UnitSort® XV SortationConveyor Installation and Maintenance Manual

Publication No. 29328202
April 26, 2011

Intelligrated®

To contact Intelligrated:

By Mail or Phone:
Intelligrated
7901 Innovation Way
Mason, OH 45040

(513) 701-7300

For Service:
Customer Service and Support (CSS)
Hotline 1-877-315-3400
On the World Wide Web: **www.intelligrated.com**

Direct questions and comments concerning the information contained in this manual to:

Documentation Department
Intelligrated
10045 International Blvd.
Cincinnati, Ohio 45246

Ph 1-800-922-1267 - Fax 1-800-881-5274
customerservice@intelligrated.com

Documentation Department
Intelligrated
9301 Olive Boulevard
St. Louis, MO 63132

Ph 1-314-993-4700 - Fax: 1-314-995-2400
Web site: **http://www.intelligrated.com**

Read these documents thoroughly before attempting to perform installation, maintenance or repairs to the applicable Intelligrated equipment components or devices. Exercise extreme caution when working around moving and rotating equipment. Wear the proper clothing and safety equipment. DO NOT attempt to perform any maintenance until the equipment is de-energized, locked out and tagged out in accordance with established company procedures and OSHA/ANSI standards.

The information presented in these documents is correct at the time of publication. Intelligrated has made every effort to ensure that the information presented is correct and free from error. However, some errors or misprints may occur. Please contact Intelligrated with any corrections.

Revision	Date	Initials	Description
Rev 0	4/27/11		Re-format entire manual. Update description of Mobile Synthetic lubricant - from SCH 630 to SHC 630.

Use of Manual

This manual contains important information. Please read this manual before attempting to operate or perform installation or maintenance on this Conveyor.

This manual is designed for operator personnel who have a substantial knowledge of mechanical operations and who have basic knowledge of typical mechanical operations. Failure to comply with the instructions and warnings contained in this manual, and the warnings posted on the Conveyor can result in serious injury to personnel and/or damage to the equipment.

Disclaimers

All terms mentioned in this manual that are known to be trademarks or service marks have been appropriately capitalized. Intelligrated can not attest to the accuracy of this information. Use of a term in this manual should not be regarded as affecting the validity of any trademark or service mark.

This manual contains a generalized description of the Conveyor and its operation available at the time this manual was approved for printing. Intelligrated reserves the right to make changes in design and specifications and to make additions to, or improvements in, the product without imposing any obligations upon it to install them on previously manufactured products.

Table of Contents

List of Figures

1 Safety Instructions

⚠ WARNING

You must read and understand these precautions completely before operating, setting up, installing, running, or performing maintenance on the equipment. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

This chapter is to provide instructions for the safe and productive operation of the equipment.

These safety precautions are to be used as a guide to supplement the following:

1. All other information pertaining to the equipment.
2. Local safety codes.
3. Plant and shop safety rules and codes.
4. Federal and state safety laws, regulations and codes.

NOTE: Emphasis is placed on the latest edition of the Occupational Safety and Health Standards, which is available from the Department of Labor, Washington, D.C. These standards (found in Part 1910, Title 29 of the Code of Federal Regulations) contain the current, general industry occupational safety and health regulations set forth by federal legislation. Also, some of the information contained in this section has been reprinted from ASME, B20.1-2000 by permission of The American Society of Mechanical Engineers. All rights reserved.

For Your Safety

This manual contains important safety information concerning the use, maintenance, installation, and operation of this equipment. Read and become familiar with the contents of this manual before attempting to install, operate, or service this equipment. It is necessary that all operators and maintenance personnel study the applicable sections of this manual thoroughly before operating the equipment.

⚠ WARNING

If you are unable to understand the contents of this manual, please bring it to the attention of your supervisor or foreman. Failure to comply with the instructions and warnings contained in this manual, and the warnings posted on the machine can result in serious injury to personnel and damage to the equipment. Do not operate this equipment unless you have read and understood the contents of this manual.

⚠ ADVERTENCIA

No dando caso a los instruciones y precauciones contenidos en el manual, puede resultar en graves heridas personal y daño a la máquina. No trate de operar el equipo sin entender claramente los instruciones del manual.

⚠ AVERTISSEMENT

Si vous ne comprenez pas le contenu de ce manuel, s.v.p. aviser votre superviseur ou le contremaître. A défaut de suivre les instructions et les avertissements contenus dans ce manuel, et les avertissements installé sur l'équipement, pourrait occasionner des blessures graves au travailleur et endommager l'équipement. Ne pas opérer cet équipement à moins d'avoir lu et compris le contenu de ce manuel d'opérations.

Standard Safety Conventions

This section includes information essential to the safety of personnel and equipment. Throughout this manual, and on the equipment, you will find **DANGER**, **WARNING**, and **CAUTION** signs. Pay particular attention to these because they signal information that is important to your safety and to the correct operation of the equipment.

Warning signs and labels posted on or near the equipment shall not be removed, painted over, or altered at any time. **Reference: ANSI Z535.4**. All safety devices, warning lights, and alarms associated with the conveyor system must be regularly tested (at least monthly) for proper operation and serviced as needed. If the original safety item(s) become defective or damaged, refer to the conveyor parts list(s) of bill(s)-of-materials for replacement part numbers.

⚠ DANGER

DANGER - information appearing under the DANGER caption concerns the protection of personnel from the immediate and imminent hazards that, if not avoided, will result in immediate, serious personal injury or loss of life in addition to equipment damage.

⚠ WARNING

If you read and understand these precautions completely before operating, setting up, installing, running, or performing maintenance on the equipment. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

CAUTION

Information appearing under the CAUTION caption concerns the protection of personnel and equipment, software, and data from hazards that can result in minor personal injury or equipment damage.

NOTE: The term **NOTE** is used to call attention to useful information and is not a safety notice. Information appearing in a NOTE provides additional information which is helpful in understanding the item being explained.

Safety Precautions

The success of any safety program depends primarily on the attitudes and training of the installation, maintenance, and operating personnel. The very nature of their work makes it necessary that they develop a complete and firsthand knowledge of each piece of equipment that is within their care. This familiarity enables them to recognize the hazards resulting from improper usage.

Guards and Guarding

Where necessary for the protection of personnel from hazards, all exposed moving machinery parts that present a hazard to employees at work stations or operator's stations shall be mechanically or electrically guarded, or guarded by location or position.

Interfacing of Equipment

When two or more pieces of equipment are interfaced, special attention shall be given to the interfaced area to insure the presence of adequate guarding and safety devices.

Guarding Exceptions

Wherever conditions prevail that would require guarding under these standards, but such guarding would render the conveyor unusable, prominent warning means such as signs or warning lights shall be provided in the area or on the equipment in lieu of guarding.

Guarded by Location or Position

Remoteness from frequent presence of public or employed personnel shall constitute guarding by location. Overhead conveyors, such as trolley equipment and hanger suspended tray conveyors, for which guarding would render the equipment unusable or would be impractical, shall have prominent and legible warnings posted in the area or on the equipment, and, where feasible, lines shall be painted on the floor delineating the danger area.

When the equipment passes over a walkway, roadway, or work station, it is considered guarded by location if all moving parts are at least 8 ft. (2.4 m) above the floor or walking surface or are otherwise located so that the employee cannot inadvertently come in contact with hazardous moving parts. Although overhead conveyors may be guarded by location, spill guards, pan guards, or equivalent shall be provided if the product may fall off the conveyor for any reason and endanger personnel.

Headroom

When the equipment is installed above exit passageways, aisles, or corridors, there shall be a minimum clearance of 6 ft. 8 in. (2.03 m) measured vertically from the floor or walking surface to the lowest part of the equipment or guards. Where system function will be impaired by providing the minimum clearance of 6 ft. 8 in. (2.03 m) through an

emergency exit, alternate passageways shall be provided. It is permissible to allow passage under the equipment with less than 6 ft. 8 in. (2.03 m) clearance from the floor for other than emergency exits if a suitable warning indicates low headroom.

Controls

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

Control Stations

Control stations should be arranged and located so that the operation of the affected equipment is visible from them. Control stations shall be clearly marked or labeled to indicate the function controlled.

Equipment that would cause injury when started shall not be started until employees in the area are alerted by a signal, or by a designated person, that the equipment is about to start. When the equipment would cause injury and is automatically controlled or must be controlled from a remote location is started, an audible device shall be provided which can be clearly heard at all points along the conveyor where personnel may be present. The audible warning shall be actuated by the controller device starting the equipment and shall continue for a required period of time before the equipment starts. A flashing light or similar visual warning may be used in conjunction with, or in place of, the audible device if a visual warning is more effective. Where system function would be seriously hindered or adversely affected by the required time delay, or where the intent of the warning may be misinterpreted (i.e., a work area with many different pieces of equipment and allied devices), a clear, concise, and legible warning sign shall be provided. The warning shall indicate that the equipment and allied equipment may be started at any time, that danger exists, and that personnel must keep clear. These warning signs shall be provided along the equipment at areas not guarded by position or location.

Remotely and automatically controlled equipment, and equipment where operator stations are not manned or are beyond voice or visual contact from drive areas, loading areas, transfer points, and other potentially hazardous locations on the equipment path not guarded by location, position, or guards, shall be furnished with emergency stop buttons, pull cords, limit switches, or similar emergency stop devices. All such emergency stop devices shall be easily identifiable in the immediate vicinity of such locations unless guarded by location, position, or guards. Where the design, function, and operation of such equipment clearly is not hazardous to personnel, an emergency stop device is not required. The emergency stop device shall act directly on the control of the equipment concerned and shall not depend on the stopping of any other equipment. The emergency stop devices shall be installed so that they cannot be overridden from other locations.

Inactive and unused actuators, controllers, and wiring should be removed from control stations and panel boards, together with obsolete diagrams, indicators, control labels, and other material which may confuse the operator.

Safety Devices

All safety devices, including wiring of electrical safety devices, shall be arranged to operate so that a power failure or failure of the device itself will not result in a hazardous condition.

Emergency Stops and Restarts

The controls shall be arranged so that, in case of emergency stop, manual reset or start at the location where the emergency stop was initiated shall be required of the conveyor(s) and associated equipment to resume operation.

Before restarting the equipment that has been stopped because of an emergency, an inspection of the conveyor shall be made and the cause of the stoppage determined. The starting device shall be locked or tagged out before any attempt is made to remove the cause of the stoppage, unless operation is necessary to determine the cause or to safely remove the stoppage. Refer to ANSI Z244.1-1982, American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements, and OSHA Standard 29 CFR 1910.147, “The Control of Hazardous Energy (Lockout/Tagout)."

Operation Safety Precautions

Only a trained person shall be permitted to operate a conveyor. Training shall include instruction in operation under normal conditions and emergency situations.

Where safety is dependent upon stopping devices or starting devices or both, they shall be kept free of obstructions to permit ready access.

The area around loading and unloading points shall be kept clear of obstructions that could endanger personnel.

No person shall ride on a conveyor under any circumstances.

Personnel working on or near a conveyor shall be instructed as to the location and operation of pertinent stopping devices.

A conveyor shall be used to transport only material it is designed to handle safely.

Under no circumstances shall the safety characteristics of the conveyor be altered if such alterations would endanger personnel.

Routine inspections and preventive and corrective installation maintenance programs shall be conducted to insure that all guards and safety features and devices are retained and function properly.

Personnel should be alerted to the potential hazard of entanglement in conveyors caused by items such as long hair, loose clothing, and jewelry.

Conveyors shall not be newly installed, maintained, or serviced while in operation unless proper installation, maintenance, or service requires the conveyor to be in motion. In this case, personnel shall be made aware of the hazards and how the task may be safely accomplished.

Installation and Maintenance Safety

Installation and Maintenance shall be performed only by qualified and trained personnel.

It is important to establish an installation and maintenance program to ensure that all conveyor components are maintained in a condition which does not constitute a hazard to personnel.

When a conveyor is stopped during installation or for maintenance, starting devices or powered accessories shall be locked or tagged out in accordance with a formalized procedure designed to protect all persons or groups involved with the conveyor against an unexpected start. Personnel should be alerted to the hazard of stored energy, which may exist after the power source is locked out. Refer to ANSI Z244.1-1982, American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements, and OSHA Standard 29 CFR 1910.147, “The Control of Hazardous Energy (Lockout/Tagout)."

Replace all safety devices and guards before starting equipment for normal operation.

Conveyors shall not be lubricated while in operation unless it is impractical to shut them down for lubrication. Only trained and qualified personnel who are aware of the hazards of the conveyor in motion shall be allowed to lubricate a conveyor that is operating.

Guards and safety devices shall be maintained in a serviceable and operational condition. Warning signs shall be maintained in a legible and operational condition. Examples of warning signs are shown later in this section.

It is the responsibility of the owner/user to add any additional protective components that may be needed whenever changes or variations are made to any of the equipment components or operational characteristics.

Lockout / Tagout Guidelines

Appropriate lockout and tagout policy and procedures shall comply with the **Code of Federal Regulations, 29 CFR 1910.147** and the minimum safety requirements outlined in the current publication of the **American National Standard Institute's Lockout/Tagout of Energy Sources (ANSI Z244.1)**.

Effective January 8, 1990, O.S.H.A. has designated the need for a 'positive, lockable' means to remove all energy sources from equipment prior to new installation(s) or any maintenance. The electrical power to your equipment can be locked out at the main disconnect switch, which is normally located on the electrical cabinet. When this is done, residual energy remains for some time in the capacitors associated with the electrical system. This residual energy is automatically depleted by features built into the equipment. After locking out the main disconnect switch, wait at least 60 seconds before beginning any installation or maintenance procedures. This allows the residual energy to diminish. (If an equipment-mounted plate indicates that you should wait longer than 60 seconds, wait the recommended period of time before beginning any installation or maintenance work.)

Whenever you need to install new equipment or perform maintenance on the equipment, or whenever you need to shut it down for any other reason, a lockout procedure must be followed. Your employer is required by O.S.H.A. to develop a written lockout/tagout procedure for this equipment. The following items should be considered in developing this procedure:

- Notify everyone who normally operates, sets up, installs, or performs maintenance on the equipment that it will be shut down.
- Turn off all electric motors.
- Turn off the main electrical disconnect switch.
- Lock the main disconnect switch in the OFF position, and place a tag on the switch to indicate that work is being performed on the equipment.
- If there is any auxiliary equipment associated with the equipment, make sure the main electrical disconnect switch is also turned off for each piece of auxiliary equipment. Then lock each disconnect switch in the OFF position, and tag each switch to indicate that work is being performed on the equipment.
- Lock the air supply valves to make sure no air can be supplied to the equipment.
- Verify that no sources of residual energy (capacitors, suspended equipment components, etc.) are present on the equipment or any piece of auxiliary equipment. If any such energy sources are located, make sure they are neutralized. If necessary, manually discharge air pressure and capacitor voltage from charged components. Also, block all suspended or spring loaded mechanical parts to prevent movement.

- Verify that electrical power has been disconnected from the equipment, and from any auxiliary equipment, by trying to energize the equipment and any auxiliaries with the appropriate control switches. If any piece of equipment is found to be operational, locate the electrical circuit(s) supplying the power, and disconnect all such power sources. Then lock and tag these power sources.
- Make sure the air system pressure is 0 PSI.
- Before you begin any work on the equipment or any auxiliary equipment, make sure that at least 60 seconds has elapsed since you turned off the main disconnect switch in step 3. (If an equipment-mounted plate indicates that you should wait longer than 60 seconds, wait the recommended period of time before beginning any new installation or performing any maintenance work.)
- Verify that any equipment which may have been added, and which is not covered by previous bulleted items, is considered for the lockout/tagout procedure.
- After you have completed your work on the equipment, make sure all guards, gates and other safety-related devices are in place and functioning properly.
- When the equipment is completely ready to resume operation, remove your lock and tag from the main electrical disconnect switch. If someone else has placed a lock and/or tag on the main disconnect, do not remove the additional lock or tag. If there is no other lock or tag on the main disconnect, turn on the main disconnect switch and the electric motors, then perform the daily safety checks.

Safety Signs

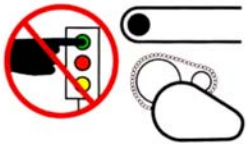
In an effort to reduce the possibility of injury to personnel working around conveying equipment, safety signs are placed at various points on the equipment to alert them of potential dangers. Please check the equipment and note all safety signs. Make certain your personnel are alerted to and obey these signs.

The following illustration shows pictograms designed by the Conveyor Equipment Manufacturers Association (CEMA) Safety Committee as a service to the industry. They also mirror, to the extent practical, the pictograms on the associated CEMA Safety Labels placed on the equipment. CEMA Safety Posters are also available to place in work areas and break areas to remind personnel of safe practices.

Package Conveyors

Do Not Climb, Sit, Stand, Walk, Ride, or Touch the Conveyor at Any Time

Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic and Gravity Energy Sources Have Been Locked Out and Blocked



Operate Equipment Only With All Approved Covers and Guards in Place

Do Not Load a Stopped Conveyor or Overload a Running Conveyor

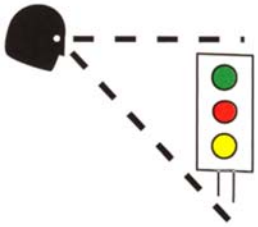
Ensure That All Personnel Are Clear of Equipment Before Starting

Allow Only Authorized Personnel To Operate or Maintain Material Handling Equipment

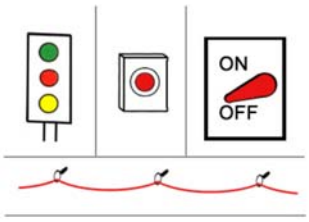
Do Not Modify or Misuse Conveyor Controls

Keep Clothing, Body Parts and Hair Away from Conveyors

Remove Trash, Paperwork and Other Debris Only When Power is Locked Out



Ensure That ALL Controls and Pull Cords are Visible and Accessible



Know the Location and Function of All Stop and Start Controls

Report All Unsafe Conditions

POST IN PROMINENT AREA

2 General Description

Introduction

The UniSort XV consists of the following components:

- an in-feed belt section to accept cases from a 22, 28, or 34 inches (558.8mm, 711.2mm, or 863.6mm) transportation conveyor,
- an idler section (consisting of an idler and an intermediate section),
- intermediate sections (as required by the application) consisting of non-divert sections, and divert sections to divert cases to the left, right, or both sides of the sorter, a catenary section (for applications over 50 feet (15.2m) long), and
- a drive section.

Applications

High speed case sorting system for transportation conveyor systems.

UniSort XV - Product Summary

General

Product Handled

Inch Specification:

0.5 to 120 lbs. weight.

6 to 48 inches length - 1 to 36 inches width.

Consult factory for other sizes.

Cartons, bags, rolls, bound package, etc.

Metric Specification:

0.2kg to 54.4kg weight.

152mm to 1219mm length - 25mm to 915mm width.

Consult factory for other sizes.

Cartons, bags, rolls, bound package, etc.

Drive Medium

RC100 matched pair, single pin extension every other pitch, with carrier bearings.

Speeds

Inch Specification:

250 to 650fpm (feet per minute), in 50fpm increments - other speeds available with variable speed control.

Note: The maximum speed for a dual-sided sorter is 550fpm.

Metric Specification:

76 to 198mpm (meters per minute), in 15mpm increments - other speeds available with variable speed control.

Note: The maximum speed for a dual-sided sorter is 168mpm.

Sort Rate

50 to 350 cartons per minute.

Actual rate dependant on: product dimension, gap between product, and conveyor speed.

Tube Centers

Inch Specification:

Non-divert tubes - 2.5 inch centers.

Divert shoe tube - 5.0 inch centers.

Material -1.75 inch diameter, 12ga steel.

Metric Specification:

Non-divert tubes - 63.5mm centers.

Divert shoe tube - 127mm centers.

Material - 44.5mm diameter, 12ga steel.

Slat Centers

Inch Specification:

Non-divert slats - 5.0 inch centers.

Divert shoe slats - 5.0 inch centers.

Material - Aluminum.

Metric Specification:

Non-divert slats - 127mm centers.

Divert shoe slats - 127mm centers.

Material - Aluminum.

Divert Characteristic

Divert centers - based on width - consult factory.

Number of diverts - Limited only by distance between sort lanes and/or conveyor pull requirements.

Divert angles - 16°/21°, 20° or 30°.

Divert switches - Left and right (electrical), or crossover (mechanical).

Delivery Rates

Table 2 1 shows the delivery rates based on uniform case lengths and a 12 inch (305mm) case gap. Actual rates will vary depending on case length mix, induction system thru-put and availability of product at induction system.

Table 2 1 Delivery Rates

Case Length In. (mm)	Cases Per Minute								
	250fpm (76 mpm)	**300fpm** (91mpm)	**350fpm** (106mpm)	**400fpm** (121mpm)	**450fpm** (136mpm)	**500fpm** (151mpm)	**550fpm** (166mpm)	**600fpm** (183mpm)	**650fpm** (198mpm)
6 (152)	167	200	233	267	300	333	367	400	433
9 (228)	143	171	200	229	257	286	314	343	371
12 (305)	125	150	175	200	225	250	275	300	325
16 (406)	107	129	150	171	193	214	236	257	279
18 (457)	100	120	140	160	180	200	220	240	260
24 (610)	83	100	117	133	150	167	183	200	216
30 (762)	71	86	100	114	129	143	157	171	186
36 (914)	63	75	88	100	113	125	138	150	162
42 (1067)	56	67	78	89	100	111	122	133	144
48 (1219)	50	60	70	80	90	100	110	120	130
Note: Gap length is dependant upon factors such as external control systems and product mix.									

Finish

Intelligrated Gray.

In-Feed Belt Sections

Widths “W”

Inch Specification:

22, 28, 34 inches.

Metric Specification:

558.8mm, 711.2mm, 863.6mm.

Belt Widths

Inch Specification:

19, 25, 31 inches.

Metric Specification:

483mm, 635mm, 787mm.

Lengths

Inch Specification:

48 to 240 inches. Extended lengths available upon Engineering review.

Metric Specification:

1219mm to 6096mm. Extended lengths available upon Engineering review.

Idler Section (Idler Unit and First Intermediate Section)

Between Frame Widths (BF)

Inch Specification:

22W - 43.5 inches, 28W - 49.5 inches, 34W - 55.5 inches.

Metric Specification:

22 inches W - 1104.9mm, 28 inches W - 1257.3mm, 34 inches W - 1409.7mm.

Lengths

20° LH Divert, RH Divert, and Dual Divert:

Inch Specification:

22W - 147.5 inches, 28W - 163.5 inches, 34W - 179 inches.

Metric Specification:

22 inches W - 3746.5mm, 28 inches W - 4152.9mm, 34 inches W - 4546.6mm.

30° LH Divert, RH Divert, and Dual Divert:

Inch Specification:

22W - 119 inches, 28W - 129.5 inches, 34W - 140 inches.

Metric Specification:

22 inches W - 3022.6mm, 28 inches W - 3289.3mm, 34 inches W - 3556.0mm.

Divert Angles - Direction

16°/21° - left or right.

20° - left or right.

30° - left or right.

Power Take-Off

Left or right side.

Divert Shoe Return

Left or right side.

Intermediate Sections

Between Frame Widths (BF)

Inch Specification:

22W - 43.5 inches, 28W - 49.5 inches, 34W - 55.5 inches.

Metric Specification:

22 inches W - 1104.9mm, 28 inches W - 1257.3mm, 34 inches W - 1409.7mm.

Lengths

0° Divert Sections:

Inch Specification:

22W, 28W, 34W inches = 12.0 to 120.0 inches, in 0.5 inch increments.

Metric Specification:

22W, 28W, 34W inches = 304.8 to 3048mm, in 12.7mm increments.

0° Divert Sections - w/IJD (Internal Jam Detector):

Inch Specification:

22W, 28W, 34W inches = 36.0 inches to 120.0 inches, in 0.5 inch increments.

Metric Specification:

22W, 28W, 34W inches = 914.4 to 3048mm, in 12.7mm increments.

16°/21° LH Divert and RH Divert:

Inch Specification:

22W - 116.4 inches, 28W - 132.0 inches, 34W - 144.0 inches.

Metric Specification:

22 inches W - 2956.6mm, 28 inches W - 3352.8mm, 34 inches W - 3657.6mm.

20° LH Divert, RH Divert, and Dual Divert Sections:

Inch Specification:

22W - 107.5 inches, 28W - 123.5 inches, 34W - 139.3 inches.

Metric Specification:

22 inches W - 2730.5mm, 28 inches W - 3136.9mm, 34 inches W - 3538.2mm.

30° LH Divert, RH Divert, and Dual Divert Sections:

Inch Specification:

22W - 79 inches, 28W - 89.5 inches, 34W - 100.0 inches.

Metric Specification:

22 inches W - 2006.6mm, 28 inches W - 2273.3mm, 34 inches W - 2540.0mm.

Divert Angles - Direction

0°

16°/21° - left or right.

20° - left, right, or crossover.

30° - left, right, or crossover.

Drive Sections

Between Frame Widths (BF)

Inch Specification:

22W - 43.5 inches, 28W - 49.5 inches, 34W - 55.5” inches

Metric Specification:

22 inches W - 1104.9mm, 28 inches W - 1257.3mm, 34 inches W - 1409.7mm.

Length

Inch Specification:

60.0 inches.

Metric Specification:

1524.0mm.

Drive Medium

Sprocket - #100 Series - 48 tooth.

Drive Mounting

Overhead, left, or right.

Motor/Reducer

Motor

Inch Specification:

5, 7.5, 10, 15, 20, 25, 30, 40, and 50hp.

3PH-60Hz.

Metric Specification:

4, 5.5, 7.5, 11, 15, 18.5, 22, 30, and 37kW

3PH-50Hz or 3PH-60Hz.

Reducer

Shaft mounted.

Drive Medium

Motor sheave - Two or three “V” groove.

Reducer sheave - Two or three “V” groove.

Belts - Two or three “V” belts.

Operating Environment

Inch Specification:

0°F to 120°F.

Metric Specification:

-18°C to 50°C.

3 Installation Procedures

This chapter contains instructions for receiving, inspecting, and installing the conveyor equipment and preparing it for operation. It is essential that the equipment be properly installed, and subsequently maintained, in order to obtain maximum productivity.

⚠ WARNING

The installer must be qualified and must comply with all applicable codes, ordinances, specifications, and/or other governing data related to the installation of the equipment. Read the installation section of this manual and resolve any questions you may have before attempting to move or install the equipment. Obey all safety precautions. Failure to follow these instructions may result in serious personal injury and/or equipment damage.

Receiving and Inspections

During the process of unloading the material, it is important to:

1. Be sure that the quantity of items received matches the count listed on the Bill of Lading. Once the Bill of Lading has been signed, the liability of any shortage is on the receiver.

2. Inspect each item for damage to the product, especially if there is any damage to the crate or container. Any obvious shortage or damage should be noted on the Bill of Lading before it is accepted.

3. Report any shortages or errors to the Manufacturer's Customer Service in writing within ten days after receipt of shipment.

Lost or Damaged Shipment

Report lost shipments to the Manufacturer's Shipping Department.

If shipping damage is evident upon receipt of the equipment, note the extent of the damage on the freight bill and immediately contact the transportation carrier to request an inspection. Do not destroy the equipment crating and packing materials until the carrier's agent has examined them. Unless otherwise agreed by the manufacturer, the Purchaser (User) shall be responsible for filing claims with the transportation carrier. A copy of the inspection report along with a copy of the freight bill should be sent to the Manufacturer's traffic department.

Claims and Returns

All equipment furnished in accordance with the Manufacturer's Agreement is not returnable for any reason except where authorized in writing by the Manufacturer. Notification of return must be made to the Manufacturer's Customer Service Department, and if approved, a "Return Authorization Tag" will be sent to the Purchaser (Users). The return tag sealed in the "Return Authorization Envelope" should be securely affixed to the exterior surface on any side of the shipping carton (not top or bottom), or affixed to any smooth flat surface on the equipment, if not boxed.

Send authorized return shipment(s) transportation charges prepaid to the address indicated on the Return Authorization Tag. If initial shipment is refused, the Purchaser (User) shall be liable for all freight charges, extra cost of handling, and other incidental expenses.

Codes and Standards

The equipment is designed and manufactured to comply with the American National Standard Institute's "Safety Standards for Conveyors and Related Equipment" (ANSI/ASME B20.1) and with the National Electrical Code (ANSI/NFPA70).

The Purchaser/Operator shall be familiar with, and responsible for, compliance with all codes and regulations having jurisdiction regarding the installation, use, and maintenance of this equipment. Appropriate lockout/tagout policy and procedures shall comply with the minimum safety requirements outlined in the American National Standard Institute's current publication (ANSI Z244.1).

Warning Signs

Warning signs and labels posted on or near the equipment shall not be removed, painted over, or altered at any time. All safety devices, warning lights, and alarms associated with the system should be regularly tested for proper operation and serviced as needed. If the original safety item(s) become defective or damaged, refer to the parts list(s) of bill(s)-of-materials for replacement part numbers.

Safety Precautions

- DO turn off power source(s) and affix appropriate lockout/tagout device(s) to operating controls before servicing the equipment. ONLY trained and qualified personnel who are aware of the safety hazards should perform equipment adjustments or required maintenance while the equipment is in operation.
- DO observe all warning signs, lights, and alarms associated with the equipment operation and maintenance, and be alert at all times to automatic operation(s) of adjacent equipment.
- DO use extreme caution near moving parts to avoid the hazard of hands, hair, and clothing being caught.
- DO NOT sit on, stand on, walk, ride, or cross (over or under) the equipment at any time except where suitable catwalks, gates, or bridges are provided for personnel travel.
- DO NOT attempt to repair any equipment while it is running, replace any component without the appropriate replacement part, or modify the equipment without prior approval by the manufacturer.
- DO NOT operate the conveyor until all safety guards are securely in place, all tools and non-product materials are removed from or near the conveying surfaces, and all personnel are in safe positions.
- DO NOT remove or modify any safety devices provided on or with the equipment.
- DO NOT clear jams or reach into any unit before first turning off the all power source(s) and affixing appropriate lockout/tagout device(s).
- Per NFPA 70E
  Only clothes of natural fiber are allowed at any voltage.
  The following safety equipment must be used:

  For 120V live panel (the DCM box)

  - Hard hat, leather work gloves, safety glasses

  For 480V

  - Safety glasses, 11 Cal. arc suit, insulated mat or platform, 2nd man 10 feet away

Parts Replacement

To minimize production downtime, selected spare parts should be stocked for replacement of defective components when required. Refer to the equipment bill-of-material where quantity requirements or code numbers are not indicated on the parts list. For added convenience, a list of selected spare parts for standard products is included in this manual (see Section I).

Factory Assistance

Contact Field Service for installation, operation, or maintenance assistance, or Customer Service and Support (CSS) for replacement parts.

Installation Overview

This section provides the recommended order for installation, final assembly, and alignment verification of the UniSort XV Sortation Conveyor. Detailed information is provided in later sections.

The layout/installation drawings that should be referenced include:

- UniSort XV layout drawings showing: type, location, and elevation of the UniSort XV sections and associated conveyors.
- Air piping/air connection drawings, for chain oiler only.
- Electrical layout drawings.

Installation and Assembly Steps

1. Verify receipt of the correct types and quantities of UniSort XV sections, installation hardware, loose parts, take-away conveyors, etc. as shown on the installation/layout drawings.

NOTE: The parts that are typically shipped loose include: carrying chains, carrying tubes (slats), divert shoes, variable speed controller, any additional air lubricators, divert control modules (DCM), supports, guardrail, PTO components (if applicable), UHMW chain guide, and Novex belting.

A Field Kit for checking and performing alignments is also shipped loose. The Field Kit contains two short strands of RC-100 carrying chain and a 0.38” × 18” (9.5mm × 457.2mm) long Switch Alignment Tool for checking divert switch alignment.

2. Mark the location and centerlines of all sections at the installation site. Identify the location of each section by marking its part number shown on the layout drawing. The part number is the same as the item number printed on the identification label affixed to each section.
3. Pre-install Floor Supports.

NOTE: If the conveyor is to be located on an elevated structural steel platform, the platform should be in place and level along it’s entire length and width before installing any section.

4. Install the sections starting at the infeed end (idler section with the PTO driven infeed belt, if supplied) and working in direction of product travel.
5. See “Installing the Infeed and Idler Sections” on page 9 “Installing Intermediate Sections” on page 12 and “Installing the Drive Section” on page 14 for details.
6. Check all sections for proper alignment.

7. Install the UHMW chain guide and Novex belting in the chain tracks.
8. Check center crossover switch.
9. Install divert control modules and check operation and alignment of all divert switches.
10. Use the Switch Alignment Tool to verify switch alignment.
11. Check over basic installation before installing chain, chain oiler, slats and shoes.
12. Install chain and perform carrying chain take-up adjustment. See “Carrying Chain Take-Up Adjustment - Catenary Take-up” on page 53 for details.
13. Install chain oiler, fill with lubricant, and setup and test operation.
14. Verify lubrication settings and check chain nozzle locations. See “Installing the ORSCO Series VSR0039 Chain Oiler” on page 41 for details.
15. Review chain facts, including temperature and stretch facts.
16. Install carrying tubes (or slats) and shoes. See “Installing Carrying Tubes (Slats) and Divert Shoes” on page 51 for details.
17. Install chain cover.
18. Install take-away conveyors/chutes. See “Installing Take-Away Conveyors” on page 54 for details.
19. Install drive motor variable frequency drive. See “VFD Installation and Motor Related Checks and Adjustments” on page 63 for details.
20. Install control panel(s) including motor starters, fuses, relays, terminal strips, sortation-induction control unit, etc.
21. Install photo-eyes which are mounted on the UniSort XV, induction, take-away, and discharge conveyors. See project electrical layout drawings, not included in standard product manual.
22. Install all electrical power and control device wiring, see Electrical layout drawings.
23. Perform initial power-off variable frequency drive (VFD) adjustments, see VFD manufacturer’s manual.
24. Check for proper oil type and quantity in the reducer. For additional information, see “Monthly Maintenance” in Section H.
25. Apply momentary power to the drive motor and verify motor phase.
26. Perform final VFD adjustments, see VFD manufacturer’s manual.
27. Ensure that the drive over-current electrical relay/sensor is properly adjusted, see manufacturer’s instruction sheet.

28. Verify the air pressure at the chain oiler to be 10psi (0.69bar). Pressure is pre-set at factory, so this step should just confirm the pressure is set properly.
29. Check the operation and adjustment of the internal jam detectors. See “IJD (Internal Jam Detector)” on page 65 for details.
30. Be sure the pop-up roller assembly operates correctly. See “Transfer Assembly” on page 68 for details.
31. Install product containment guarding (if applicable), personnel safety guards, labels, or signs.
32. Perform final power-off and power-on checks.
33. Test run the installed UniSort XV with product being diverted. Make any necessary adjustments.

Installing the Conveyor

Order of Conveyor Section Installation

Set the sections in place in the order of product flow starting with the infeed section followed by the idler section, intermediate sections, catenary section, and drive section. See Figure 3 - 1.

NOTE: Before beginning the installation, ALWAYS refer to the layout drawings to verify proper identification of the sections. Since layouts are site specific, it is important that the sections be installed as specified by the layout drawings.

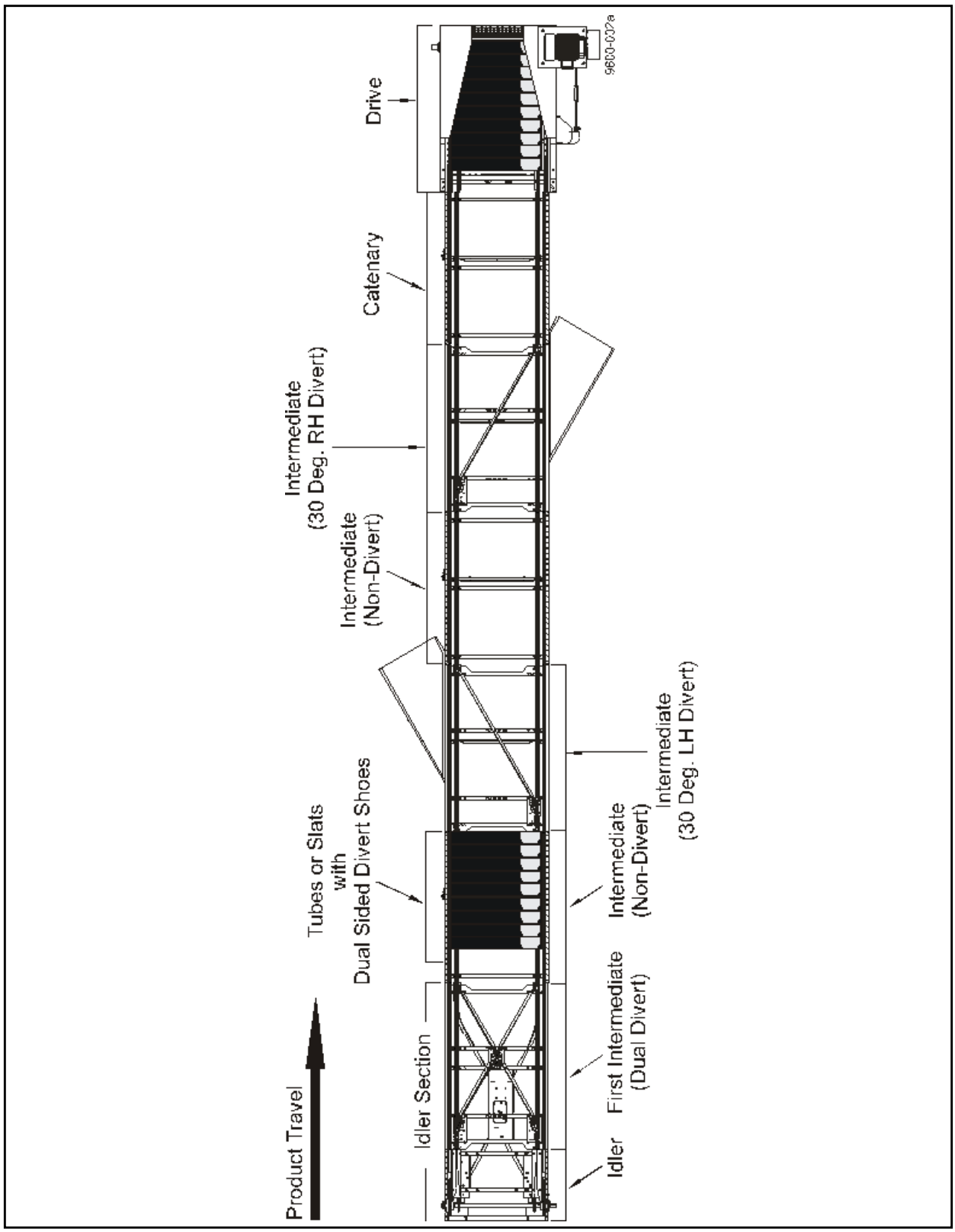


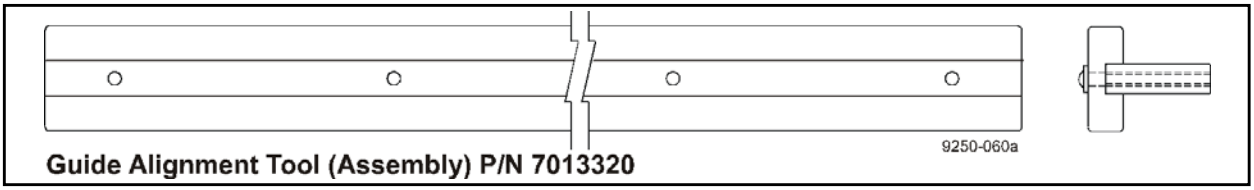
Figure 3 - 1 Conveyor Sections Layout

Conveyor Installation Alignment Tools

Several alignment tools are available to assist in installation and ensure proper alignments. These tools are listed in this section along with the part number of the tool.

Guide Alignment Tool

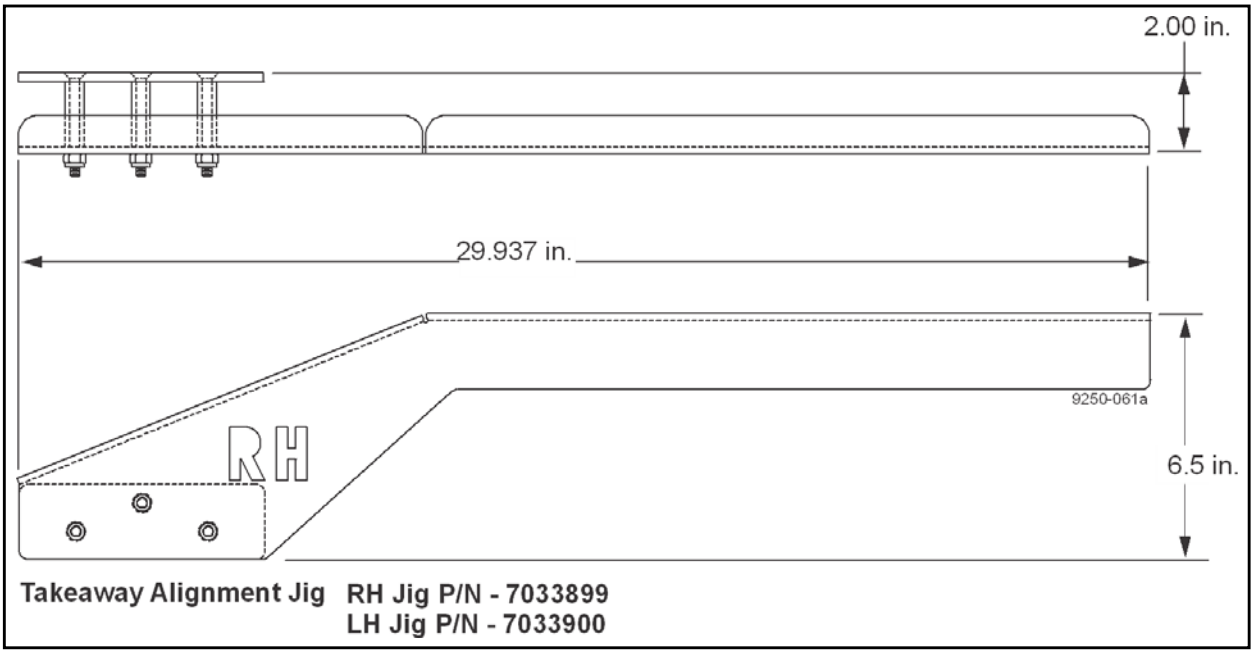
This alignment tool is used to align the pin guide tracks and divert switches.



