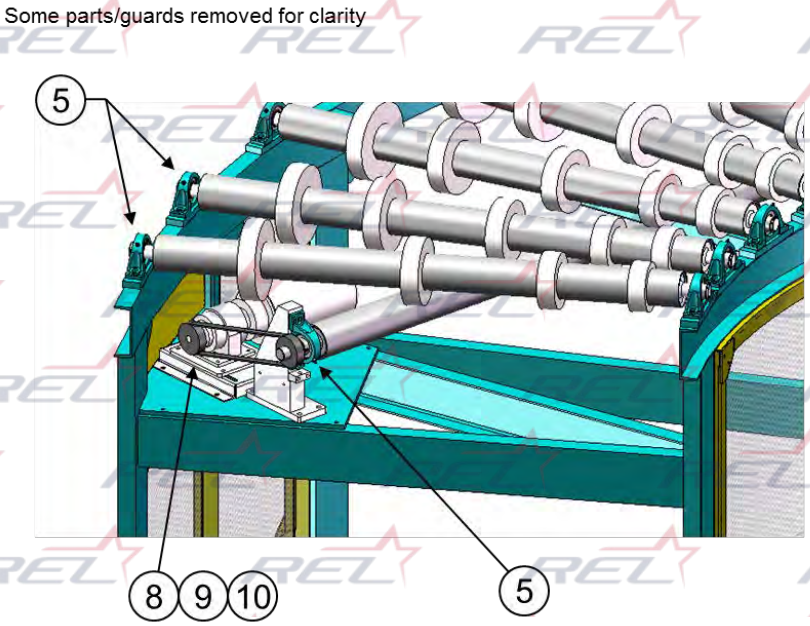

Figure 15: Corner Turn Tipple Conveyor

Figure 16: Power Curve

Corner Turn Tipple Conveyor Parts List

Item #	Description	Qty
1	Air cylinder	1
2	Motor, 2hp, 230/460V, Premium	1
3	Gear reducer	1
4	Polychain Belt, roller drive	1
5	Pillow block bearing	24
6	Flange bearing, 2-bolt	22
7	Flange bearing, 2-bolt	2
8	Motor, 2hp, 230/460V, Premium	1
9	Gear reducer	1
10	Polychain Belt, roller drive	1
-	Fenner Drives 1/2" round urethane belting	11
-	Fenner Drives 3/8" round urethane belting	11

Ramp Conveyor

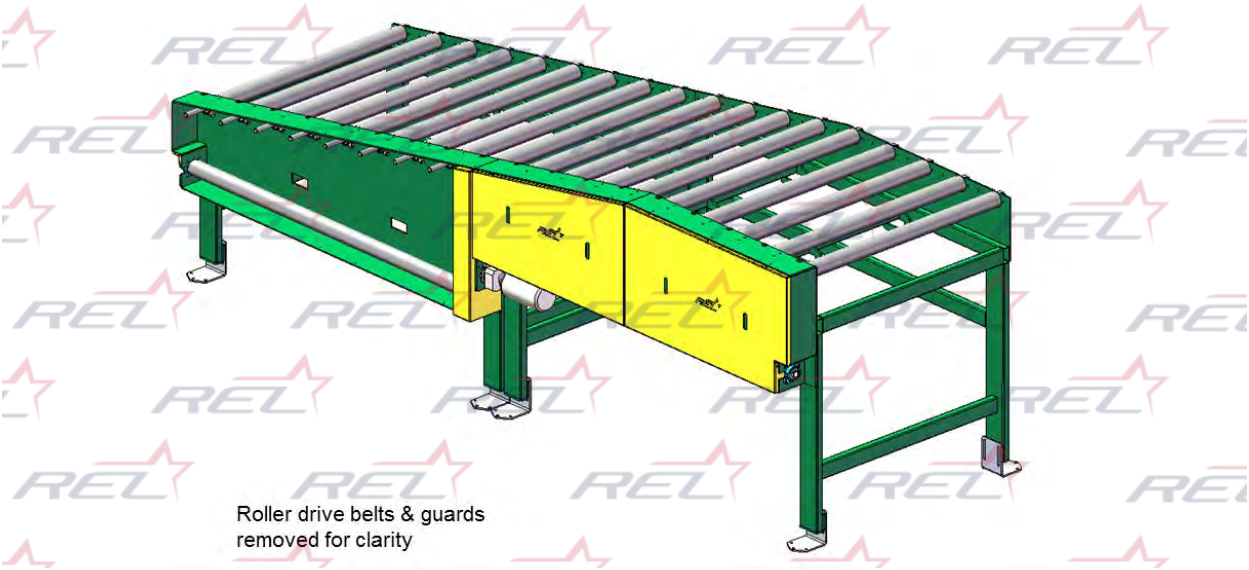

Figure 17: Ramp Conveyor

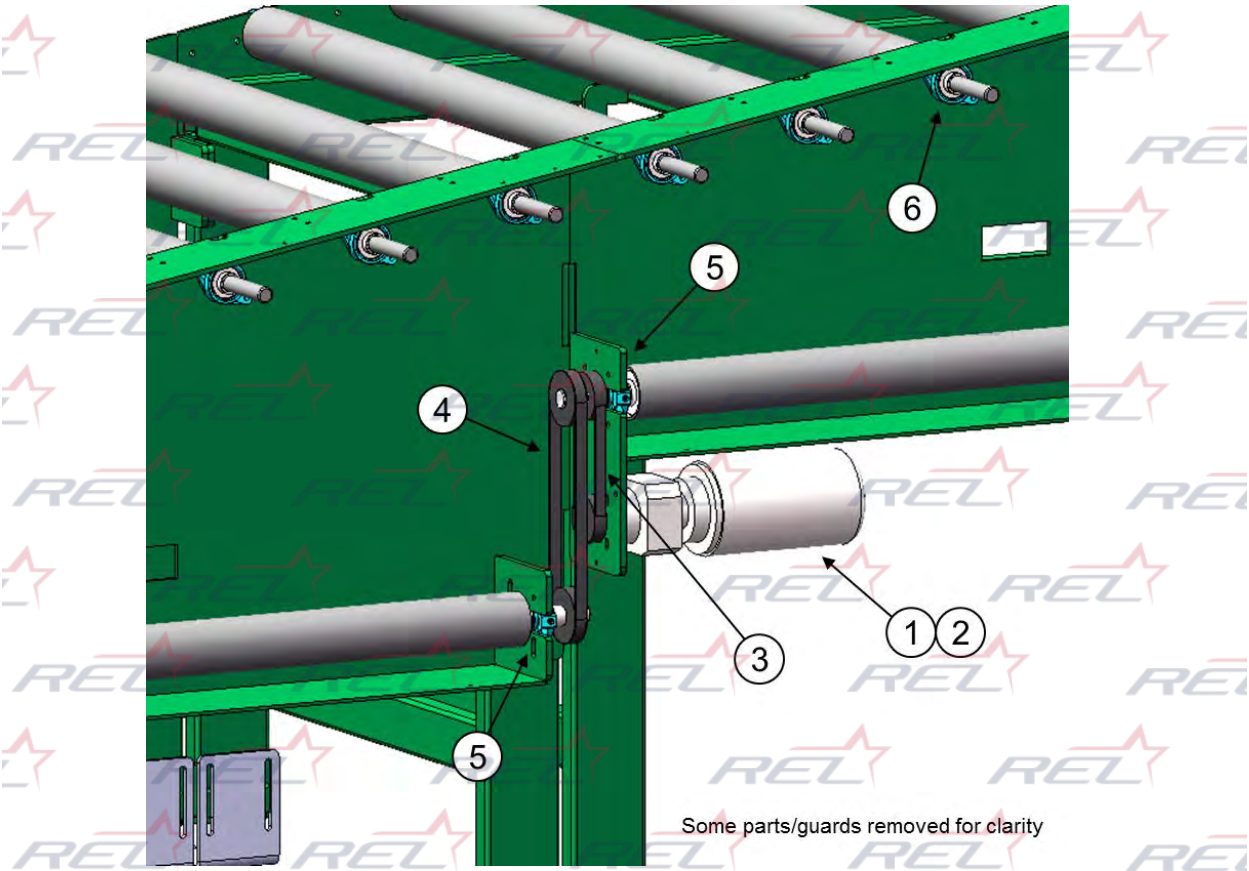

Figure 18: Ramp Conveyor

Ramp Conveyor Parts List

Item #	Description	Qty
1	Motor, 2hp, 230/460V, Premium	1
2	Gear reducer	1
3	Polychain Belt	1
4	Polychain Belt	1
5	Flange bearing, 2-bolt	4
6	Flange bearing, 2-bolt	36
-	Fenner Drives 3/8" round urethane belting	18

Paint Conveyor

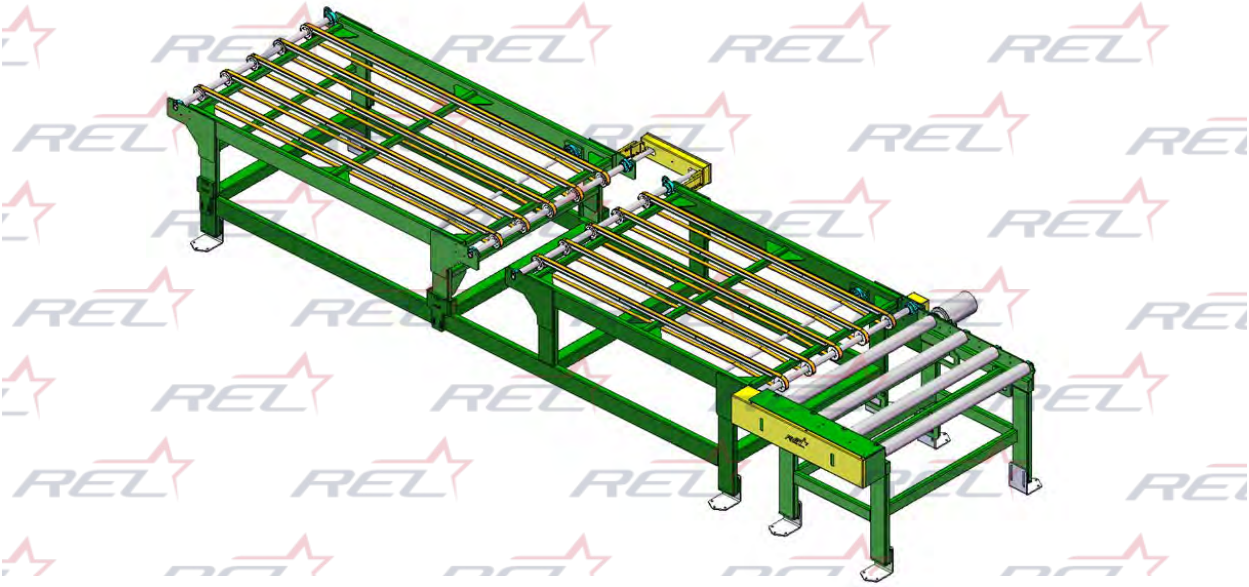

Figure 19: Paint Conveyor

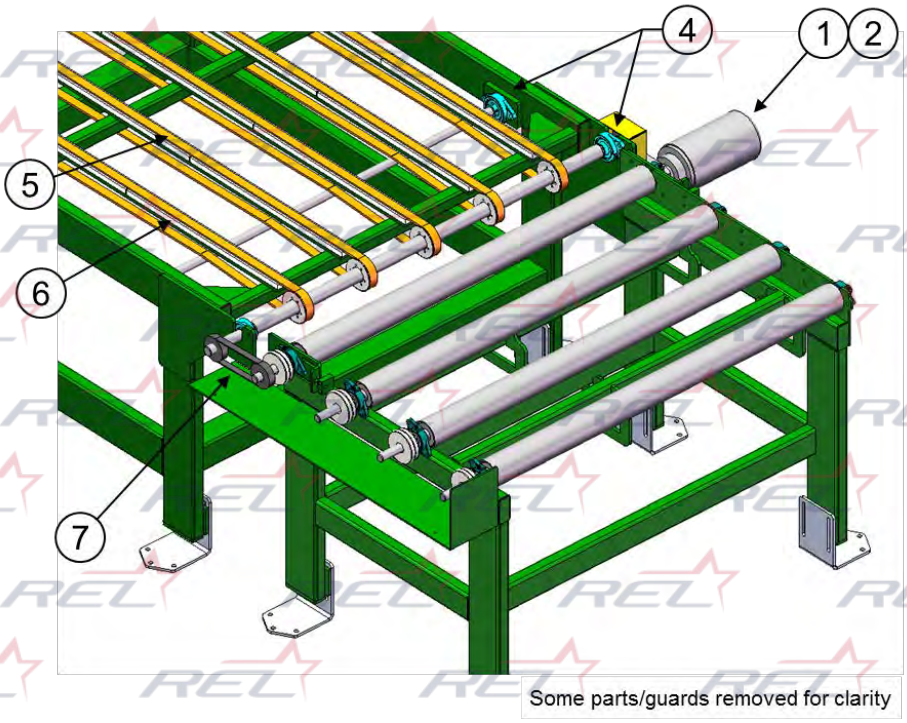

Figure 20: Paint Conveyor

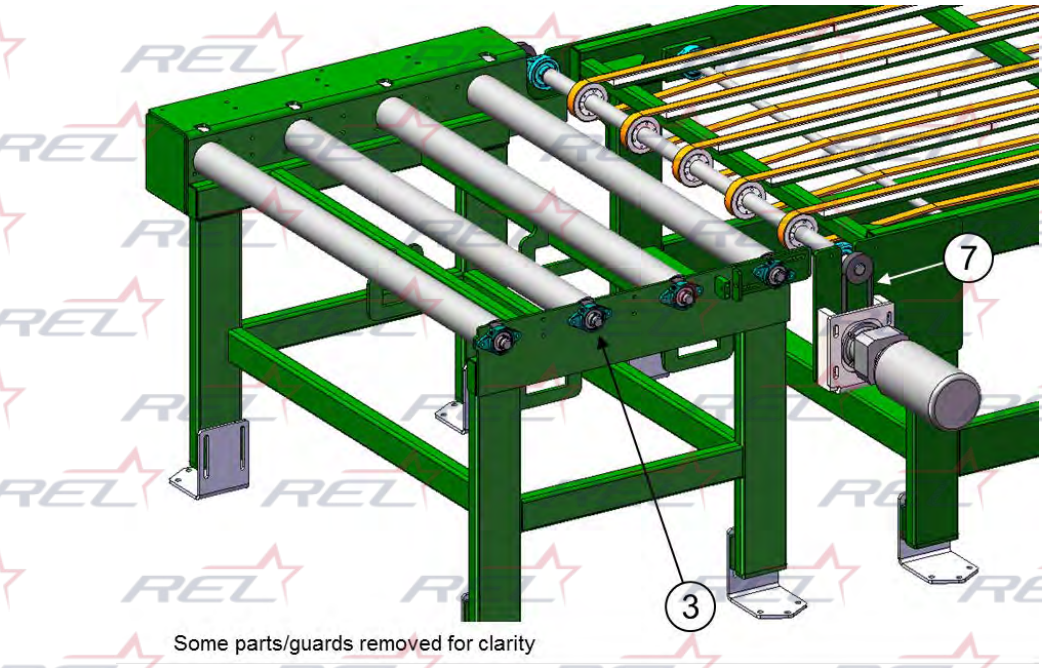

Figure 21: Paint Conveyor

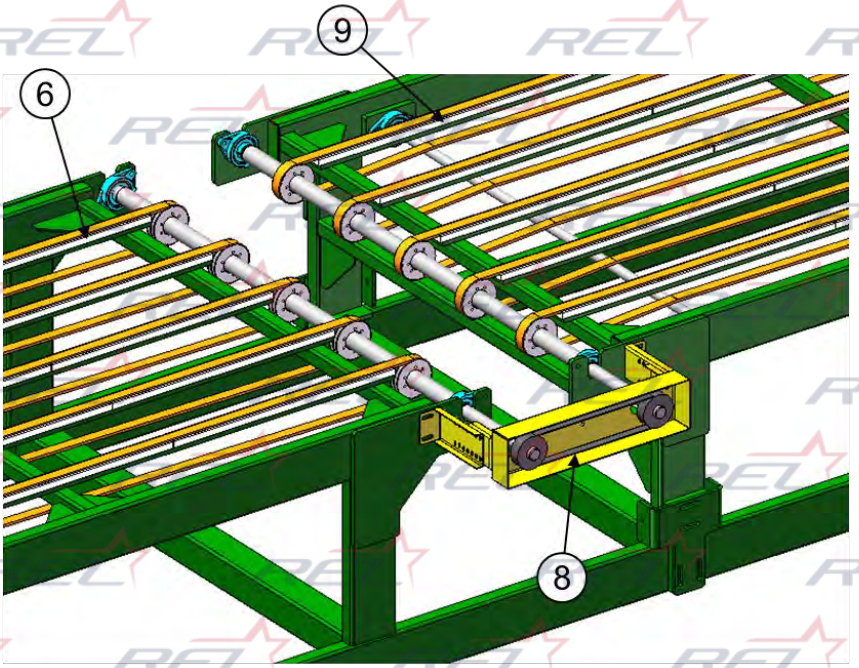

Figure 22: Paint Conveyor

Paint Conveyor Parts List

Item #	Description	Qty
1	Motor, 2hp, 230/460V, Premium	1
2	Gear reducer	1
3	Flange bearing, 2-bolt	8
4	Flange bearing, 2-bolt	12
5	Fenner "A" twin round urethane belting	10
6	Wear strip, out-feed end	15
7	Polychain Belt	2
8	Polychain Belt	1
9	Wear strip, in-feed end	15
-	Fenner Drives 3/8" round urethane belting	3

Straight Conveyor

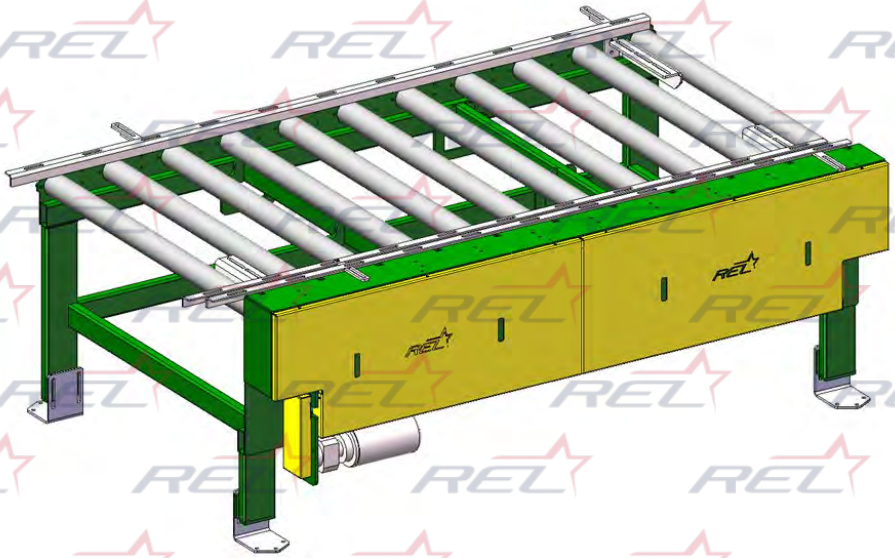

Figure 23: Straight Conveyor

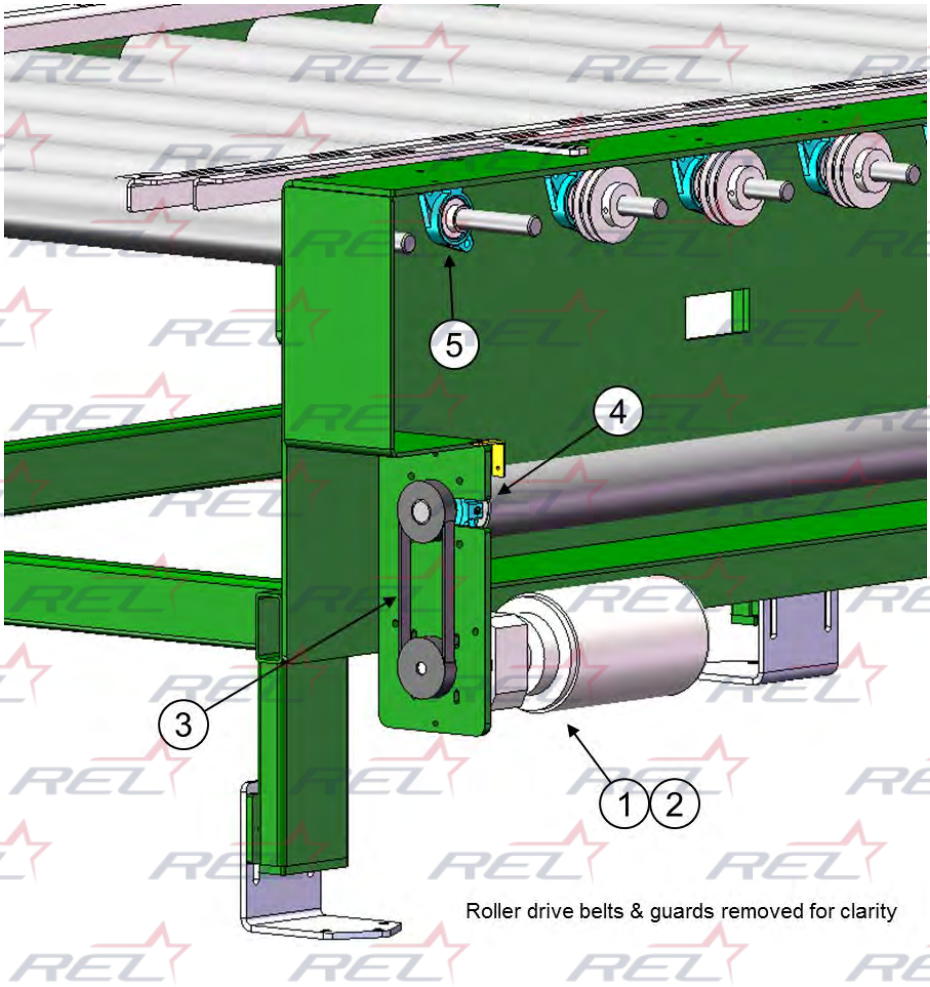

Figure 24: Straight Conveyor

Straight Conveyor Parts List

Item #	Description	Qty
1	Motor, 2hp, 230/460V, Premium	1
2	Gear reducer	1
3	Polychain Belt	1
4	Flange bearing, 2-bolt	2
5	Flange bearing, 2-bolt	as req'd.
-	Fenner Drives 38" round urethane belting	as req'd.