Guide Alignment Tool (Assembly) P/N 7013320

Takeaway Conveyor Alignment Jigs

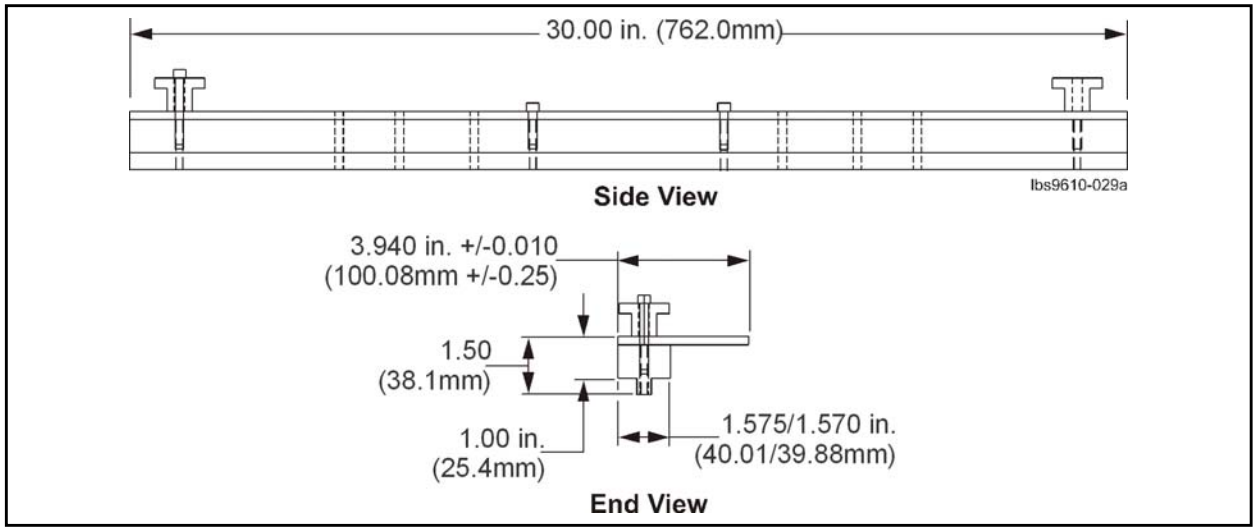
These alignment jigs are used to properly locate the takeaways conveyors to intermediate sections.



Takeaway Alignment Jig RH Jig P/N - 7033899
LH Jig P/N - 7033900

Pin Guide Track Alignment Tool

This alignment tool is used at assembly to align the pin guide track to the chain track. It should also be used at installation to verify pin guide track alignment before installing the tubes (or slats).



Installing the Infeed and Idler Sections

The infeed section is used to connect the UniSort XV sortation conveyor to a product induction conveyor. During installation, the idler section must be installed first, see Figure 3 - 2, then the infeed section installed between the product induction conveyor and the idler, see Figure 3 - 3.

To install the idler section:

1. Refer to the layout drawing and verify the accuracy of the installation site layout.
2. Move the idler near its final installation location.
3. Install the floor supports.

CAUTION

As the idler section will be the "alignment reference section" for aligning the remaining sections, it is most important that the idler section be carefully aligned and leveled. Re-check all alignments if the idler section is accidentally bumped during installation of the remaining sections.

4. Set the idler into its final position:
   - Adjust the idler height requirement.
   - Check that the idler section is level and square front-to-back and side-to-side.

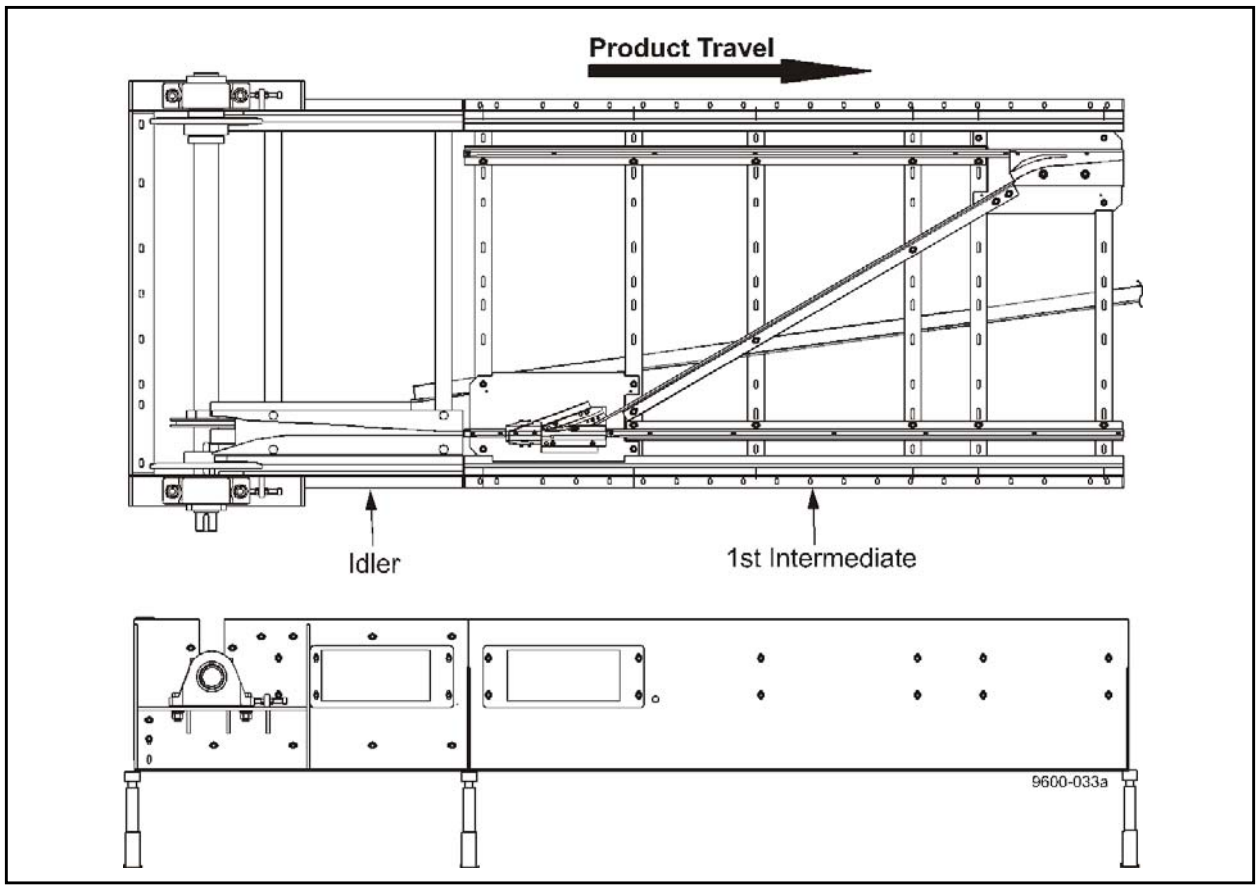


Figure 3 - 2 Idler Section (Idler and 1st Intermediate)

5. Install the infeed section between the idler and product induction conveyor:
   - Verify all alignments.

6. Secure the floor supports by lagging to the floor.
7. Install the PTO drive belt between the infeed and idler section.
   - The belt guard must be installed before putting the conveyor system into production.

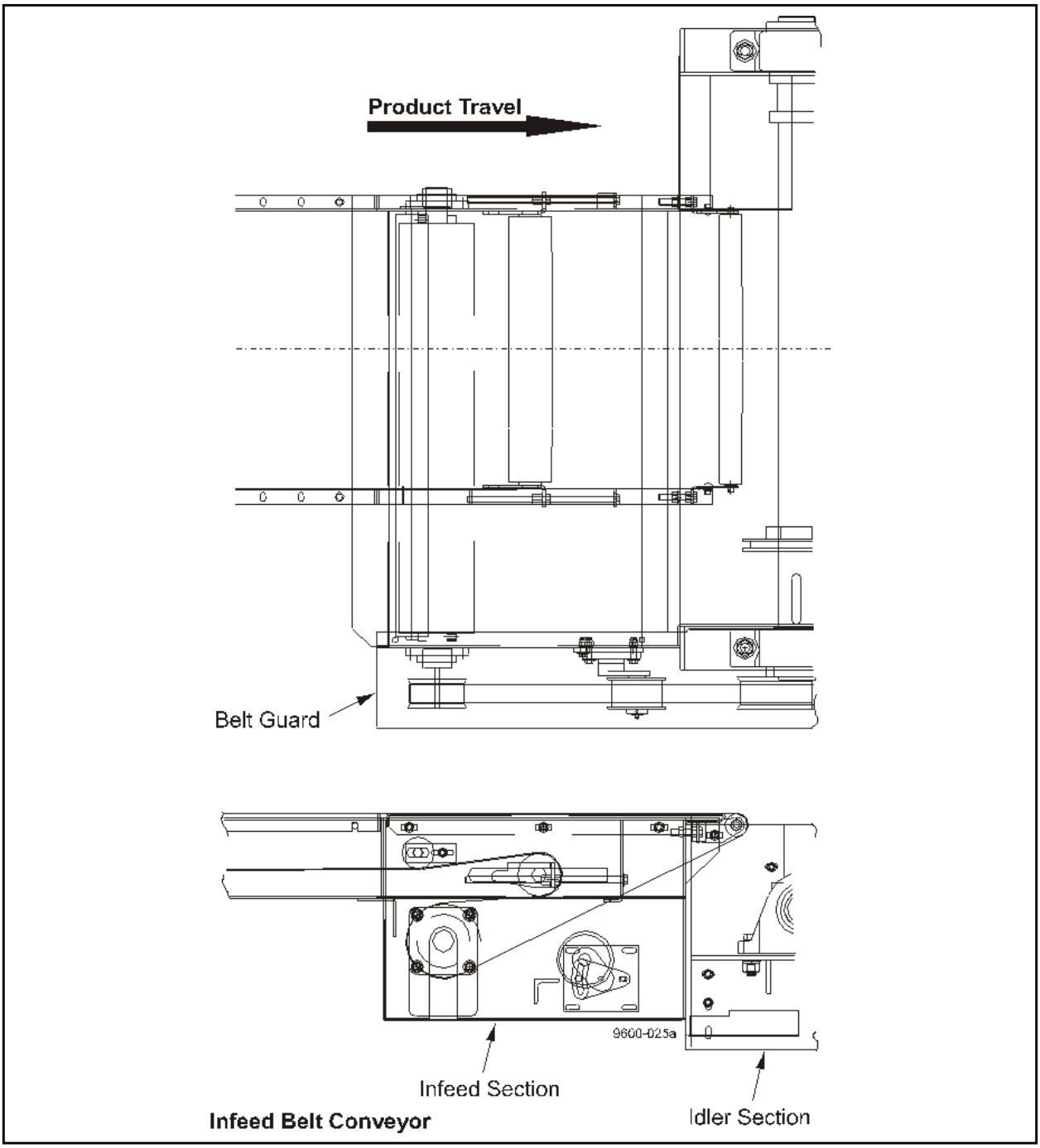


Figure 3 - 3 Infeed Section - Single-Sided Idler (shown)

Installing Intermediate Sections

To install the intermediate sections, see Figure 3 - 4:

1. Refer to the layout drawing and verify the accuracy of the installation site layout.
2. Move the intermediate section near its final installation location.
3. Install the floor the supports.
4. Set the intermediate section into its final position.
   - Align the intermediate section to the idler.
   - Adjust the intermediate section height requirement.
   - Check that the intermediate section is level and square front-to-back and side-to-side.
5. Bolt the intermediate section to the idler section.
6. Secure the floor supports by lagging to the floor.
7. Repeat this process for all remaining intermediate sections.

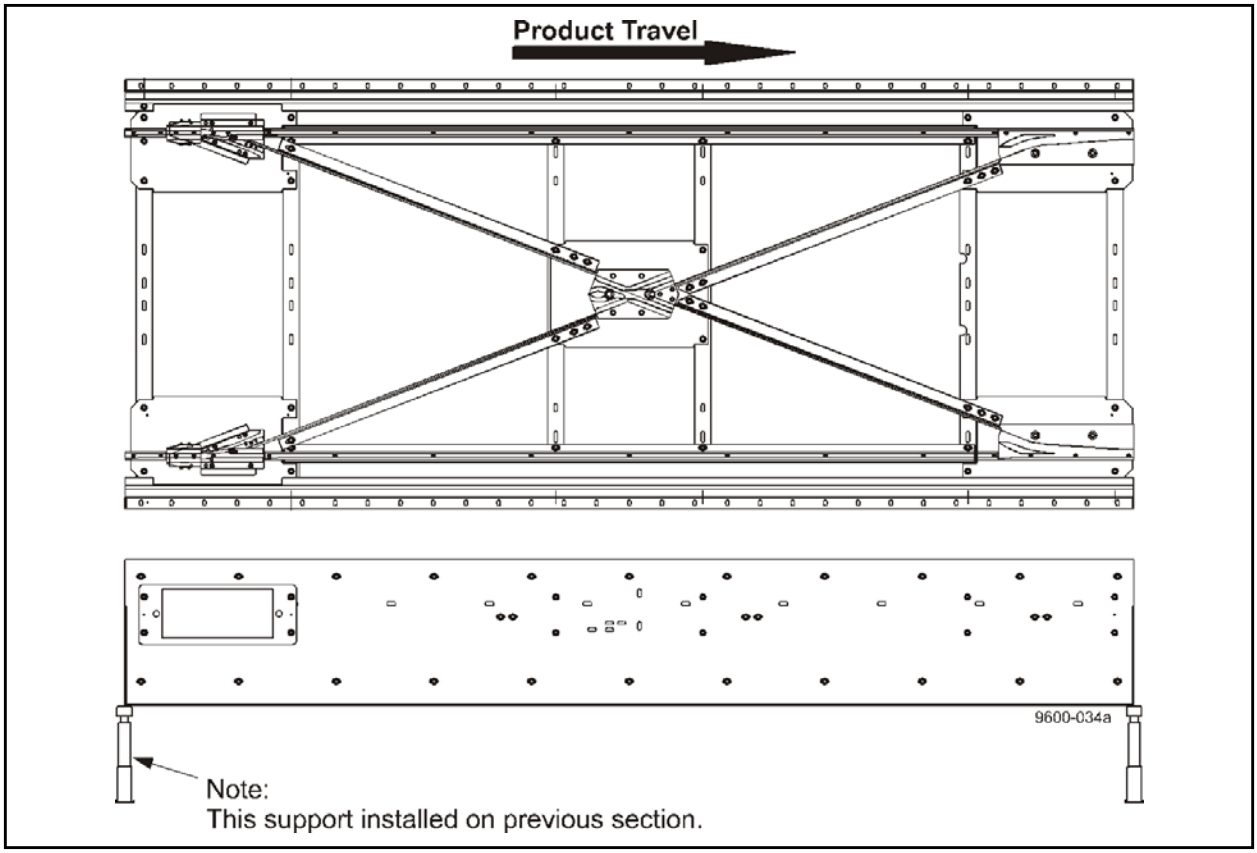


Figure 3 - 4 Intermediate Section

Installing Catenary Section

To install a catenary section, if supplied:

1. Refer to the layout drawing and verify the accuracy of the installation site layout.
2. Move the catenary section near its final installation location.
3. Install the floor supports.
4. Set the catenary section into its final position.
   - Align the catenary section to the last intermediate section.
   - Adjust the catenary section height requirement.
   - Check that the catenary section is level and square front-to-back and side-to-side.
5. Bolt the catenary to the intermediate section.
6. Secure the floor supports by lagging to the floor.

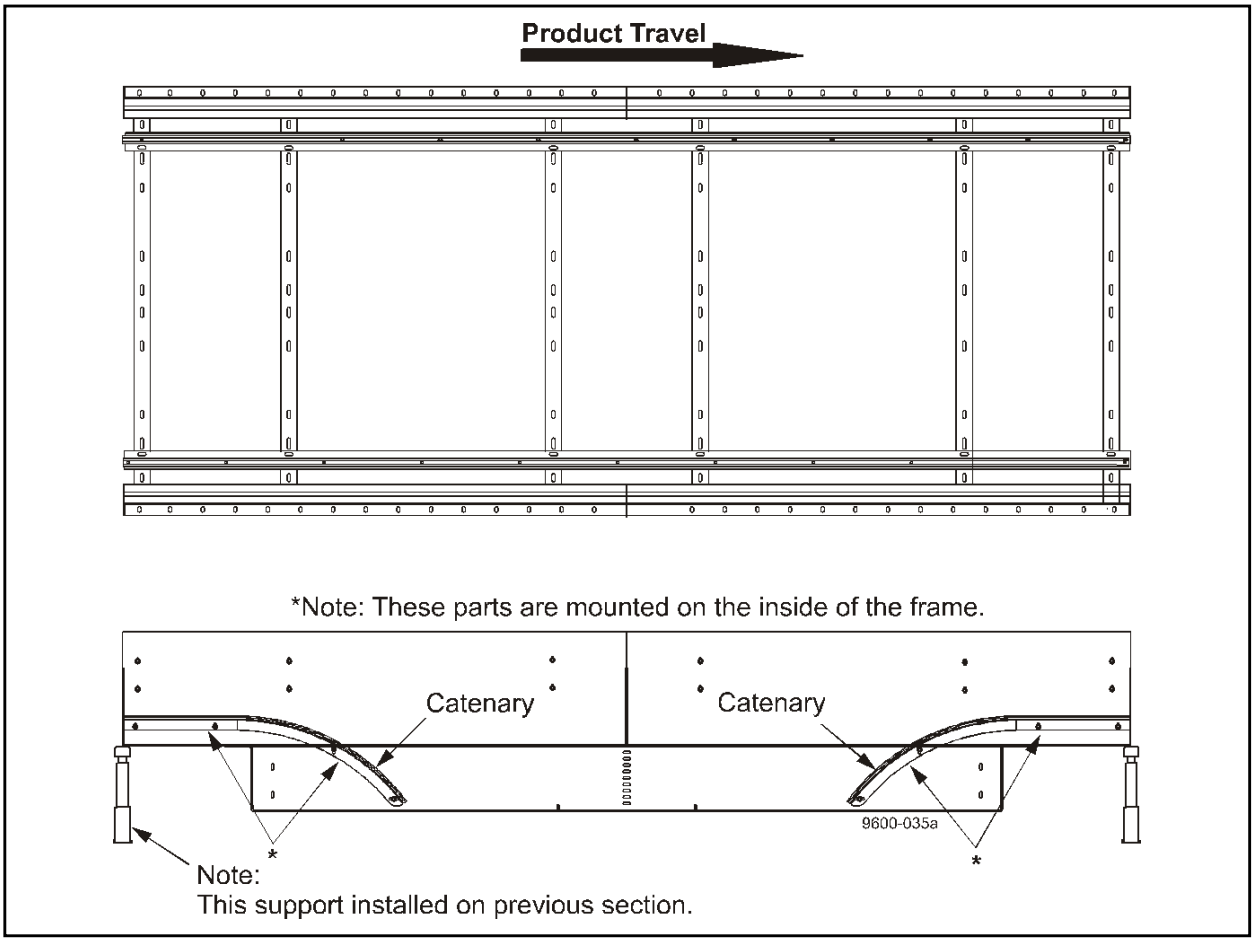


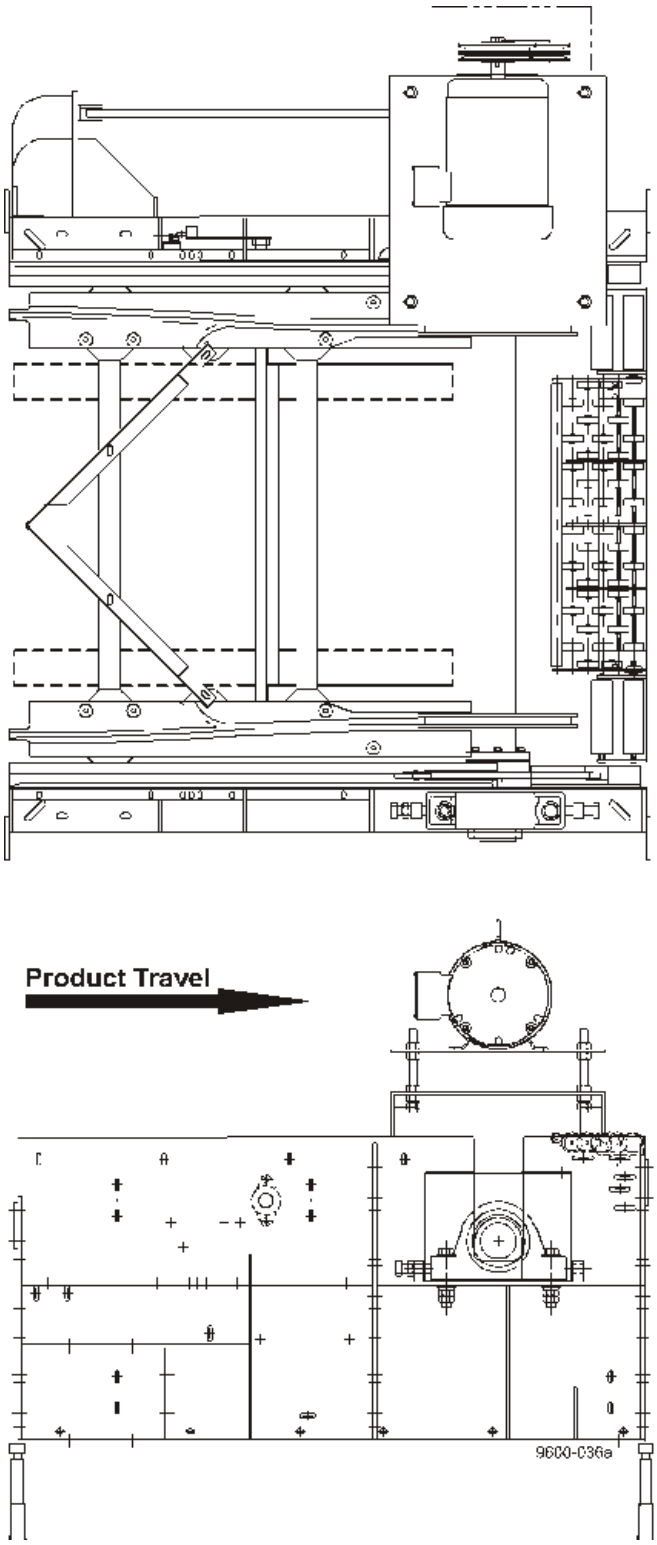
Figure 3 - 5 Catenary Section

Installing the Drive Section

Power unit configurations may be different than shown, refer to the layout drawings provided for site specific information.

To install the drive section, see Figure 3 - 6:

1. Refer to the layout drawing and verify the accuracy of the installation site layout.
2. Move the drive section near its final installation location.
3. Install the floor supports.
4. Set the drive section into its final position.
   - Align the drive section to the catenary section.
   - Adjust the drive section height requirement.
   - Check that the drive section is level and square front-to-back and side-to-side.
5. Bolt the drive section to the catenary section, or to the last intermediate if the catenary is not supplied.
6. Secure the floor supports by lagging to the floor.
7. Install of drive section guards.



Note: Plow guards removed for clarity.

Figure 3 - 6 Drive Section

Aligning Sections

To check the alignment of two sections over their entire length:

1. Assemble a divert shoe onto two carrying tubes (or slats) with the two short lengths of roller chain furnished in the Field Kit.
2. Cut two short pieces each of UHMW chain guides and Novex wear strips and place them in the chain tracks to allow the chain to roll along the conveyor sections.
3. Place the carrier tubes/roller chain assembly into the section to be checked. Position the shoe's pin into the pin guide track, see Figure 3 - 7.
4. Slowly move the assembly in the direction of product travel checking for free shoe movement without interference along the entire length of the conveyor.

NOTE: Ensure the top and bottom divert shoe pin guide track sections are flush where conveyor sections join.

5. If adjustment is required, loosen the bolts joining the two sections requiring adjustment and adjust as necessary

NOTE: Mis-alignment of any section may result in accelerated wear and increased operating noise.

6. After aligning the sections, tighten all bolts located in the section joint flanges. Also, check the tightness of all floor support bolts.

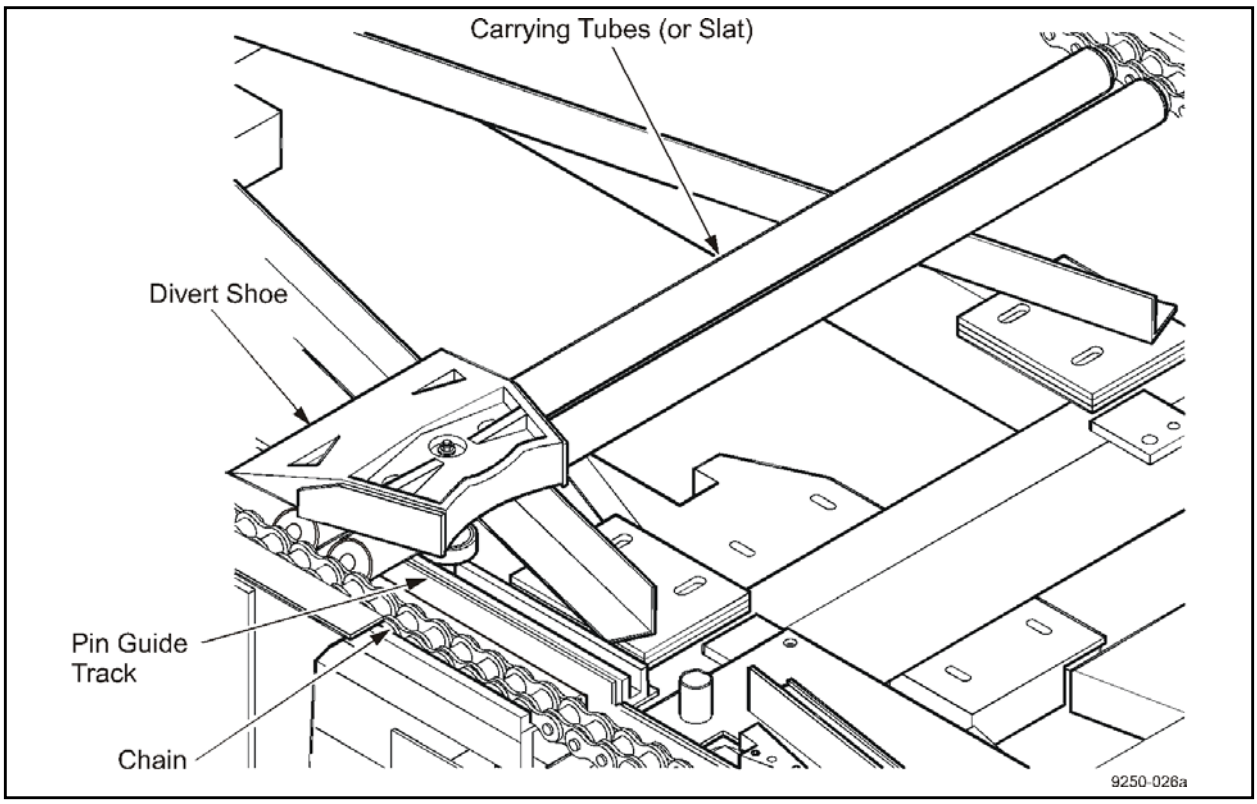


Figure 3 - 7 Checking Conveyor Section Alignment

Installing the UHMW Chain Guide and Novex Belting

The chain track is designed to minimize wear and noise and consists of the following components:

- Extruded aluminum chain track,
- UHMW chain guide,
- Novex belting, and
- Chain cover.

All sections are shipped with the chain track pre-assembled to the frame and should not require field adjustment.

The UHMW chain guide, Novex belting, and chain covers are shipped loose for field installation. Figure 3 - 8 shows the mounting locations of these components.

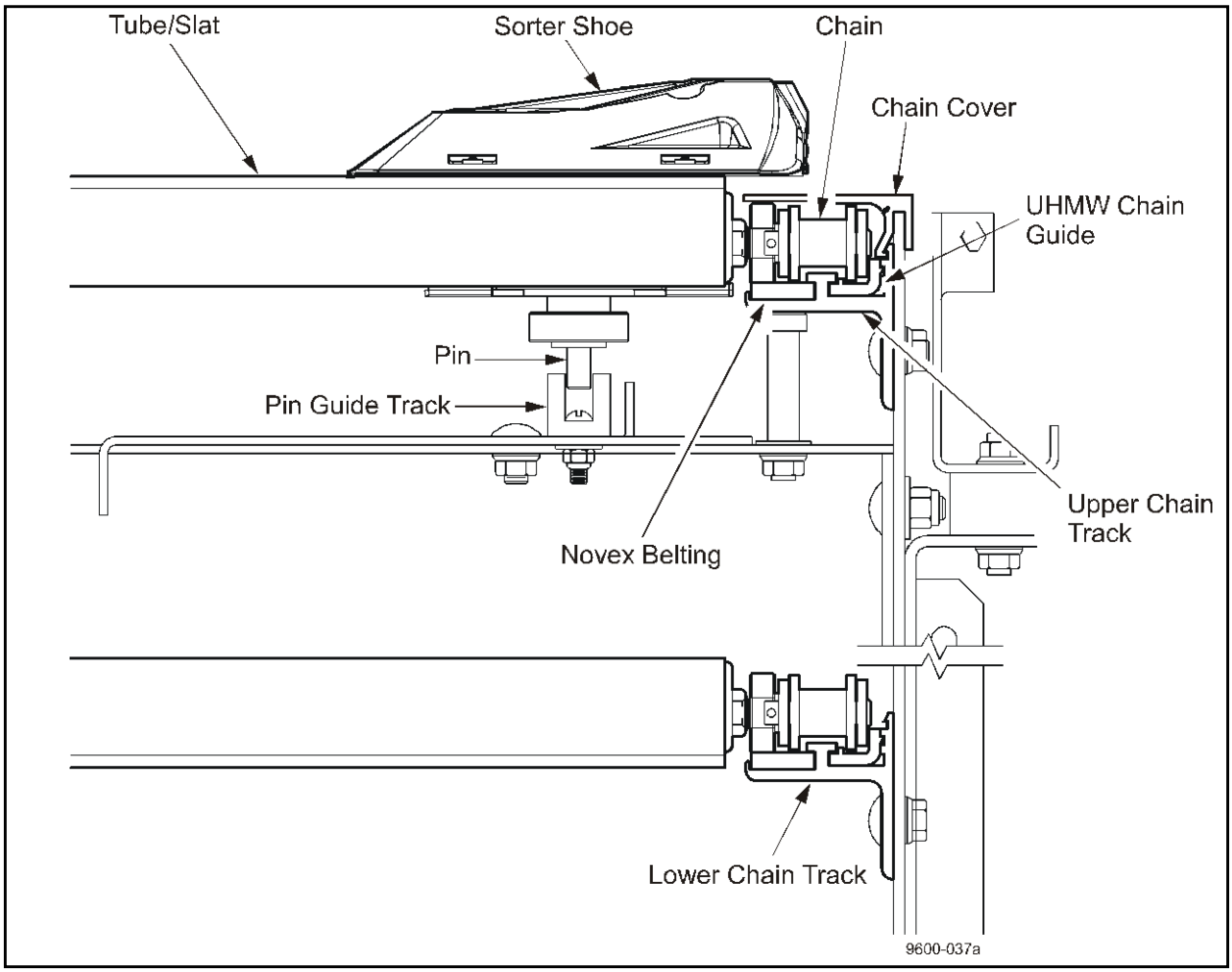


Figure 3 - 8 Chain Tracks, UHMW Chain Guide, and Novex Belting

UHMW Chain Guide Installation and Anchoring

Use the following procedure to install and anchor UHMW chain guide strips:

- Verify that enough 10 feet (3m) pieces of UHMW chain guide strips were supplied for installation on the four track sections of each conveyor section.
- UHMW chain guide strips snap into the chain tracks versus sliding them in from the end, see Figure 3 - 9.

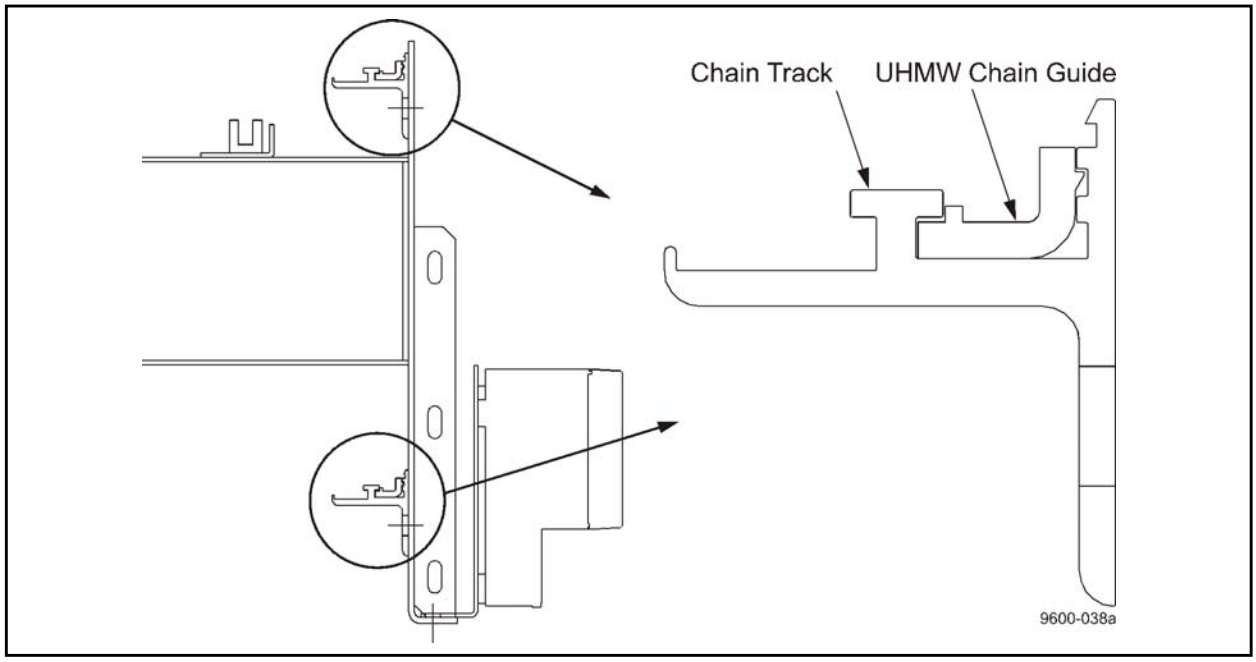


Figure 3 - 9 Installing the UHMW Chain Guide

1. Starting on the top side of the idler section, snap the first piece of UHMW into the chain track.
   - Verify that the trailing edge overlaps the chain track of the next conveyor section. The end of a UHMW must not coincide with the end of a conveyor section.
2. Anchor the UHMW to the chain track at approximately 1 inch (25.4mm) from the leading edge. see Figure 3 - 10:
   a. Drill a hole through the UHMW and chain track to accept a No.8 flat head machine screw.
   b. Countersink the hole in the UHMW to allow the screw head to seat below the UHMW.
   c. Install the #8-32 flat head screw and nut.
4. Install the next UHMW strip leaving a 0.25 inch (6.4mm) gap between the end of the previous UHMW strip. Anchor the UHMW as described in Step 2 above.

5. Repeat the UHMW strip installation and anchoring process for the upper chain tracks of all conveyor sections.
   - Ensure a 0.25 inch (6.4mm) gap is maintained between each UHMW strip and that the end of a UHMW strip does not coincide with the end of a conveyor section. A UHMW strip may be cut in order to ensure proper overlapping between adjoining conveyor sections.

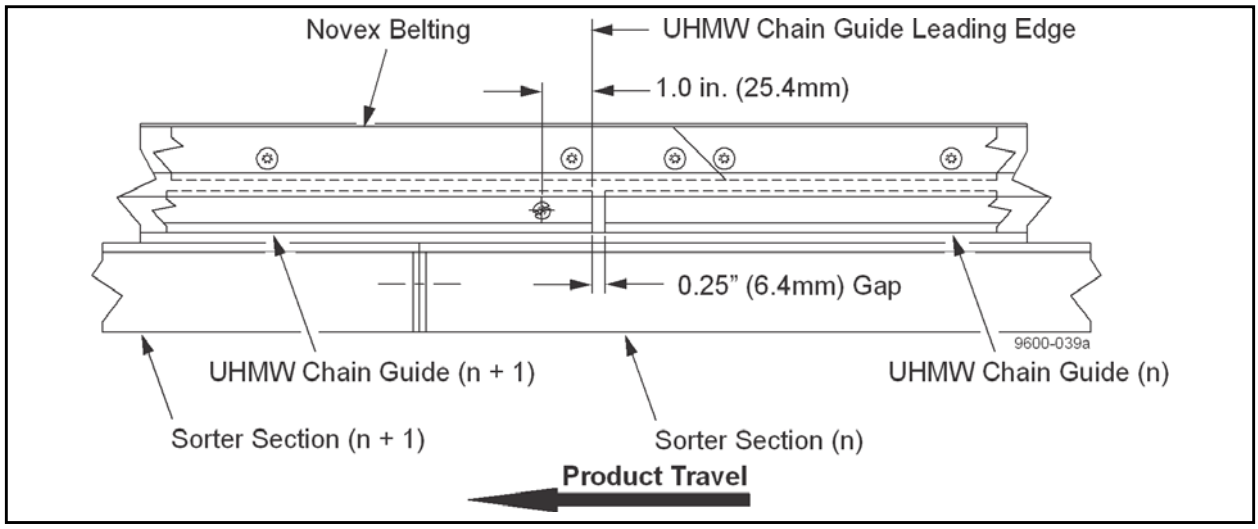


Figure 3 - 10 Anchoring UHMW Chain Guide Strips

CAUTION

Leaving a 0.25 inch (6.4mm) gap between the UHMW sections is critical, since the sections will expand as the conveyor chain warms up to its operating temperature. Failure to leave a gap between sections will result in the UHMW strip buckling and coming out of the aluminum track, possibly causing chain binding.

6. Repeat this process for the lower chain tracks.
   - Start at the drive section and work toward the idler.

Novex Belting Installation and Anchoring

Straight Sections

The Novex belting is mounted to the chain track to provide a running surface for the chain carrier bearings, see Figure 3 - 8. Use the following guidelines for mounting the Novex belting:

- The Novex belting is shipped in 100 feet (30.5m) rolls for field installation.
- Install the belting with the smooth (covered side) up.
- Anchor the pad using #10-24 screws and nuts.
- Anchor the pad 3 inches from each end of a conveyor section and at approximately every 60 inches (1524mm) of the chain track. Countersinking is not necessary.

1. Starting at the infeed end of the conveyor, roll the Novex belting out along the chain track.
2. Position the belting in the chain track with the outer edge under the lip of the track, see Figure 3 - 8.

CAUTION

Anchoring the Novex pad less than 3.0" (76.2mm) from the end of a conveyor section may result in the belting pulling away from the chain track. ALWAYS follow the dimensions shown in Figure 3 - 11 for drilling and mounting the Novex belting.

3. Anchor the Novex belting, see Figure 3 - 11:
   a. Starting 3 inches (76.2mm) in from the end, drill a 0.210 inch (5.3mm) diameter hole through the belting and chain track, 0.63 inch (16mm) from the inside edge of the belting.
   b. Install the #10-24 flat head screws and nuts.
   c. Tighten the screws such that the screw heads are below the surface of the belting.
   d. Drill and anchor the pad at every 60.0 inches (1524mm) along the chain track.

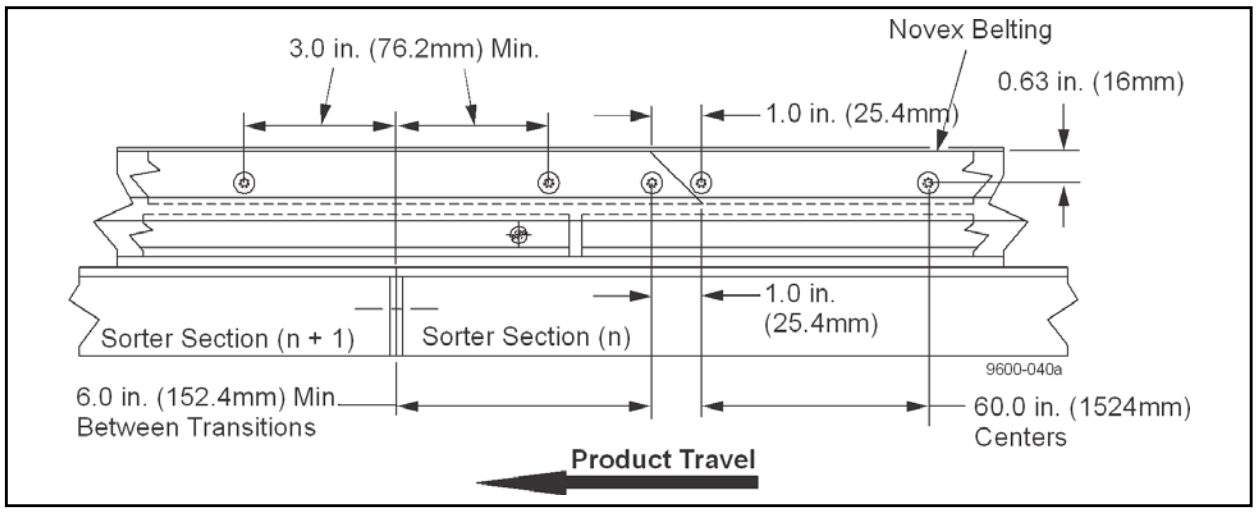


Figure 3 - 11 Novex Belting Installation - Straight Sections

Splicing Novex Belting Joints

Use the following guidelines when making spliced joint:

- The end of the Novex belting must always end at least 6.0 inches (152.4mm) away from the joints of conveyor sections, see Figure 3 - 11.
- The joint between the two sections of belting must be cut on a 45° angle.
- Drill and anchor both ends of the splice 1.0 inch (25.4mm) in from the end of the splice.

Drive Section

Use this procedure to install Novex belting in the drive section, see Figure 3 - 12.

1. Lay the Novex belting in the UHMW block.
The Novex belting must overlap the adjoining conveyor section by least 6.0 inches (152.4mm).
2. Anchor the Novex belting:
    a. Starting 1.0 inch (25.4mm) in from the end of the UHMW block, drill two 0.210 inch (5.3mm) diameter holes through the belting and UHMW block, 1.75 inch (44.5mm) from the inside edge of the drive frame.
    b. Install two #10-24 flat head screws and nuts.
    c. Tighten the screws such that the screw heads are below the surface of the belting.
    d. Drill three 0.210 inch (5.3mm) diameter holes through the belting and UHMW block on 12.0 inch (304.8mm) centers, 1.63 inch (41.4mm) from the inside edge of the drive frame, see Figure 3 - 12.
    e. Install three #10-24 flat head screws and nuts.
    f. Tighten the screws such that the screw heads are below the surface of the belting.

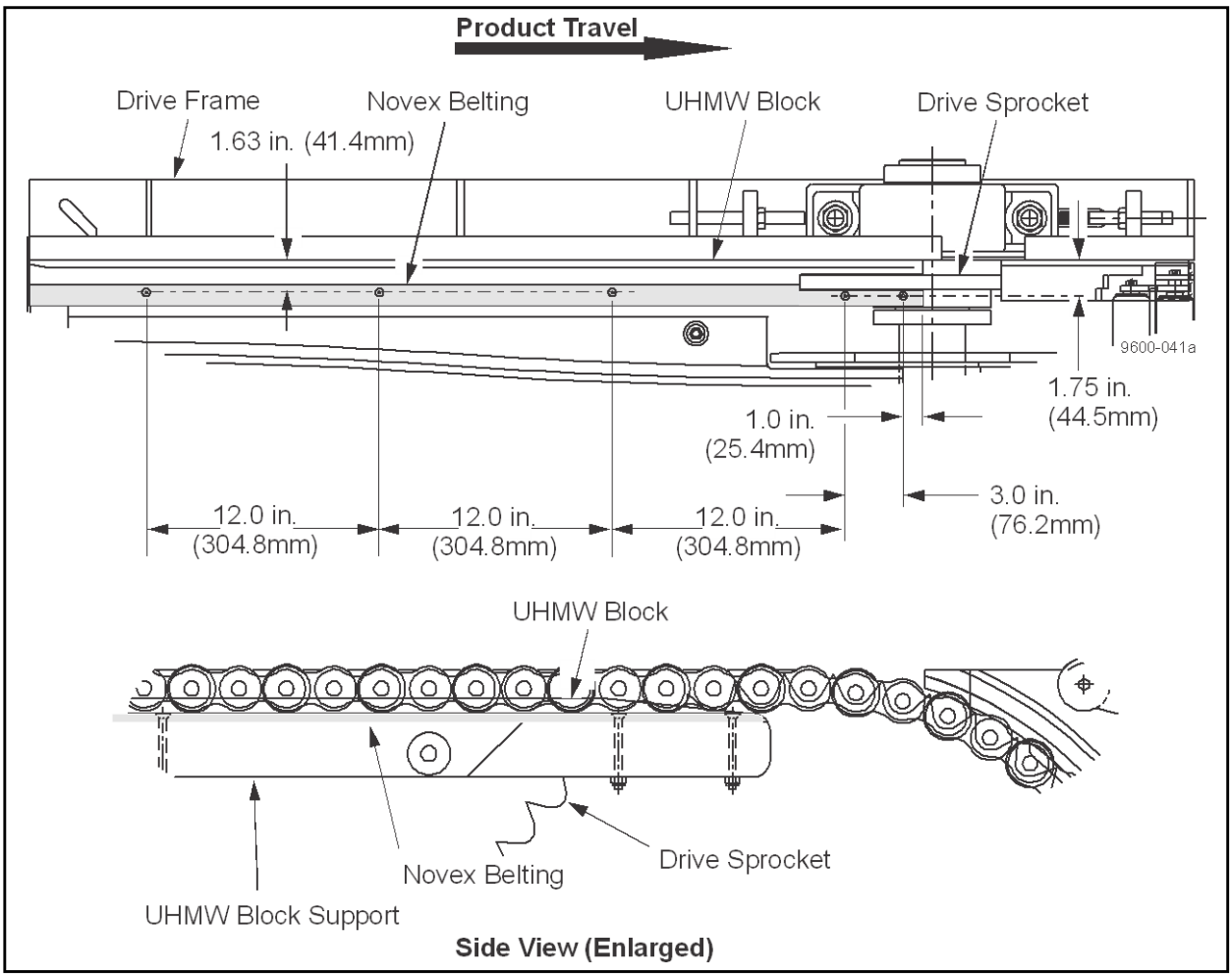


Figure 3 - 12 Novex Belting Installation - Drive Section

Idler Section

Figure 3 - 13 shows a Side View of the inside of the idler frame.

Novex belting installation and anchoring in the idler is similar to that of the drive section shown in Figure 3 - 12.

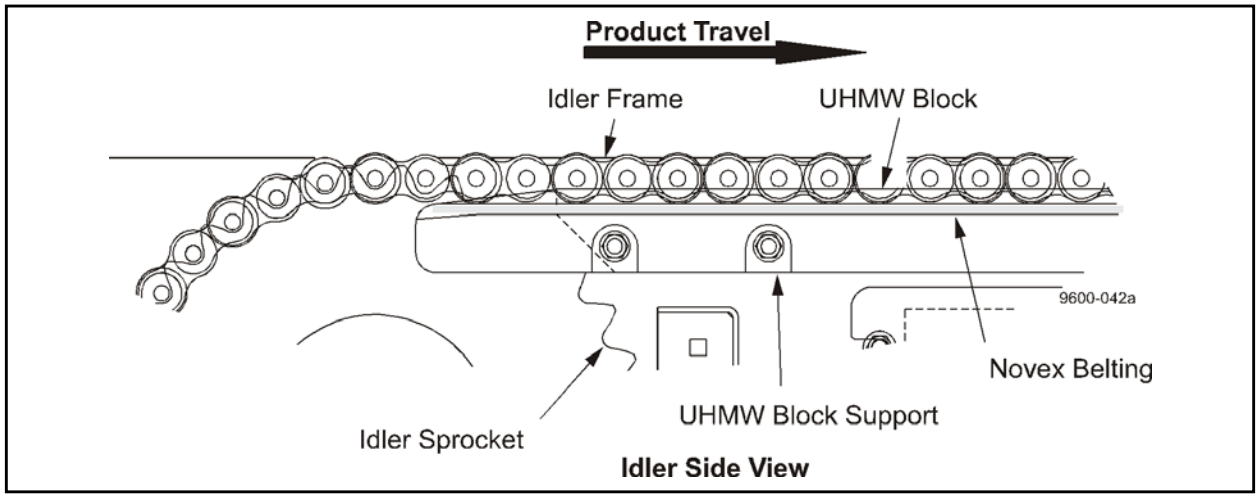


Figure 3 - 13 Novex Belting Installation - Idler Section

Catenary Section

Use this procedure to install the Novex belting in the catenary section, see Figure 3 - 14.

- Do not splice the Novex belting on the curve of the catenary.
- The Novex belting must overlap adjoining conveyor sections by least 6.0 inches (152.4mm).

1. Lay the Novex pad in the catenary curve section.
2. Anchor the Novex belting:
    a. Drill a 0.210 inch (5.3mm) diameter hole through the Novex belting and catenary curve, 0.63 inch (16mm) in from the inside edge of the catenary curve.
    b. Install a #10-24 flat head screw and nut.
    c. Tighten the screw such that the screw head is below the surface of the belting.
    d. Drill and anchor the belting at 3 additional equally spaced positions along the catenary curve.

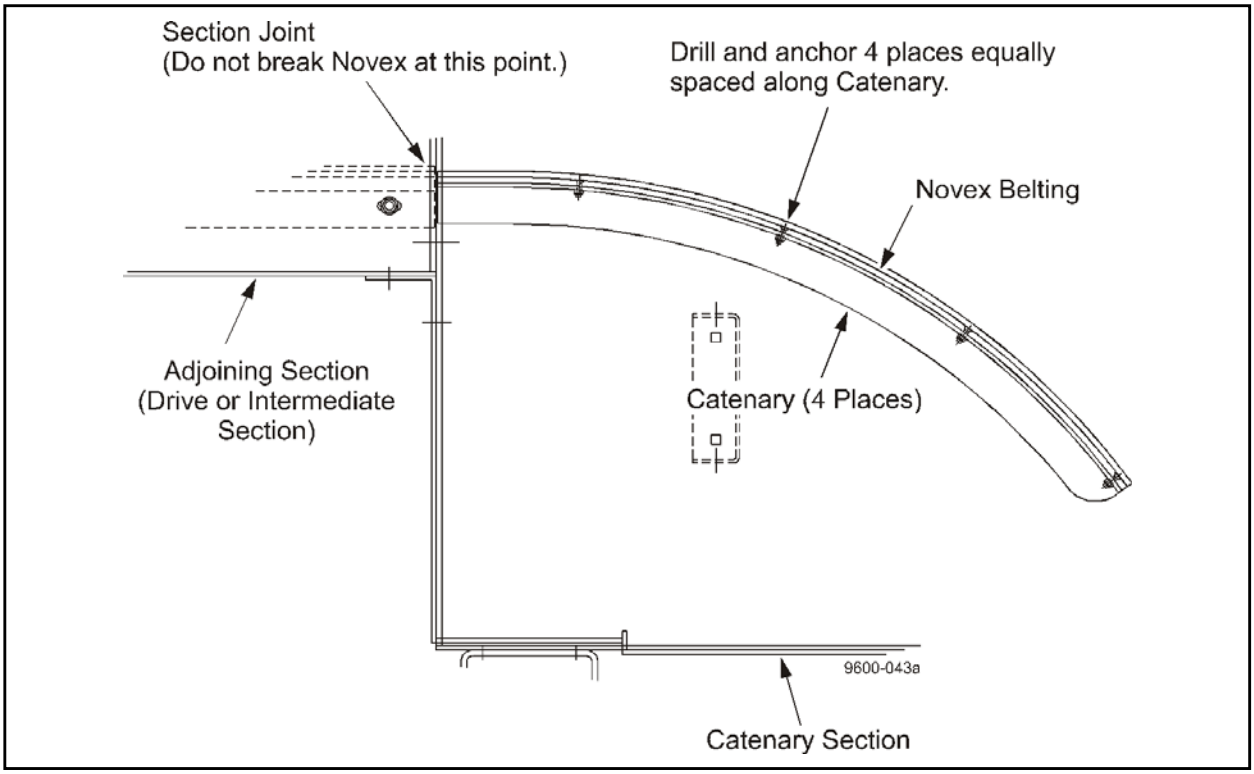


Figure 3 - 14 Novex Belting Installation - Catenary Section

Crossover Switch

The crossover switch is fully mechanical and requires no pneumatic or electrical interface, see Figure 3 - 15.

To check for proper operation of the crossover switch:

- Flip one of the triggers back and forth.
- The second trigger should move in the opposite direction as the trigger being moved; and should strike the base simultaneously.

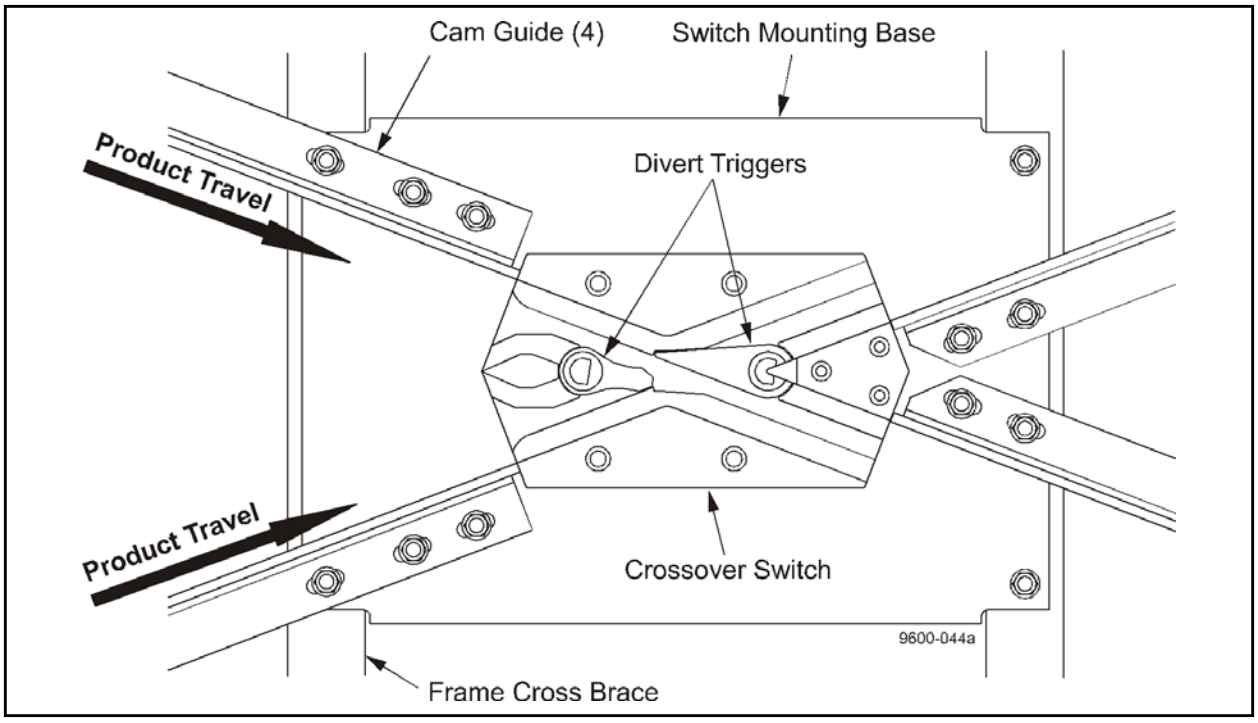


Figure 3 - 15 Center Cross Switch - 20° Divert (shown)

LH and RH Divert Switches

Electronic controlled divert switches are used to divert the carrying tube (or slat) shoes onto a different path. Figure 3 - 16 shows the switch in the non-divert position.

- The divert switch incorporates a double acting brushless rotary actuator to control the divert trigger.
  - In the non-divert position, the divert shoe pin travels though the switch and onto the pin guide track.
  - In the divert position, the divert shoe cam follower travels down the cam guide to the opposite frame side.
- Each divert switch has an embedded photo-eye and reflector to sense the divert shoe cam follower.

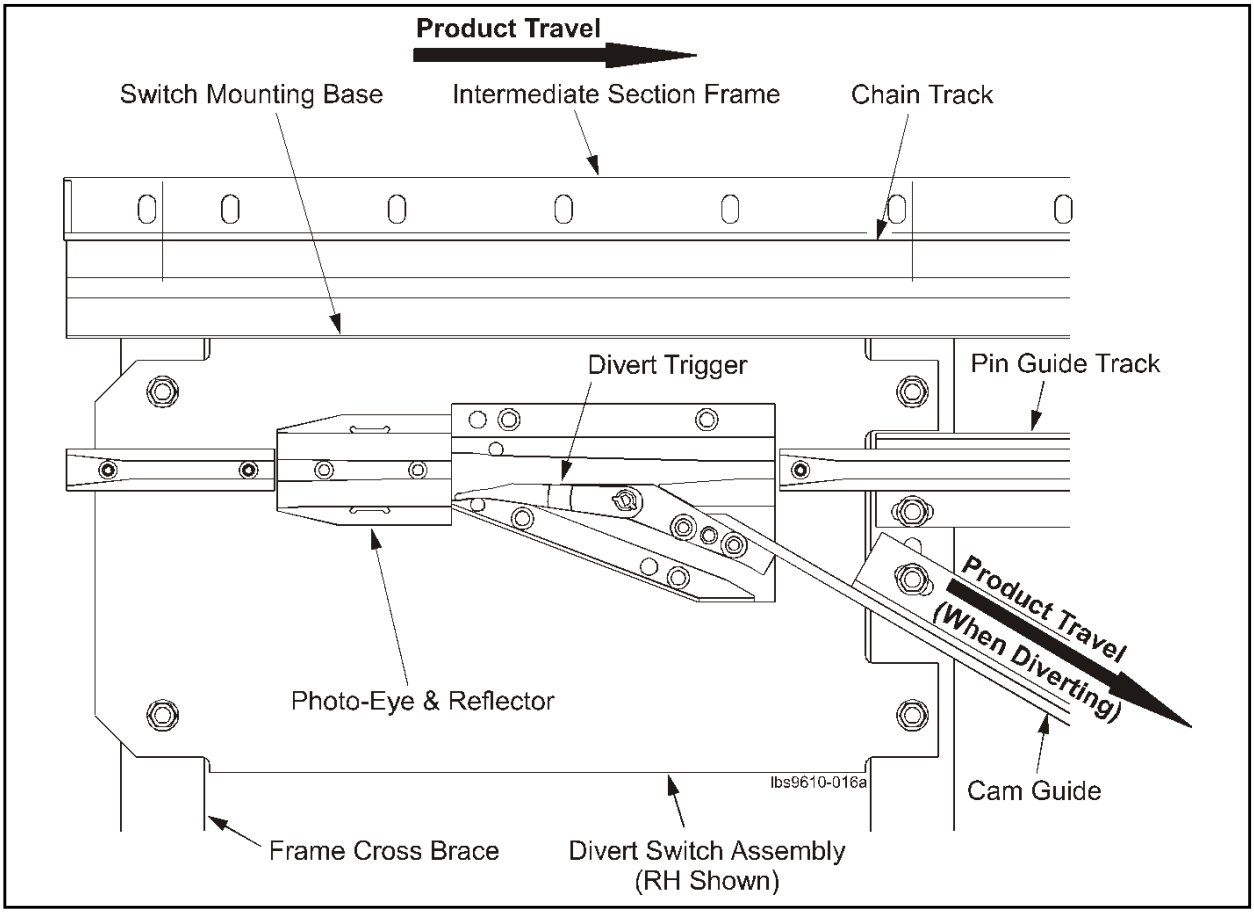


Figure 3 - 16 Divert Switch Detail (RH shown)

Installing and Wiring Divert Control Modules

Divert Control Module Operation

The Divert Control Module provides two functions to the control system. First, it controls the voltage to the brushless rotary actuator that moves the divert switch trigger. The rotary actuator has a higher voltage required to move the trigger, and a lower voltage required to hold the trigger in position. The DCM handles the timing of the outputs to the rotary actuator.

Second, the DCM fires the rotary actuator. It receives an "enable" signal from the control system and fires the rotary actuator on the next shoe's cam follower bearing sensed. It's ability to scan the photo-eye input very fast provides greater precision in the firing of the rotary actuator than is available from most control systems.

When a control system determines that the next shoe is to be diverted, an output is activated that enables the DCM. When the DCM senses the trailing edge of the bearing (Figure 3 - 17), the DCM activates the rotary actuator, causing shoes to be diverted. The first shoe diverted will be the shoe that was sensed by the photo-eye.

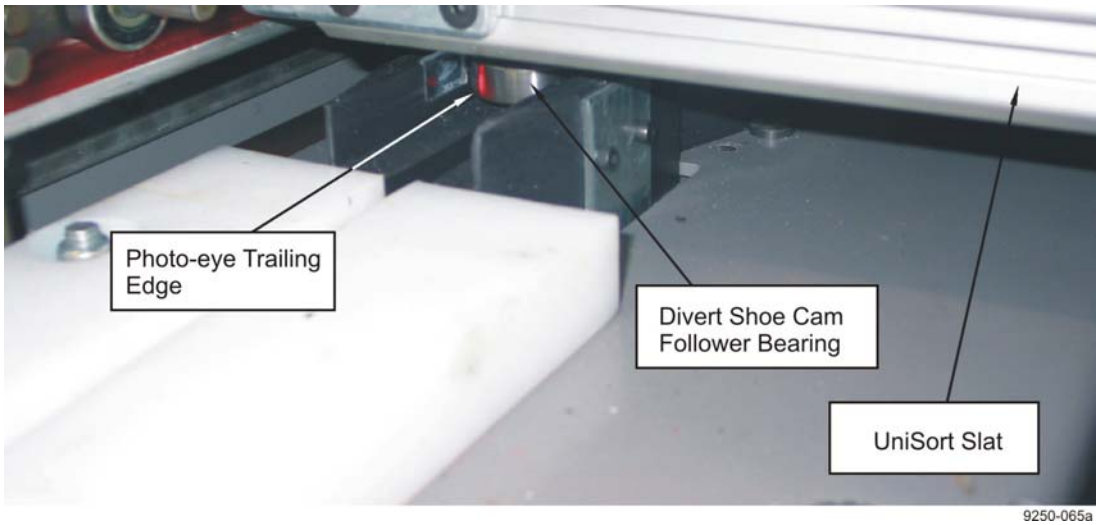


Figure 3 - 17 Divert Shoe Cam Follower Bearing/Photo-eye Trailing Edge

The enable signal from the control system is to remain activated until the last required shoe has been diverted. Upon seeing the trailing edge of the cam follower bearing of the first shoe to not be diverted, the DCM will return the trigger to its original position and no further shoes will be diverted.

NOTE: To ensure proper voltage is supplied to the DCM in order to achieve optimal performance, a constant voltage transformer should be used in the electrical design of the system. A constant voltage transformer recreates a well-regulated sinusoidal waveform that is well isolated from input disturbances including: impulses, brownouts, severe waveform distortion, swell, and sags.

Connecting the Divert Control Module

Connections for the Divert Control Module can be seen in Figure 3 - 18

.

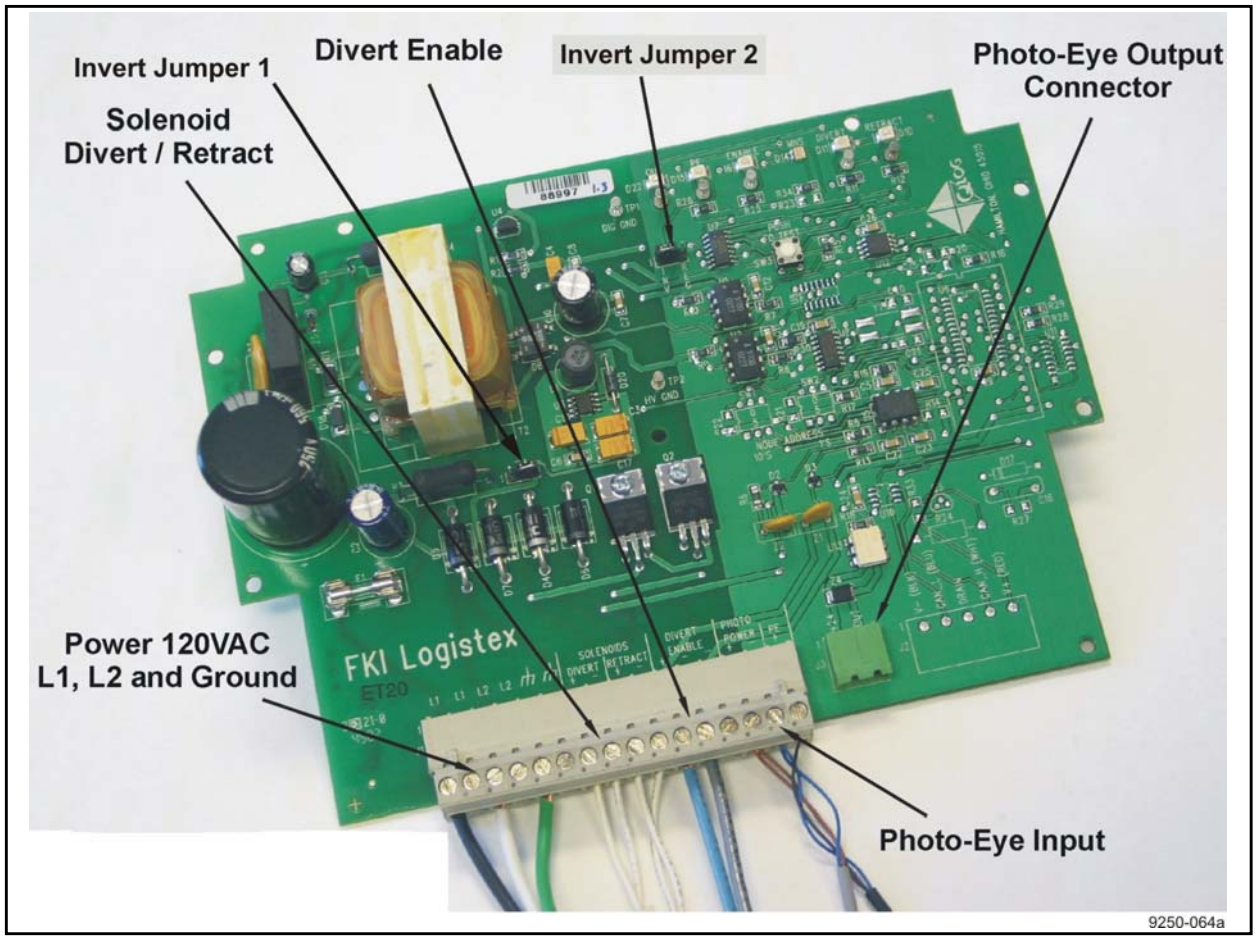


Figure 3 - 18 DCM Details

Connection	Description
Power	120Vac power must be fed to all DCMs. This will be connected to L1, L2, and ground terminals.
Brushless Rotary Actuator	The rotary actuator on the divert switch must be connected to the DCM. There are + and - terminals for both "DIVERT" and "RETRACT" directions. Note: The position on the DCM where the rotary actuators are wired are labeled “Solenoid Divert and Retract”.
Divert Enable	The control system provides a "DIVERT ENABLE" signal to the DCM. This signal notifies the DCM that shoes are to be diverted, starting with the next shoe to pass by the photo-eye. A 24Vdc output from the control system is connected to the terminal marked "+" under "DIVERT ENABLE". A common from that 24Vdc power supply is connected to the terminal marked "-" under "DIVERT ENABLE". The second "-" terminal is provided so the "-" signal can be daisy-chained from one DCM to another.
Photo-eye	The photo-eye mounted in the divert switch is wired to the photo-eye terminals. The +24Vdc wire to the photo-eye is wired to the "+" terminal under "PHOTO POWER" (typically brown), and the common is wired to "-" under "PHOTO POWER" (typically blue). The signal from the photo-eye is connected to the "PE +" terminal (typically black).

If it is desired to connect photo-eye signals back to the control system, then the separate green connector is used. On that connector, 24Vdc from your control system is connected to the terminal labeled "+24" and the signal back to your input is labeled "OUT".

NOTE:

1. Only one DC common wire need be provided. You do not need separate common wires for the divert enable and the photo-eye.
2. Circuit breaker for DCM must be CE compliant (for CE specific applications), Allen Bradley 1492MC or equivalent.
3. For CE compliant applications, DCM enclosure must be electrically connected to frame rail. Field installation to remove paint at interface of panel box and mounting clip and along with interface between mounting clip and frame rail. Serrated flange screws and nuts are required.

Layout of the Divert Control Module

One of jumpers on the DCM is labeled "INV" and "REG". This jumper controls the timing of the firing of the divert switch brushless rotary actuator.

- INV: - this setting will fire the switch when the DCM sees the trailing edge of the divert shoe bearing. This is the default setting for the UniSort XV.
- REG: - this setting will fire the switch when the DCM sees the leading edge of the divert shoe bearing.

NOTE: This jumper will affect the polarity of the photo-eye signal back to the control system.

The jumper installed on the DCM marked W2 should remain in position P1 unless instructed otherwise by Intelligrated engineering. The jumper on the DCM marked W5 is for future use and should remain in the left position.

There are 7 LED's on the DCM.

LED Label	Color	Description
PIN	Red	Indicates the state of the two photo eyes installed for missing pin detection. It will be on when either photo eye is blocked. (Only functional with missing pin detection.)
MISS	Red	Indicates the state of the missing pin signal sent to the control system. A pin is assumed missing whenever the pin to pin period is 150% of the previous measurement. The signal will be sent for 160mS whenever a missing pin is detected. (Only functional with missing pin detection.)
PE	Red	Indicates the state of the photo-eye that is looking at the divert shoe's pin. It will be on when a pin is detected.
ENABLE	Red	Indicates the state of the divert signal from the control system.
CPU	Red	Blinks on and off when the DCM is powered to indicate the DCM is operational.
DIVERT	Red	This LED is on when the divert coil of the rotary actuator is energized.
RETRACT	Red	This LED is on when the retract coil of the rotary actuator is energized.

Checking Divert Switch Alignment

Use the following procedure as a final check for divert switch alignment, see Figure 3 - 19:

1. Insert the guide alignment tool, from the Field Kit, between the pin guide tracks located on both sides of the divert switch.
2. Check for proper alignment of the switch entry and exit areas with the pin guide tracks.
3. If adjustment is required:
    a. Loosen the four divert switch mounting base screws.
    b. Shift the mounting base as needed to obtain alignment.
    c. Tighten the screws.
4. Repeat this procedure for all divert switches.

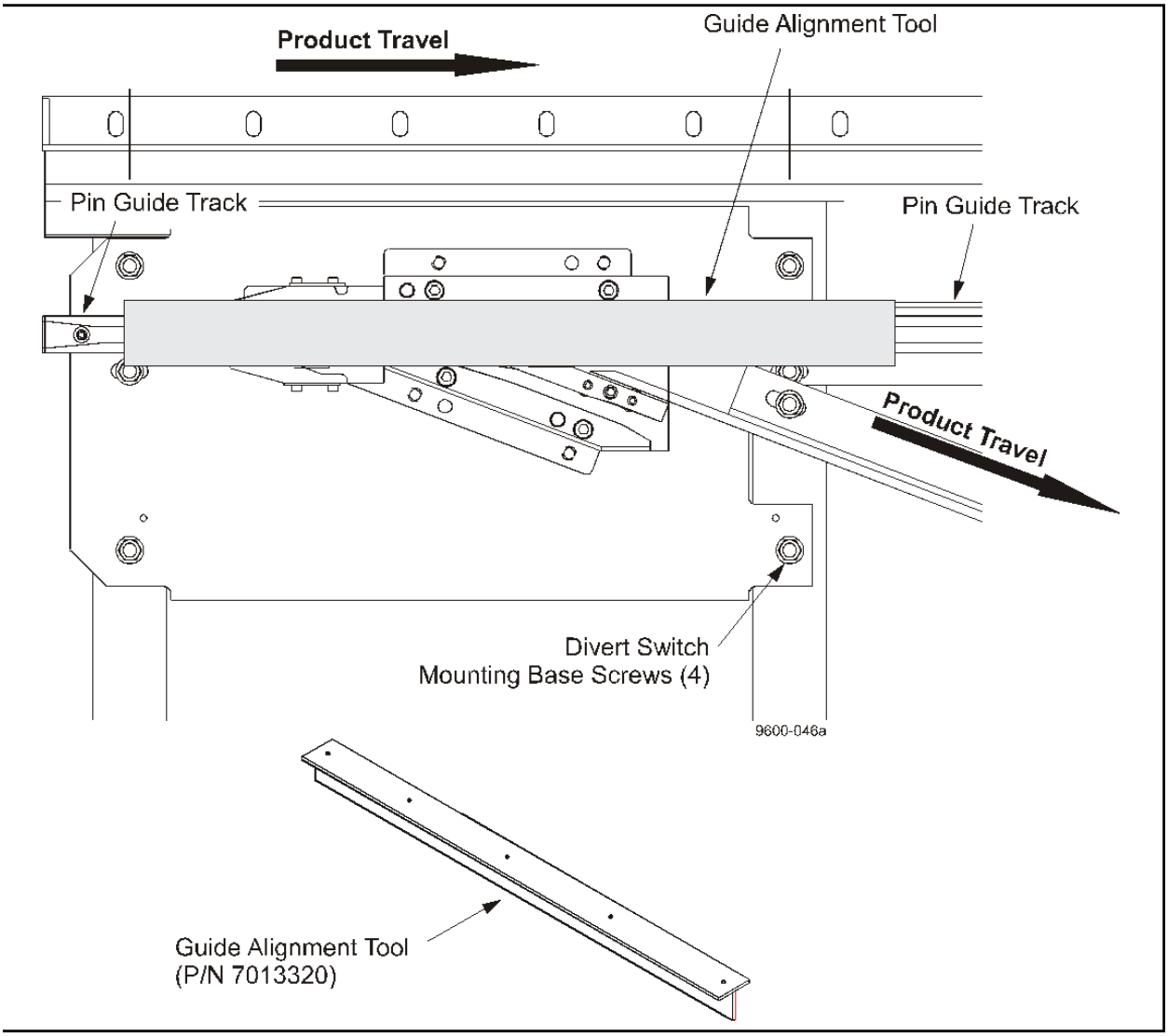


Figure 3 - 19 Checking Divert Switch-to-Pin Guide Track Alignment

Checking Pin Guide Track Alignment

The pin guide track alignment tool (P/N 7066054) is used at assembly to align the pin guide track to the chain track. The alignment tool sets the outside edge of the pin guide track 2.437 inches +/-0.015 (61.90mm +/-0.38) from the edge of the chain track.

- Use this alignment tool at installation to verify pin guide track alignment before installing the slats.

1. First, check for proper alignment at both ends of the pin guide track within the a section.
2. If adjustment is necessary:
    a. Loosen all pin guide track mounting screws.
    b. Align the pin guide track to the chain track over the full length of the section.
    c. Tighten all pin guide track mounting screws.
4. Check the alignment of the pin guide tracks of adjoining sections:
    a. Place the alignment tool midway in the pin guide tracks of adjoining sections.
    b. If the upstream section is properly aligned but the downstream section is not, align the pin guide track of the downstream section.
    c. Check/set the alignment over the full length of the section.
4. Check/set the alignment of the pin guide tracks over the full length of the sortation conveyor.
5. Check/set the alignment of the pin guide tracks on the opposite side of the sortation conveyor.

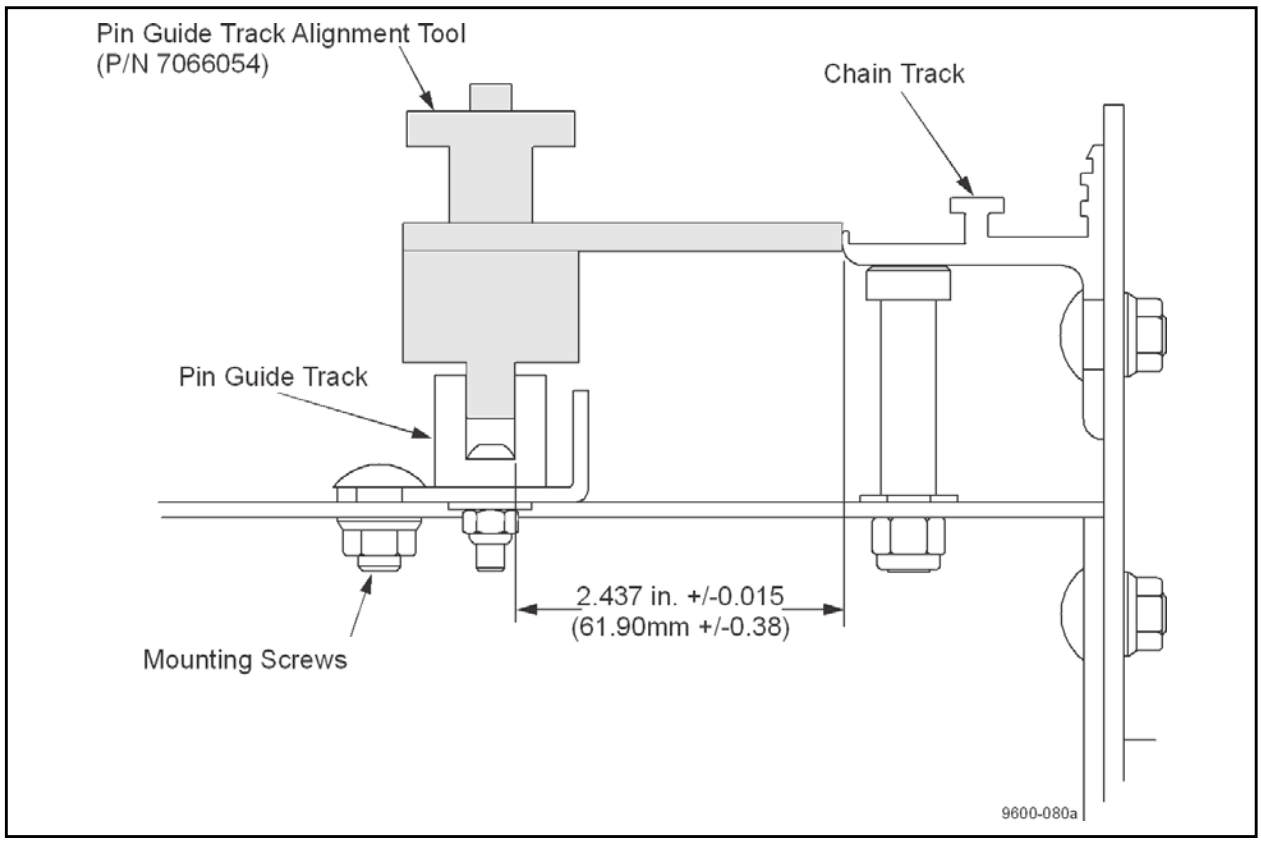


Figure 3 - 20 Checking Pin Guide Track Alignment

Checklist Prior to Chain, Chain Oiler, Tube, and Shoe Installation

CAUTION

To ensure the safety of personnel when using any solvent, pay strict attention to the solvent manufacturers' use instructions and health hazard warnings.

Check the following before installing the conveyor chain, chain oiler, carrying tubes (or slats), and shoes

.

Table 3 1 Checklist

Check	Comments
Pin Guide Track Alignment	• Ensure the side channels are aligned and the section joints tight. • Make any necessary adjustments to assure smooth travel of the pins through the pin guide track transitions.
Chain Guide Support Alignment	• Verify the vertical alignment of the chain guide support angle at all section joints. The top surface of these angles must be at the same height.
Chain Track	• Ensure the UHMW chain guide and Novex belting are properly installed and anchored.
Divert and Crossover Switches	• Verify all divert switch wiring. • Verify alignment and operation of all switches.
Carrying Tubes	• Inspect all tubes of signs of damage. • Clean dirty tubes with a suitable degreasing solvent. Use a very fine grade emery cloth or steel wool if necessary. • Ensure cleaning solvent does not enter the inside of the tube or remain on the end bushings. Wipe with a soaked cloth, do not spray the solvent. • Acceptable cleaning solvents include: Mobilarma 245 - Mobil Oil Corporation Rust Veto® 4214 - E.F. Houghton Company Tectyl 235 - Ashland Oil Company • Do not lubricate.

Table 3 1 Checklist

Check	Comments

Carrying Slats	• Inspect all slats of signs of damage.
	• New slats should not require cleaning.
	• For regular maintenance, clean dirty slats with a suitable mild detergent.
	  • Dilute the mild detergent with water (30:1)
	  • Dampen a cloth with the solution and wring out excess solution.
	  • Wipe the belt slat with the solution dampened cloth
	  • Wipe the belt slat with a cloth dampened with water.
	  • Wipe the belt slat with a clean, dry cloth.
	• Do not lubricate.

Installing the Carrying Chains

CAUTION

The coils of chain in each box must be installed as a matched pair, one coil on the right side of the conveyor and the other on the left side. Maintaining this relationship is extremely important.

The chain is boxed and shipped in matched length coils (two coils per box) in 10’ (3m) and/or 20’ (6m) increments. The length is based on twice the conveyor’s length plus enough chain to get through the catenary and around the drive and idler sprockets.

Notice, due to pin placement, that the ends of the chain are not alike. When installing the chains:

- Uncoil the chain for one side of the conveyor in the direction of product travel.
- Uncoil the chain for the other side of the conveyor opposite the direction of product travel.

  This is necessary to correctly position the connecting links which facilitates removal of tubes and shoes.

To install the carrying chains:

1. Remove the motor V-belts to allow the drive sprockets to rotate freely.
2. Check the idler shaft to be sure it is square. Adjust the pillow block bearings as necessary.
3. Install the carrying chains on both sides of the conveyor.

   Install a tube (or slat) approximately every 4 to 5 feet (1.2 to 1.5m) to prevent the chain from falling off the track.

NOTE: Be sure the extended pins and connecting links of the chains are directly opposite each other. Do not fasten the ends of each chain strand together until this is verified.

If the conveyor has a catenary take-up, be sure the return run of each chain is located on the chain support guides located in the catenary take-up assembly. Allow for a chain sag of 4 inches to 5 inches (101.6 to 127.0mm) in the catenary.

4. Fasten the ends of each chain strand by installing the master link, see Figure 3 - 21.

5. Remove the chain support in the catenary after the chain has been assembled. Verify chain sag.

NOTE: When the sorter is started, the chain will bounce in the catenary. The chain will settle approximately 5 minutes of operation.

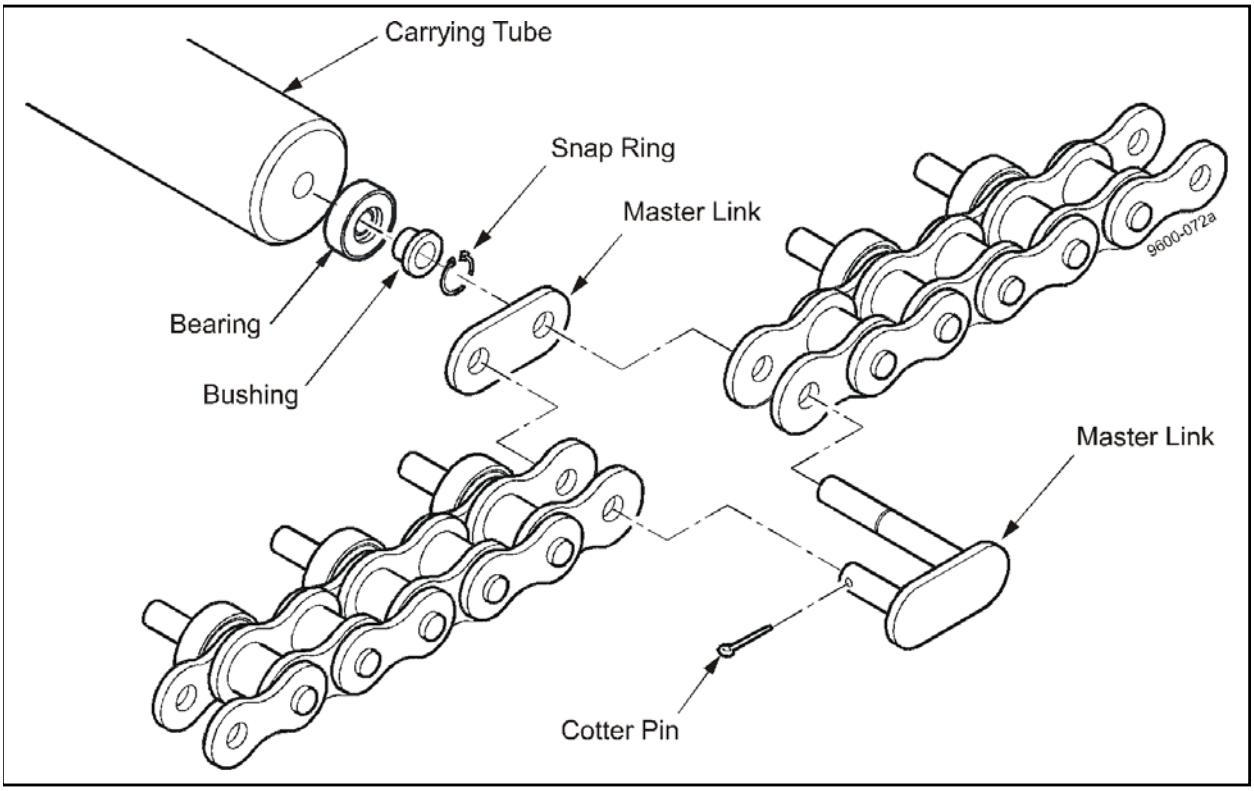


Figure 3 - 21 Roller Chain Connection

Installing the ORSCO Series VSR0039 Chain Oiler

Chain Oiler Location

The chain oiler must be mounted vertically on a stable solid surface on, or near, the idler section of the conveyor. The chain oiler consists of:

- Controller and oil reservoir,
- Lubricator nozzle assemblies and mounting hardware, and
- Associated tubing.