High Speed Tipple

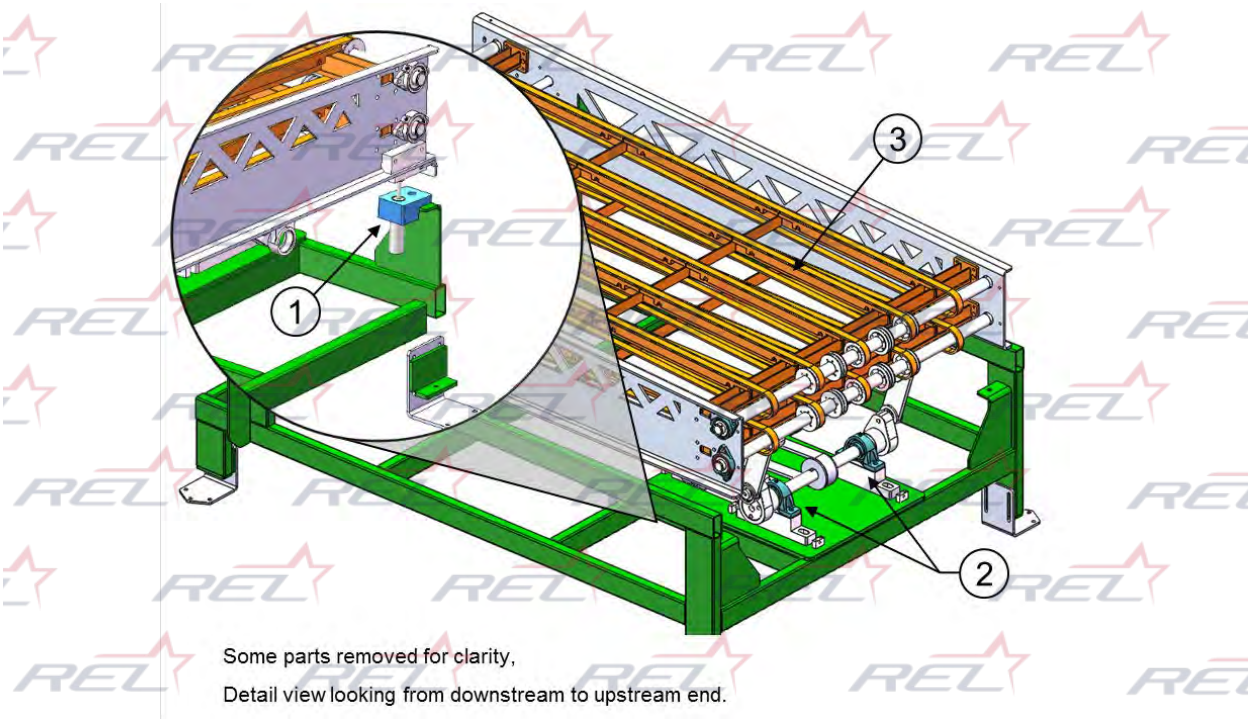

Figure 25: High Speed Tipple

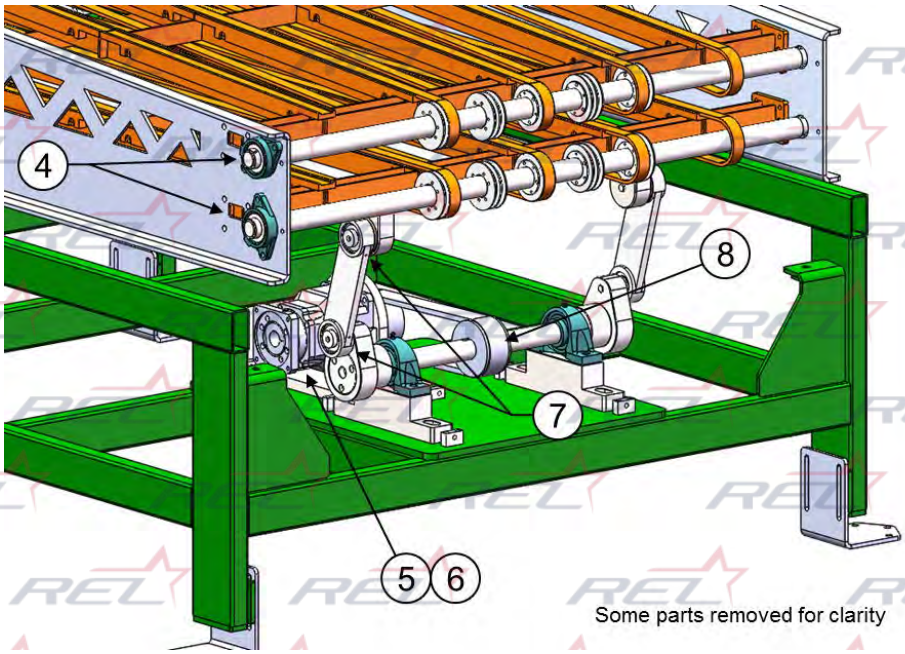

Figure 26: High Speed Tipple

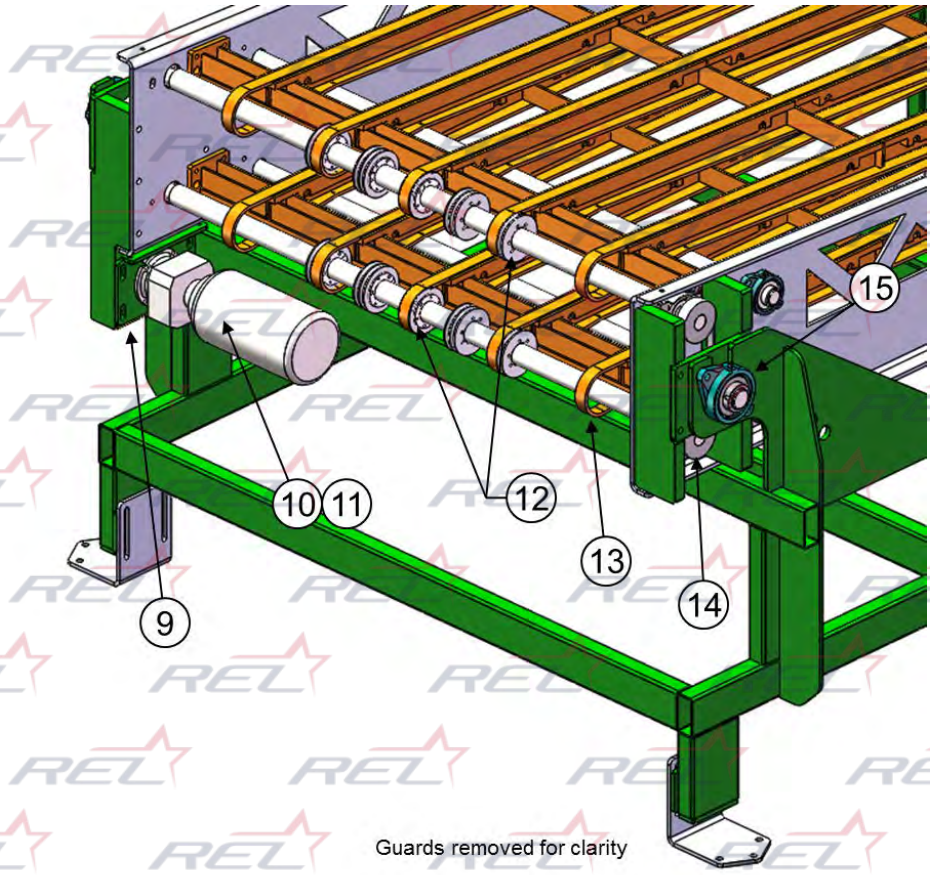

Figure 27: High Speed Tipple

High Speed Tipple Parts List

Item #	Description	Qty
1	Shock absorber	2
4	Flange bearing, 2-bolt	12
2	Pillow block bearing	2
3	Wear strip	30
5	Servo motor, 460V	1
6	Servo gear box	1
7	Spherical Bearing, sealed	4
8	Timing Belt	1
9	Polychain Belt, lower belts drive	1
10	Motor, 2hp, 230/460V, Premium	1
11	Gear reducer	1
12	Drive sheave assembly	20
13	Fenner "A" twin round urethane belt	10
14	Polychain Belt, coupling belt	1
15	Flange bearing, 2-bolt	2