CAUTION

The chain oiler operates by supplying compressed air and oil injection signals to the oiler control unit. Before installing the oiler, make certain to thoroughly review this section. Proper installation of the controller unit and the air and oil lines is essential to provide adequate lubrication to the conveyor chains. Failure to follow these steps will result in inadequate chain lubrication, causing accelerated wear of the chain.

Installation Procedure

Installation includes suppling compressed air, mounting the controller and reservoir unit, mounting the lubricator nozzle assemblies, and installing the air and oil lines.

During conveyor operation, the oiler supplies a fine spray of oil to the conveyor chains.

1. Mount the nozzle assemblies:
    a. Locate on the 2nd downstream cross member of the idler section, see Figure 3 - 22.

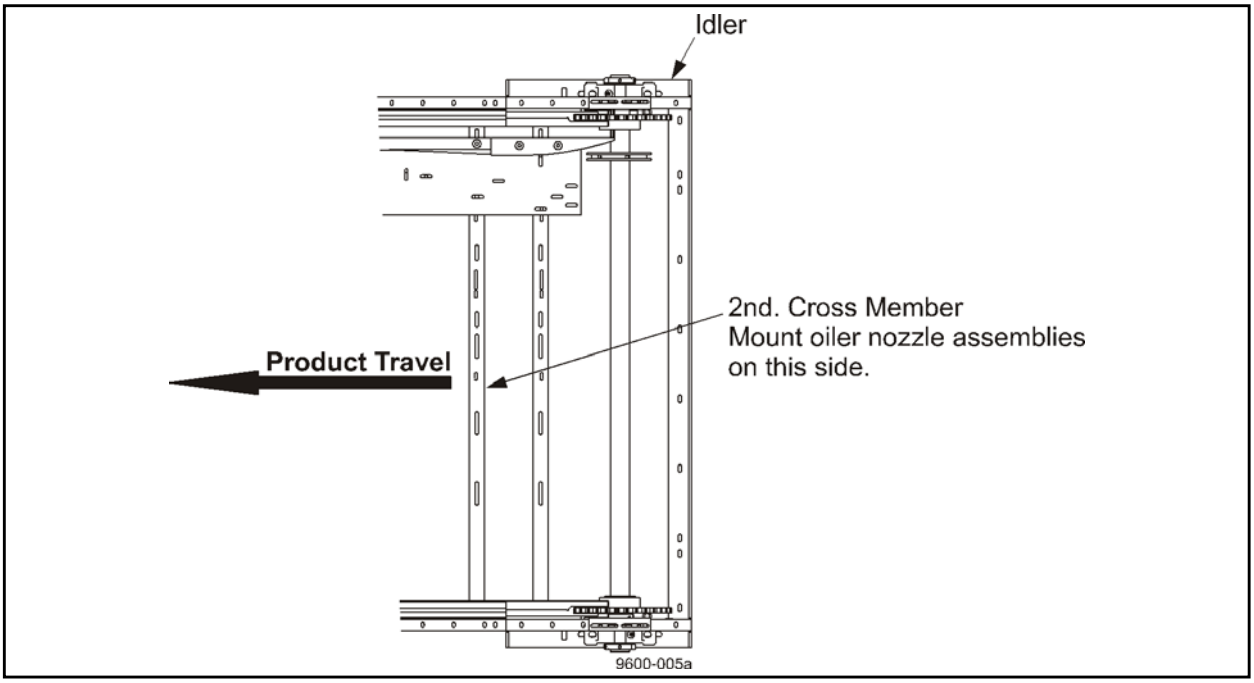


Figure 3 - 22 Idler Section 1st Downstream Cross Member

b. Install the nozzle assembly brackets, see Figure 3 - 23.

c. Adjust the nozzles such that each nozzle is aimed directly at the chain side bars.

   Set the nozzles 0.375 inches +/- 0.063 inches (9.52mm +/- 1.60mm) from the chain. Setting the oiler nozzles closer or further away will cause improper oiling.

NOTE: The nozzles are to be located on the idler section before the turnaround so once the oil is distributed to the chain, the action of the chain coming around the sprocket will force the oil to all areas of the chain. Do not locate the nozzles elsewhere on the conveyor.
Ensure the right and left nozzles are connected to the proper positions on the oiler assembly.

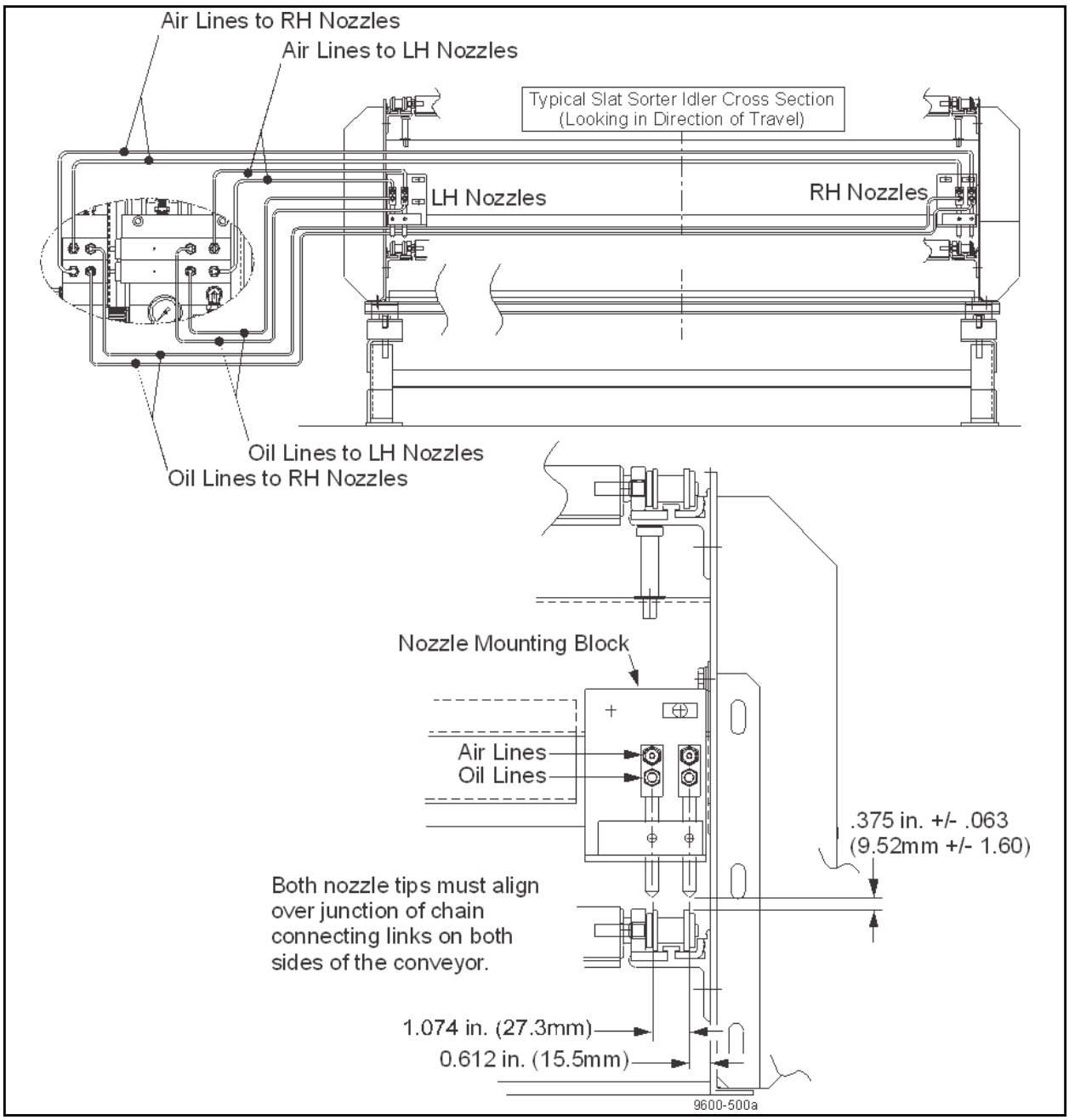


Figure 3 - 23 Location of Chain Oiler Nozzles

2. Mount the oil controller assembly:

    a. Locate the oil controller near the nozzles on the idler section, see Figure 3 - 24.

    Alternative mounting location not to exceed 100 feet from the nozzle location.

    b. Mount the reservoir in a vertical position.

c. Mark and drill mounting holes.

d. Mount the assembly with the supplied hardware.

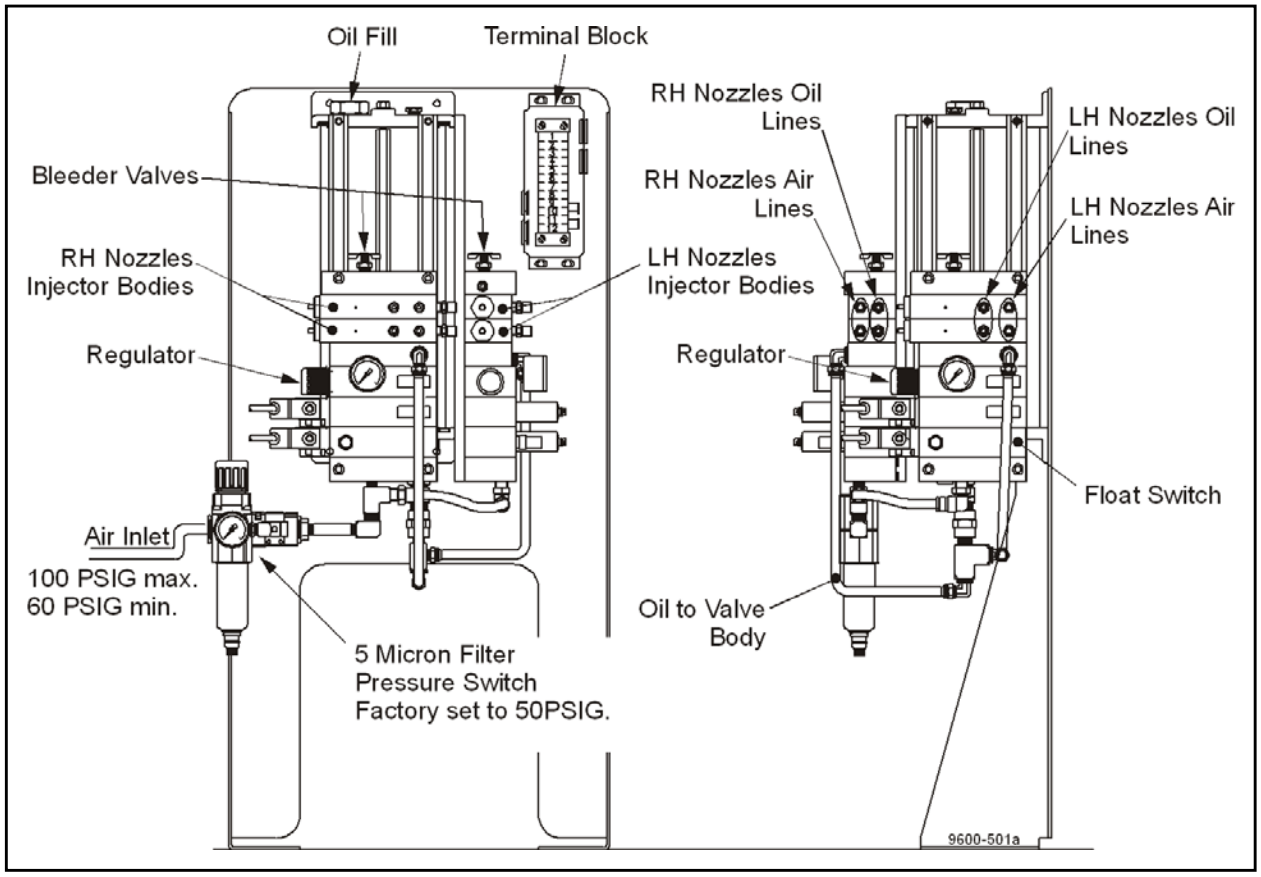


Figure 3 - 24 Oil Controller Assembly

CAUTION

It is very important that the air and oil lines coming from one injector body of the oiler be routed to the correct nozzle (i.e. right vs. left position). Mismatching the lines to different nozzles is not acceptable. Each nozzle operates with a set of lines, one air and one oil, from the same injector body.

3. Connect the air and oil lines, see Figure 3 - 23 and Figure 3 - 24.
   - The oil lines are 0.187 inches (4.76mm) O.D.
   - The air lines are 0.250 inches (6.35mm) O.D.
   - Tube ends must be cut square and be free of burrs
   - All valves and nozzles have ports marked for air and oil, connect air-to-air and oil-to-oil.

d. Push the tube end through the collet into the fittings on the injector bodies and nozzles.

e. The tubing should bottom out past the O-ring and then stop.

f. Once the tube has bottomed out, pull back slightly on the tube to check that the tube is secure.

When disconnecting, push the tube back into the fitting until it has bottomed out, then hold down the collet and remove the tubing

4. Make all electrical connects to the oil controller, see Figure 3 - 25.

- Connect the 120Vac (or 24Vdc) power source and ground.
- Connect the signal wire for the air solenoid, right and left.
- Connect the signal wire for the oil injector solenoid, right and left.
- Connect the Air Pressure OK and Oil Level OK signal wires.

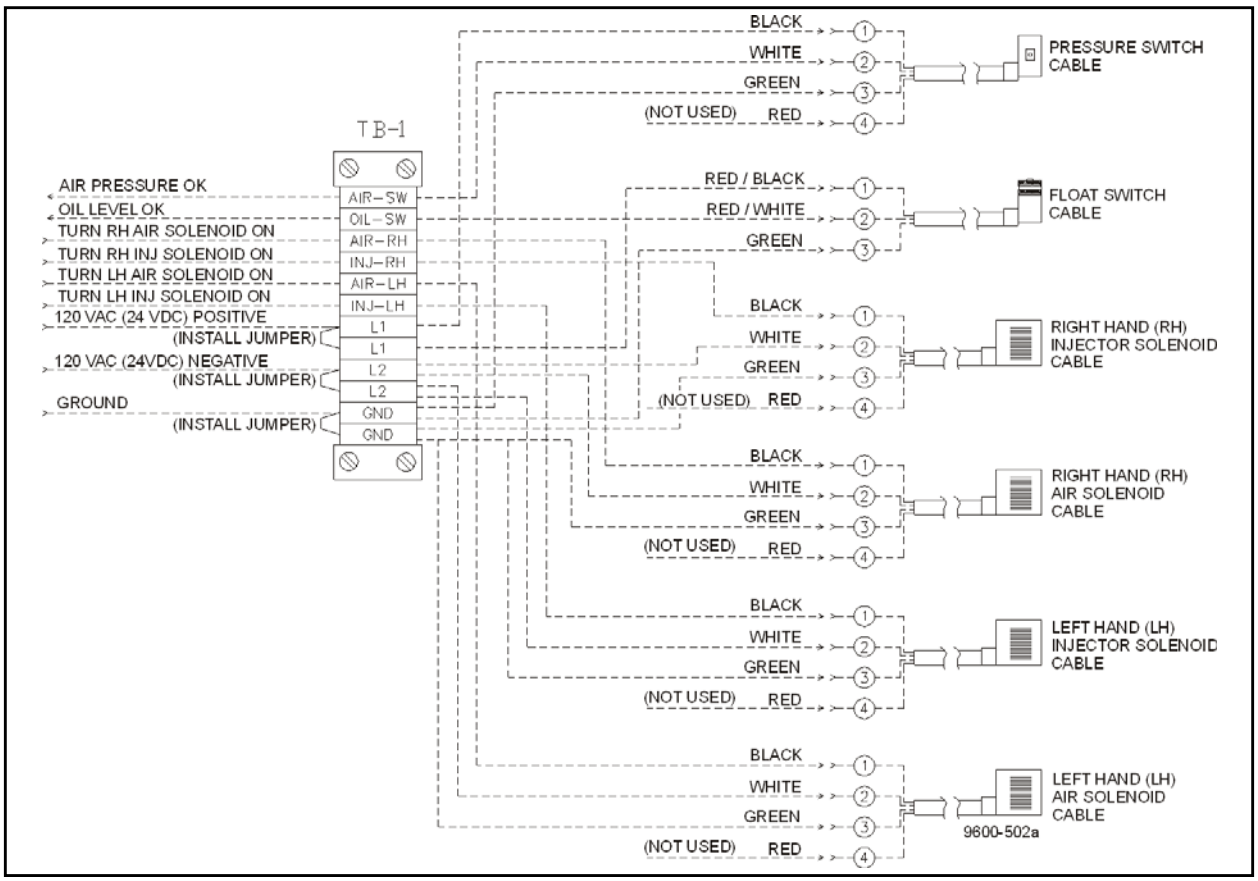


Figure 3 - 25 Oil Controller Schematic

5. Connect the air source to the oil controller.

- This air should be a minimum of 60psi (4bar) and a maximum of 100psi (7bar).
- The air inlet is 1/4" NPT.

Reservoir Filling and Bleeding the System

CAUTION

Use of other lubricants in the chain oiler must be reviewed and approved by Intelligrated. Do not attempt to place any other lubricants into the oiler without approval from Intelligrated. Use of other oils may accelerate chain wear.

1. Fill the reservoir with the supplied oil (Mobil Oil, 20 wt. DTE Heavy Medium ISO-68 non-detergent machine oil).
2. Open the ball valve to allow the lubricant to fill the system, see Figure 3 - 24.
   - The ball valve must be open at all times for oiler operation. It should only be shut off during oil controller system maintenance.
3. Bleed the oil injector bodies:
   a. Temporarily shut off the air to the oiler.
   b. Open the bleed port located on top of the injector body assembly, see Figure 3 - 24.
   - It is not necessary to cycle the air or oil solenoids during this procedure.
   - Allow gravity pressure to force the oil up and out of the bleed port.
   c. Close the bleed port once oil starts to flow from the port.

CAUTION

If you apply pressure to the top side of the reservoir, make certain not to exceed 5psi (0,3bar). If this level of pressure is exceeded, damage to the unit can result. Always attempt to bleed the system with the gravity procedure mentioned above before ever putting pressure on the reservoir.

To assist with bleeding, it is possible to supply slight air pressure (5psi (0.3bar) max.) to the top of the reservoir.

4. Turn the air on and set the pressure to 10psi (0.7bar) at the pressure regulator.

CAUTION

Do not attempt to turn the oil injector solenoid off and then back on again in less than the 0.75 seconds. Doing so may cause the oil injector valves to lock up.

5. Bleed the oil lines to the nozzles:
    a. Turn the air solenoid on.
    b. Cycle the oil injector solenoid on for 1 sec., then off for 1 sec.
    c. Continue to cycle the oil injector solenoid until oil reaches the nozzles.
    - A fine oil mist should be seen at the nozzles once all lines have been bled.
    d. Turn the air solenoid off.
    e. Note - If the sorter is controlled by the Intelligrated BOSS system, this process can be completed through the sorter status screen. See BOSS documentation for further details.

Oil Controller Lubrication Settings

The amount of lubrication required depends on the speed of the conveyor and other variables. Table 3 1 provides guidelines for setting the oil injector solenoid on/off times for the different conveyor speeds.

Table 3 1 Oil Controller - Oil Solenoid Settings for Given Conveyor Speed

Conveyor Speed - fpm (mpm)	**Oil Injector Solenoid "On" (Time in Seconds)**	**Air Solenoid "On"**	**Oil Injector Solenoid "Off" (Time in Seconds)** (Time between 0.5 sec. Oil Injector On cycles)	**Estimated Time Between 4000 ml Reservoir Refills (Days)**
Bleed Lines	0.5 seconds fixed	On while bleeding	0.75 minimum	N/A
150 (45.7)	0.5 seconds fixed	On continuously while conveyor is in operation	214	83
200 (60.9)			160	62
250 (76.2)			128	50
300 (91.4)			106	41
350 (106.7)			92	35
400 (121.9)			80	31
450 (137.2)			72	28
500 (152.4)			64	25
550 (167.6)			59	23
600 (183.0)			54	20
650 (198.0)			50	19

Note that the air solenoid must always be on while the conveyor is running. The air pressure is set to a constant at 10psi (0.7bar). This allows the nozzles to continually spray oil, even thought the oil injector solenoid is off.

The oil injector solenoid "On" time is fixed at 0.5 seconds regardless of the conveyor speed. For higher conveyor speeds the chain requires more oil, so the "Off" time between 0.5 second pulses becomes less as the conveyor speed increases. Figure 3 - 26 shows a graphical representation of the logic for the oil controller.

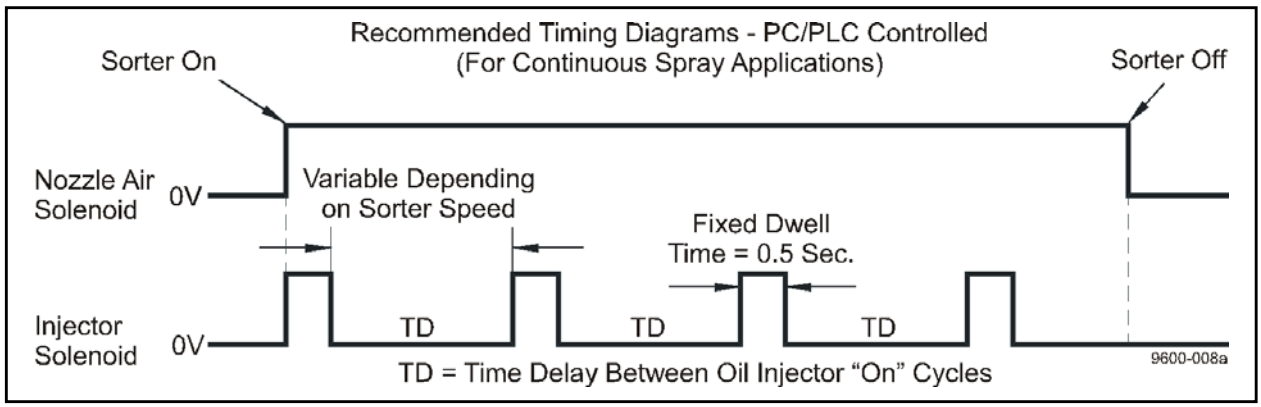


Figure 3 - 26 Oil Controller Logic Diagram

CAUTION

If for any reason you are not able to diagnose a problem with the oiler, or feel the chain is not receiving proper lubrication, stop the conveyor and call Intelligrated immediately for technical assistance. Running the conveyor chain without lubrication will cause the chain to wear very quickly.

These values are given as a reference starting point. Chain temperatures and the visible condition of the chain must be closely monitored during the first several days of operation to make certain the chain is receiving adequate lubrication.

Chain Facts

- Manual chain lubrication may be necessary at start-up to facilitate smooth conveyor operation. Once the lubrication system is working correctly, manual lubrication is not necessary. Manual lubrication should be a one-time procedure.
- When the chain oiler is working correctly, the chain will appear to have a clean and uniform sheen.
- If the chain oiler is adjusted correctly, the moving chain remains relatively cool. Measure the temperature with a laser guided infrared thermometer approximately six hours after start-up. See chain temperature section.
- Do not use cleaners on the chain. Wipe off excess oil with a rag.
- During normal operation a small buildup of oil my be noticed at the chain track expansion joints (splices).

- The teeth of the drive sprockets on each end of the drive shaft must be aligned with each other.
- The links of the chains must be aligned with each other. If they are not, the carrying tubes will be at an angle producing a skewing effect.
- Individual chain carrier bearings cannot be replaced. If defective bearings are found, that 10 feet or 20 feet (3m or 6m) section of chain must be replaced. Since the left and right sides are matched sets, both sides must be replaced.

Chain Temperature

An effective method of evaluating the lubrication being applied to the conveyor chain is by checking the temperature of the left hand and right hand chains. The temperature of the running chains should be initially checked after six hours of operation.

To check the temperature of the chains:

- Take ambient temperature readings (temperature readings of steel objects in the vicinity of the conveyor).
- Take infrared thermometer readings of the chain at the idler end of the conveyor with the thermometer as close to the chain as is safely possible. Measure the temperature of the side plates of the chain, not the rollers.
- The chain temperature should be 5 to 10°F (3 to 6°C) higher than the ambient temperature.
- If the temperature variance is greater than 10°F (6°C), the oiler system may need to be adjusted to deliver more oil. Freezer applications give different readings than room temperature environments.
- Each chain should be checked separately. Take the chain temperature at the same place on both sides of the conveyor.

Sorters Without a Catenary

The drive chains do stretch with time. To compensate for chain stretch (short conveyors only) adjust the drive shaft take-up screws equally, thereby moving the drive shaft. Conveyors that are relatively short must be manually adjusted because they do not have a catenary section.

Installing Carrying Tubes (Slats) and Divert Shoes

Before Installing the Tubes

1. Ensure the chain oiler nozzles are aligned over the chain link plates as covered under Installing Chain Oiler.
2. If the infeed conveyor is PTO driven from the idler, disconnect the timing belt from the PTO drive during chain installation and initial start-up. Once the UniSort XV is operating satisfactorily, connect the timing belt.

NOTE: When installing the carrying tubes (or slats), be sure they are perpendicular to the side frame.
Install an even number of tubes (or slats) only. Remove/add carrying chain links as necessary. This must be done in 5 inch (127mm) length increments.

Installing the Carrying Tubes and Divert Shoes

Carrying tubes and divert shoes are shipped loose. The shoes are installed on the carrying tubes when they are installed on the conveyor.

To install the carrying tubes and divert shoes:

1. Be sure the extended pins of both carrying chain strands are exactly opposite each other.
2. Install two adjacent carrying tubes by inserting the extended chain pins into the end bushings of the two tubes on one side of the conveyor only.
3. Slide a divert shoe onto the two tubes with the ramp of the shoe facing the discharge end of the conveyor, see Figure 3 - 27.
4. Using tool P/N 7013466, pry the chain upward and outward to insert the extended pins of the opposite chain into the tubes.
5. Repeat Steps 2 - 4 until all tubes with divert shoes are installed. Be sure the pins of all shoes drop into the pin guide track.

NOTE: When installing divert shoes with tubes, the shoes must be installed between every other tube.

Installing the Carrying Slats and Divert Shoes

Carrying slats and divert shoes are shipped loose. The shoes are installed on the carrying slats when they are installed on the conveyor.

To install the carrying slats and divert shoes:

1. Be sure the extended pins of both carrying chain strands are exactly opposite each other.
2. Install one carrying slat by inserting the extended chain pins into the end bushings of the slat on one side of the conveyor only.
3. Install the adjacent carrying slat by inserting the extended chain pins into the end bushings of the slat on one side of the conveyor only.
4. Slide a divert shoe onto the two slats with the ramp of the shoe facing the discharge end of the conveyor, see Figure 3 - 27.
5. Using tool P/N 7013466, pry the chain upward and outward to insert the extended pins of the opposite chain into the two slats.
6. Repeat Steps 2 - 5 until all slats with divert shoes are installed. Be sure the pins of all shoes drop into the pin guide track.

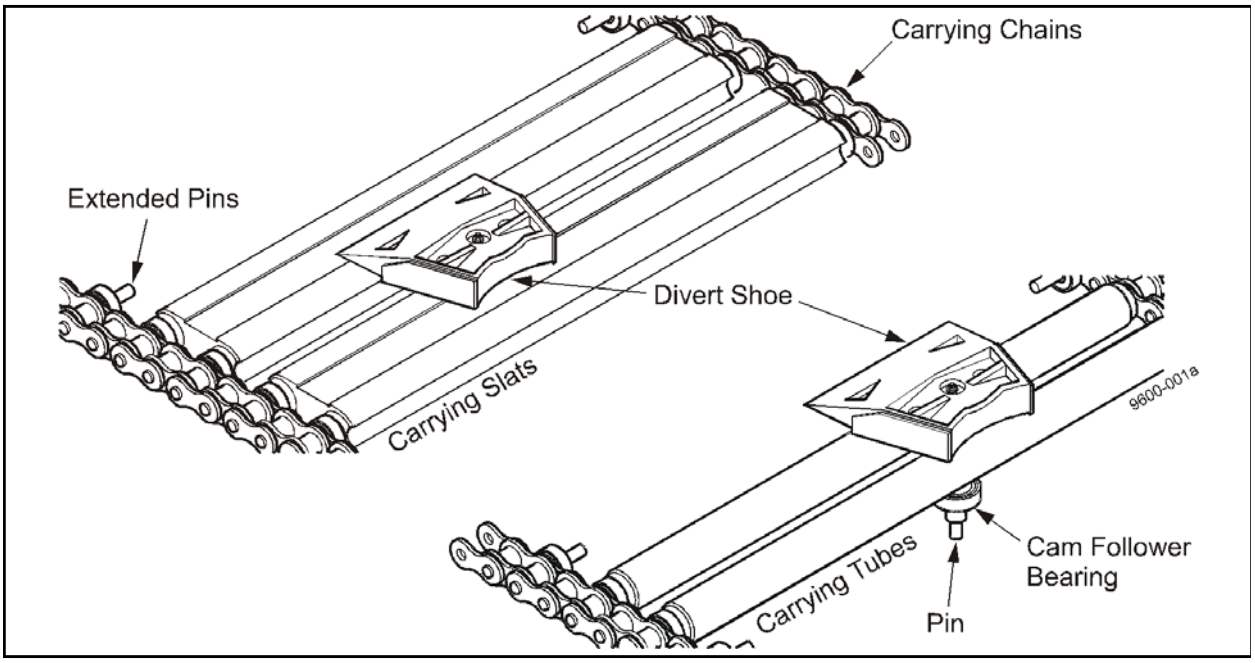


Figure 3 - 27 Installing Carrying Tubes and Shoes

Carrying Chain Take-Up Adjustment - Catenary Take-up

To adjust the carrying chain on conveyors with a catenary take-up.

1. Remove the drive unit “V” belts.
2. Measure the carrying chain sag on each side in the catenary, it should be 4 inches to 5 inches (101.6mm to 127.0mm), see Figure 3 - 28.
3. Add/remove chain links in 5” (127mm) increments as necessary to obtain the proper chain sag.
4. Ensure that the drive and idler shafts are square and that the carrying tubes (or slats) are not skewed (they must be perpendicular to the side frame).
5. Install the power unit “V” belts.
    a. Adjust the drive belt tension as shown on decal affixed to the power unit belt guard.
    b. Adjust the drive belt tension for 0.250” inch (6.35mm) maximum deflection at the belt’s mid-point.

Note: When the sorter is started, the chain will bounce in the catenary. The chain will settle after approximately 5 minutes of operation.

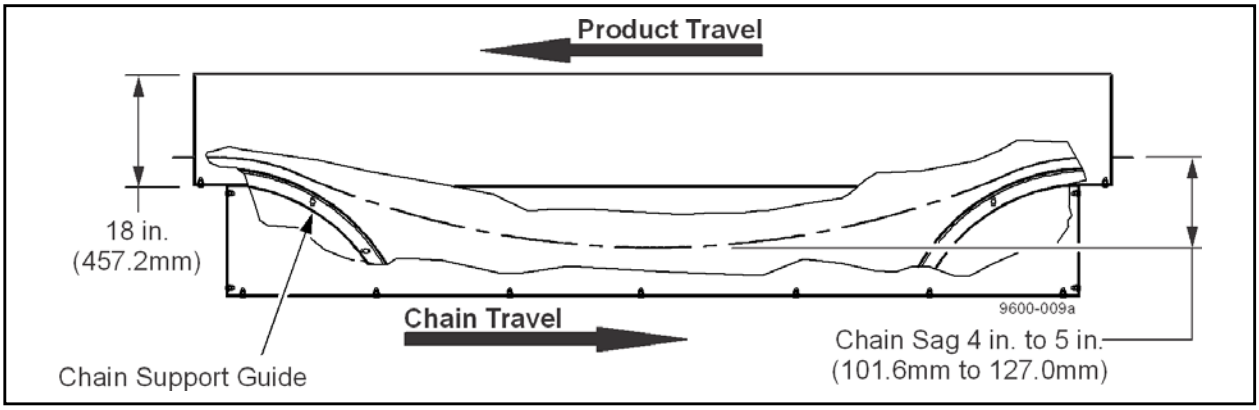


Figure 3 - 28 Chain Sag at Catenary Section

Installing Take-Away Conveyors

Takeaway conveyors are located by LH and RH takeaway alignment jigs, see Figure 3 - 29. The jigs are temporarily clamped to the sorter section cam guide rail to locate the inside of the short junction rail.

- Refer to site specific layout/installation drawings for the locations of the take-away conveyors.
- Be sure to install the take-aways at the specified elevation and pitch.

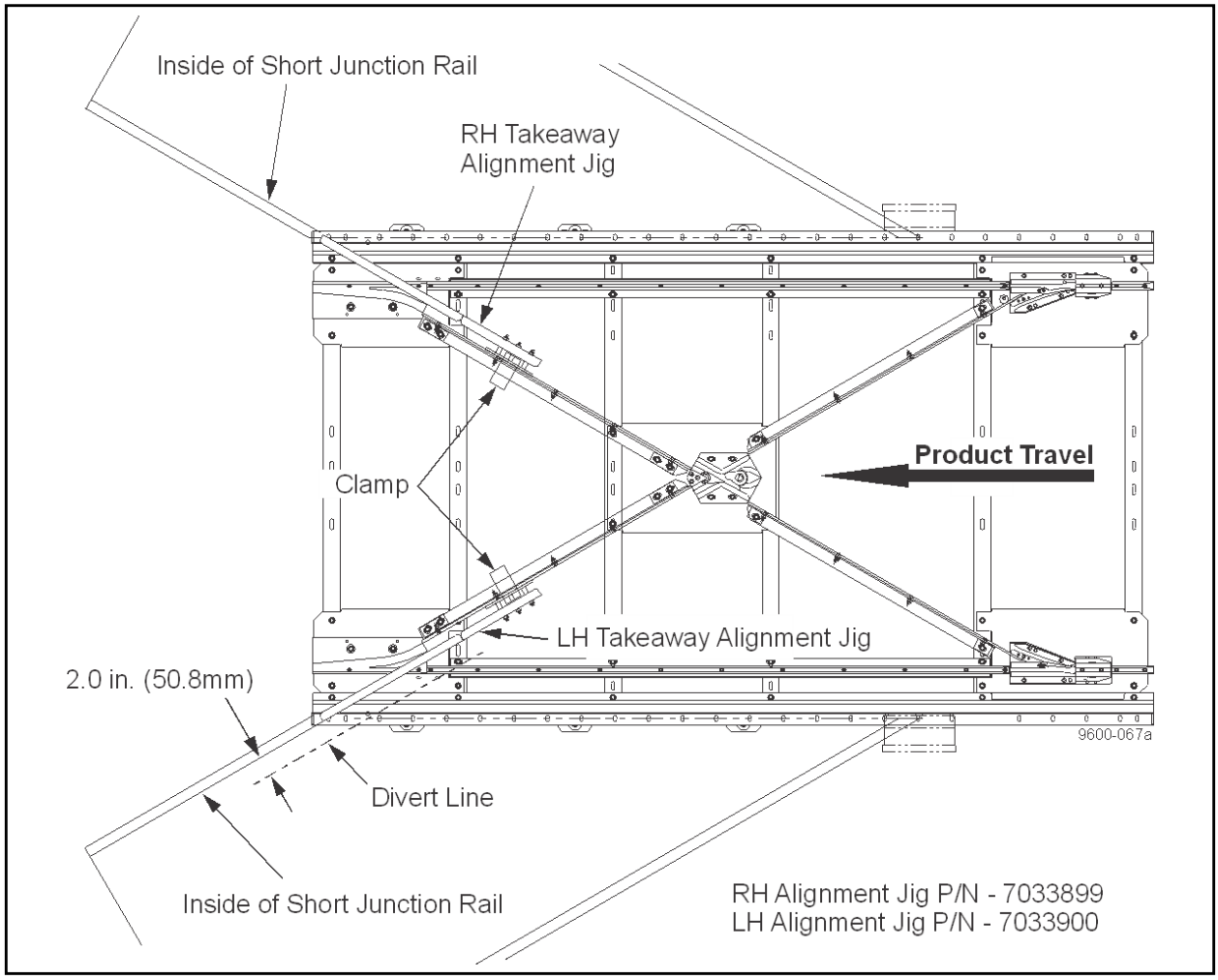


Figure 3 - 29 Divert Takeaway Layout

Installing Side Guides

Side guides are installed onto the conveyor after all of the after-sort takeaway lines have been installed and installation adjustments have been made.

Side guides installed on the conveyor's "divert" side must not interfere with the product movement along the main-line or at the divert point(s), see Figure 3 - 30.

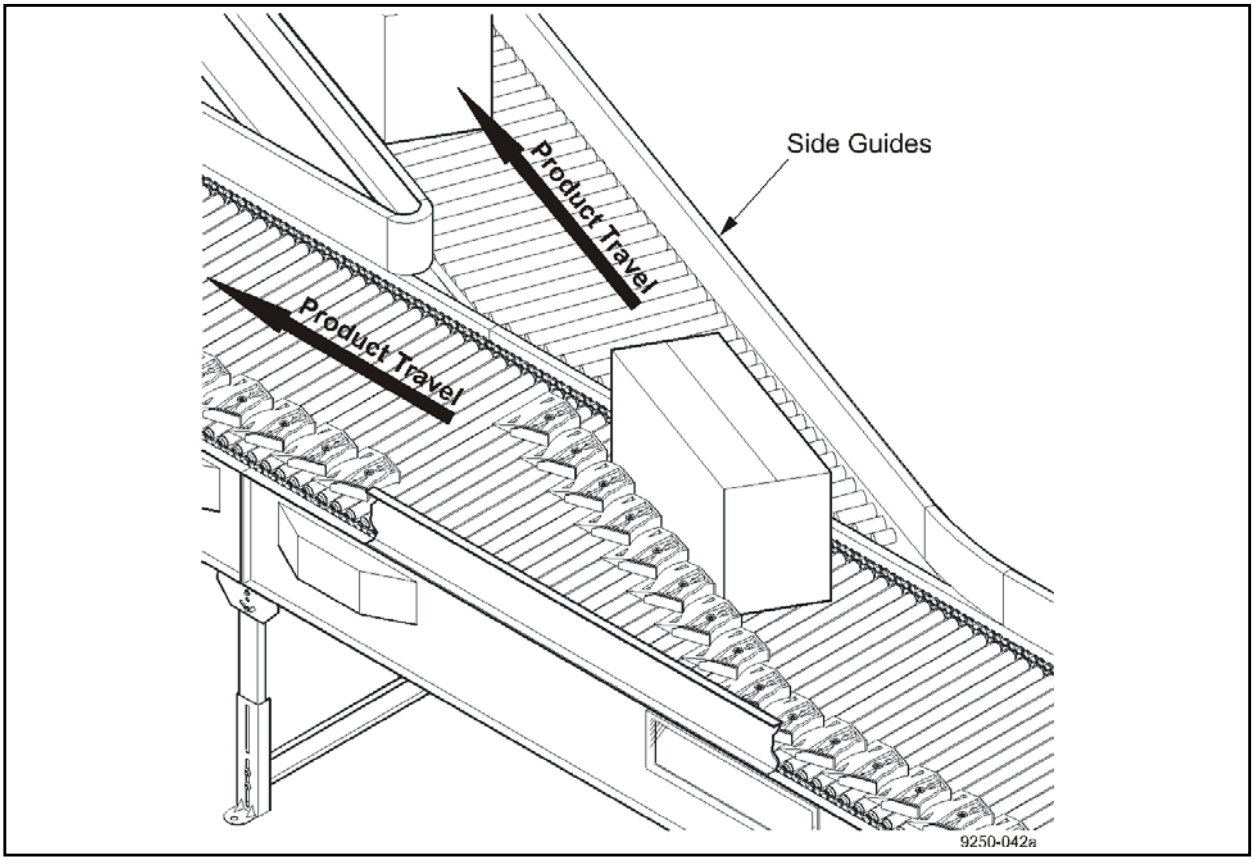


Figure 3 - 30 Side Guide Installation - Divert/Non-Divert Side

CAUTION

The drive section V-belts are fully enclosed for personnel safety and the sorter shoes are protected by plow guards covers. If these guards are removed during installation, re-install them before turning on the conveyor.

Installing Personnel Safety Guarding

Personnel safety guarding prevents personnel from contacting moving conveyor parts.

To install personnel safety guarding, refer to the installation/layout drawing because requirements vary by installation.

Installing Chain Cover

The chain cover (extruded aluminum) keeps product from contacting the sorter chain(s) when sorting onto an after-sort line. Chain covers ship to the field in 10 foot (3m) lengths.

To install the chain cover onto the side frame rail:

1. Make certain the chains, slats/tubes, and shoes are installed.
2. Press the chain cover onto the side rail and locks into the aluminum chain track, see Figure 3 - 31. The use of a plastic/rubber mallet may be required to fully-seat the cover into the chain track.

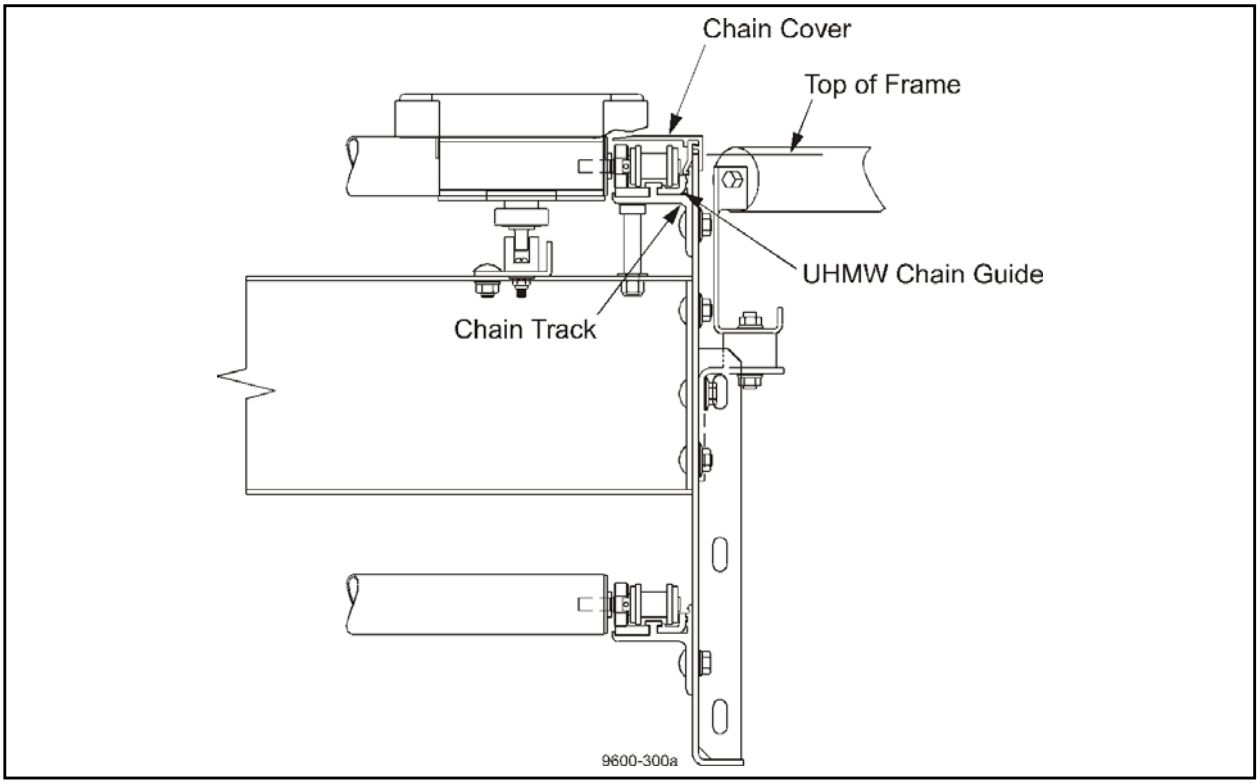


Figure 3 - 31 Chain Cover Installation

Adjusting Slat/Tube Brush Assembly

The drive section's brush assembly sweeps any debris that might adhere to the carrying slats/tubes, see Figure 3 - 32.

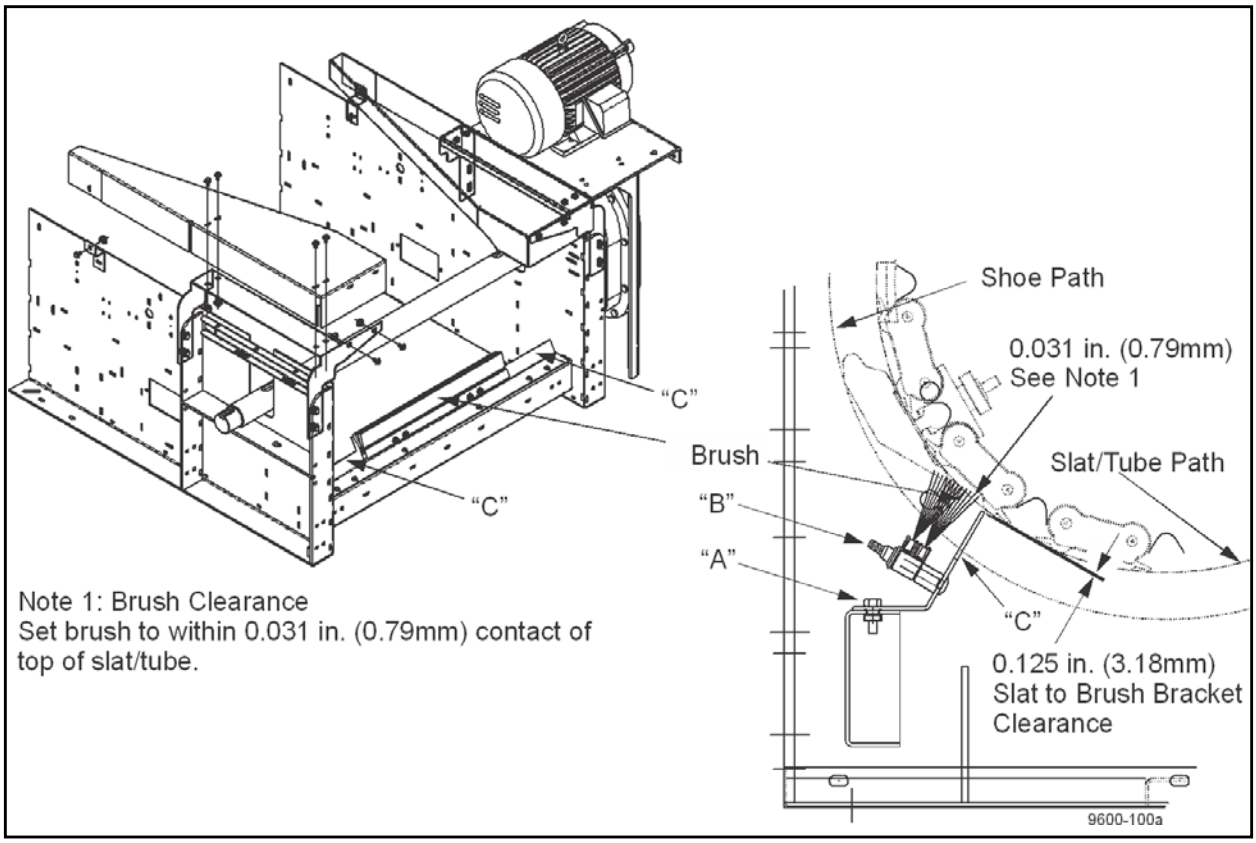


Figure 3 - 32 Drive Section w/Brush (left), Bracket/Brush Adjustment (right)

After carrying slats/tubes are installed, the mounting bracket and brush must be individually adjusted to provide proper clearances between the brush, mounting bracket and the slats/tubes, see Figure 3 - 32 (right).

- Loosen bolts ("A") and move the mounting bracket (fore/aft) to provide a clearance of 0.125 inch (3.18mm) between the bracket and the top surface of the slats/tubes.
- Loosen bolts ("B") and adjust the brush (up/down) to provide a clearance of 0.031 inch (0.79mm) between the brush and the top surface of the slats/tubes.

When running the conveyor for the first time at its full operating speed, verify that the sorter shoes clear the cutouts ("C") in the mounting bracket.

Adjusting Transfer Assembly Height

The drive section's pivoting transfer assembly provides a smooth conveying surface for non-diverted products as they advance onto the "downstream" conveyor.

Adjust the transfer's height so that the leading, pop-up roller is level with the carrying tubes/slats, see Figure 3 - 33, Detail B.

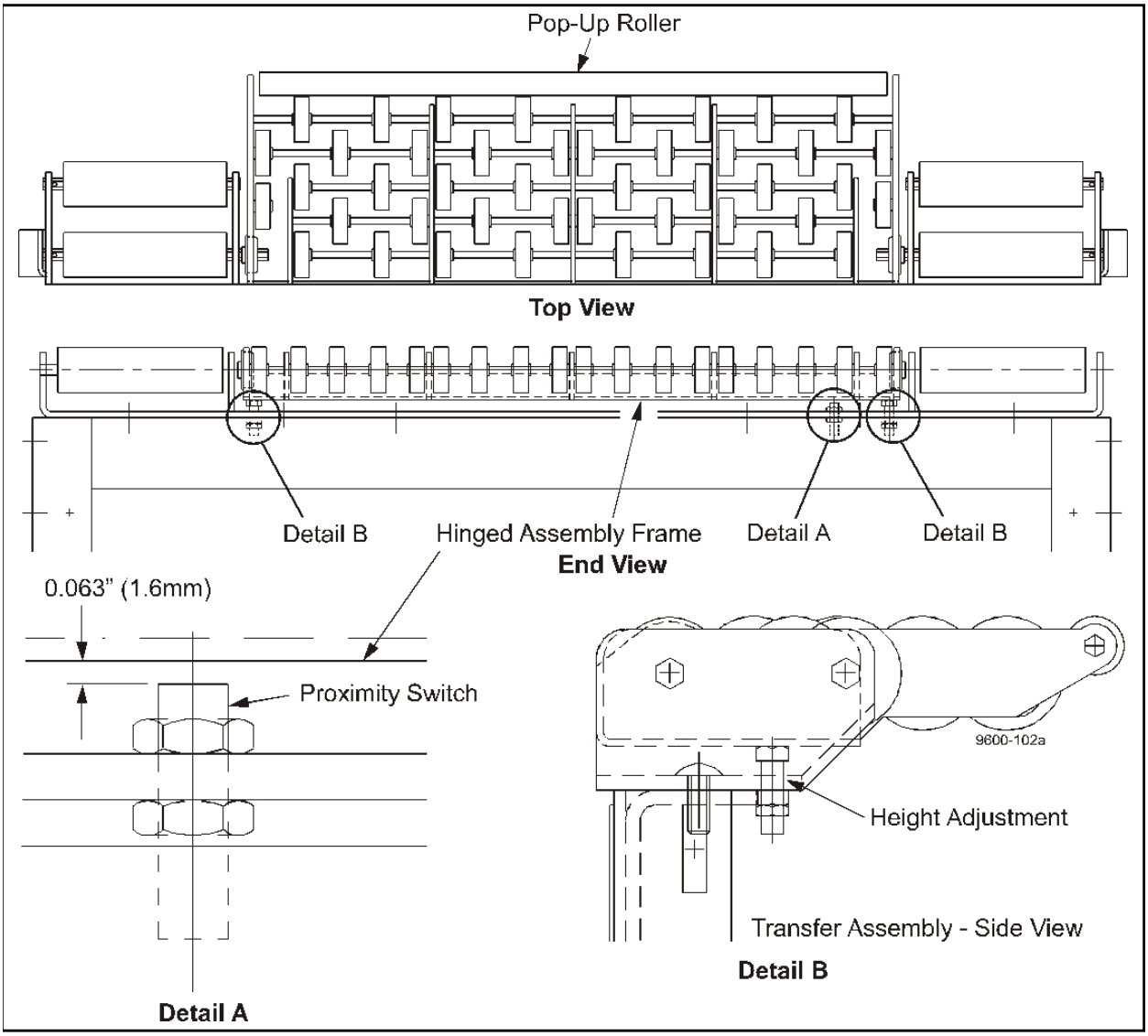


Figure 3 - 33 Transfer Assembly

Wiring / Adjusting Proximity Switch Height

The transfer assembly's proximity switch monitors the transfer's "up/down" position. When anything causes the transfer to pivot "up", power to the motor is turned off. Make wiring connections between the sensor and the control system.

After adjusting the transfer assembly (above), adjust the proximity switch so that there is a 0.063 inch +/-0.015 inch (1.6mm +/-0.38mm) clearance between the sensor and the hinged assembly frame, see Figure 3 - 33, Detail A.

Installing Electrical/Control Devices

Table 3 1 shows the typical electrical/control devices that may be used for controlling a conveyor. Refer to the electrical installation drawings and materials list for the exact type, location, and wiring of each device used.

Table 3 1 Electrical/Control Components

Device	Function
Main Power Disconnect (may be 4-pole switch)	Switches power to the drive motor(s) and the control unit. The fourth pole switches power to the control unit. Located in the control panel.
Motor Starter(s)	Switches power to drive motor(s) via a motor disconnect switch and Variable Frequency Drive. Contact status may be supplied to control unit. Located in control panel.
Motor Disconnect	Switches power to the drive motor via the Variable Frequency Drive. The contact status is typically supplied to the control unit.
Variable Frequency Drive (VFD)	Provides smooth drive motor start-up. Typically wired between drive motor and motor disconnect switch (one per motor). Located on conveyor or in the control panel.
Emergency Stop Push Button/Pull Cord	Used to drop power to the drive motor(s). The contact status is typically supplied to the control unit. Located on the conveyor.
Divert Control Module	Used to control voltage and starting sequence to each divert switch. Divert switches will not function without the use of the DCM. Located on the conveyor.
Low Oil Reservoir Switch	The chain oiler has a low level switch. When the oil reaches a low level, the switch is closed, indicating the oiler needs lubrication.
Air Pressure Switch	Detects low operating air pressure. The contact status is typically supplied to the control unit. The chain oiler contains a pressure switch that is preset to 50psi (3.4bar). If the pressure drops below this point, the oiler switch will be closed, indicating low air pressure. The main compressed air system leading up to the conveyor may have a low pressure switch as well. See layout for specifics.
Photo-Eye (On Divert Switch Assembly)	Used to detect the presence of the divert shoe for synchronizing divert switching. Located on each divert switch. Signal input to the control unit. Photo-eyes are not adjustable.

Table 3 1 Electrical/Control Components (Continued)

Device	Function
Proximity Switch(es) (Other uses)	Proximity switches may also be used for detecting divert shoe “out of track”, discharge end “product jam”, pop-up roller “up”, and conveyor speed.
Induction Photo-Eye(s)	Located on the conveyor to detect the leading/trailing edge of product entering the conveyor. Initiates product tracking.
Lane Full Photo-Eye	Located on each take-away conveyor (sort lane) at the point where the take-away lane is considered full. Oriented at an angle so product is detected even if small gaps between product exists. Typically used with a 3-7 second delay timer. Lane is considered full if photo-eye remains blocked for that period of time. Product diverting to the lane is then inhibited.
Product Jam Detect Photo-Eye	Located at extreme up-stream end of each take-away conveyor (sort lane). Oriented perpendicular to product flow direction. Used with 3-7 second time delay. Product jam condition indicated when product blocks entrance to take-away conveyor for that period of time. Diverting to that lane is inhibited and power to conveyor may be dropped.
Current Sensing Relay (Over-Current Detection)	Used to sense drive motor over-current condition as the result of a jam condition or mechanical/electrical problem. Power to the conveyor is dropped. Contact status is supplied to the control limit.

Installing Electrical Power and Control Device Wiring

Install wiring from the control panel to all electrical/control devices on the conveyor according to the electrical layout drawing. Figure 3 - 34 shows a typical conveyor drive motor wiring diagram.

Refer to the appropriate manufacturer's instruction manuals for wiring Variable Frequency Drives, over-current relays, air pressure switches, and photo-eyes.

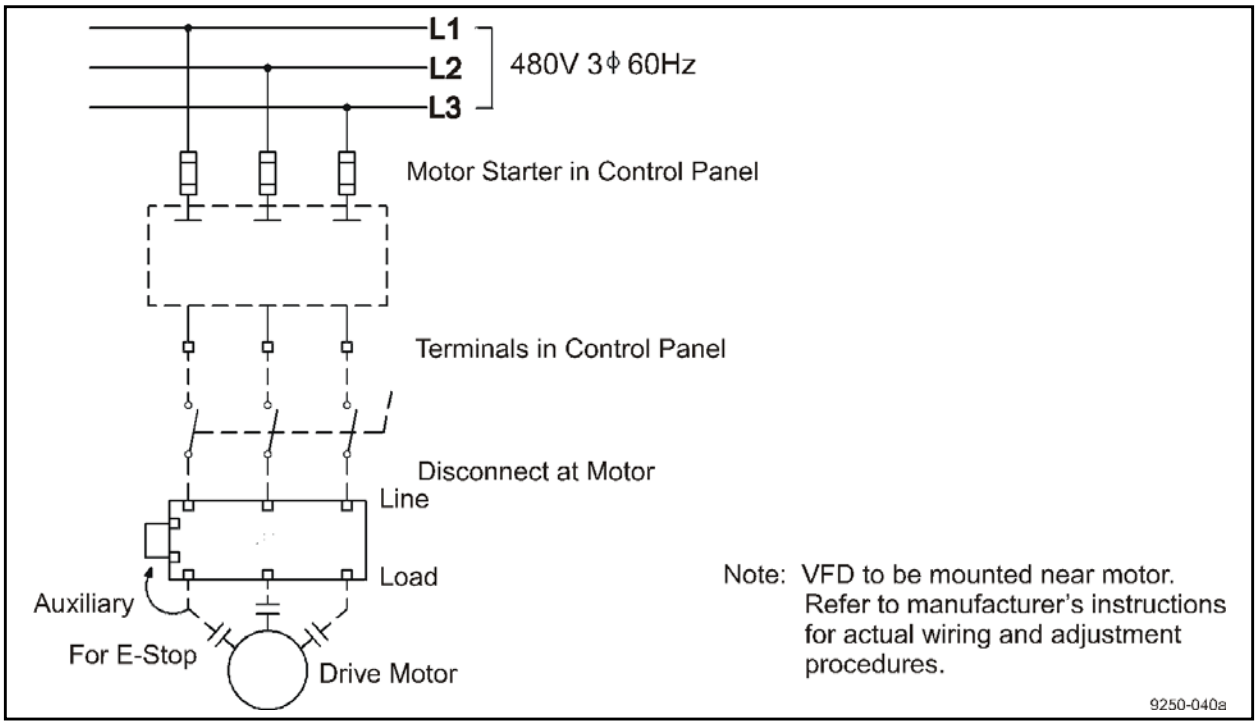


Figure 3 - 34 Typical Drive Motor Wiring

VFD Installation and Motor Related Checks and Adjustments

Installing the Variable Frequency Drive

A VFD (Variable Frequency Drive) is supplied for each conveyor drive motor.

- Mount the VFD as close as possible to the drive motor.
- 6” clearance on top and bottom is needed for adequate ventilation.

See the project electrical installation drawings and VFD Manufacture’s Manual (included in project) for specific mounting details.

Before applying power to the VFD, perform any required adjustments according to the Manufacturer’s Manual.

- Set the acceleration ramp time to 20 seconds.

CAUTION

Before applying power, review the safety checks in “Before Applying Electrical Power” on page 69 to ensure the safety of personnel.

Verifying Correct Drive Motor Rotation

- Be sure the drive motor wiring is correct.
- Remove the drive “V” belts.
- Apply momentary power to the drive motor(s) and check the direction of rotation.
- Re-install the “V” belts.

CAUTION

A drive motor wiring error can result in reversed motor operation and/or possible drive motor damage.

Final VFD Adjustments

Perform the final VFD adjustments (with power applied) according to the manufacturer's manual.

When the VFD is correctly adjusted, the conveyor will accelerate smoothly to operating speed without jerking or surging of the carrying chains.

Drive Over-Current Relay/Sensor Adjustments

The drive over-current relay/sensor is adjusted to match the starting current of the drive motor listed on the motor name plate. Refer to the manufacturer's instruction sheet for adjusting the over-current relay/sensor.

Checking Safety Features

IJD (Internal Jam Detector)

This safety feature detects:

- Divert shoe pin out of track.
- Carton flap, piece of banding, etc., extending between and below the carrying tubes (or slats).

Whenever any of these conditions are detected, the IJD sends a signal to interrupt electrical power to the drive motor.

IJDs are included in the drive, and approximately every 50 feet (15.2m) of intermediate sections. The electrical installation drawing shows the IJD's wiring to the control panel.

An IJD consists of a flipper blade, extending across the width of the conveyor, a trip arm and a limit switch. Movement of the flipper blade actuates the limit switch, see Figure 3 - 35.

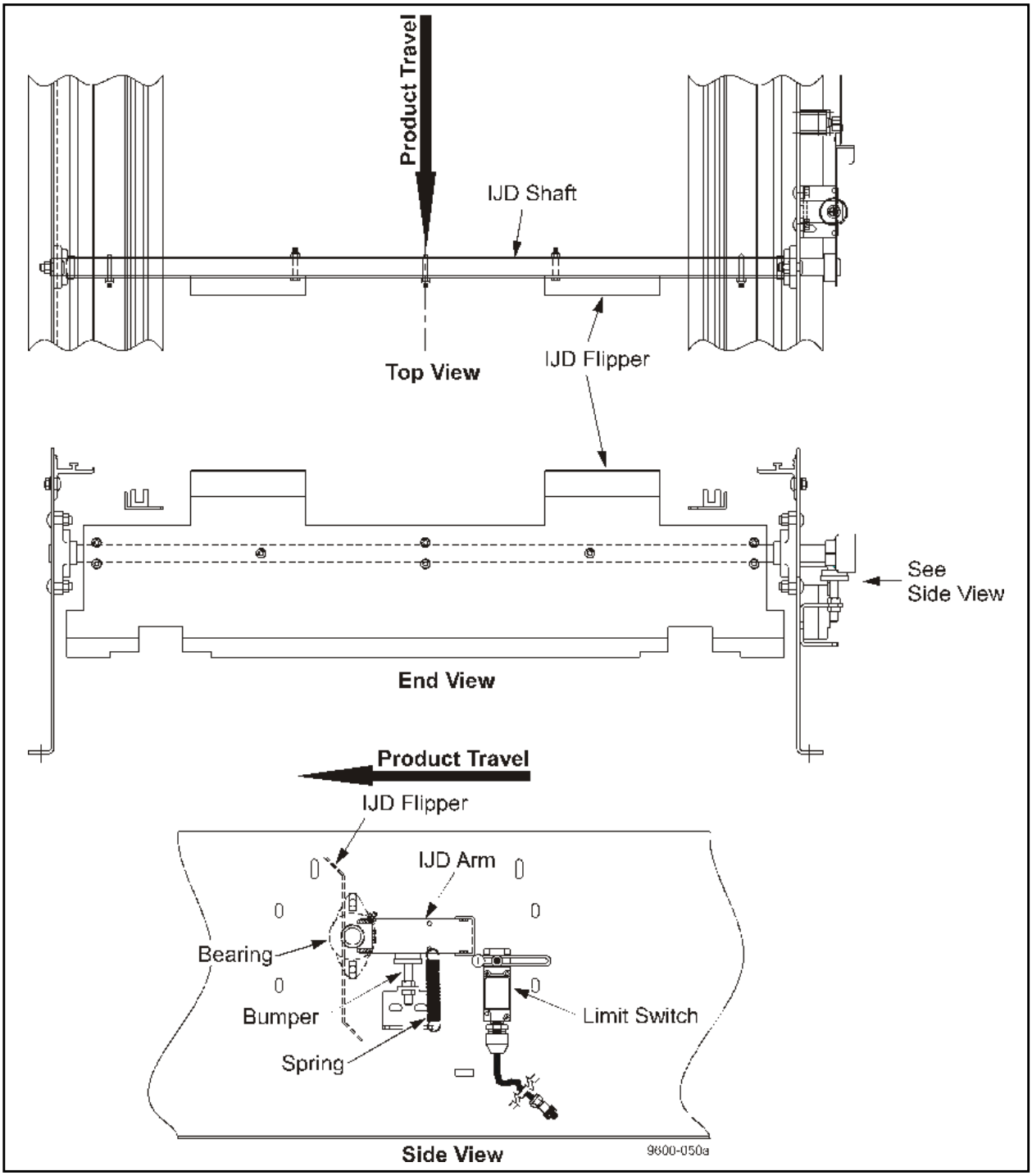


Figure 3 - 35 Internal Jam Detector

IJD Checks to Perform at Install

Confirm the IJD assembly pivots up.

Confirm drive motor power is dropped when the IJD limit switch is tripped.

To adjust the internal jam detector, see Figure 3 - 35:

1. Loosen the flange bearing bolts so the bearing drops to the lowest position.
2. Place a magnetic mount torpedo level vertically on the flipper blade.
3. Place a 0.125 inch (3.2mm) thick flat underneath the flipper blade on each end of the blade.

   The objective is to position the flipper blade so it is perpendicular to the carrying tubes and 0.125 inch (3.2mm) above them.
4. Grasp the trip arm and rotate the arm against the rubber bumper until the flipper blade is vertical.

   The flange bearing will move up or down as you do this. If you cannot move the arm far enough, adjust the rubber bumper so the flipper plate is vertical.
5. Tighten the flange bearing bolts.
6. Remove the 0.125 inch (3.2mm) thick flats.
7. Adjust the limit switch arm, if necessary.
   a. Loosen the limit switch arm.
   b. Rotate the arm until limit switch arm roller is in the normal operating position when the IJD flipper blade is in the vertical position and the trip arm is over the limit switch arm roller.
   c. When the IJD has detected a jam condition, the trip arm is moved off the limit switch arm roller and trips the limit switch. In this condition, power is dropped to the drive motor.
   d. Tighten the limit switch arm.

NOTE: The IJD flipper plate in the drive section is only one half a normal flipper plate. The half plate faces upward (bottom half is blank) with the angled portion facing in the direction of product travel (towards the discharge end). Adjusting this IJD is the same as that described above except that slats/tubes must be above the flipper plate and the 0.125” inch (3.2mm) flats are placed between the flipper plate and the slats/tubes above it.

Transfer Assembly

The transfer assembly is installed at the end of the drive section to inhibit product flow of non-diverted product, see Figure 3 - 36.

The transfer assembly is mounted to a pivoting bracket. When the assembly pivots to the up position, a proximity switch sends a signal to the system controller to drop power to the UniSort XV drive motor.

Check the transfer assembly to ensure it pivots freely.

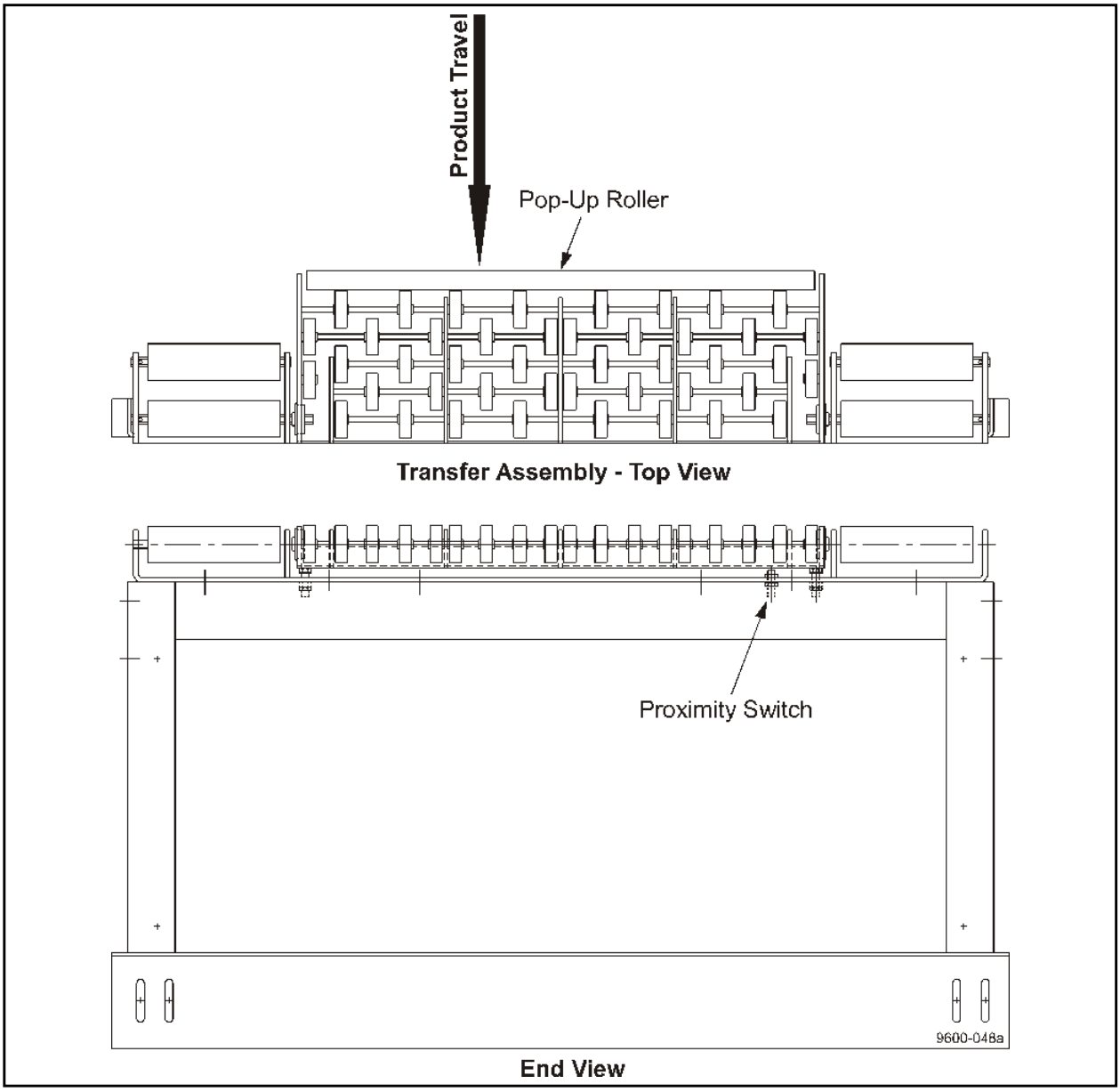


Figure 3 - 36 Transfer Assembly

Final Installation Adjustments

CAUTION

Electrical power must be applied to perform the final checks. To ensure the safety of personnel and minimize the possibility of damage to the conveyor, verify the following before applying electrical power.

Before Applying Electrical Power

1. Be sure the carrying chains, carrying tubes (or slats), and divert shoes are correctly installed.

   Be especially sure the carrying tubes (or slats) are perpendicular to the conveyor side frames.

   Check for any bent, nicked or dirty tubes.
2. Check the divert shoes to make sure they slide freely on the carrying tubes (or slats).
3. Be certain the pins of each divert shoe is in the pin guide track on the non-divert side.
4. Be sure all returning shoes have the proper clearance as they move towards the idler.
5. Be sure all floor supports are correctly installed.
6. Check the tightness of all mounting bolts including those fastening the conveyor sections together.
7. Check to see that the left and right side carrying chains have equal and correct tension.
8. The catenary (if used) should have a 4 inch to 5 inch (101.6mm to 127.0mm) chain sag (equal for each chain).
9. If no catenary take-up is used, the chain sag at the bottom of each drive sprocket should not exceed 1.5 inches (38.1mm).
10. Connect a hand crank to the reducer input shaft and rotate the chain and check that the chain moves freely (not necessarily easily) and without catching.
11. Inspect the conveyor thoroughly for foreign objects in the chain, conveyor sections, pin guide tracks, and in between the runs of tubing. Look for stray bolts, tubes, shoes, tools, spare parts, etc.
12. Check the electrical connections at the conveyor and control panels.
13. Check the tension of the “V” belts between the drive motor and the reducer.
14. Be sure the drive unit safety guarding is installed.

15. Be sure the divert switch access cover plates are installed.
16. Check the reducer for correct oil type and oil level.

    Refer to manufacturer's instructions.

    Be sure any required oil breather plug has been correctly installed.
17. Be sure the VFD is adjusted per the manufacturer's instructions.
18. Check the over-current relay/sensor for correct wiring and to see that it is adjusted for first time power turn-on. Refer to manufacturer's instructions.
19. Before applying electrical power, instruct all personnel to stand clear of the conveyor. An alert will sound before the conveyor starts.

After Applying Electrical Power

1. Perform the final VFD adjustments according to the manufacturer's manual.

When the VFD is correctly adjusted, the conveyor will accelerate smoothly to operating speed without jerking or surging of the carrying chains.

2. Observe the carrying chains, they should travel smoothly around each of the sprockets located in the drive and idler sections.
3. Apply a divert signal (electrical) to each DCM.

CAUTION

Immediately correct the cause of any divert shoe binding on the carrying tubes (or slats). Excessive friction may result in current overload or cause carrying tubes to become detached. See Chapter 6 - Preventive Maintenance.

4. The shoes should travel smoothly to the divert side and return downstream to the non-divert side. The shoe return is located next to the drive section.
5. Remove the electrical signal and verify that the shoes travel smoothly through the divert switch.
6. Verify that the carrying chain oiler has the correct oil type, quantity, and is adjusted to keep the chains properly lubricated.
7. The conveyor should be operating while making the final chain oiler adjustment.
8. Check the operation of all safety devices.

Final Installation Checks

1. Current overload relay/sensor adjusted to trip at current shown on electrical installation drawing.
2. Control unit and all control devices are installed and operational per the electrical layout installation drawing.
3. Check for smooth start-up of the conveyor when power is applied.
4. With product being diverted, verify that product is being smoothly and correctly diverted onto the correct take-away conveyors.
5. Be sure that installed guard rail will not result in product jams.
6. Check all safety devices to be sure they operate as designed.
7. Be sure that all safety labels are in place and guarding installed.
8. Make any necessary adjustments.

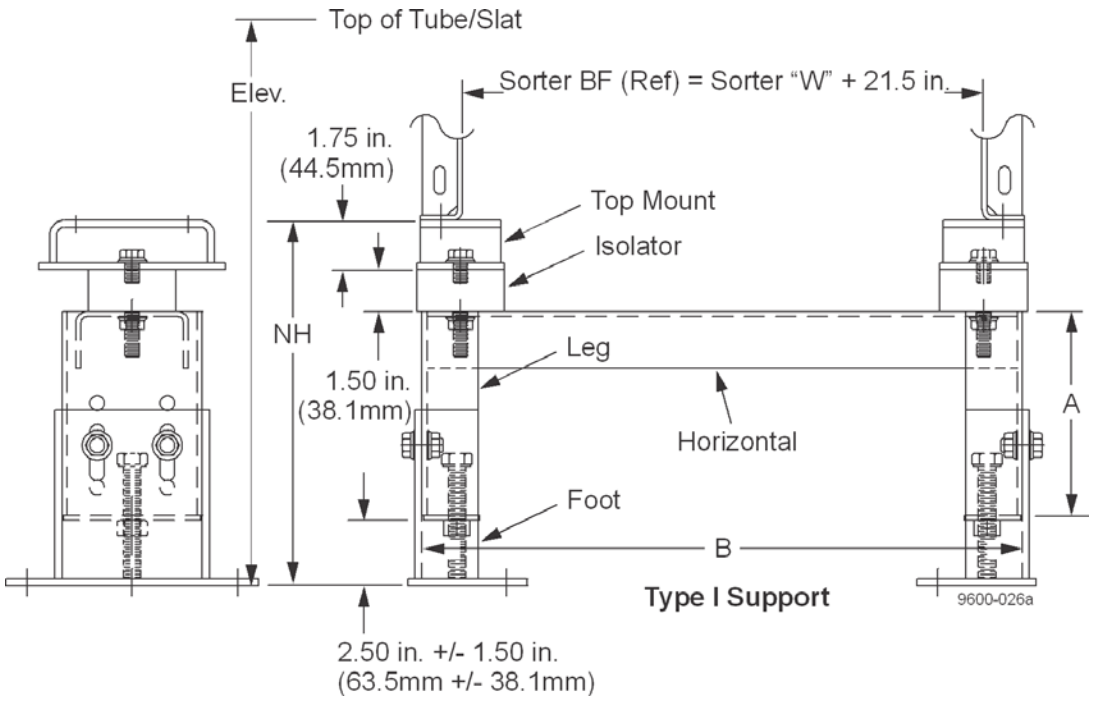
4 Accessories

The UniSort XV accessories include Floor Supports, Carrier Chain Covers, and Sound Abatement Panels. Refer to the following sections for detail.

Floor Supports - For Intermediate and Idler Sections

The UniSort XV uses five different types of intermediate and idler floor supports based on the NH (Nominal Height) of the sorter. The types are identified by Type I, II, III, IV, and V.

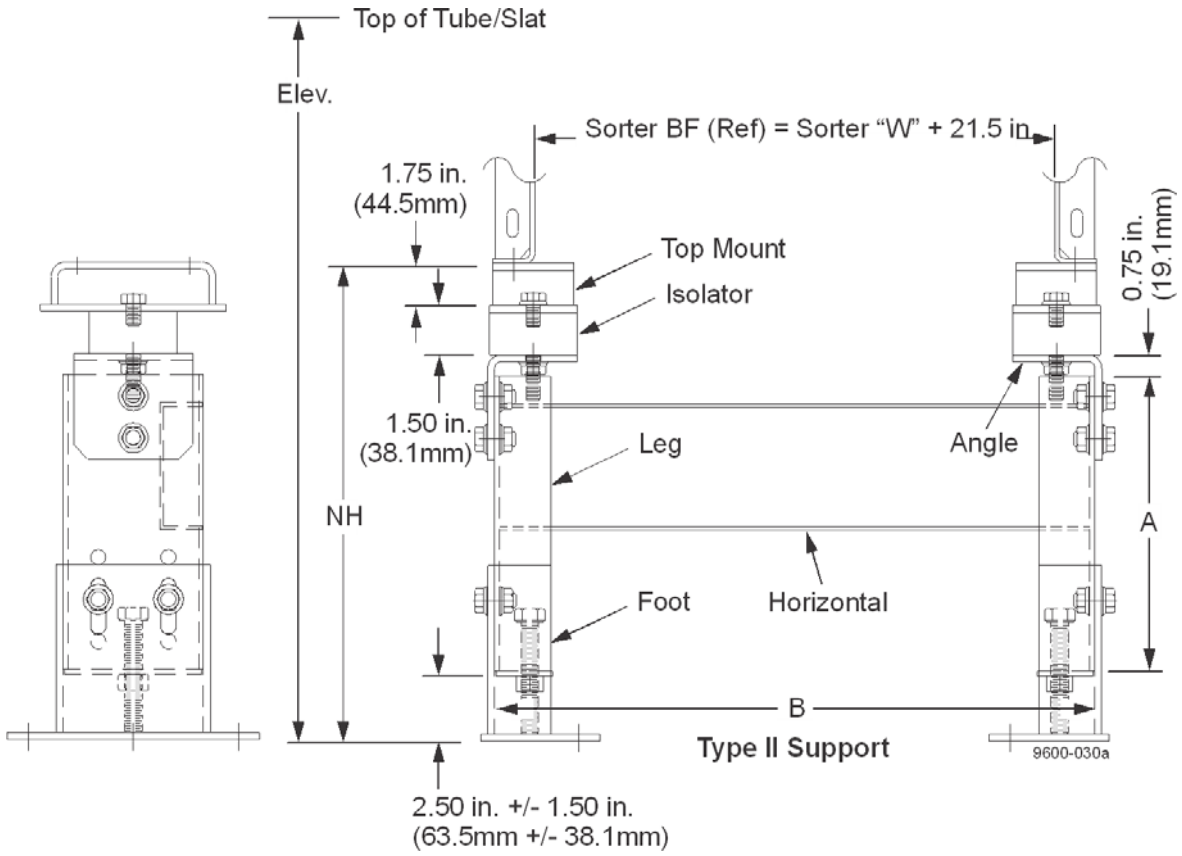
Type I Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
29 (736.6)	11 (279.4)	5.25 (133.4)	B = W + 24.38 (619.3)
30 (762.0)	12 (304.8)	6.25 (158.8)	
31 (787.4)	13 (330.2)	7.25 (184.2)	
32 (812.8)	14 (355.6)	8.25 (209.6)	
33 (838.2)	15 (381.0)	9.25 (235.0)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 1 Type I Floor Supports - Intermediate and Idler Sections

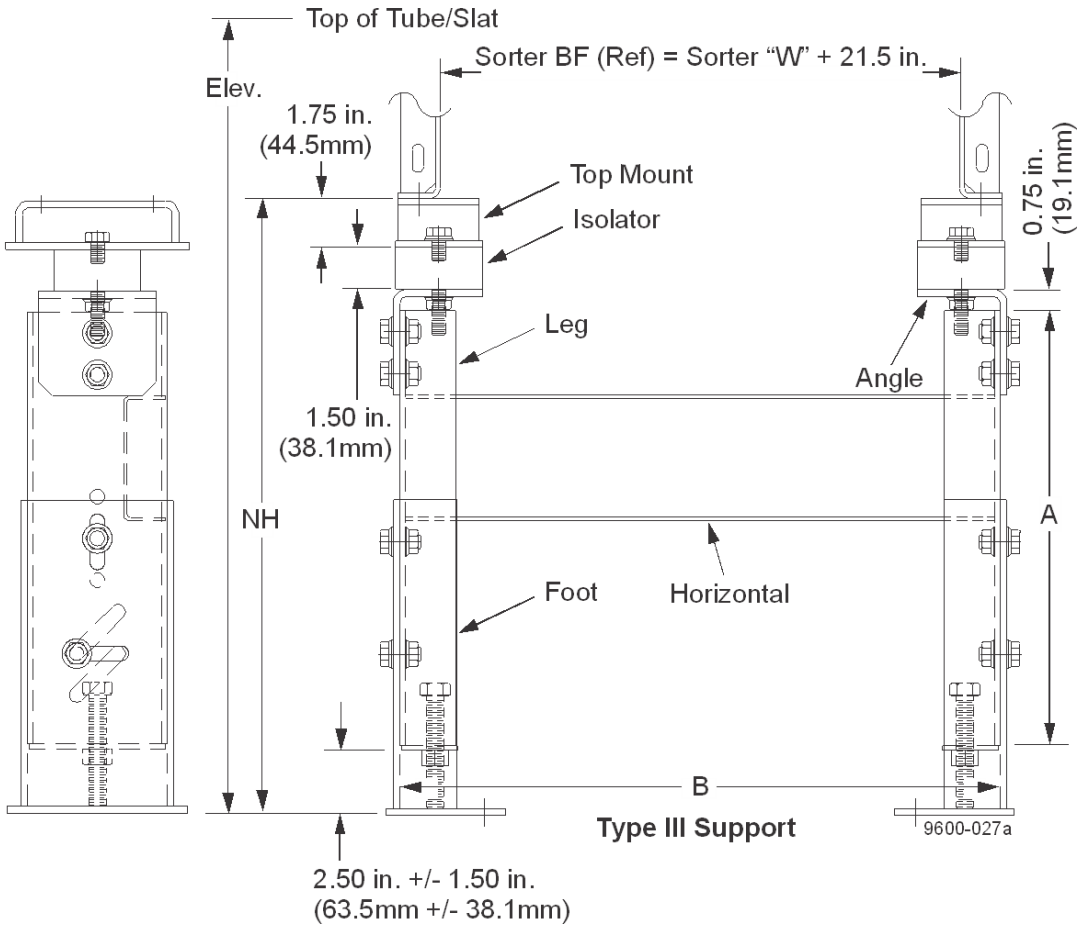
Type II Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
34 (863.6)	16 (406.4)	9.50 (165.1)	B = W + 24.38 inches (619.3)
35 (889.0)	17 (431.8)	10.50 (266.7)	
36 (914.4)	18 (457.2)	11.50 (292.1)	
37 (939.8)	19 (482.6)	12.50 (317.5)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 2 Type II Floor Supports - Intermediate and Idler Sections