Corner Transfer/Overpass

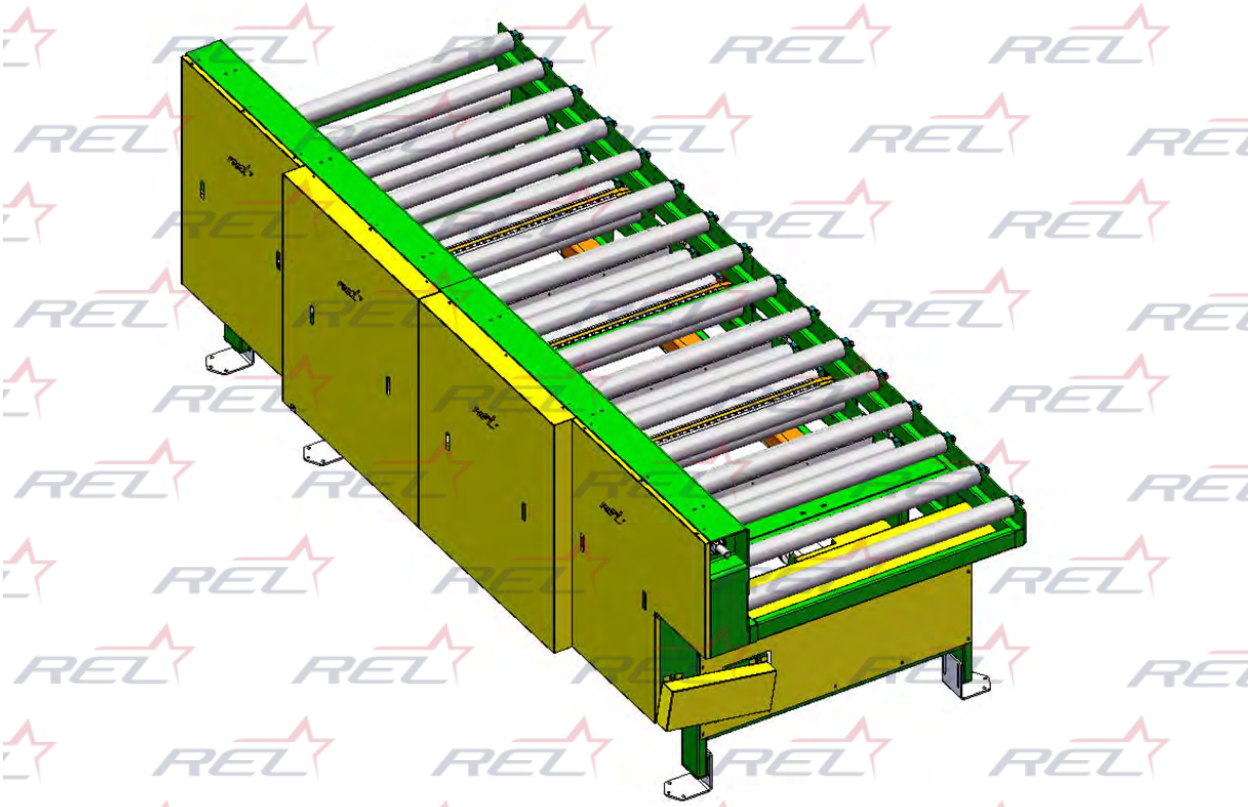

Figure 28: Corner Transfer Overpass

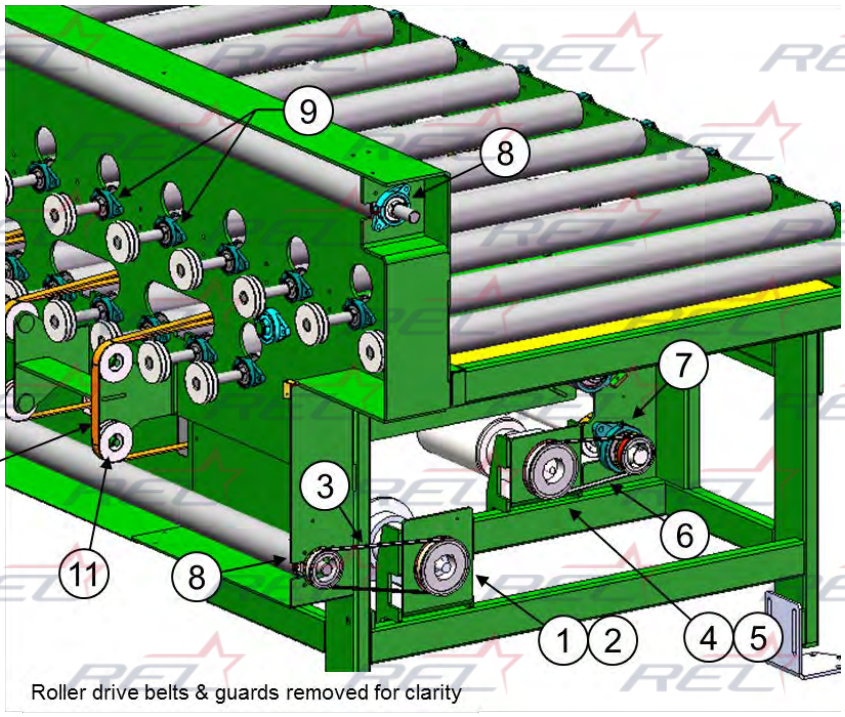

Figure 29: Corner Transfer Overpass

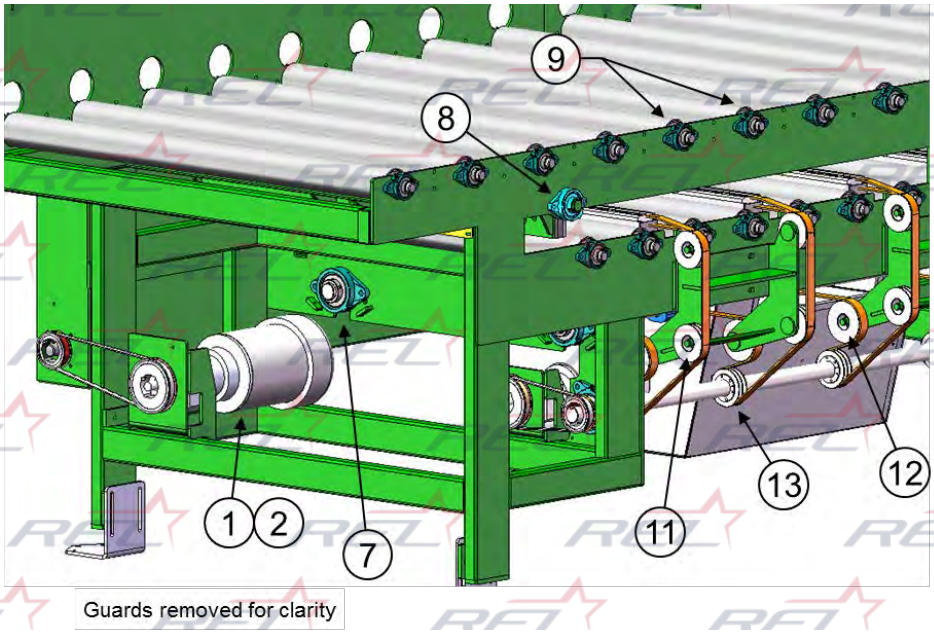

Figure 30: Corner Transfer Overpass

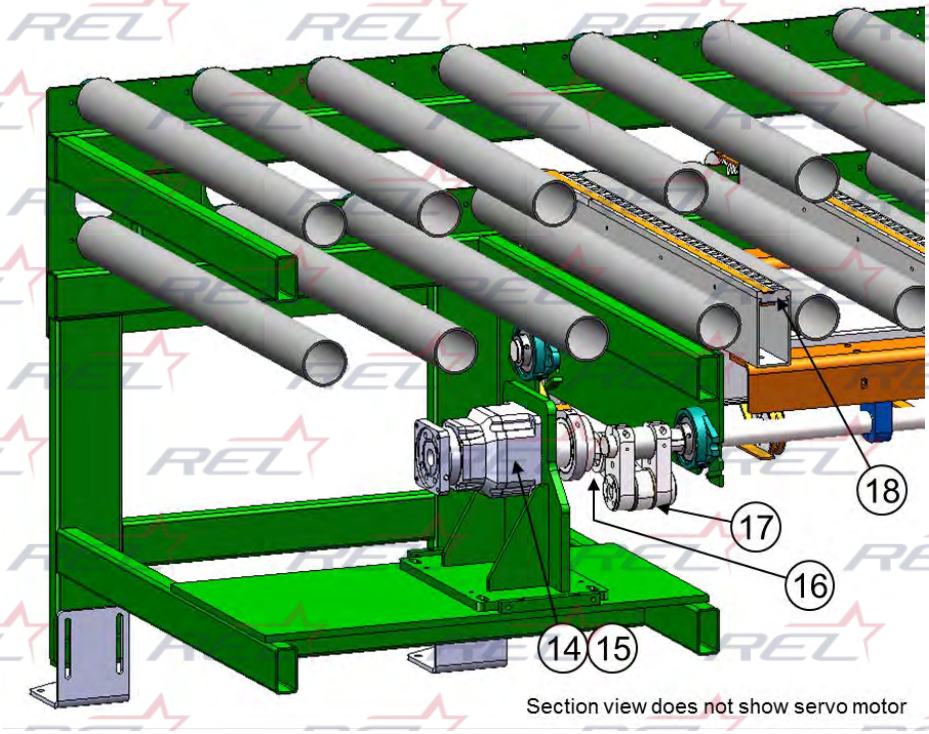

Figure 31: Corner Transfer Overpass

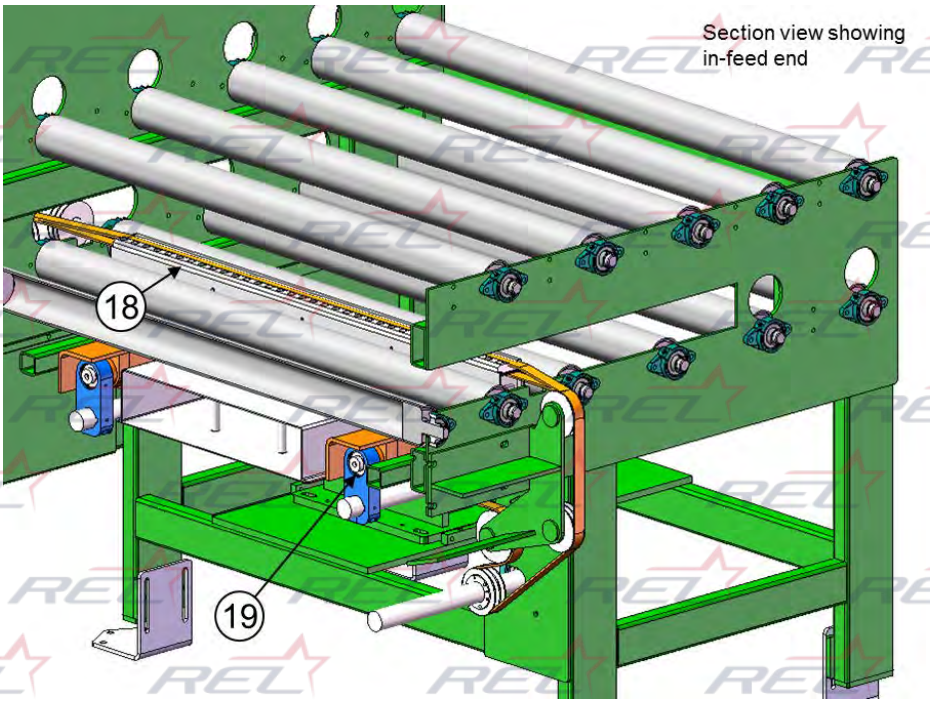

Figure 32: Corner Transfer Overpass

Figure 33: Corner Transfer Overpass

Corner Transfer/Overpass Parts List

Item #	Description	Qty
1	Motor, 5hp, 230/460V, Premium	1
2	Gear reducer	1
3	Polychain Belt	1
4	Motor, 2hp, 230/460V, Premium	1
5	Gear reducer	1
6	Polychain Belt	1
7	Flange bearing, 2-bolt	6
8	Flange bearing, 2-bolt	6
9	Flange bearing, 2-bolt	64
10	Fenner "A" twin round urethane belt	6
11	Idler sheave assembly	24
12	Crowned Idler sheave assembly	6
13	Drive sheave assembly	6
14	Servo motor - 460V	1
15	Servo gear box	1
16	Spherical Bearing, sealed	2
17	Thrust washer	2
18	Wear strip	6
19	Spherical Bearing, sealed	4
-	Fenner Drives 3/8" round urethane belting	64
-	Oil resistant vibration dampener, stop fence	1