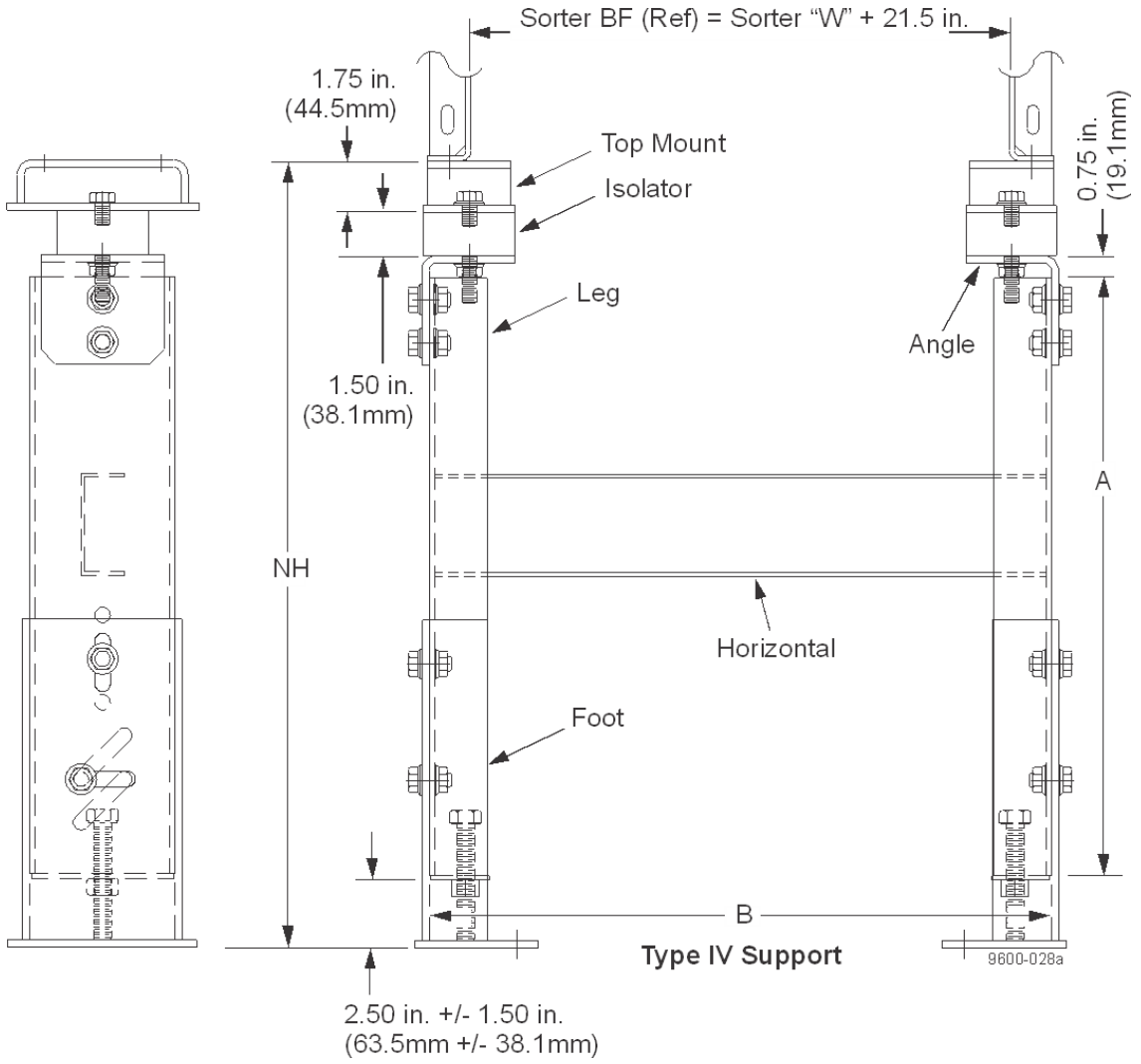
Type III Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
38 (965.2)	20 (508.0)	13.50 (342.9)	B = W + 24.38 inches (619.3)
39 (990.6)	21 (533.4)	14.50 (368.3)	
40 (1016.0)	22 (558.8)	15.50 (393.7)	
41 (1041.4)	23 (584.2)	16.50 (419.1)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

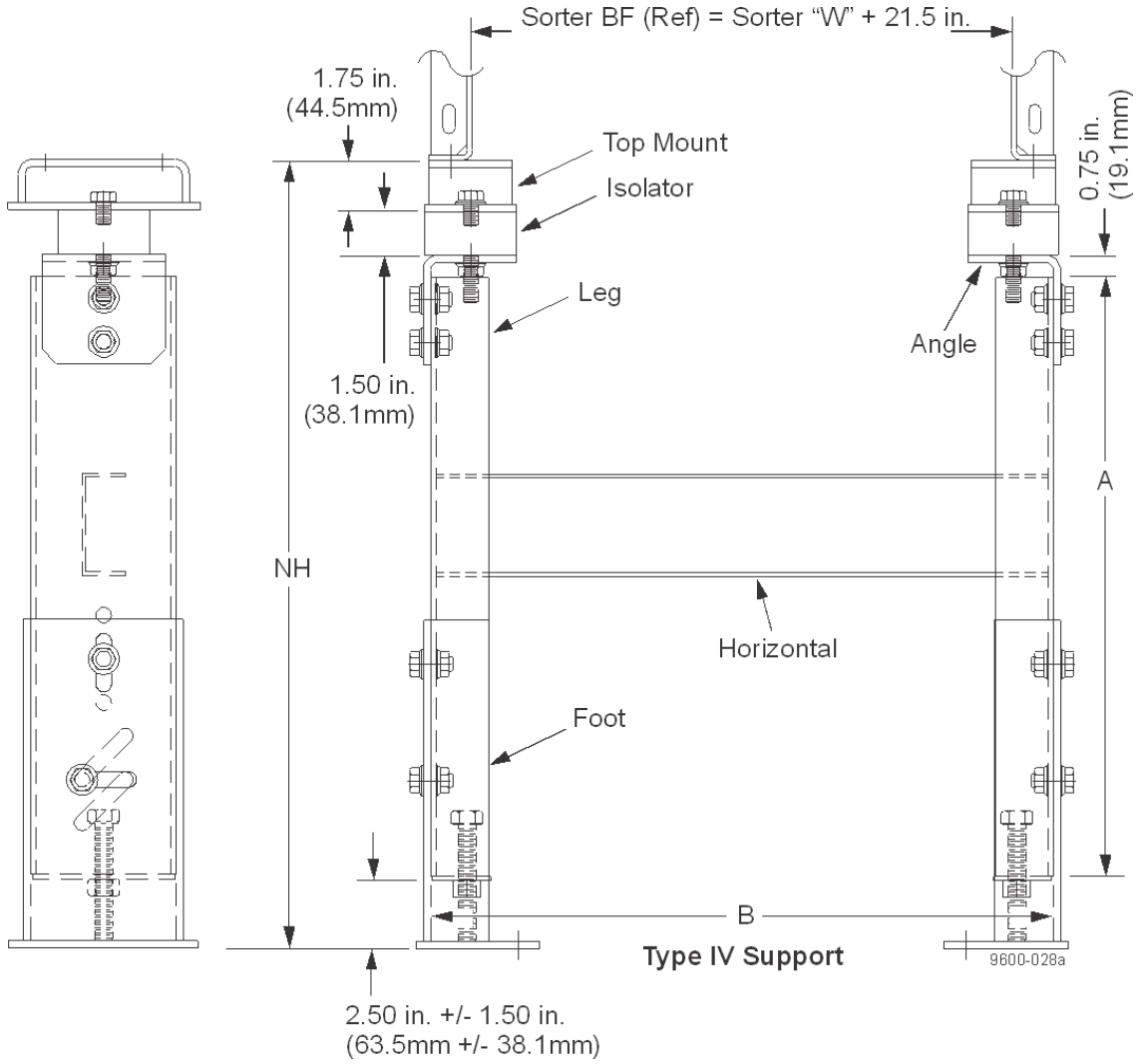
Figure 4 - 3 Type III Floor Supports - Intermediate and Idler Sections

Type IV Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
42 (1066.8)	24 (609.6)	17.50 (444.5)	B = W + 24.38 inches (619.3)
43 (1092.2)	25 (635.0)	18.50 (469.9)	
44 (1117.6)	26 (660.4)	19.50 (459.3)	
45 (1143.0)	27 (685.8)	20.50 (520.7)	
46 (1168.4)	28 (711.2)	21.50 (546.1)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 4 Type IV Floor Supports - with 1 Horizontal Brace - Intermediate and Idler Sections



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
47 thru 59 inches in 1 inch increments (1193.5 thru 1498.6 in 25.4 increments)	29 thru 41 inches in 1 inch increments (736.6 thru 1041.4 in 25.4 increments)	NH -6.50 (NH -165.1)	B = W + 24.38 inches (619.3)
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 5 Type IV Floor Supports - with 2 Horizontal Braces - Intermediate and Idler Sections

Type V Floor Supports

The Tables below lists the dimensions for the Type V floor supports shown in Figure 4 - 6.

Type V Floor Supports - with 2 Horizontal Braces

NH inches (mm)	A inches (mm)	B inches (mm)
42 thru 96 inches in 1 inch increments (1066.8 thru 2438.4 in 25.4 increments)	NH -6.50 inches (NH -165.1)	B = W + 24.38 inches (619.3)
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)		

Type V Floor Supports - with 3 Horizontal Braces

NH inches (mm)	A inches (mm)	B inches (mm)
97 thru 174 inches in 1 inch increments (2463.8 thru 4419.6 in 25.4 increments)	NH -6.50 inches (NH -165.1)	B = W + 24.38 inches (619.3)
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)		

Type V Floor Supports - with 4 Horizontal Braces

NH (mm)	A (mm)	B (mm)
175 thru 246 inches in 1 inch increments (4445.0 thru 6248.4 in 25.4 increments)	NH -6.50 inches (NH -165.1)	B = W + 24.38 inches (619.3)
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)		

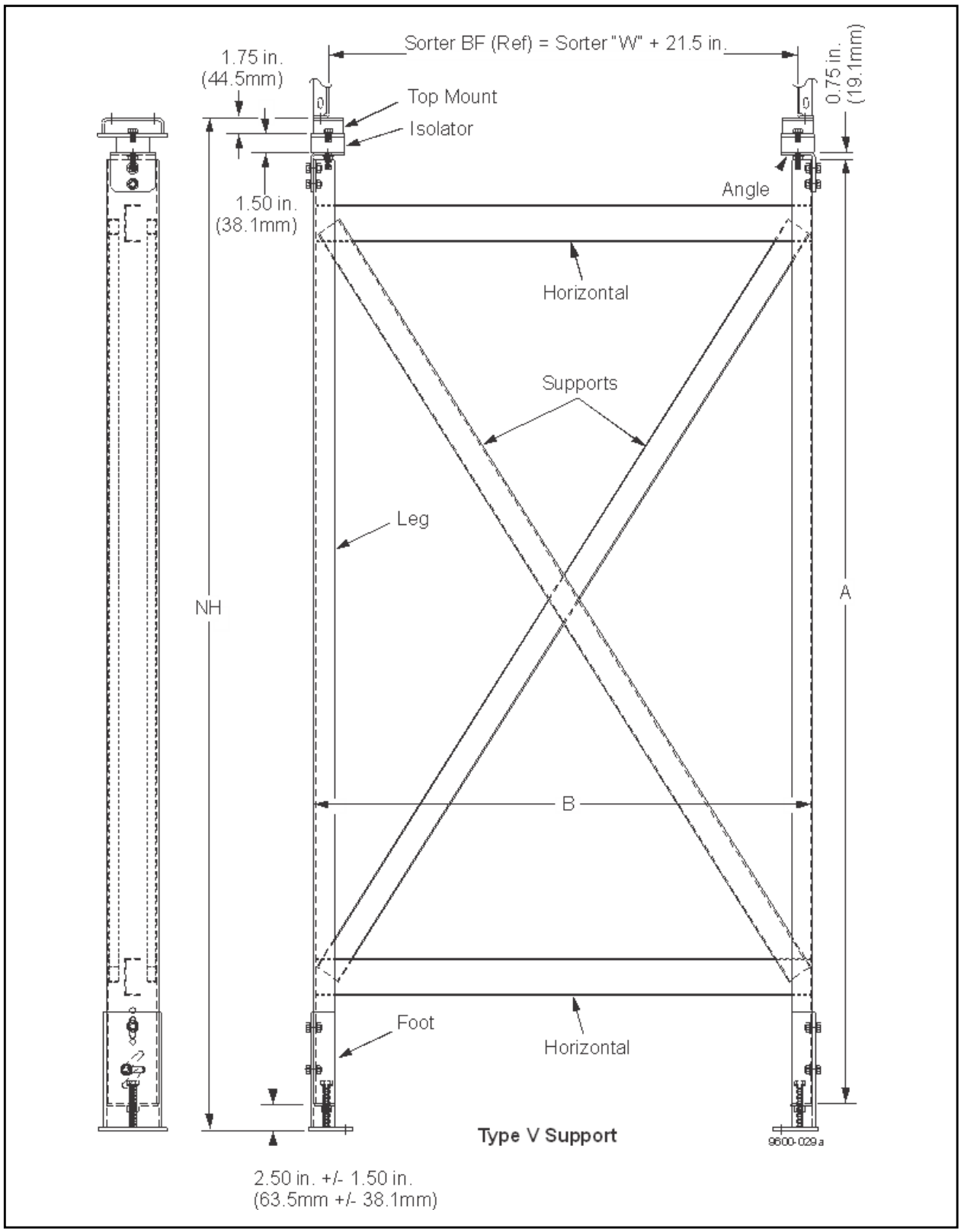
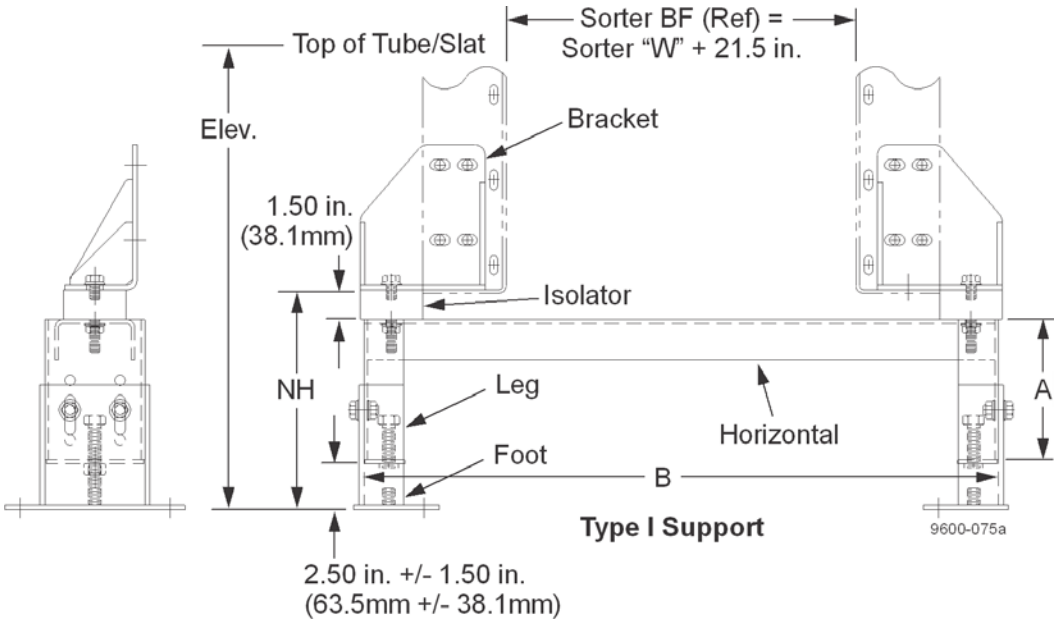


Figure 4 - 6 Type V Floor Supports - Intermediate and Idler Sections

Floor Supports - For Drive Section

The UniSort XV uses five different types of drive floor supports based on the NH (Nominal Height) of the sorter. The types are identified by Type I, II, III, IV, and V.

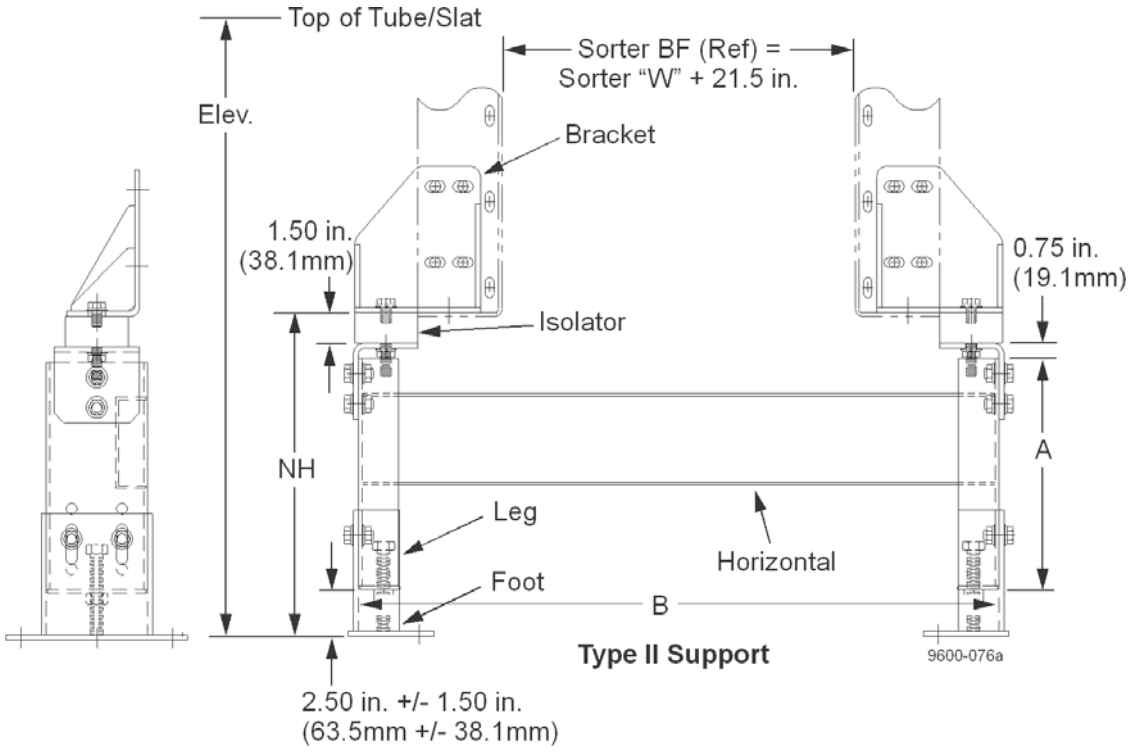
Type I Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
28 (685.8)	9.3 (236.2)	5.3 (134.6)	B = W + 35.75 inches (908.1)
27 (711.2)	10"(254.0)	6.00 (152.4)	
29 (736.6)	11 (279.4)	7.00 (177.8)	
30 (762.0)	12"(304.8)	8.00 (203.2)	
31 (787.4)	13 (330.2)	9.00 (228.6)	
32 (812.8)	14 (355.6)	10.00 (254.0)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 7 Type I Floor Supports - Drive Section

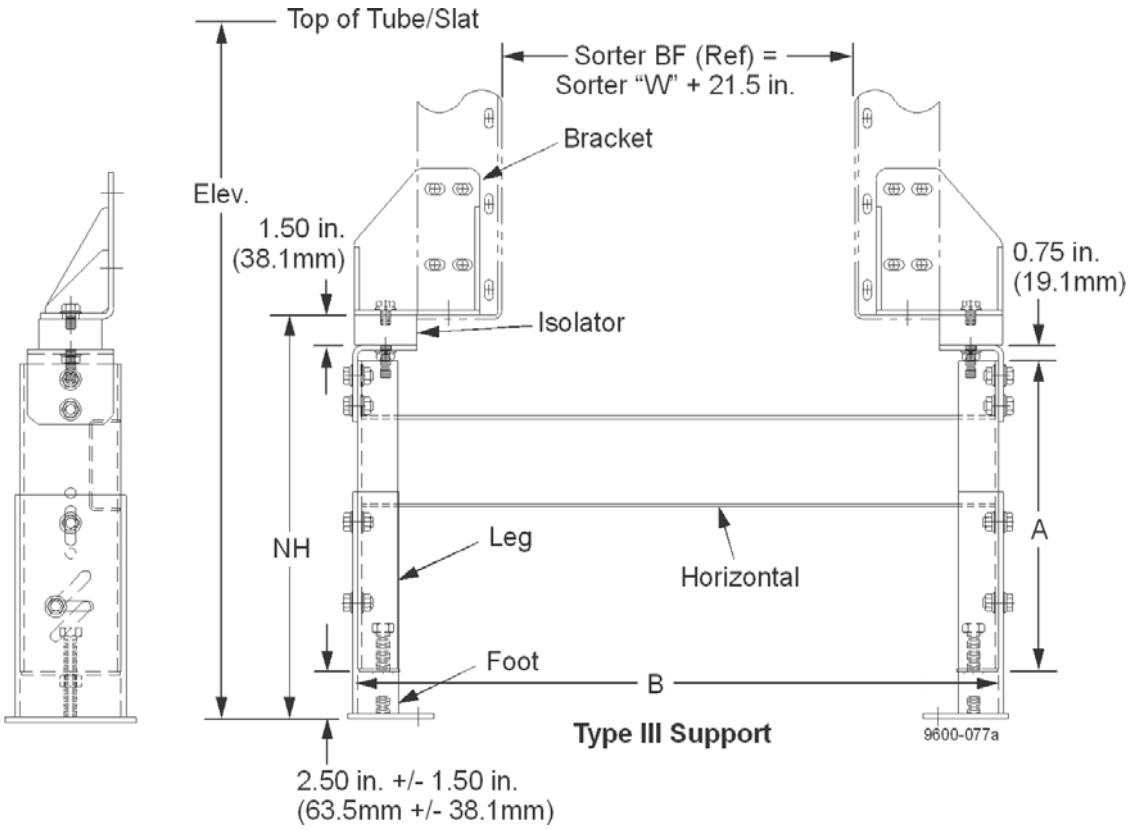
Type II Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
33 (838.2)	15 (381.0)	11.00 (279.4)	B = W + 35.75 inches (908.1)
34 (863.6)	16 (406.4)	12.00 (304.8)	
35 (889.0)	17 (431.8)	13.00 (330.2)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 8 Type II Floor Supports - Drive Section

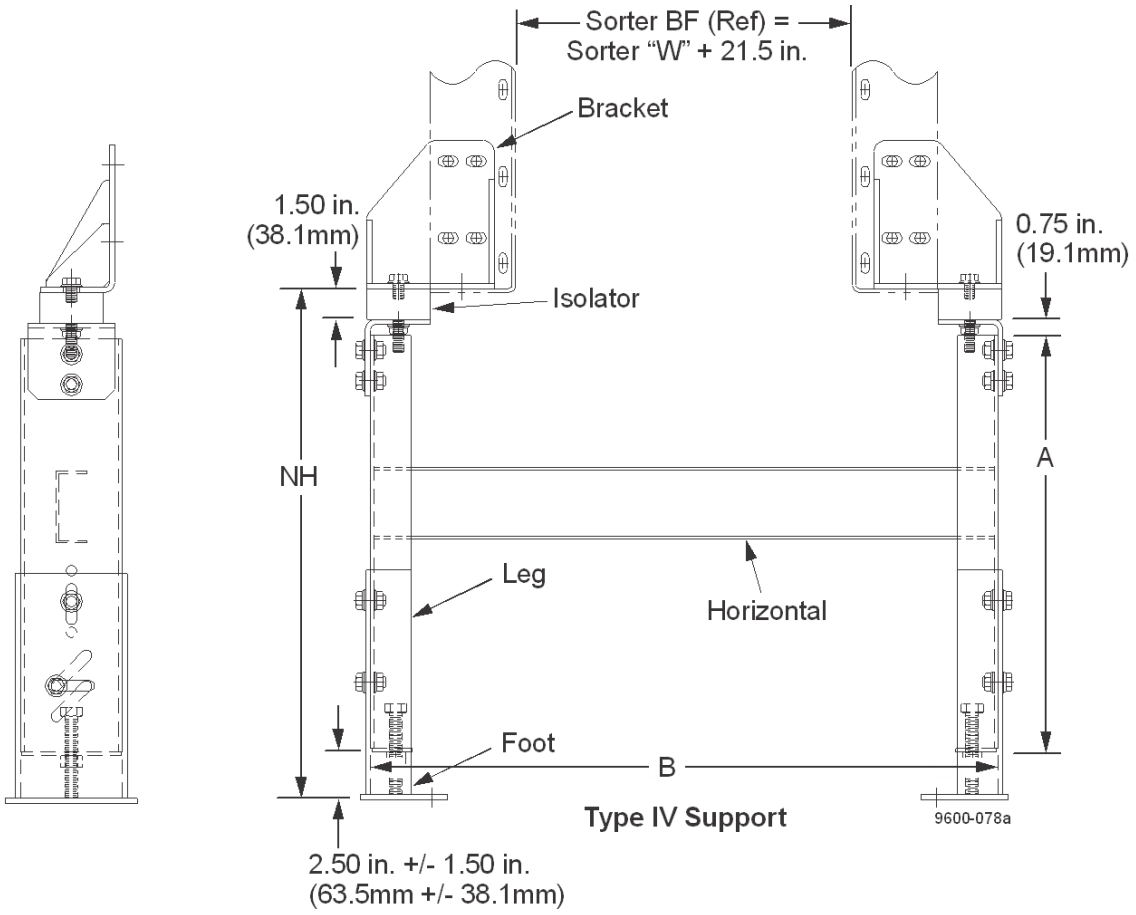
Type III Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
36 (914.4)	18 (457.2)	14.00 (355.6)	B = W + 35.75 inches (908.1)
37 (939.8)	19 (482.6)	15.00 (381.0)	
38 (965.2)	20 (508.0)	16.00 (342.9)	
39 (990.6)	21 (533.4)	17.00 (368.3)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

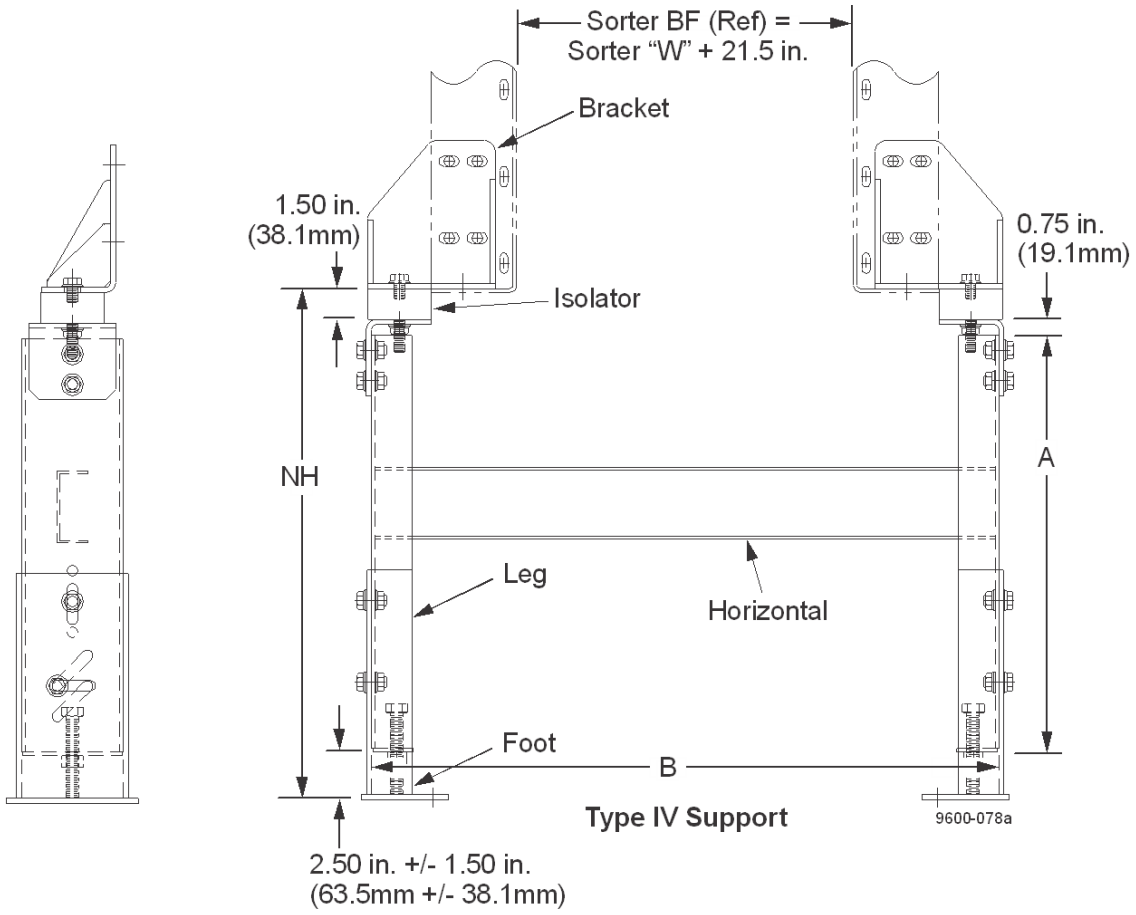
Figure 4 - 9 Type III Floor Supports - Drive Section

Type IV Floor Supports



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
40 (1016.0)	22 (558.8)	18.00 (457.2)	B = W + 35.75 inches (908.1)
41 (1041.4)	23 (584.2)	19.00 (482.6)	
42 (1066.8)	24 (609.6)	20.00 (508.0)	
43 (1092.2)	25 (635.0)	21.00 (533.4)	
44 (1117.6)	26 (660.4)	22.00 (558.8)	
45 (1143.0)	27 (685.8)	23.00 (584.2)	
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)			

Figure 4 - 10 Type IV Floor Supports - with 1 Horizontal Brace - Drive Section



Elevation inches (mm)	NH inches (mm)	A inches (mm)	B inches (mm)
46 thru 57 inches in 1" increments (1168.4 thru 1447.8 in 25.4 increments)	28 thru 39 inches in 1" increments (711.2 thru 990.6 in 25.4 increments)	NH -4.75 inches (NH -120.7)	B = W + 35.75" inches (908.1)
	W = 2 inches" (558.8), 28 inches (711.2), 34 inches (863.6)		

Figure 4 - 11 Type IV Floor Supports - with 2 Horizontal Braces - Drive Section

Type V Floor Supports

The Tables below lists the dimensions for the Type V floor supports shown in Figure 4 - 12.

Type V Floor Supports - with 2 Horizontal Braces

NH inches (mm)	A inches (mm)	B inches (mm)
40 thru 94 inches in 1 inch increments (1016.0 thru 2387.6 in 25.4 increments)	NH -4.74 inches (NH -120.7)	B = W + 35.75 inches (908.1)
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)		

Type V Floor Supports - with 3 Horizontal Braces

NH inches (mm)	A inches (mm)	B inches (mm)
95 inches thru 172 inches in 1 inch increments (2413.0 thru 4368.8 in 25.4 increments)	NH -4.75 inches (NH -120.7)	B = W + 35.75 inches (908.1)
W = 22” (558.8), 28” (711.2), 34” (863.6)		

Type V Floor Supports - with 4 Horizontal Braces

NH inches (mm)	A inches (mm)	B inches (mm)
173 thru 244 inches in 1 inch increments (4394.2 thru 6197.6 in 25.4 increments)	NH -4.75 inches (NH -120.7)	B = W + 35.75 inches (908.1)
W = 22 inches (558.8), 28 inches (711.2), 34 inches (863.6)		

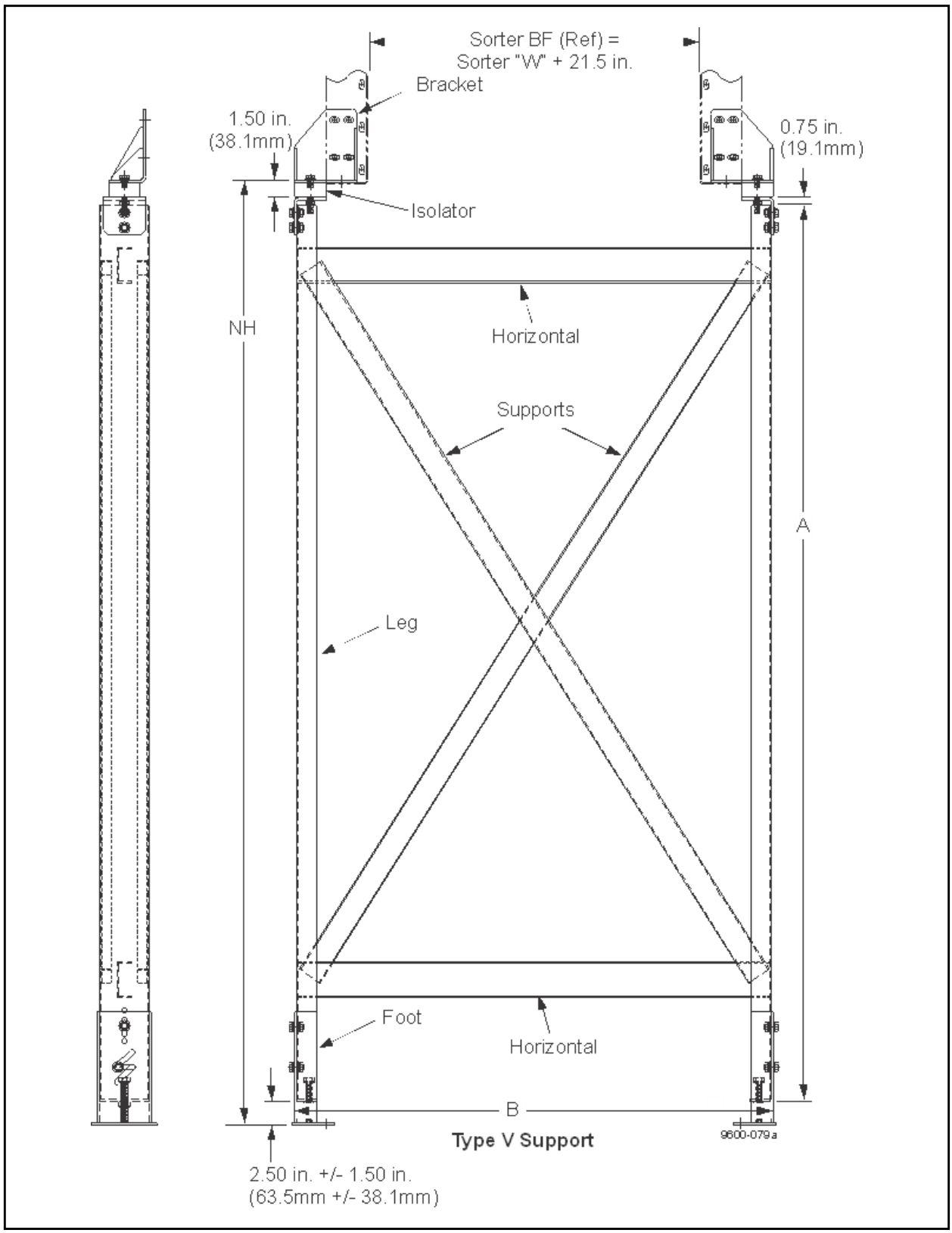


Figure 4 - 12 Type V Floor Supports - Drive Section

Carrier Chain Covers

Aluminum covers are used to cover the chain and bearings in order to protect the product from the chain, and to protect the chain from the product. Available in 10’ (3m) sections that snap onto the different conveyor sections.

Sound Abatement Panels

Covered acoustic fiberglass panels used to provide a lower decibel conveyor operating level. Available in varying lengths and widths to fit the different conveyor sections. Consult the factory for additional details.

5 Troubleshooting

CAUTION

Do not clear jams or reach into any unit before first turning off the equipment power source(s) and making certain that all moving parts are fully stopped. To avoid personal injury or equipment damage, lock out and tag out the conveyor operation control(s) before attempting to correct any malfunction.

Failure to follow this instruction may result in equipment damage.

Basic troubleshooting provisions are outlined in Table 5 1. When troubleshooting a specific conveyor system, always check the maintenance information.

Table 5 1 Basic Troubleshooting Problems and Solutions

Problem	Cause	Solution
Drive Motor Does Not Run	Tripped Safety Device • Internal jam detector is tripped. • Product jam on conveyor. • Infeed/discharge end safety rollers out of position. • Emergency Stop on. • Product out of position detected at drive section shoe return.	• Verify limit switch is not actuated, see Figure 6-15 in Chapter 6. Remove any debris. • Clear jam, verify position and operation of applicable photo-eyes. • Verify roller(s) are in safe position, proximity switch is actuated indicating rollers in correct position, see Figure 6-14 in Chapter 6. • Verify Emergency Stop is Off. • Check for product on wrong side of shoes at drive section. Check photo-eye and proximity switch.
	Electrical Power Circuits/Drive Motor • Drive motor defective. • Motor disconnect switch. • VFD, misadjusted/defective. • Drive overcurrent relay/sensor. • Motor contactor. • Power fuses/circuit breakers. • Motor start PB/main power switch. • Wiring.	• Check drive motor and wiring. • Check that motor disconnect switch is On and not defective. • Refer to VFD manufacturer's manual for troubleshooting. • Verify overcurrent relay/sensor not tripped or defective. Check adjustment. • Verify motor contactor is not defective. • Check for blown fuses, tripped circuit breakers. • Check that main power switch is on and motor start PB is not defective. • Check all wiring for any loose connections or broken wires.
	• Low air pressure at chain oiler.	• Check air pressure at chain oiler regulator to be set to 10psi (0.7bar). • Verify supply pressure to be 60 to 100psi (4 to 6.9bar).

Table 5 1 Basic Troubleshooting Problems and Solutions (Continued)

Problem	Cause	Solution
Drive Motor Starts, But Stops Immediately or Conveyor Does Not Reach Specified Operating Speed	• Over current relay/sensor is tripping.	• Check adjustment of relay/sensor. • Check carrying chains for proper lubrication and tension. • Check carrying tubes for contamination or divert shoes binding. • Check for any binding in drive and idler sections. • Check drive motor for free rotational movement.
	• VFD misadjusted or defective.	• Refer to VFD manufacturer's instructions and verify adjustments.
	• First divert switch photo-eye malfunctioning.	• Repair or replace divert switch photo-eye.
Conveyor Takes Long Time to Reach Speed or Carrying Chains Jerk When Starting	• VFD misadjusted or defective.	• Refer to VFD manufacturer's instructions and verify adjustments.
	• Carrying chains not properly lubricated.	• Check for proper operation of automatic chain oiler, make adjustments as necessary.
	• Carrying chains tension incorrectly.	• Check carrying chain tension and adjust if required. Re-adjust VFD.

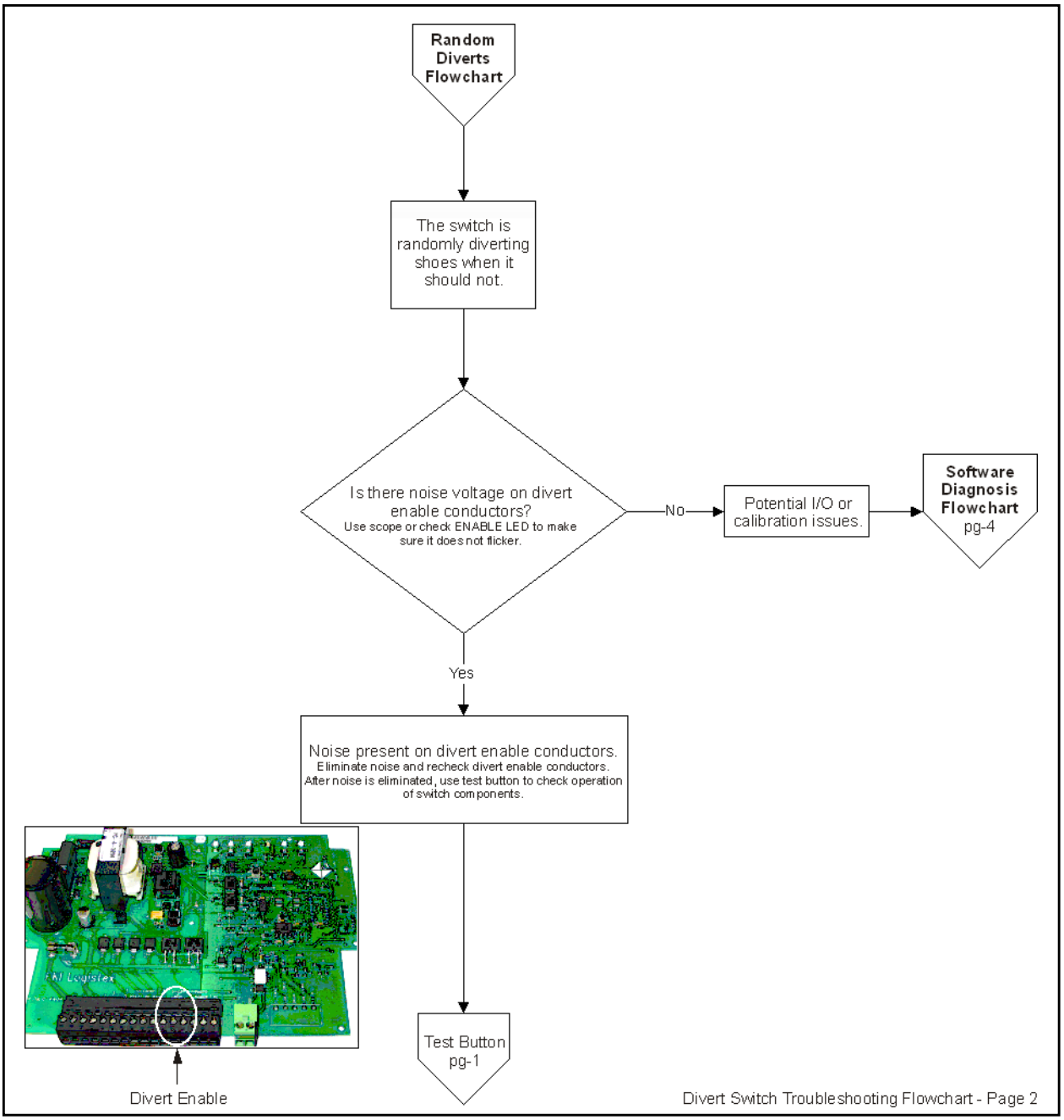
Table 5 1 Basic Troubleshooting Problems and Solutions (Continued)

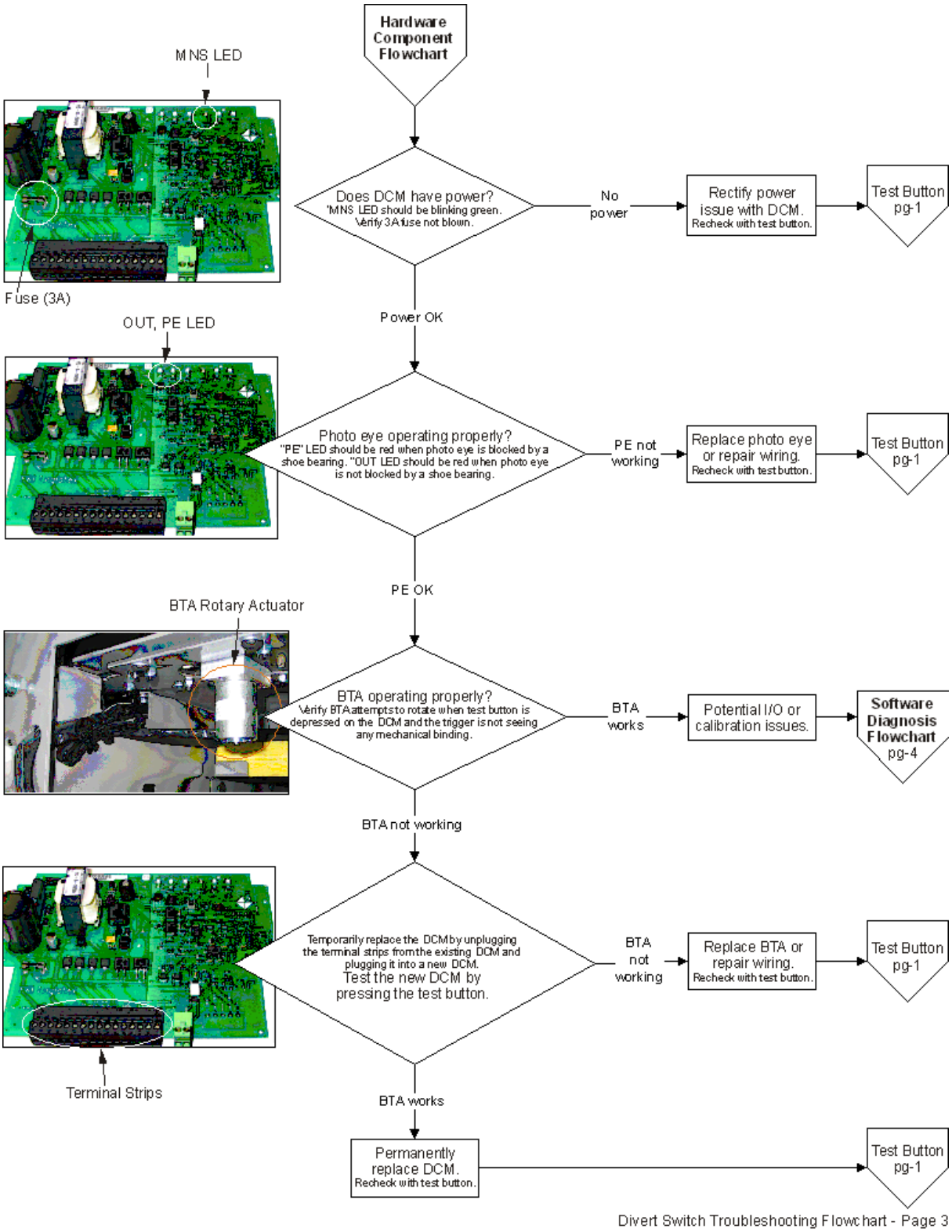
Problem	Cause	Solution
Conveyor Shuts Off Automatically During Normal Operation	• Safety device(s) tripped.	• See the “Drive Motor Does Not Run” checks in this section.
	• Low oil level in chain oiler reservoir.	• Check and refill if required. Use Mobil Oil, 20 wt. DTE Heavy Medium ISO-68 non-detergent machine oil only. Do not use other lubricants without approval of Intelligrated.
	• Low air pressure at chain oiler.	• Check air pressure at chain oiler regulator to be set to 10psi (0.7bar). • Verify supply pressure to be 60 to 100psi (4 to 6.9bar).
	• Electrical power circuit/device problem.	• See to “Electrical Power Circuits/Drive Motor” in this section.
	• Recirculation/overflow conveyor full or not operating.	• Clear full condition. • Troubleshoot drive/power unit.
	• Sort control unit.	• Verify control unit is not inhibiting drive motor power due to possible control unit failure/wiring problem.
Drive Switching Noisy at One or More Divert Switches	• Some divert shoes binding/carrying tubes contaminated.	• Clean carrying tubes/adjust shoe fasteners as necessary.
Divert Shoes “Jump” During Diverting	• Divert switch block binding, misaligned, or damaged. • Divert shoe pin damaged. • Pin guide track(s) misaligned.	• Align, adjust, or replace switch block as necessary. (see “Divert Switch Operational Mechanisms Check and Alignment”.) • Replace. • Align pin guide track.
Inoperative Divert Switch	• See the D • "Divert Switch Troubleshooting Flowchart" in this chapter.	
All Divert Switches Inoperative - Conveyor Drive Motor Operates - Conveyor Runs at Correct Speed	• +24 Vdc supply voltage for proximity switches. • Loss of 110 Vac for brushless rotary actuators. • Control system failure.	• Check +24 Vdc power supply and wiring. • Check 110 Vac wiring and control unit. • Troubleshoot control system per control supplier’s instructions.

Table 5 1 Basic Troubleshooting Problems and Solutions (Continued)

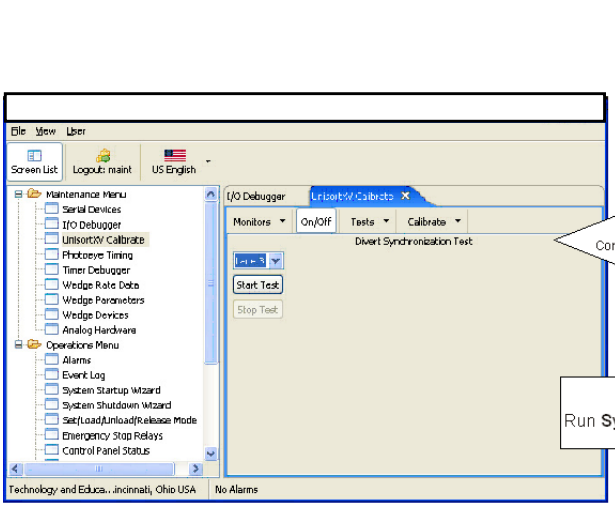
Problem	Cause	Solution
Induction Conveyor Inoperative	• Conveyor not at speed.	• First proximity switch defective and/or auxiliary contact on motor starter defective.
	• Induction conveyor drive-power unit.	• Verify induction conveyor run not inhibited by control unit. • Troubleshoot induction conveyor drive-power unit.

Divert Switch Troubleshooting Flowchart

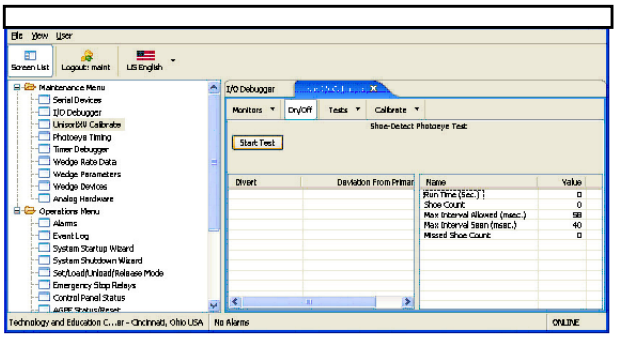




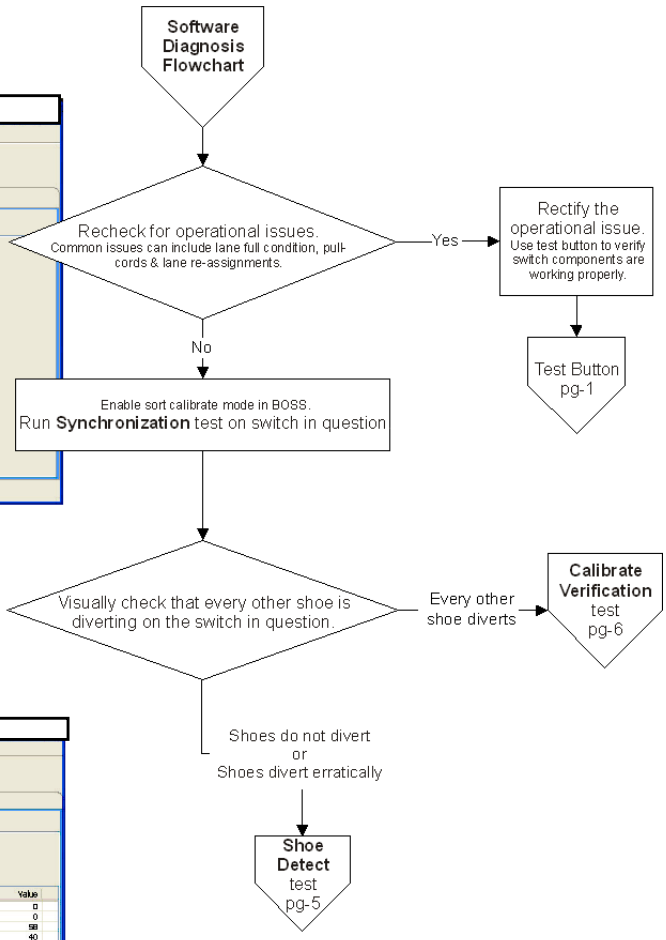
Divert Switch Troubleshooting Flowchart - Page 3



Synchronization Test



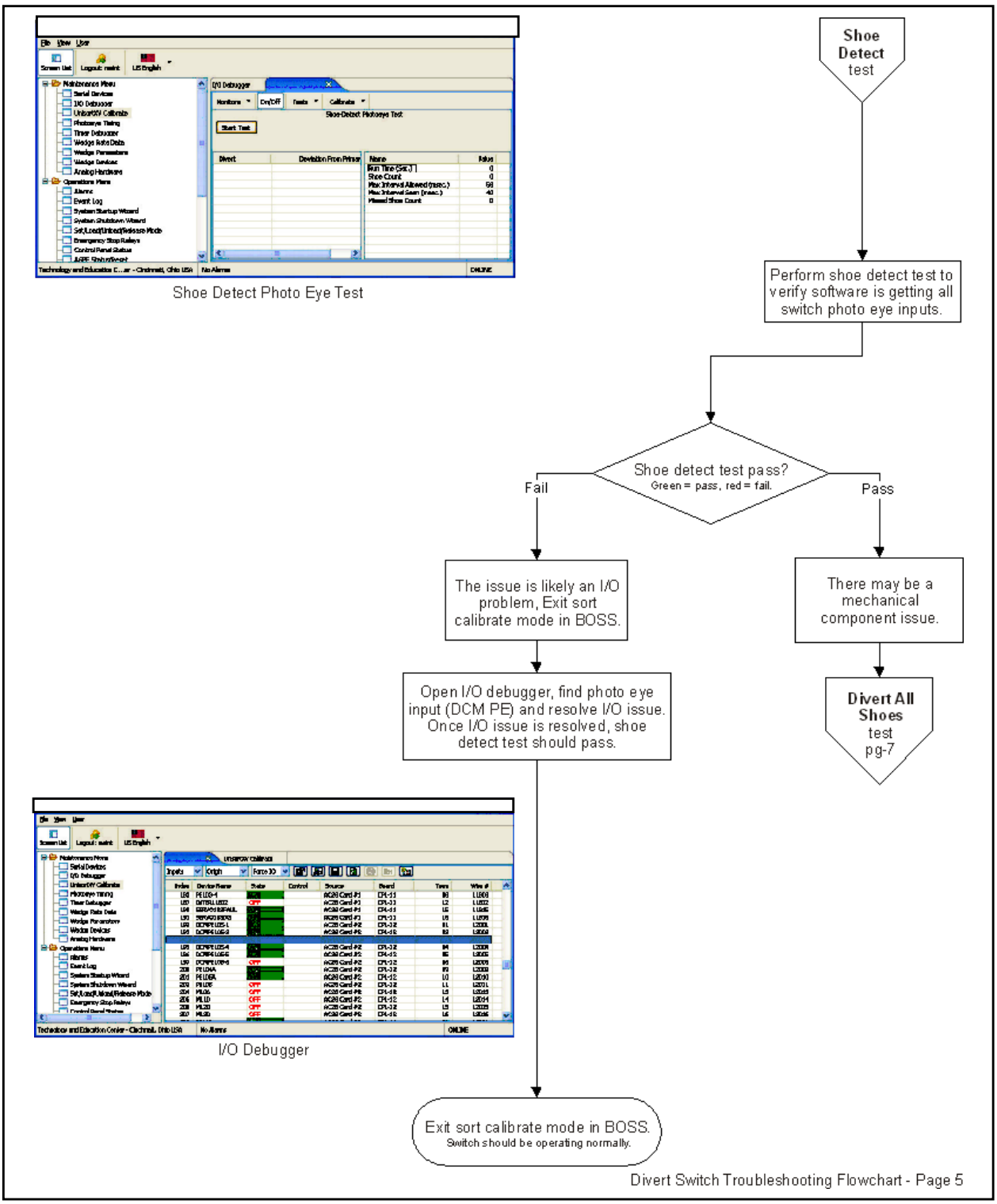
Shoe Detect Photo Eye Test



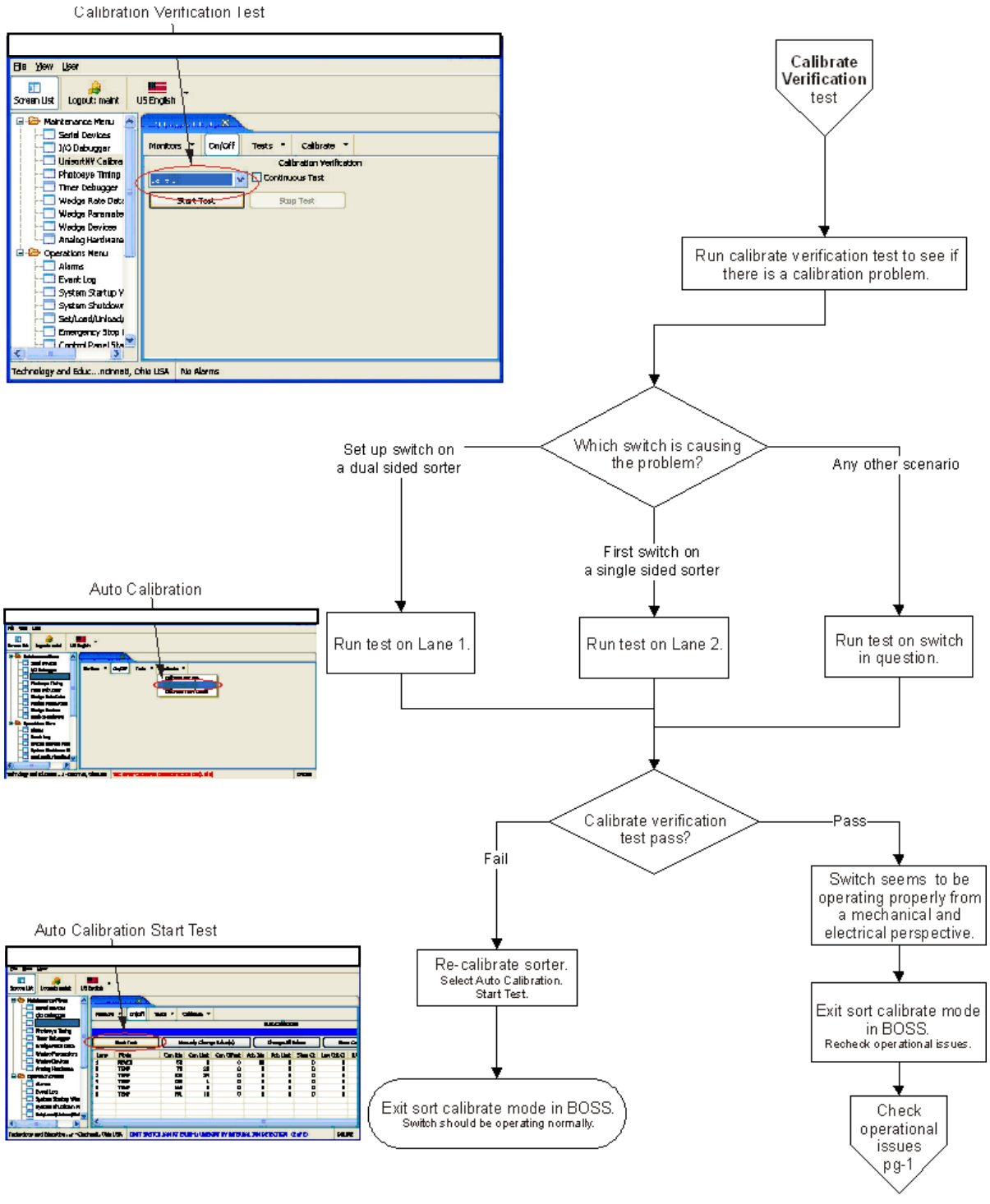
Divert Switch Troubleshooting Flowchart - Page 4

Shoe Detect Photo Eye Test

I/O Debugger



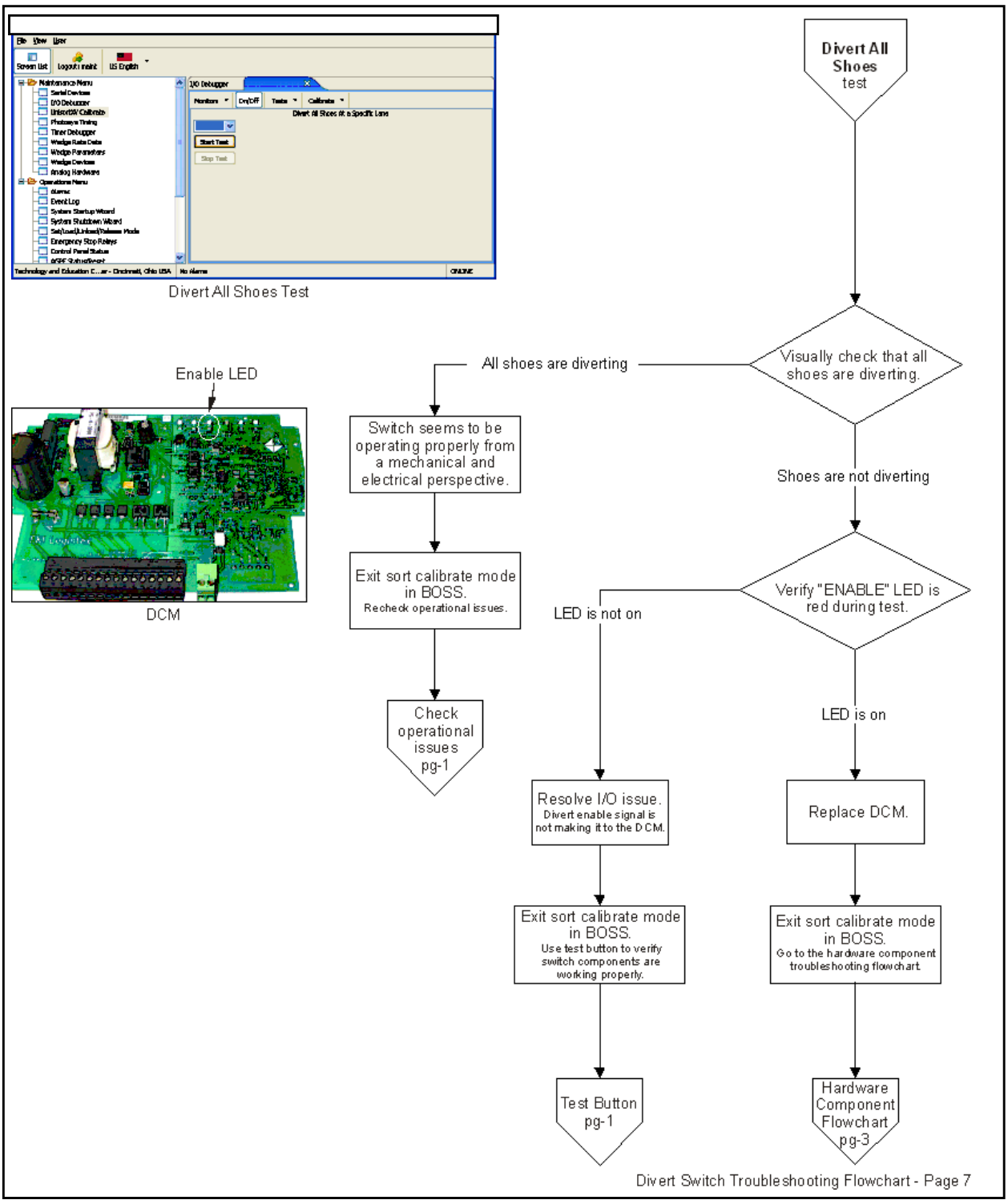
Divert Switch Troubleshooting Flowchart - Page 5



Divert Switch Troubleshooting Flowchart - Page 6

Divert All Shoes Test

DCM



Divert Switch Troubleshooting Flowchart - Page 7

6 Preventive Maintenance

CAUTION

Before performing maintenance on a conveyor, make certain that the conveyor's power disconnect is locked in the OPEN position and tagged to prevent accidental or unexpected application of power.

Do not perform maintenance while the conveyor is running unless specifically instructed to do so in this manual. Note: Other than checking of chain tension, it is NOT necessary to have the conveyor turned ON to perform any of the work described in this section.

Maintenance must be performed only by qualified personnel who are trained in normal and emergency operations of the conveyor and who understand all safety devices, their locations, and functions.

Recommended service checks and equipment maintenance are outlined in this section for typical, intermittent-duty conveyor applications. Additional maintenance and servicing schedule adjustments may be required for continuous-duty operation or extreme environmental conditions.

The indicated preventive maintenance time intervals are based on a conveyor which is operating eight hours per day in 40°F to 110°F (4°C to 43°C) environmental temperatures.

All newly installed equipment should be frequently inspected and serviced as needed during the first 40 hours of operation. Thereafter, an appropriate maintenance program should be established and followed, see Table 6 1. The time intervals should be appropriately adjusted for more than eight hours per day operation and/or operation in a harsh environment. Also, sorting product that produces an extraordinary amount of dust, dirt, or any other type of contamination may require more frequent preventive maintenance.

Maintaining separate service log sheets on each type of conveyor is recommended for plants operating more than one shift. Each log sheet should show dates, detailed inspection service information, and name or initials of person(s) performing the equipment inspection or service for future reference.

Before restarting a conveyor:

- Remove all foreign objects from the conveyor.
- Be sure that all guards and safety devices are properly installed and working.
- Make sure that all persons are clear of the conveyor and are aware that the conveyor is about to be restarted.

Intervals indicated for performing maintenance should be considered for 8 hour per day operation. An application may subject the equipment to conditions that would necessitate more frequent maintenance. This may best be determined by performing maintenance more frequently when the conveyor is first put into operation, and then lengthening the intervals based on experience.

NOTE: Power does not need to be applied to the conveyor drive motor except to observe divert switching and to verify the operation of the safety and control devices.

Table 6 1 Scheduled Maintenance

	Components	Item Check									
		Lubrication	Oil Level	Tension	Wear	Alignment	Fasteners	Set Screws			Operation
Weekly	Chain Oiler		X							X	X
	Carrying Chains	X									
	Carrying Tubes (Slats)									X	
	Control Devices - on Conveyor						X			X	X
	DCM (Divert Control Module)									X	
	Divert Shoes									X	X
	Divert Switches										X
	General Structure						X			X	
	Safety Guards and Devices						X		X	X	X
Monthly (175 Hrs.)	Carrying Chains			X							
	Carrying Tubes									X	
	Divert Shoes						X				
	Divert Switches									X	
	Novex Belting						X			X	
	Reducer	X	X								
	Sprockets/Hubs/Pulleys					X		X			
	Supports/Hangers						X			X	
	UHMW Chain Guides						X			X	
	V-Belts			X	X	X					
Semi Annu-ally (1040 Hrs.)	Bearings	X					X				
	Slat/Tube Brush						X		X		
	Carrying Chains			X							
	Drive Motor	X					X				
	Plastic Parts				X					X	
	Reducer	X	X				X				

Making A Window

Opening a “window” in the conveyor involves removing several tubes (or slats), see Figure 6 - 1. This is best done at the idler (cannot be done near a spur).

To remove tubes (or slats):

1. Remove the side guide on one side of the conveyor (if present).
2. Pry up the chain until the shoe pins clear the pin guide. Slide the shoes to the center.
3. Continue prying up and out on the chain until it is clear of the track.
4. While holding the chain in this position, push the necessary tubes (or slats) away from the chain until they clear the extended pins.
5. Lift each tube (or slat) away from the conveyor and place it on a clean surface.

After removing the tubes (or slats) needed to create a “window”, return any remaining shoes to their position over the pin guide, place the chain back into its track, and shake the shoes to make sure they have reseated.

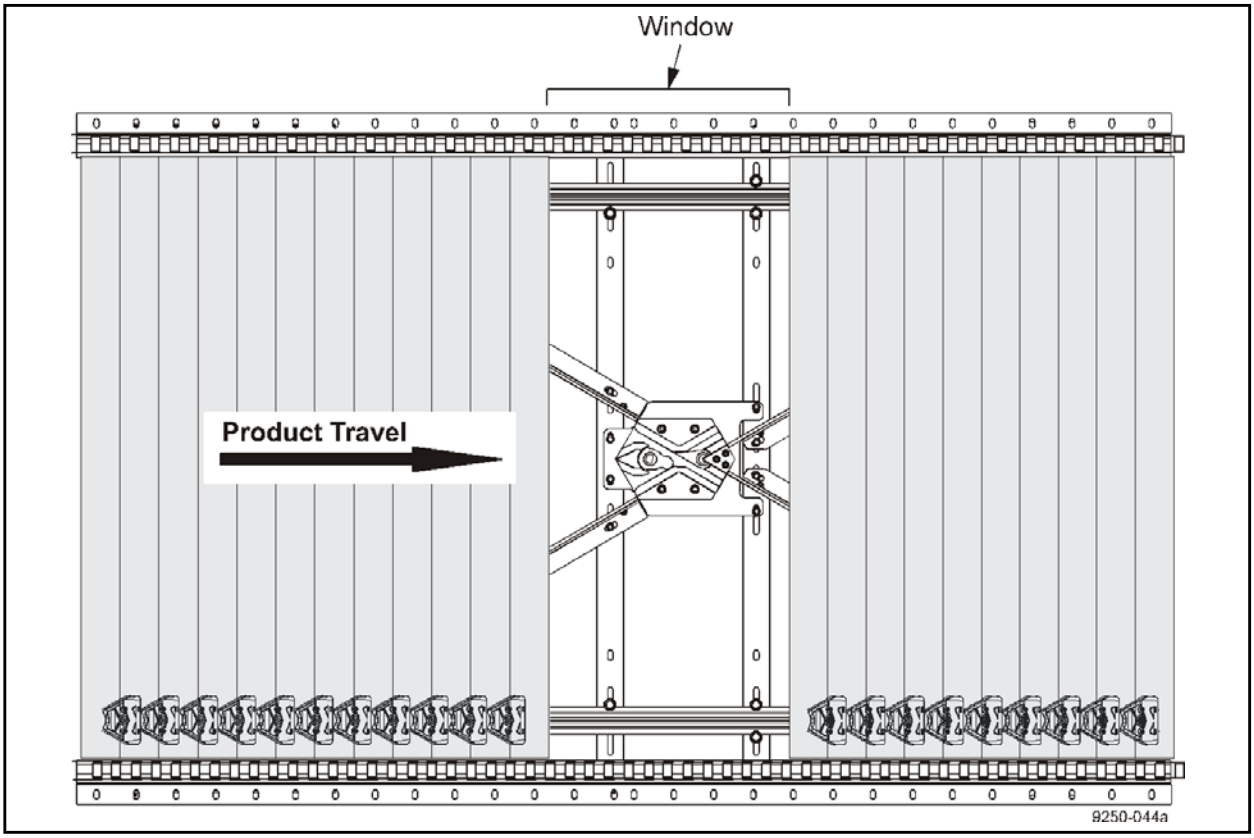


Figure 6 - 1 Window in the Tubes/Slats (Slats shown)

Scheduled Maintenance

Initial Start-Up and Run-In Period

⚠ WARNING

Do not assume that this unit has been properly lubricated. Prior to start-up, be sure the reducer has been filled with the proper type, grade, and amount of oil. Failure to follow this instruction may result in serious equipment damage.

Power Unit Reducer

The reducer is shipped from the factory filled with Mobil SHC 630 Synthetic lubricant.

Table 6 2 lists gear lubricants recommended for use in the reducer. Contact Intelligrated in the event the lubricants listed below are not available or when considering using another lubricant. Conventional lubricants may be used, however synthetic lubricants are recommended for maximum reducer life.

Table 6 2 Approved Reducer Lubricants

Manufacturer and Designation	Ambient Temperature Range	AGMA Viscosity Grade and Viscosity @ 104° F (SSU/cST)
Mobil Oil Company, Mobilgear SHC 630	15° to 150° F (-10° to 50° C)	Grade 5 918-1122 SSU 198-242 cST
Shell Oil Company, Hyperia Oil 220	15° to 150° F (-10° to 50° C)	Grade 5 918-1122 SSU 198-242 cST
Texaco, Inc., Pinnacle 220	15° to 150° F (-10° to 50° C)	Grade 5 918-1122 SSU 198-242 cST
Mobil Oil Corporation, Mobilgear SCH 629	0° to 90° F (-20° to 30° C)	Grade 4 626-765 SSU 135-165 cST
Texaco, Inc., Pinnacle 150	0° to 90° F (-20° to 30° C)	Grade 4 626-765 SSU 135-165 cST

Safety Provisions

Check that warning signs and labels posted on or near the conveyor equipment are not removed, painted over, or altered at any time.

Check all safety devices, warning lights, and alarms associated with the conveyor system for proper operation and serviced as needed.

Daily Inspections

Perform walk-through inspections of the conveyor equipment each day. For continuous duty applications, conduct inspections each shift. Listen for unusual noises and carefully observe the system.

To ensure the personnel safety, check safety guards, warning signs, lights, and alarms associated with the conveyor, and keep them in good condition. Immediately report and correct any unusual noise, oil leak, or operational problem.

Weekly Inspections

Chain Oiler

Check the reservoir level and fill with Mobil Oil, 20 wt. DTE Heavy Medium ISO-68 non-detergent machine oil, as needed.

Verify that the oiler is cycling properly, refer to the “Sorter Lubrication Run Time Settings” in Chapter 3 Installation Procedures.

Adjust the settings as needed if insufficient or excessive oil is being applied to the carrying chain.

Check the air regulator gauge for correct operating air pressure and adjust if needed.

Pressure should be set to 10psi (0.7bar).

Remedy the cause of any chronic air pressure losses.

Carrying Chains

Confirm that the carrying chains are receiving the proper amount of lubrication.

Carrying Tubes

⚠ WARNING

For trouble free divert shoe operation, the carrying tubes must be maintained in good physical condition. Do not apply any lubricant to the carrying tubes without first consulting the manufacturer. Failure to follow this instruction may result in serious equipment damage.

Check the carrying tubes to be sure they are clean, straight and smooth. Replace bent or nicked carrying tubes.

Clean the carrying tubes by wiping with a degreaser type solvent. Clean extremely dirty or rusty tubes with steel wool or a fine grade emery cloth with a degreaser. See “Carrying Tube (Cleaning)” on page 10 for recommended solvents.

Carrying Slats

⚠ WARNING

For trouble free slat operation, the slats must be maintained in good physical condition. Do not apply any lubricant to the carrying slats without first consulting the manufacturer. Failure to follow this instruction may result in serious equipment damage.

Check all slats for physical damage and replace as needed. Be sure all slat linear belts slide freely and repair any that are damaged.

Check the carrying slats to be sure they are clean, straight and smooth. Replace bent or nicked carrying slats.

New slats should not require cleaning.

For regular maintenance, clean dirty slats with a suitable mild detergent.

- Dilute the mild detergent with water (30:1)
- Dampen a cloth with the solution and wring out excess solution.
- Wipe the belt slat with the solution dampened cloth
- Wipe the belt slat with a cloth dampened with water.
- Wipe the belt slat with a clean, dry cloth.

Do not lubricate.

Control Devices

Mounted on the conveyor - Be sure all photo-eye and reflector fasteners are tight. Check tightness and physical condition of all wire/conduit fittings.

Divert Control Module

Check the divert control module wiring, making sure any loose connections are promptly fixed. Check the condition of the DCM box to make certain the cover is closed and there is no damage to the box.

Divert Shoes

Check all divert shoes for physical damage and replace damaged shoes. Be sure all shoes slide freely and repair any that are binding.

NOTE: Typical causes of binding include: dirty or bent carrying tubes and shoe fasteners adjusted to tight.

Divert Switches

Observe the shoes as they divert and listen for unusual clicking sounds at each divert switch. If a random clicking sound occurs, a divert shoe pin may be damaged. If a repetitive clicking sound occurs, the divert switch may be out of adjustment or improperly synchronized (control timing).

General Structure / Operation

Check the physical condition of fasteners on the following structural items: floor supports, section joint fasteners, product containment guard rail, and take-away conveyor mountings.

Safety Guards and Devices

Check the drive section safety guard for loose fasteners or physical damage. Check all personnel safety guards for looseness or physical damage. These guards may include, for example, conveyor underside guards, safety netting and/or solid type guards mounted on top of the conveyor side frames.

Check the physical condition and operation of all safety devices, including the:

- Emergency Stop pull cord.
- Discharge end transfer assembly, see Figure 6 - 14.
- Internal jam detector(s), see Figure 6 - 15.
- Non-diverted product out of position at drive section.
- Product jam photo-eyes.
- Divert switch access cover plates.
- Any other specially applied safety devices.

Monthly Maintenance

Lubricants

Lubricate the conveyor with the following:

Table 6 3 Lubricants for the UniSort XV Conveyor

Component	Ambient Temperature	Lubricant
Carrying Chains	+20° F to +40° F +41° F to +120° F	Mobil Oil, 20 wt. DTE Heavy Medium ISO-68 non-detergent machine oil. Consult Intelligrated before using any other lubricants.
Pillow Block Bearings	-25° F to +120° F	Lithium Base, NLGI-2 Bearing Grease.
Idler Shaft	-25° F to +120° F	Lithium Base, NLGI-2 Bearing Grease.
Reducers	Refer to Manufacturer's Instruction Manual. The reducer may be supplied with synthetic type lubricant. Do not mix synthetic lubricants without checking compatibility. It is a good practice to flush out one type of lubricant prior to using any other type or brand.	
Drive Motor	Refer to Manufacturer's Instruction Tag or Sheet.	

Carrying Chains

Check the carrying chain tension after the first month of operation.The carrying chain should sag 4 to 5 inches, at the catenary in the drive section, when the conveyor is not operating, see Figure 6 - 2.

To adjust, remove links in 5 inch increments (2 links).

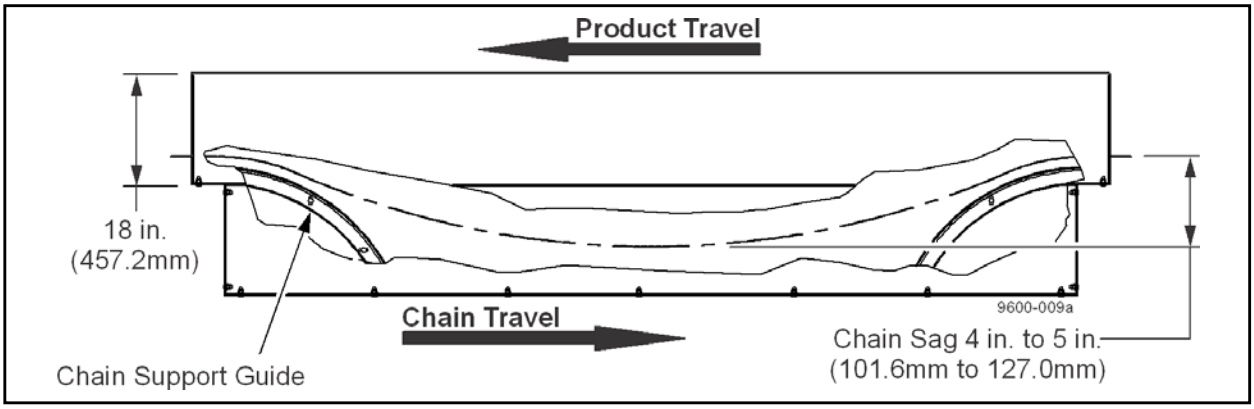


Figure 6 - 2 Chain Sag at Catenary

Carrying Tube (Cleaning)

Periodically check the carrying tubes for cleanliness. To clean the tubes, wipe them with a suitable solvent/degreaser. For extremely contaminated tubes, use a very fine grade emery cloth or steel wool alone or with a cleaning solvent.

Be careful not to allow solvent to enter the tubes or to remain in contact with the end bushings. Do not spray the tubes.

Do not lubricate the carrying tubes. This may cause malfunctions by allowing contamination to build-up on the tubes. It is only necessary to keep the tubes clean for trouble-free operation.

Use the following solvents/degreasers to clean the tubes:

- Mobilarma 245 - Mobile Oil Corporation
- Rust Vetro ® 4214 - E.F. Houghton Company
- Tectyl 235 - Ashland Oil Company

To ensure the safety of personnel, pay strict attention to the solvent manufacturers' instructions concerning use and health hazard warnings.

Carrying Slat (Cleaning)

New slats should not require cleaning.

For regular maintenance, clean dirty slats with a suitable mild detergent.

- Dilute the mild detergent with water (30:1)
- Dampen a cloth with the solution and wring out excess solution.
- Wipe the belt slat with the solution dampened cloth
- Wipe the belt slat with a cloth dampened with water.
- Wipe the belt slat with a clean, dry cloth.

Do not lubricate.

Divert Shoes

Check the nuts on the divert shoes. Do not overtighten; this will cause the shoes to bind on the carrying tubes.

NOTE: The divert shoes should slide freely when pushed by hand. To check, lift a shoe from the pin guide track and push the shoe across the carrying tubes.

Return Wedge - If the shoe pads show unusual wear, check the position of the shoe return wedge in the drive section, see Figure 6 - 3.

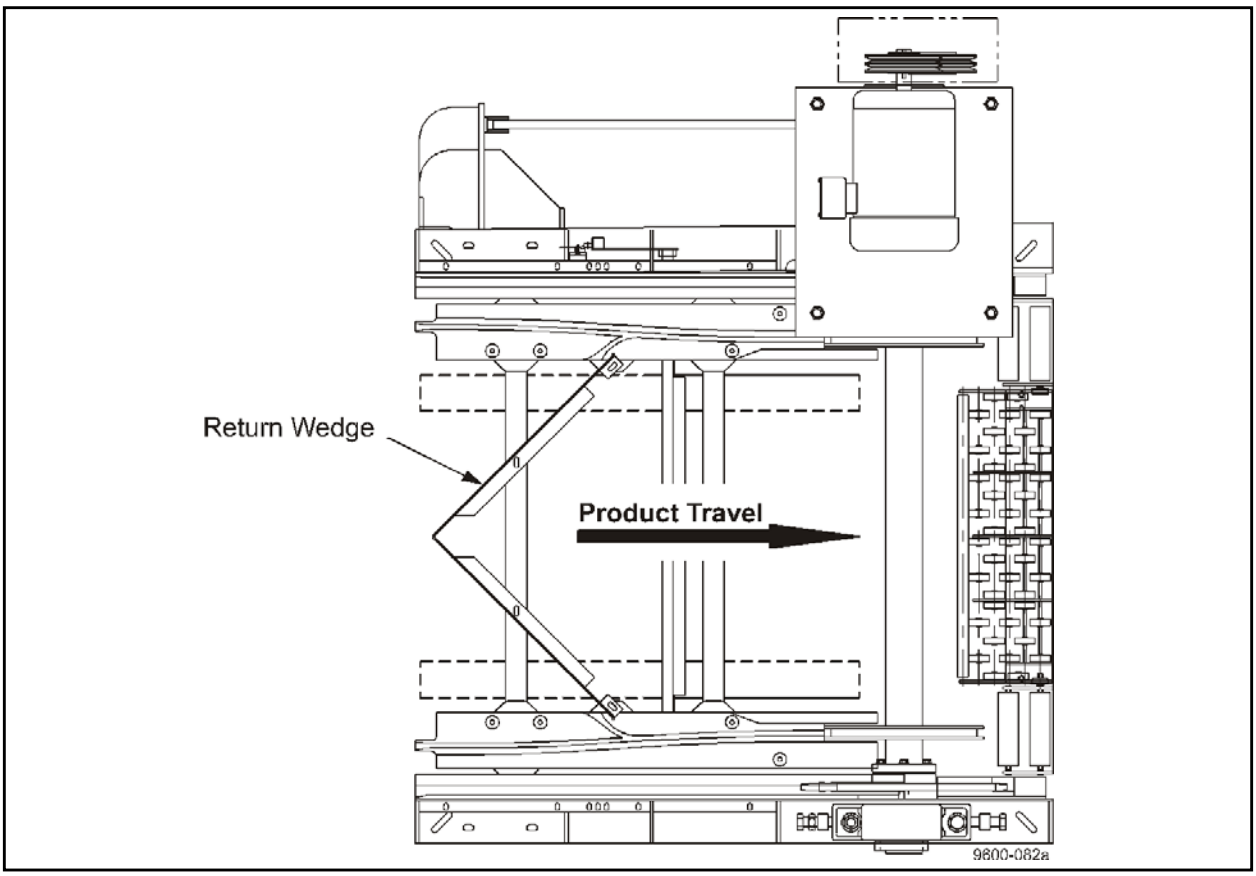


Figure 6 - 3 Drive Section - Return Wedge

Divert Switches

Inspect each divert switch for dirt or product spillage and clean as required. Be sure the top of the proximity switch is free of contamination.

Novex Belting

Check the physical condition of the Novex belting located in the chain track.

- The belting should be smooth and not contain any damaged sections.
- The belting should be properly anchored and not interfering with the flow of the chain.

If problems exist with the belting strips, the chain in that conveyor section will need to be removed and the belting strips replaced.