Board Flipper #1

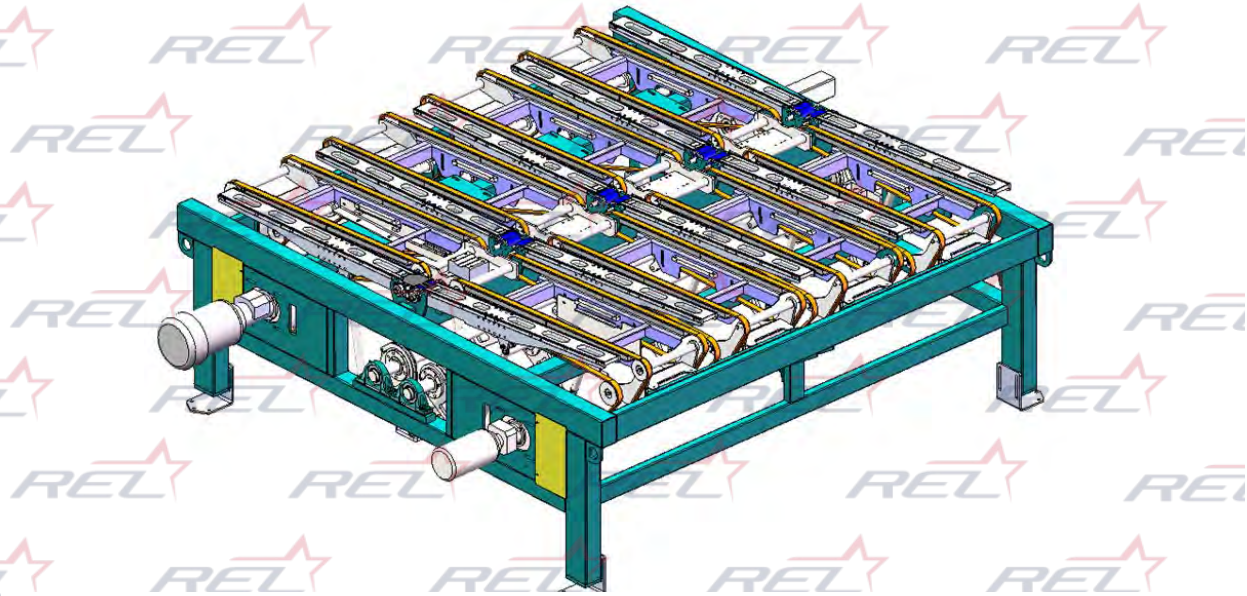

Figure 34: Board Flipper #1

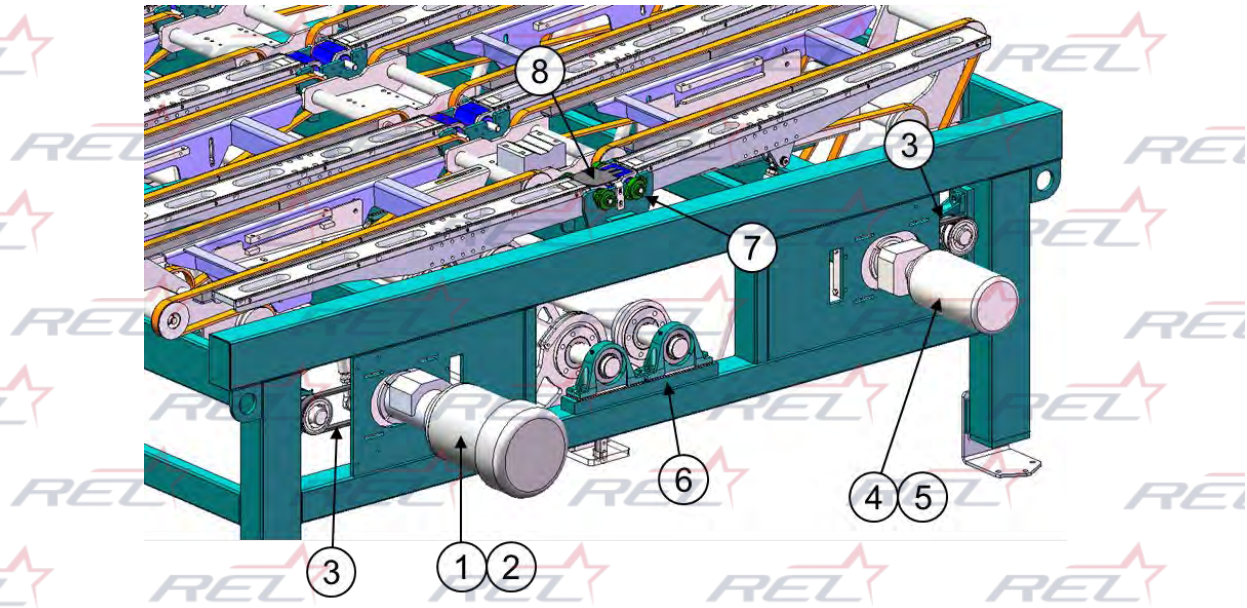

Figure 35: Board Flipper #1

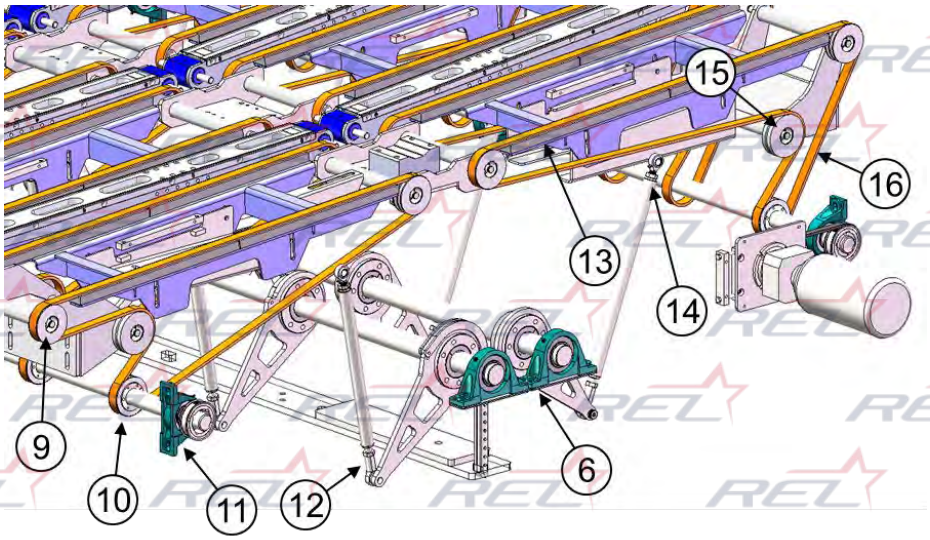

Figure 36: Board Flipper #1

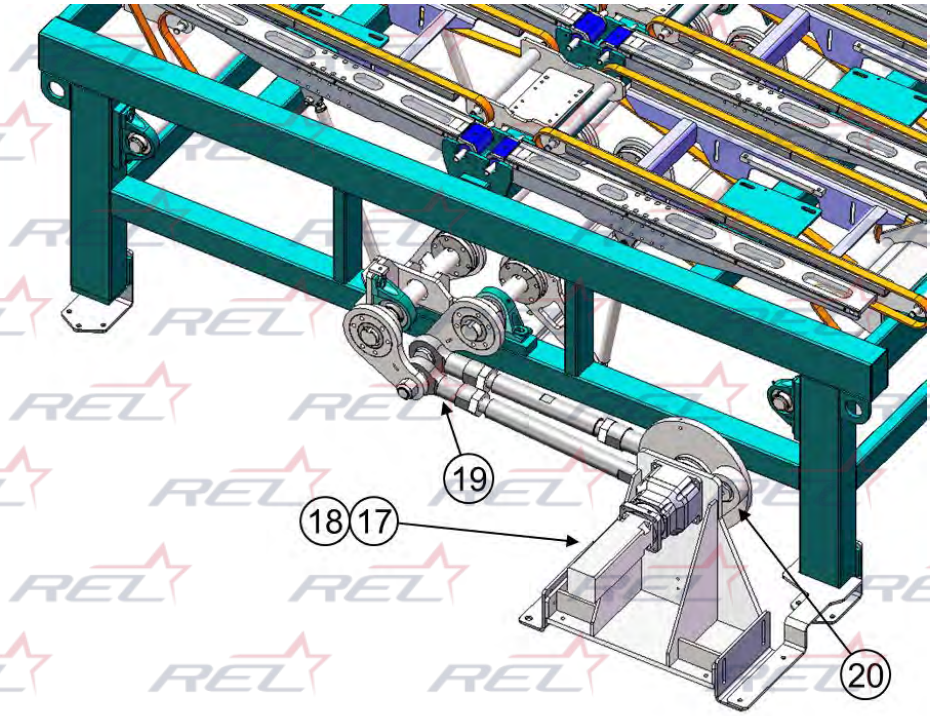

Figure 37: Board Flipper #1

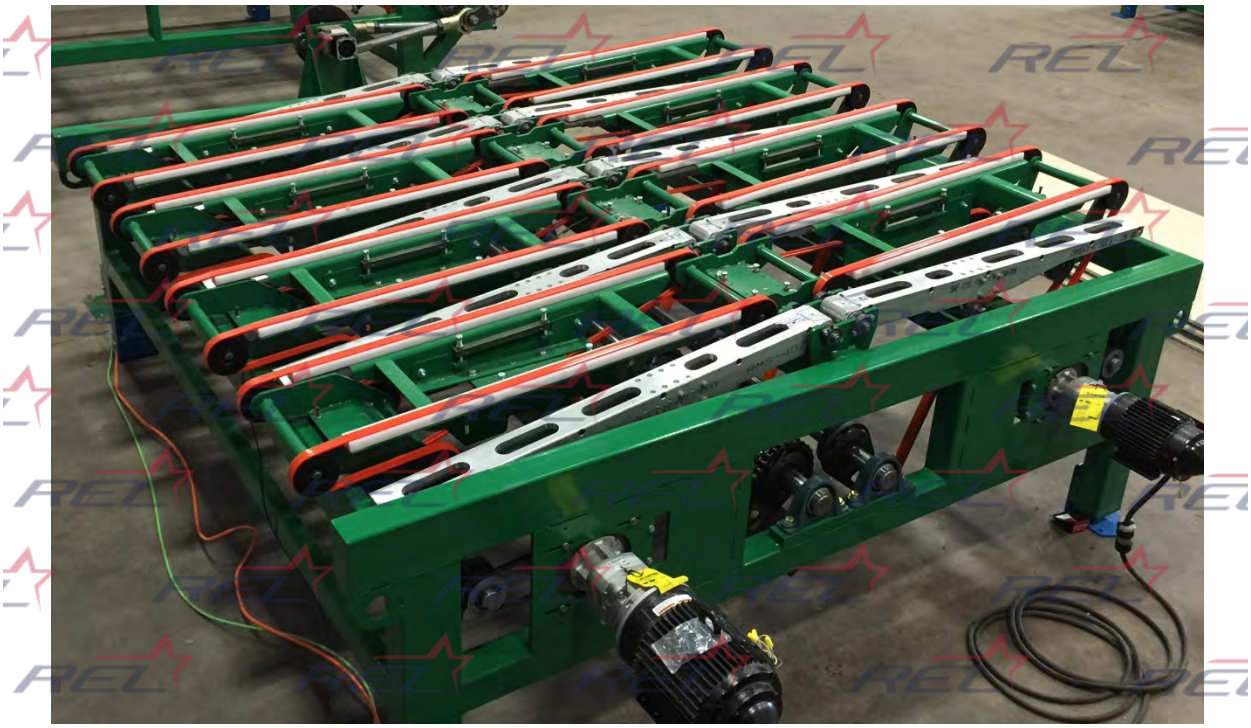

Figure 38: Board Flipper #1

Board Flipper #1 Parts List

Item #	Description	Qty
1	Motor, 5hp, 230/460V	1
2	Gear reducer	1
3	Polychain Belt, infeed belt drive	2
4	Motor, 2hp, 230/460V	1
5	Gear reducer	1
6	Pillow block bearing	6
7	2-bolt flange bearing	20
8	Bumper Pad	5
9	Idler sheave assembly	32
10	Drive sheave assembly	16
11	Pillow block bearing	6
12	Rod end, female	10
13	Belt wear strip	32
14	Rod end, male	10
15	Idler sheave assembly	16
16	Fenner "A" twin round urethane belt	16
17	Servo motor - 460V	1
18	Servo gear box	1
19	Rod end, female	3
20	Spherical bearing	1

High Speed Corner Transfer

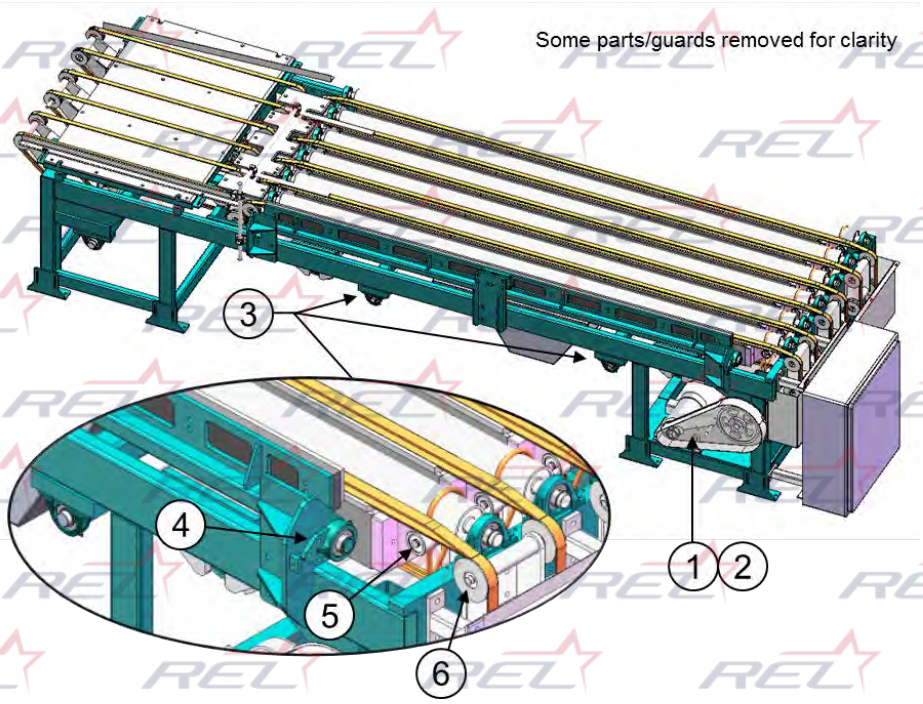

Figure 39: High Speed Corner Transfer

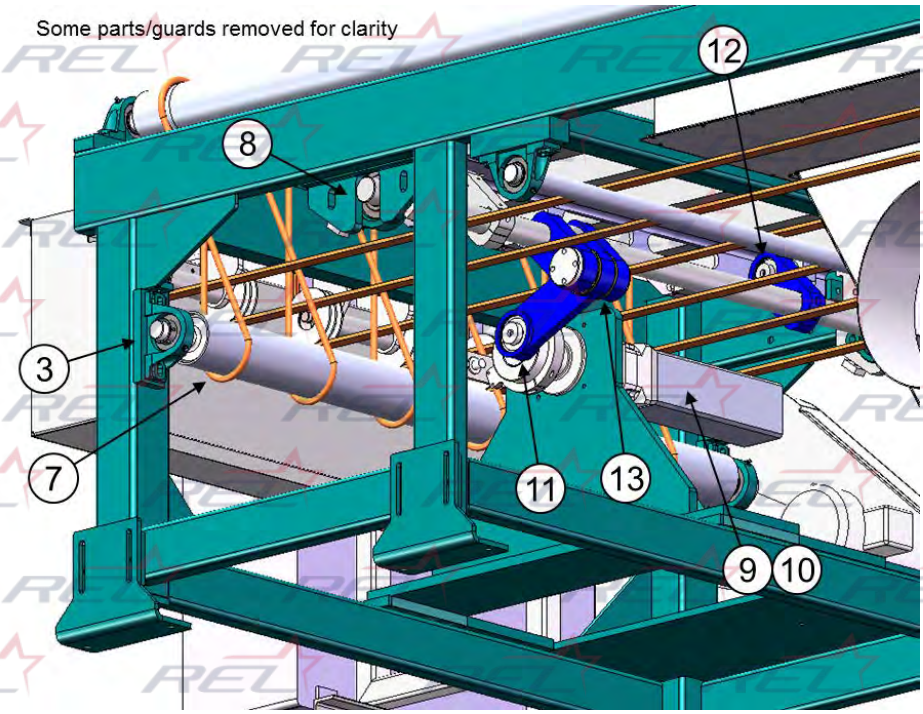

Figure 40: High Speed Corner Transfer

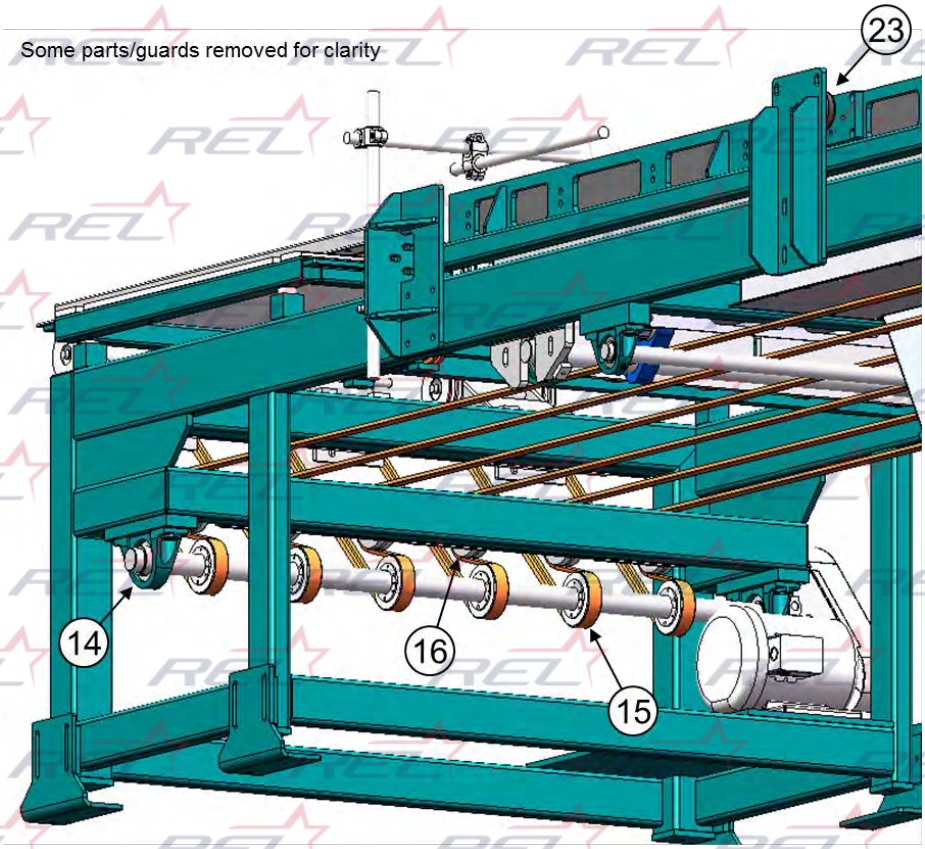

Figure 41: High Speed Corner Transfer

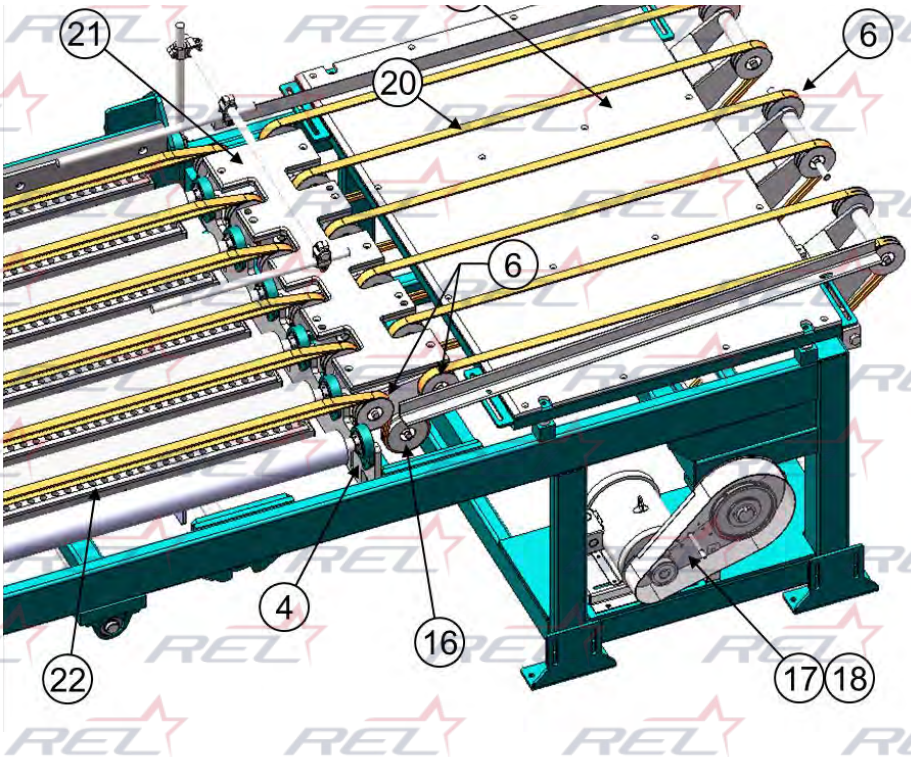

Figure 42: High Speed Corner Transfer

Figure 43: High Speed Corner Transfer

High Speed Corner Transfer Parts List

Item #	Description	Qty
1	Motor, 2hp, 230/460V	1
2	Polychain Belt, roller drive	1
3	Pillow block bearing	12
4	Flange bearing, 3-bolt	8
5	Idler roller assembly	6
6	Idler sheave assembly	30
7	Fenner Drives 1/2" round urethane belting	6
8	Flange bearing, 2-bolt	4
9	Servo motor - 460V	1
10	Servo gear box	1
11	Spherical Bearing, sealed	4
12	Spherical Bearing, sealed	2
13	Thrust washer	2
14	Pillow block bearing	2
15	Drive sheave assembly	6
16	Idler sheave assembly	12
17	Motor, 5hp, 230/460V	1
18	Polychain Belt, belt drive	1
19	Wear plate, 1/2"	1
20	Fenner "A" twin round urethane belt	6
21	Wear plate, 1/2"	1
22	Wear strip, 1x3	18
23	Oil resistant vibration dampener	1

High Speed Tenoner Transfer

Figure 44: High Speed Tenoner Transfer

Board Accumulator Conveyor

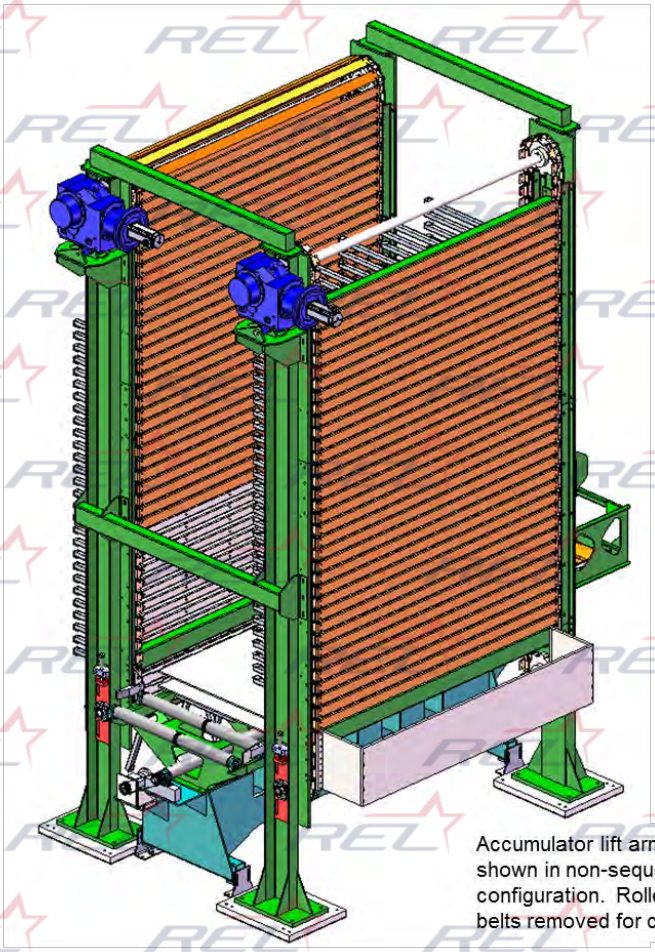

Figure 45: Board Accumulator

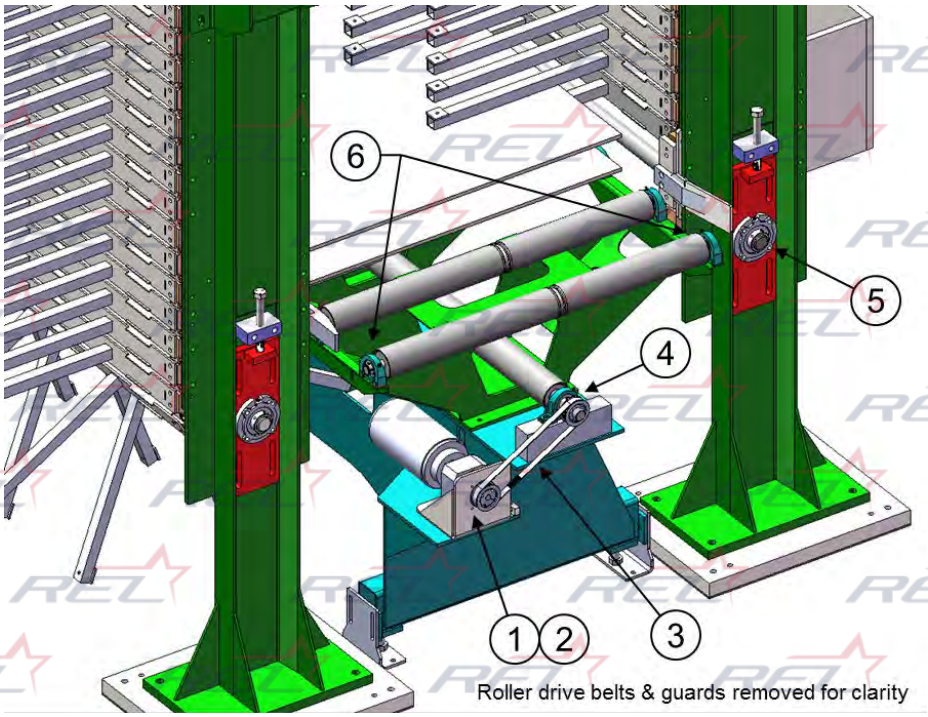

Figure 46: Board Accumulator

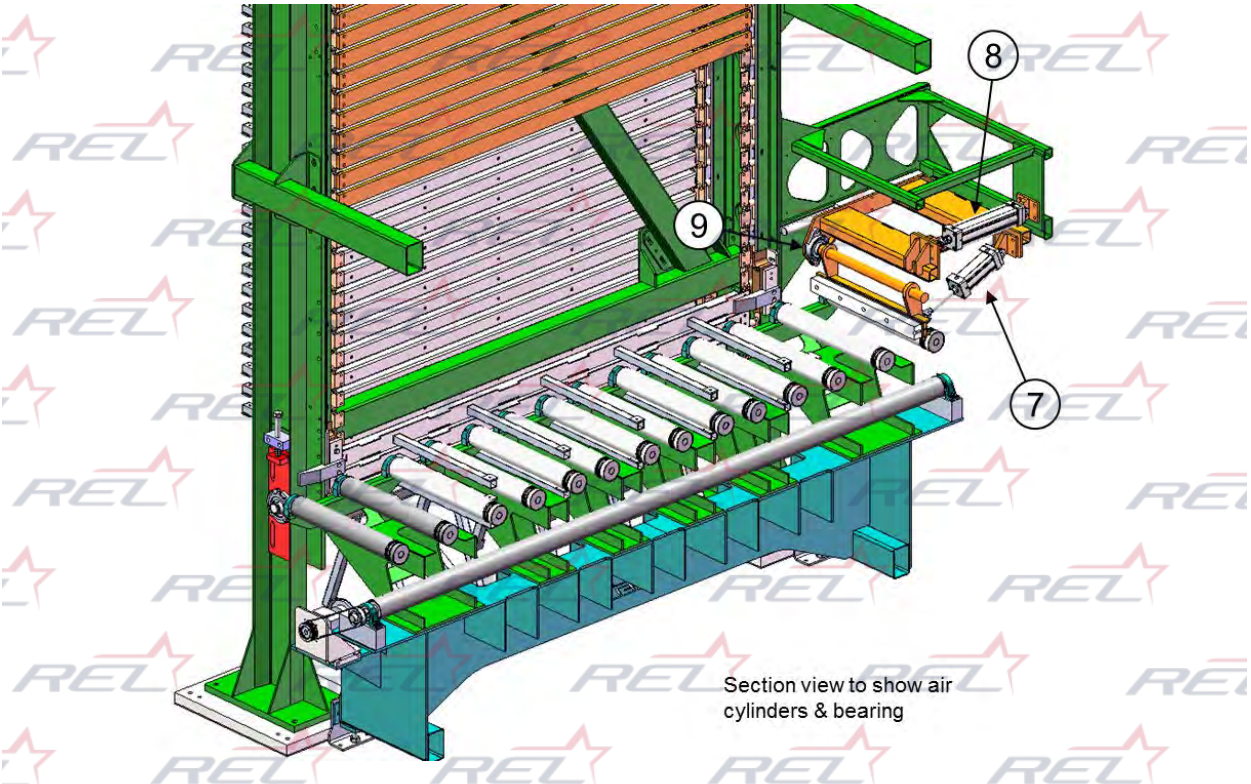

Figure 47: Board Accumulator

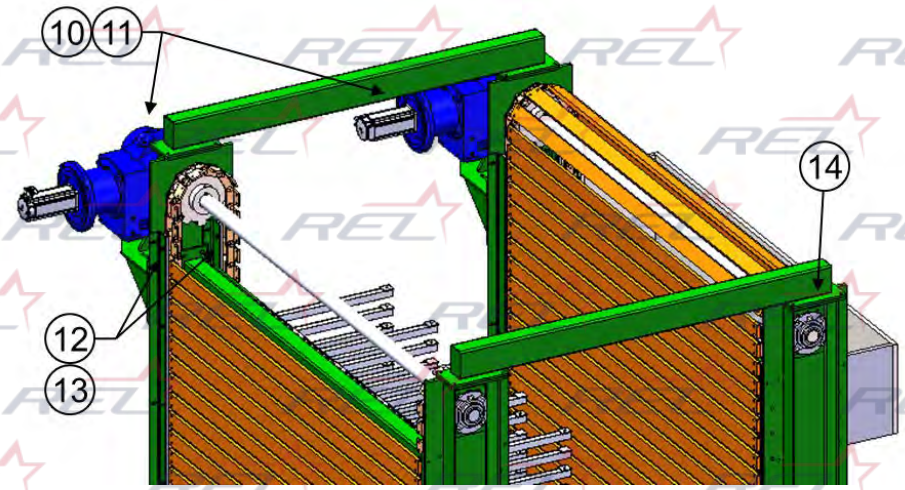

Figure 48: Board Accumulator

Figure 49: Board Accumulator

Board Accumulator Parts List

Item #	Description	Qty
1	Motor, 2hp, 230/460V	1
2	Gear reducer	1
3	Polychain Belt, roller drive	1
4	Pillow block bearing	2
5	Flange bearing, 4-bolt	4
6	Pillow block bearing, tapped base	28
7	Air cylinder	1
8	Air cylinder	1
9	2-bolt flange bearing	2
10	Servo motor	2
11	Helical bevel reducer	2
12	Wear plate, 1/2" x 2"	28
13	Wear plate, 1/2" x 2"	4
14	Flange bearing, 4-bolt	4
-	Fenner Drives 1/2" round urethane belting	14

Tipple Conveyor

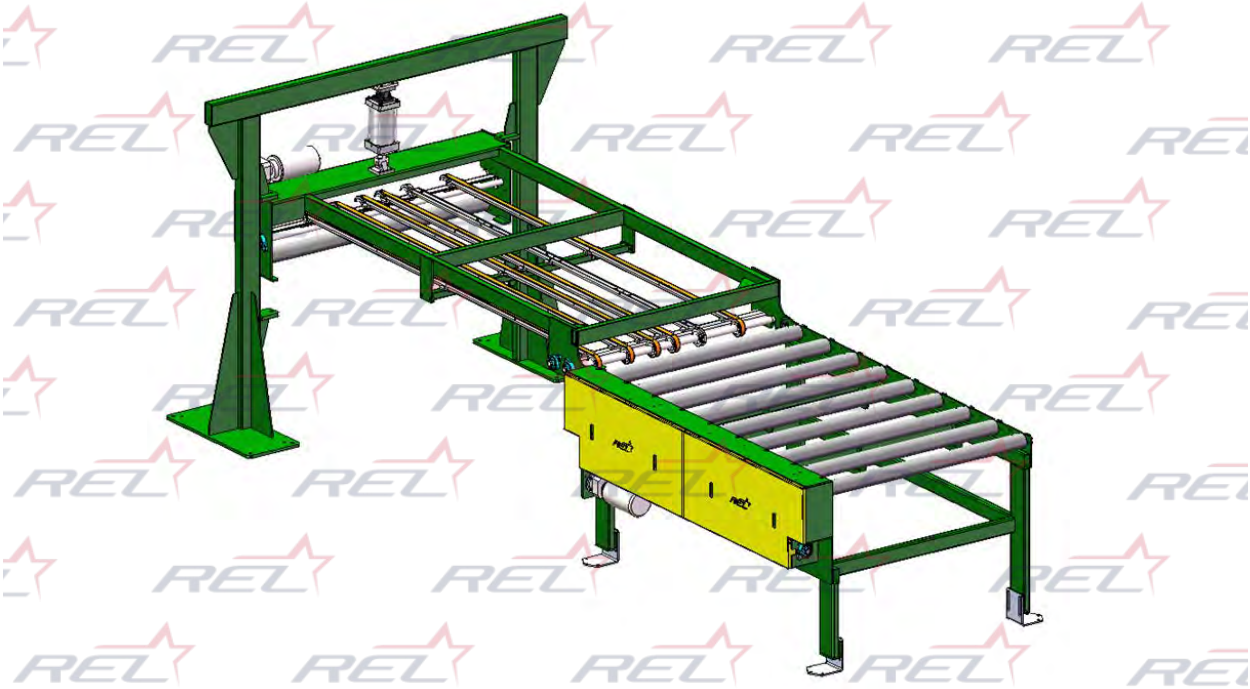

Figure 50: Tipple Conveyor

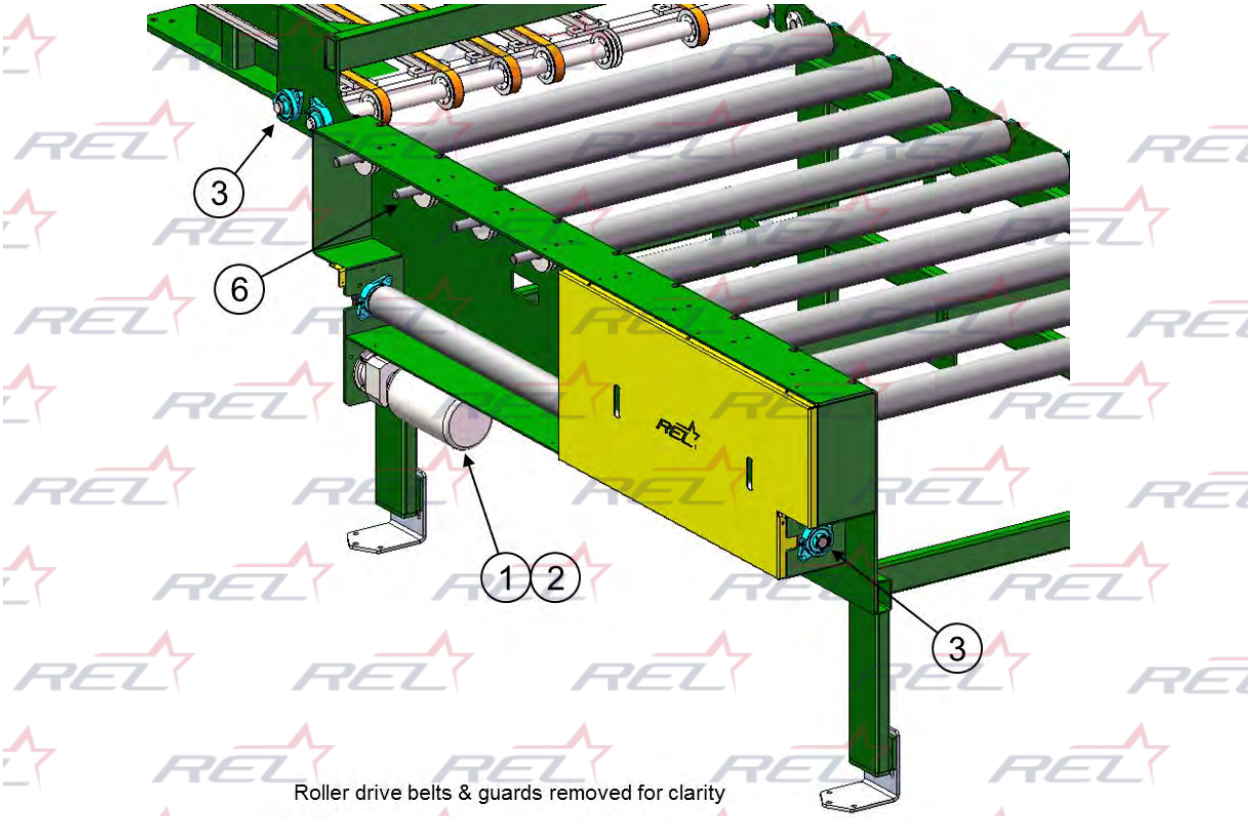

Figure 51: Tipple Conveyor

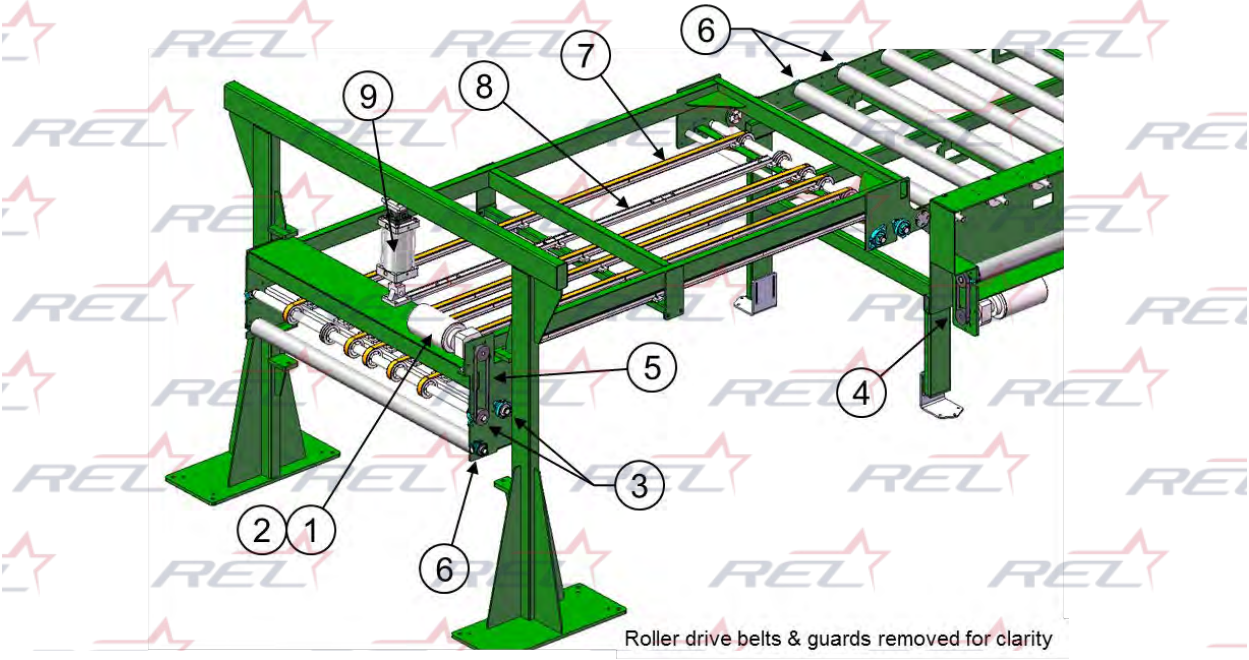

Figure 52: Tipple Conveyor

Tipple Conveyor Parts List

Item #	Description	Qty
1	Motor, 2hp, 230/460V	2
2	Gear reducer	2
3	Flange bearing, 2-bolt	10
4	Polychain Belt	1
5	Polychain Belt	1
6	Flange bearing, 2-bolt	20
7	Fenner "A" twin round urethane belt	6
8	Wear strip, 3/4" x 2"	24
9	Air cylinder	1
-	Fenner Drives 38" round urethane belting	9

Flipper Accumulator

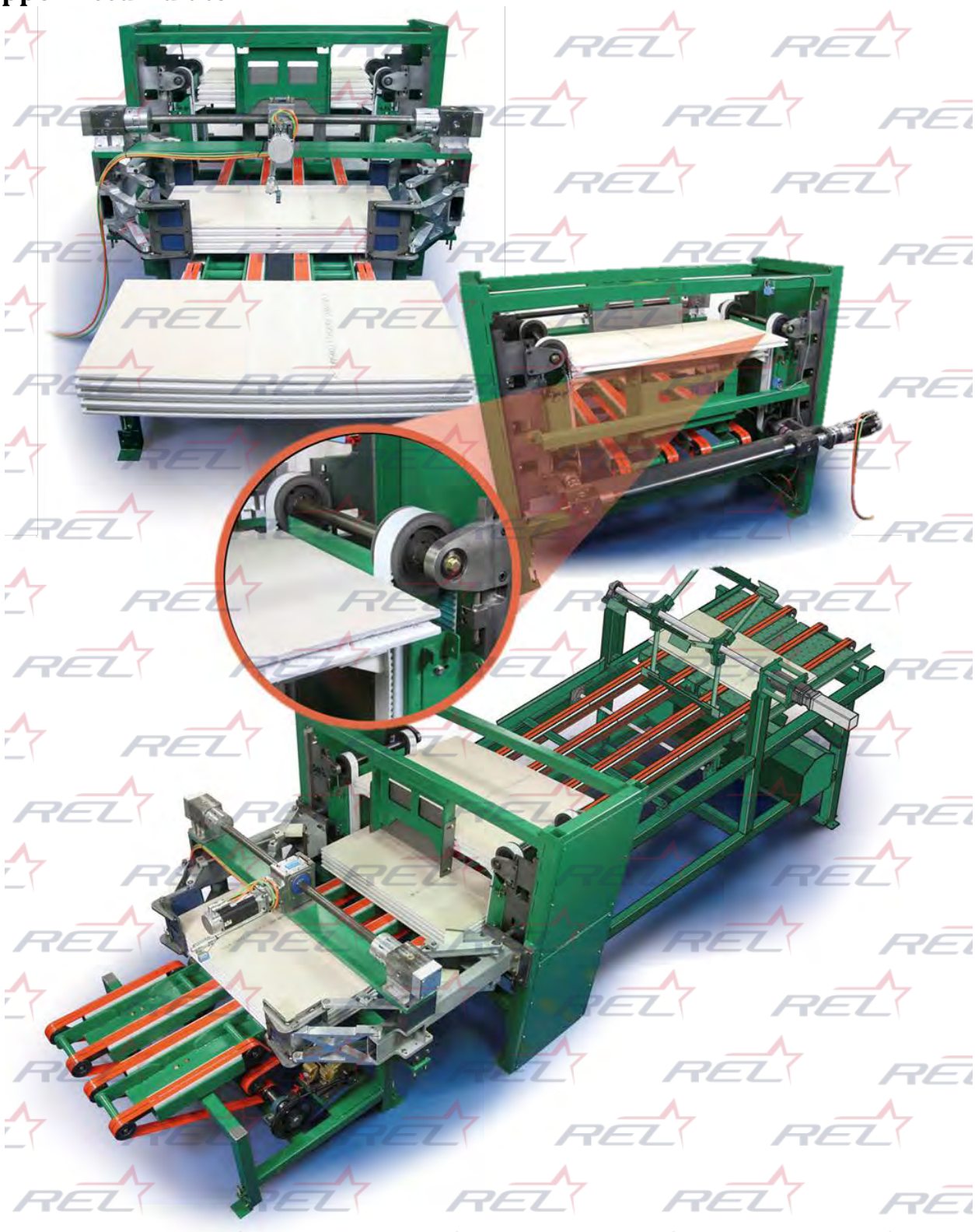

Figure 53: Flipper Accumulators

Turntable Detail: A Design & Engineering Example

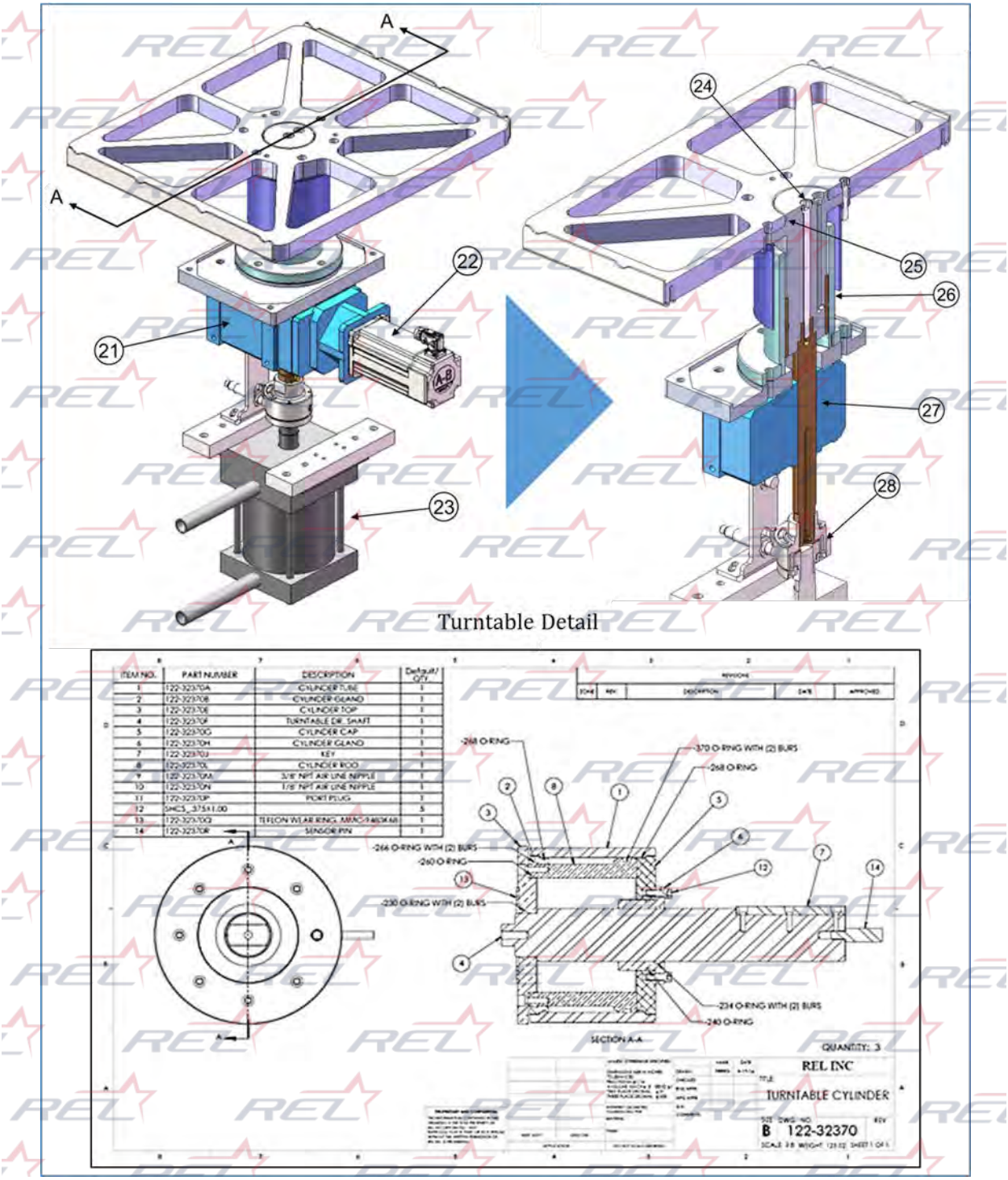

Figure 54: REL's attention to design & engineering detail

Warranty

REL will repair, without charge, any defects due to faulty materials or workmanship for one year from the date of purchase. This warranty does not cover part failure due to wear or tool abuse. For further detail regarding warranty coverage and/or warranty repair information, please call 1-906-337-3018. This warranty does not apply to accessories or damage caused where repairs have been made or attempted by others. This warranty gives you specific rights and you may have others rights which vary by state or province.

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO LIABILITY FOR LOSS OF PROFITS) ARISING FROM THE SALE OR USE OF THIS PRODUCT. SOME STATES IN THE U.S. AND SOME CANADIAN PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENCIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

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