⚠ WARNING

Always lock out the electrical power prior to working on the reducer or related power transmission devices. Failure to follow this instruction may result in serious personal injury and equipment damage.

Reducer

Check the reducer oil level. Fill as needed with approved lubricants, see Table 6 2 on page 5.

Sprockets / Hubs / Pulleys

Check the tightness of set screws used in sprockets, hubs, and pulleys. Recheck alignment if any set screws are found loose.

Slat / Tube Brush

Check the clearances between brush assembly (located at the drive sprocket) and the load-carrying slats/tubes.

1. Clearance “A” of 0.031 inch (0.79mm) is required between the brush bristles and the top surface of the slats/tubes.
2. Clearance “B” of 0.125 inch (3.18mm) is required between the brush mounting bracket and the top surface of the slats/tubes.
3. After making any adjustments to the mounting bracket, verify that the sorter shoes clear the cutouts in the bracket “C” when electric power is turned on and the conveyor returns to full speed.

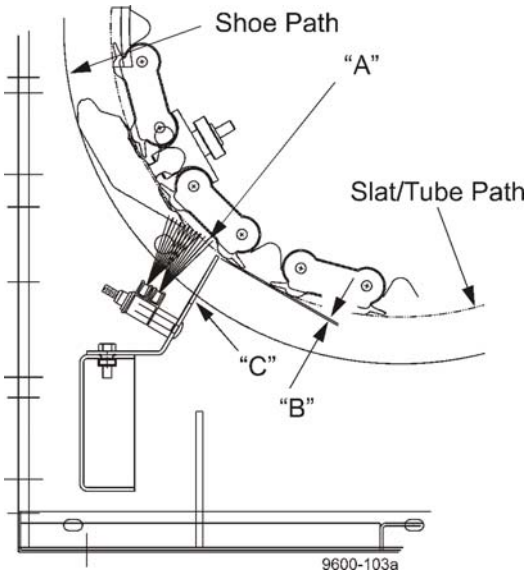


Figure 6 - 4 Adjustment of Brush / Mounting Bracket

Supports / Hangers

Be sure all floor supports are in good condition and have not been damaged. Check that all fasteners are securely tightened and that none are missing.

UHMW Chain Guides

Check the physical condition of the UHMW chain guides located in the chain track.

- The chain guides should be smooth and not contain any damaged sections.
- The chain guides should be properly anchored and not interfering with the flow of the chain.

If problems exist with the chain guides, the chain in that conveyor section will need to be removed and the chain guides replaced.

V-Belts

⚠ WARNING

Be sure to reinstall the drive section safety guarding. Failure to follow this instruction may result in serious personal injury and equipment damage.

Inspect the drive section V-belts for proper tension, wear, and alignment. Do not over tighten the V-belts.

Semi Annual Maintenance

Bearings

Check the tightness of all pillow block bearing mounting bolts. Lubricate each bearing using no more than two grease gun shots of lithium base NLGI-2 grease.

NOTE: Over lubrication may result in bearing failure.

Carrying Chains

Check the carrying chain tension, see “Unscheduled Maintenance Functions” on page 14 for details.

Drive Motor

Remove any build-up of dirt or dust around the motor vent openings.

Check the motor to see that all mounting bolts are securely tightened and the motor lead wires securely connected.

Unless otherwise specified wick-oil sleeve bearings should be lubricated every 2000 to 4000 hours after the first 4000 hours of operation with 3 or 4 drops of light-grade mineral oil or SAE-10W motor oil.

Reducer

Check the tightness of reducer mounting bolts and torque arm (if equipped).

For information on changing oil, oil type, and operating oil level, see “Power Unit Reducer” on page 5 for details.

Unscheduled Maintenance Functions

Chain Maintenance

Chain lubrication is a critical preventative maintenance activity that should be closely regulated by a line sorter owner. Proper lubrication and application can extend the life of a chain saving significant costs and downtime associated with chain replacement. All moving parts are subject to wear and sorter chain is no exception. Several factors can affect the rate of chain elongation due to pin and bushing wear, however proper lubrication is one of the single most important preventative maintenance functions on a line sorter. See Figure 6 - 5 and Figure 6 - 6 below.

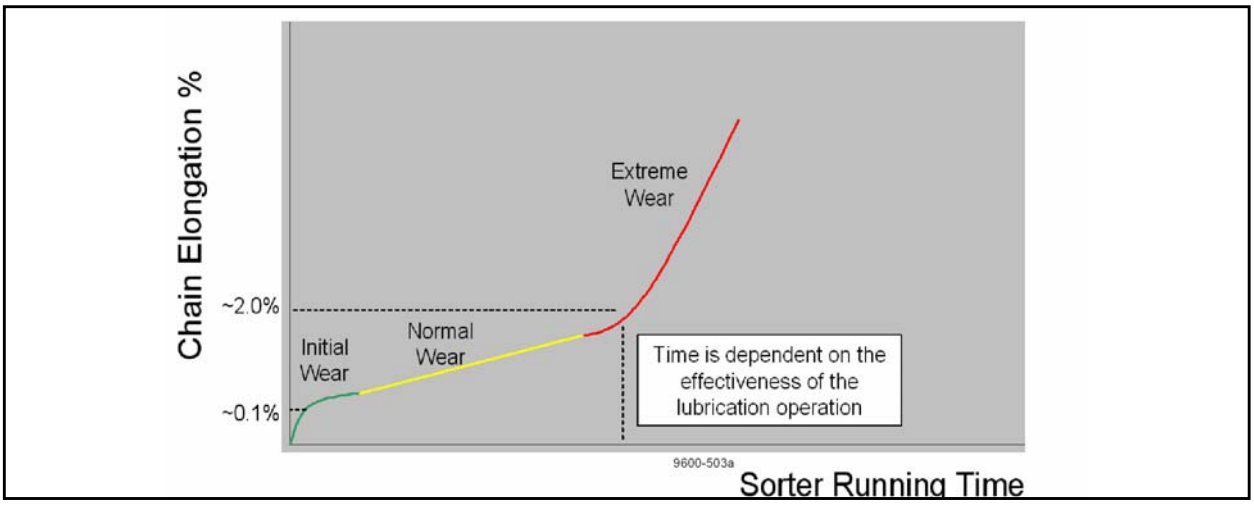


Figure 6 - 5 Chain Elongation Example 1

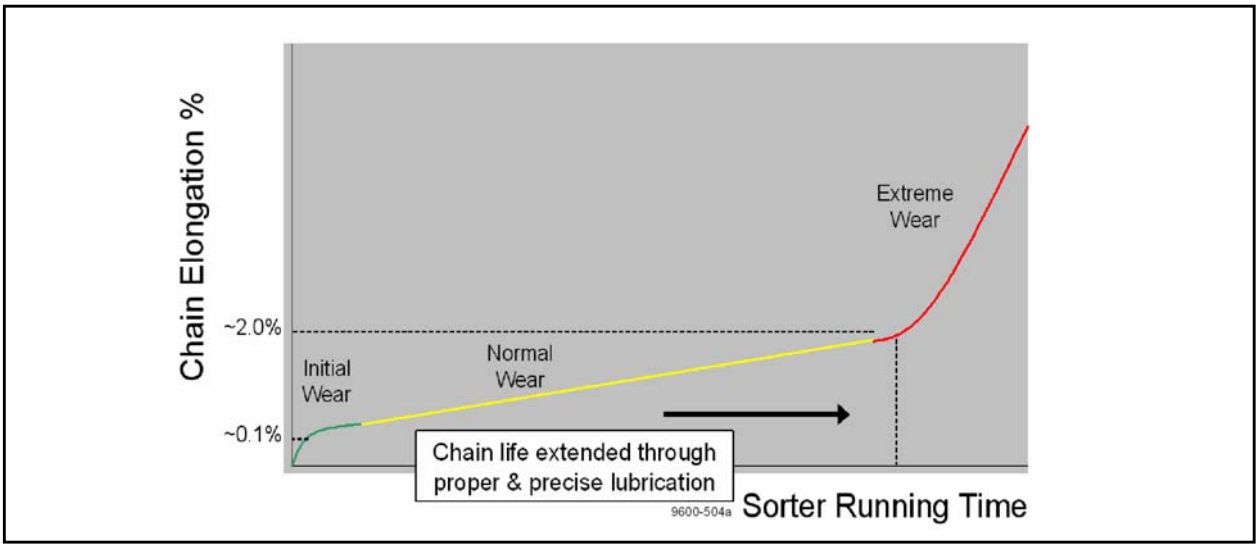


Figure 6 - 6 Chain Elongation Example 2

Chain Temperature

An effective method of evaluating the lubrication being applied to the conveyor chain is by checking the temperature of the left hand and right hand chains. The temperature of the running chains should be initially checked after six hours of operation.

To check the temperature of the chains:

- Take ambient temperature readings (temperature readings of steel objects in the vicinity of the conveyor).
- Take infrared thermometer readings of the chain at the idler end of the conveyor with the thermometer as close to the chain as is safely possible. Measure the temperature of the side plates of the chain, not the rollers.
- The chain temperature should be 5 to 10°F (3 to 6°C) higher than the ambient temperature.
- If the temperature variance is greater than 10°F (6°C), the oiler system may need to be adjusted to deliver more oil. Freezer applications give different readings than room temperature environments.
- Each chain should be checked separately. Take the chain temperature at the same place on both sides of the conveyor.

Sorters Without a Catenary

The drive chains do stretch with time. To compensate for chain stretch (short conveyors only) adjust the drive shaft take-up screws equally, thereby moving the drive shaft. Conveyors that are relatively short must be manually adjusted because they do not have a catenary section.

Chain Wear

Chain wear is checked by measuring the % elongation over a new chain. Chains should be replaced when they reach a 2.0% elongation over their original length. Elongation can be checked by measuring the center-to-center distance over 25 extended pins (48 chain pitches). A brand new chain will measure 60" (1524mm), center-to-center over 25 extended pins. At 2% elongation, a chain will measure 61 3/16" (1554mm), center-to-center over 25 extended pins and should be replaced. For good statistical data, this measurement should be checked on both sides of the sorter (RH and LH chain) every 100' to ensure even elongation on the entire chain. See Figure 6 - 7.

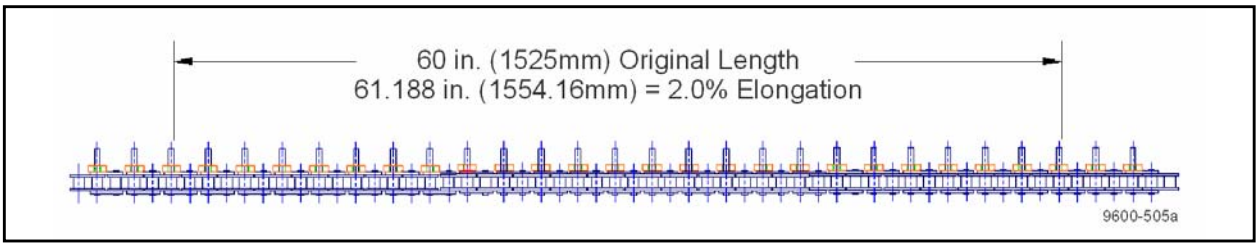


Figure 6 - 7 Measuring Chain Elongation

Divert and Crossover Switches

Cleaning the Divert Switches

1. Make a window in the conveyor to access the divert switches.
2. Move the window to the location of a divert switch.
3. Use compressed air to blow out debris in the switch mechanisms.
4. Wipe the switches with a clean, dry soft cotton towel to remove any oil or debris which may have collected.
5. It may be necessary to use a mild detergent to get all of the debris off of the switches

NOTE: Never use a solvent based cleaner on the divert switches. Solvent based cleaners may damage the polymer materials in the switch and will destroy the photo-eye lens covers.

6. Look for loose or broken parts. Replace parts as required.
7. Examine the divert trigger, making certain it moves freely and returns to the straight through position.

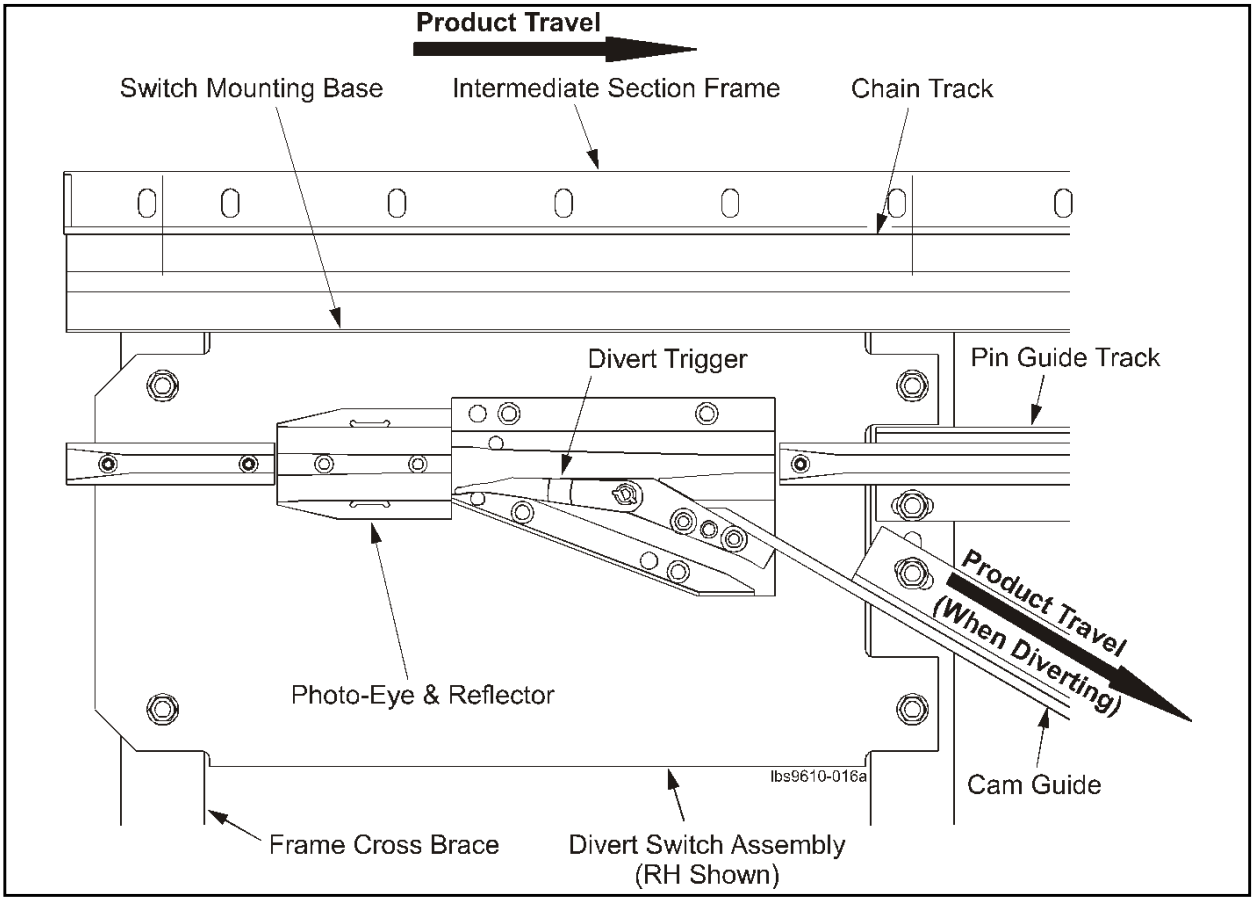


Figure 6 - 8 Divert Switch

Divert Switch Actuator Assembly Replacement

The divert switch actuator assemlby consists of the trigger, spacer block, and rotary actuator, see Figure 6 - 10. Use this procedure to replace the assembly.

1. Turn the conveyor Off and perform “Lockout/Tagout”.
2. Remove window on side of conveyor.
3. Disconnect the M12 cable connected to the DCM, see Figure 6 - 9.

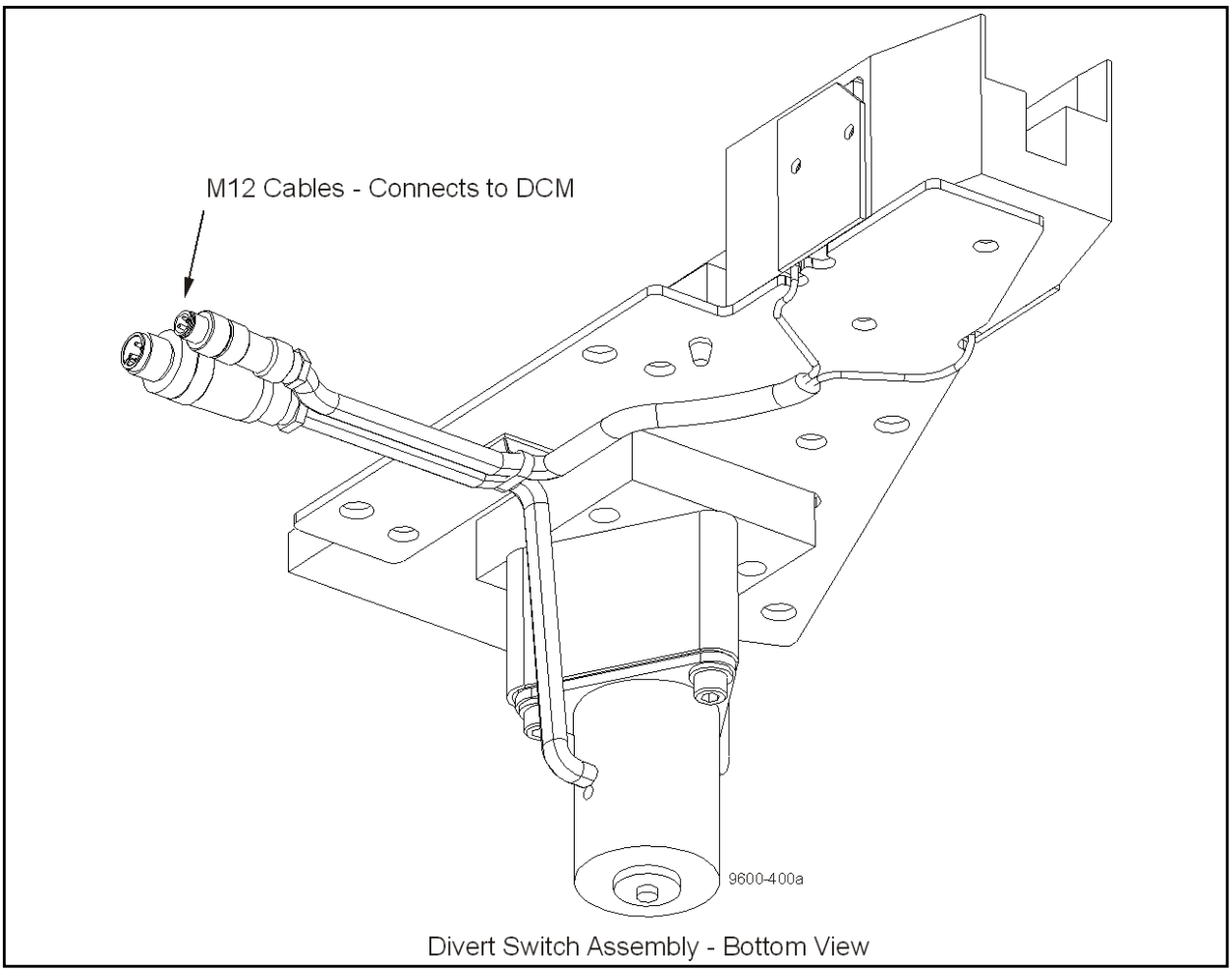


Figure 6 - 9 Divert Switch M12 Cables to Divert Control Module

4. Remove the actuator assembly hardware.

NOTE: The screws were installed with Loctite 609 and torqued to 48 in/lbs at assembly.

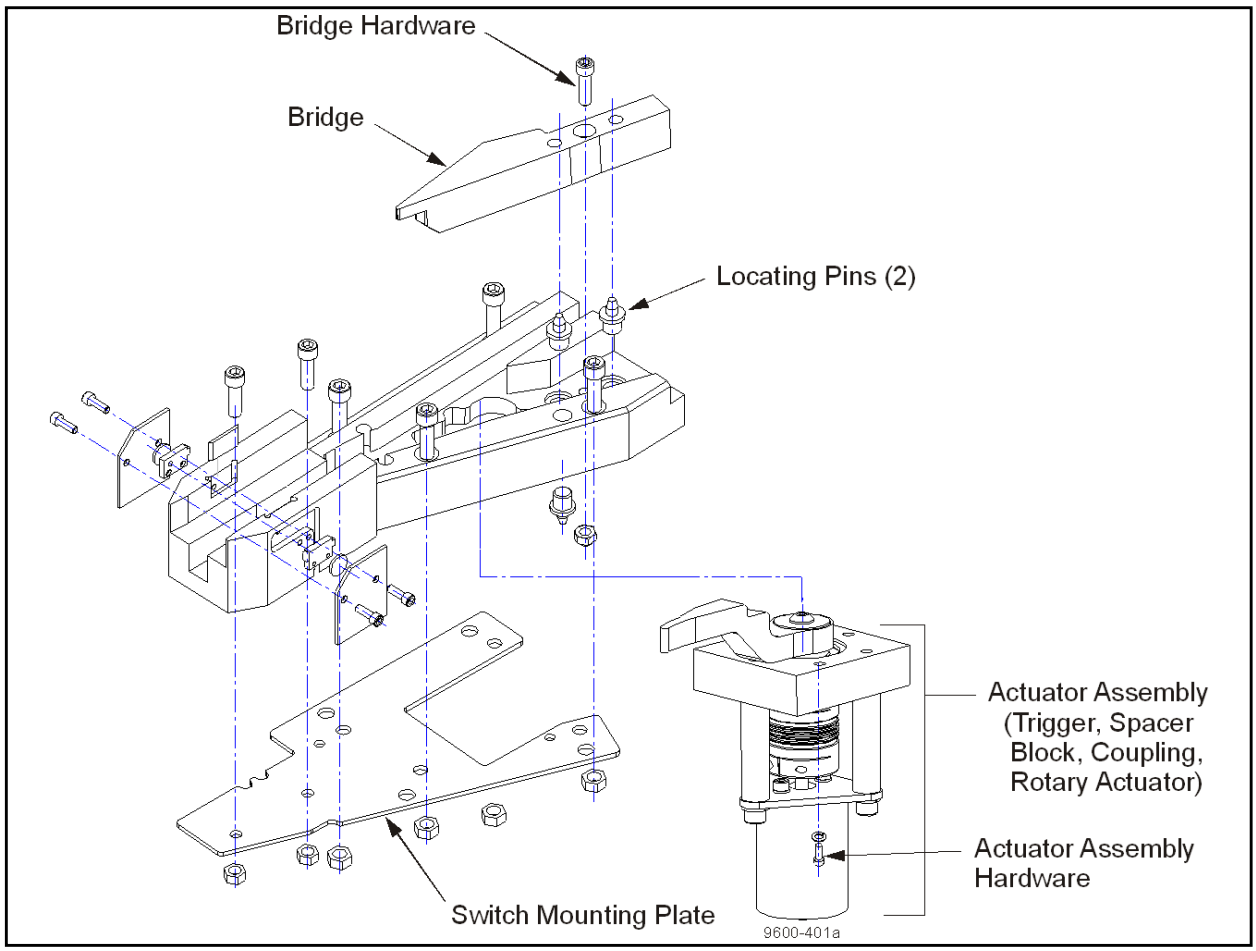


Figure 6 - 10 Divert Switch Details

5. Remove the actuator assembly from the divert switch.
6. Install the new actuator assembly into the divert switch.
    a. Apply Loctite 609 to the threads of the mounting screws.
    b. Install the screws and washers.
    c. Torqure the screws to 48 in/lbs.
7. Re-connect the M12 cable, see Figure 6 - 9.

Divert Switch Trigger Replacement

1. Turn the conveyor off and perform “Lockout/Tagout”.
2. Remove some slats/tubes and shoes from the sorter apron to create a working window.
3. Remove the 1/4-28 × 1/2 inch long screw, see Figure 6 - 11.
4. Remove the 1” O.D. washer and lock washer.
5. Remove the trigger. There are notches on the bottom of the trigger for a small gear puller, if necessary.
6. Install the new trigger and replace the washers.
7. Apply Locktite 609 to the screw and reinstall with 55 in/lbs of torque.
8. Replace the slats/tube and shoes to the sorter apron.
9. Remove all tools from the conveyor.
10. Remove the “Lockout/Tagout”.
11. Restore power to the conveyor and test divert switch operation.

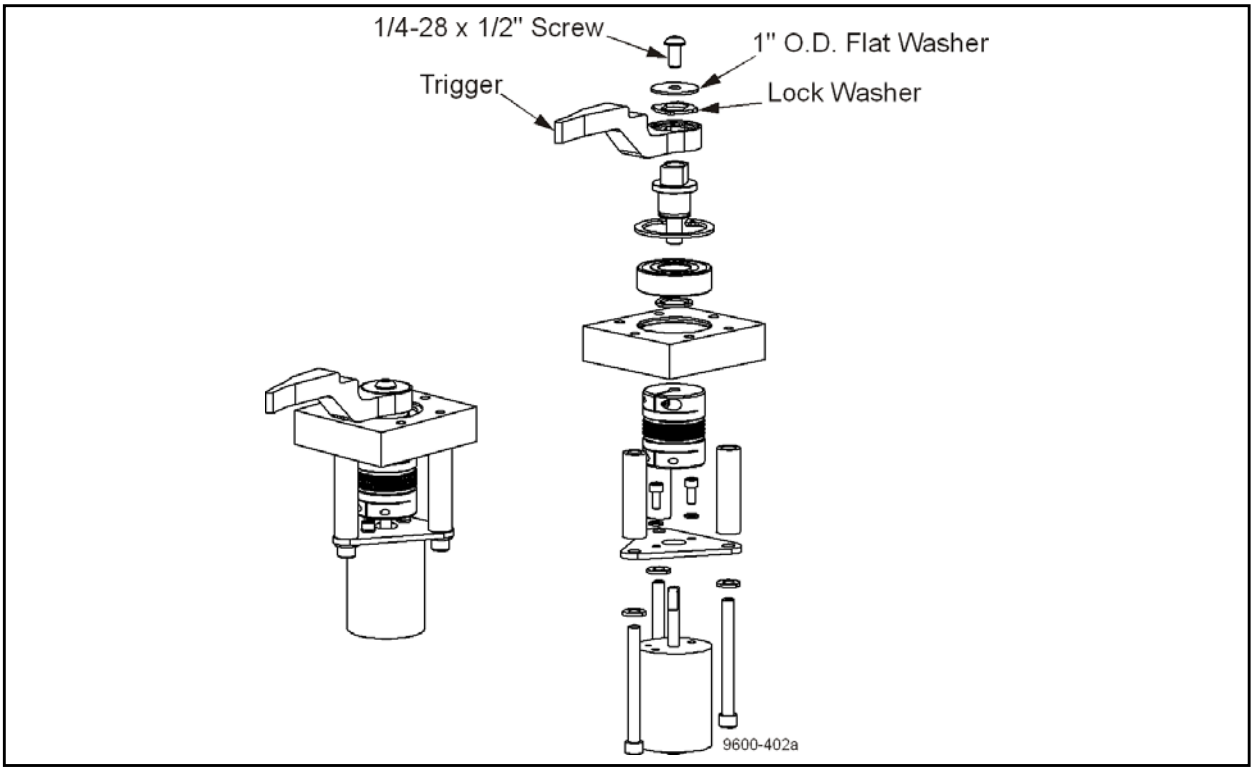


Figure 6 - 11 Divert Switch Trigger Replacement

Heat Sink Installation on the Justifier Switch for Dual-Sided Sorters

Use the follwing procedure to field install a heat sink on the justifier switch on dual-sided sorters, see Figure 6 - 12 for the location of the justifier switch.

1. Turn the sorter off and perform Lockout/Tagout.
2. Make a window above the justifier switch to access the switch, see Figure 6 - 12.
3. Apply a thin layer of heat sink compound #10-8109 on the outside surface of the brushless torque actuator (BTA) of the heat sink.

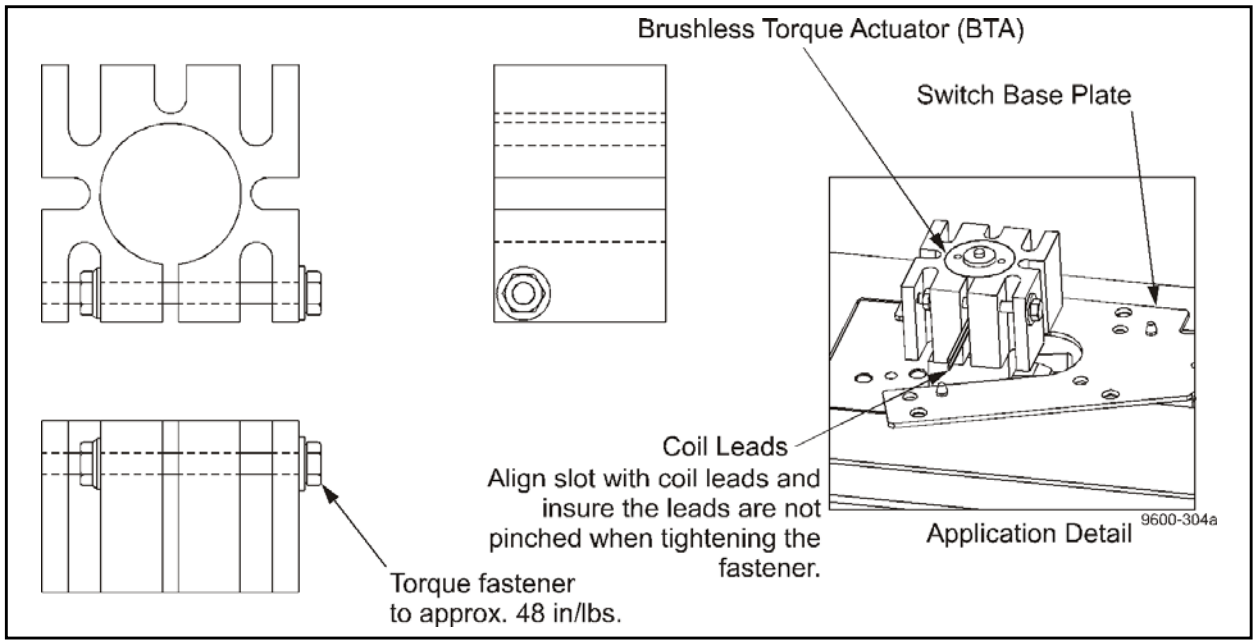


Figure 6 - 12 Heat Sink Installation on Dual-Sided Sorter Justifier Switches

4. Position the heat sink over the BTA; aligning the slot in the heat sink with the BTA coil leads.
5. Torque the fastener to approximately 48-in/lbs; being careful not to pinch the coil leads.
6. Re-install the slat and shoes; closing the access window.
7. Restart the sorter.

Cleaning the Center Crossover Switch

1. Make a window in the conveyor to access the crossover switches.
2. Move the window to the location of a crossover switch.
3. Use compressed air to blow out debris in the switch mechanisms.
4. Wipe the switches with a clean, dry soft cotton towel to remove any oil or debris which may have collected.
5. It may be necessary to use a mild detergent to get all of the debris off of the switches.

NOTE: Never use a solvent based cleaner on the crossover switches. Solvent based cleaners may damage the polymer materials in the switch.

6. Look for loose or broken parts. Replace parts as required.
7. Examine the divert triggers, making certain they move freely.

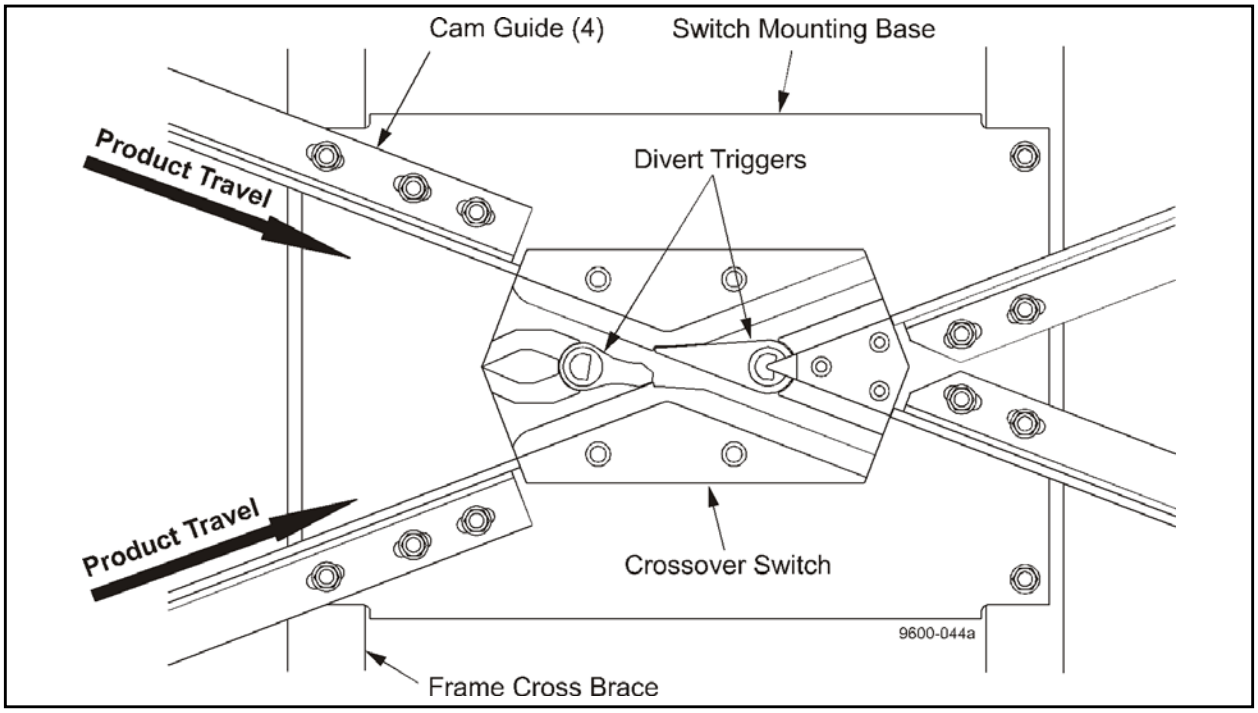


Figure 6 - 13 Center Crossover Switch

Carrying Chain Shortening

The procedure in this section is used to remove carrying chain links in order to maintain the proper chain sag at the catenary.

- Remove chain links in 5.0 inch (127mm) increments from both carrying chains.
- Remove the same amount of chain links from both carrying chains at the same location on both chains. This is necessary to keep the chains properly matched and timed.

Tools Needed to Shorten the Chain

- Two come-alongs, preferably chain types.
- Four 1/2” grade 8 eyebolts.
- Eight nuts and flat washers, used to attach the eyebolts to the chain.
- Chain breaker or hand grinder, used to break the chain.
- Two master links, one for each chain.

Chain Shortening Procedure

1. Position the chain so that the master links are near the catenary.
2. Turn the conveyor Off and perform “Lockout/Tagout”.
3. Remove a 10’ (3m) section of side guard near the catenary, if equipped.
4. Make a 5’ to 6’ (1.5m to 1.8m) window in the conveyor, sufficient enough to break the chain.
   - Refer to “Making A Window” on page 4 to remove the slats (or tubes) from the sorter.
5. Attach two eyebolts on each chain at the same location on both chains:
   a. Place a nut and flat washer on the eyebolt.
   b. Insert the eyebolt, with eye facing up, through a chain link.
   c. Place another flat washer and nut to the bottom of the eyebolt.
   d. Tighten the nuts to secure the eyebolt to the chain link.
   e. Repeat steps a. through d. to install another eyebolt approximately 10’ (3m) from the first eyebolt.
   f. Repeat steps a. through e. for the other chain.

6. Attach the two come-alongs to each chain:
    a. Attach the come-along to one of the eyebolts on the chain.
    b. Attach the come-along chain to the other eyebolt on the same chain.
    c. Repeat steps a. and b. to attach the other come-along to the eyebolts on the opposite chain.
7. Equally tighten the come-alongs until the desired chain sag is acquired in the catenary.

NOTE: Make sure that you can remove at least 5.0” inches(127mm) of chain before breaking the chains, this is best done at an existing master link.

It must be done in 5.0 inch (127mm) increments and exactly in the same location on each chain.

8. Break the chain at the correctly determined location.
    - Use a chain breaker or hand grinder to break the chain.
9. Remove identical chain lengths from both chains and reconnect the chains using new master links.
10. Disconnect the come-alongs and remove all eyebolts, nuts, and washers from the chain.
11. Verify the proper amount of chain sag is in the catenary.
12. Install the slats (or tubes) to close the window in the conveyor.
    - Check for any tools, bolts, or debris that might have fallen into the sorter during this procedure.
13. Install the side guard.
14. Apply power and test run the sorter in the jog mode.
15. Re-calibrate the sorter.
    - Any time the chain has been altered the sorter must be calibrated.

Transfer Assembly

Confirm the transfer assembly pivots up and down freely.

Confirm drive motor power is dropped when the assembly is pivoted to the up position.

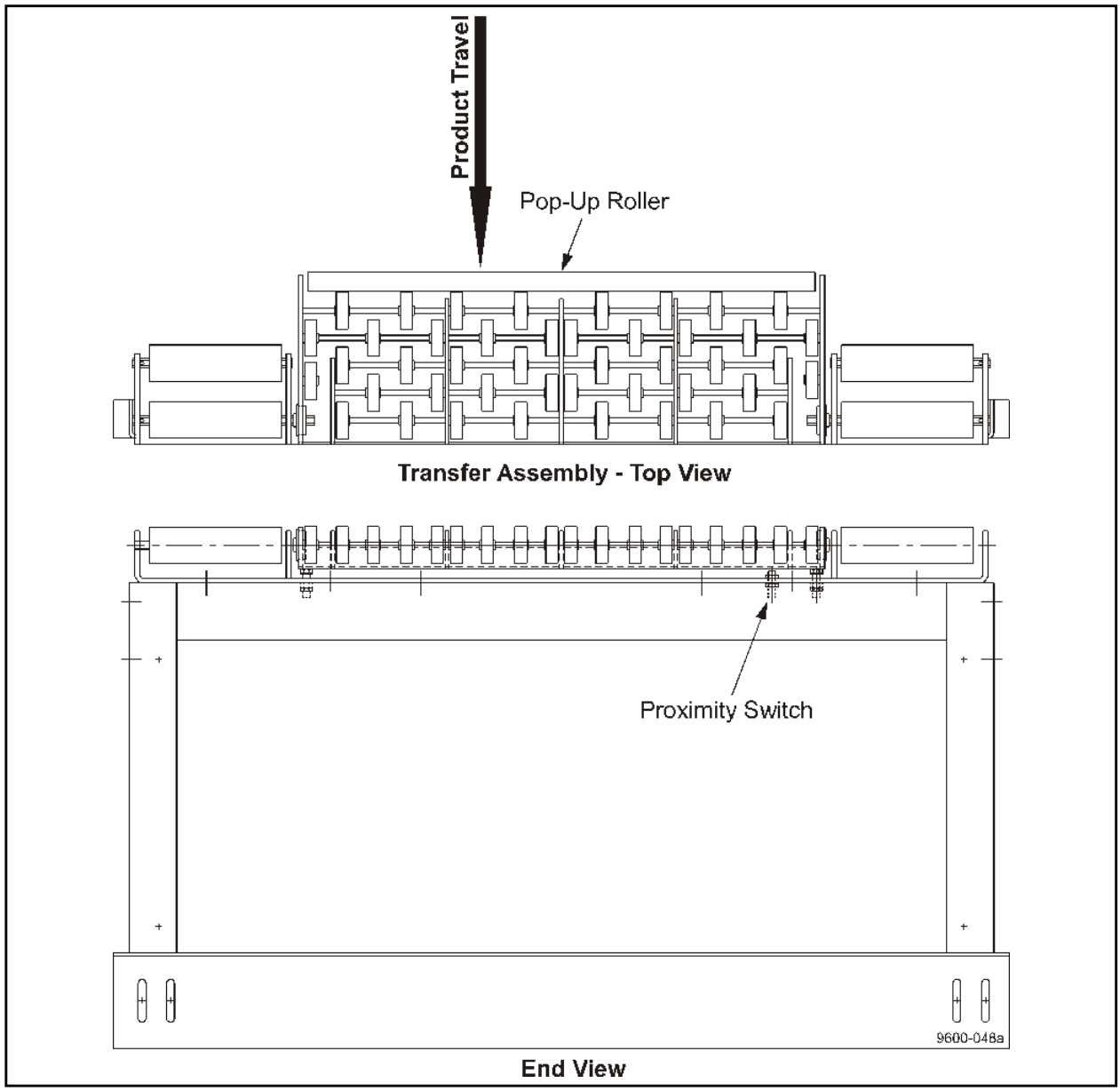


Figure 6 - 14 Transfer Assembly

Internal Jam Detector

Confirm the IJD assembly pivots up.

Confirm drive motor power is dropped when the IJD limit switch is tripped.

To adjust the internal jam detector, see Figure 6 - 15:

1. Loosen the flange bearing bolts so the bearing drops to the lowest position.
2. Place a magnetic mount torpedo level vertically on the flipper blade.
3. Place a 0.125 inch (3.2mm) thick flat underneath the flipper blade on each end of the blade.

   The objective is to position the flipper blade so it is perpendicular to the carrying tubes and 0.125 inch (3.2mm) above them.
4. Grasp the trip arm and rotate the arm against the rubber bumper until the flipper blade is vertical.

   The flange bearing will move up or down as you do this. If you cannot move the arm far enough, adjust the rubber bumper so the flipper plate is vertical.
5. Tighten the flange bearing bolts.
6. Remove the 0.125 inch (3.2mm) thick flats.
7. Adjust the limit switch arm, if necessary.
   a. Loosen the limit switch arm.
   b. Rotate the arm until limit switch arm roller is in the normal operating position when the IJD flipper blade is in the vertical position and the trip arm is over the limit switch arm roller.
   c. When the IJD has detected a jam condition, the trip arm is moved off the limit switch arm roller and trips the limit switch. In this condition, power is dropped to the drive motor.
   d. Tighten the limit switch arm.

NOTE: The IJD flipper plate in the drive section is only one half a normal flipper plate. The half plate faces upward (bottom half is blank) with the angled portion facing in the direction of product travel (towards the discharge end). Adjusting this IJD is the same as that described above except that slats/tubes must be above the flipper plate and the 0.125” inch(3.2mm) flats are placed between the flipper plate and the slats/tubes above it.

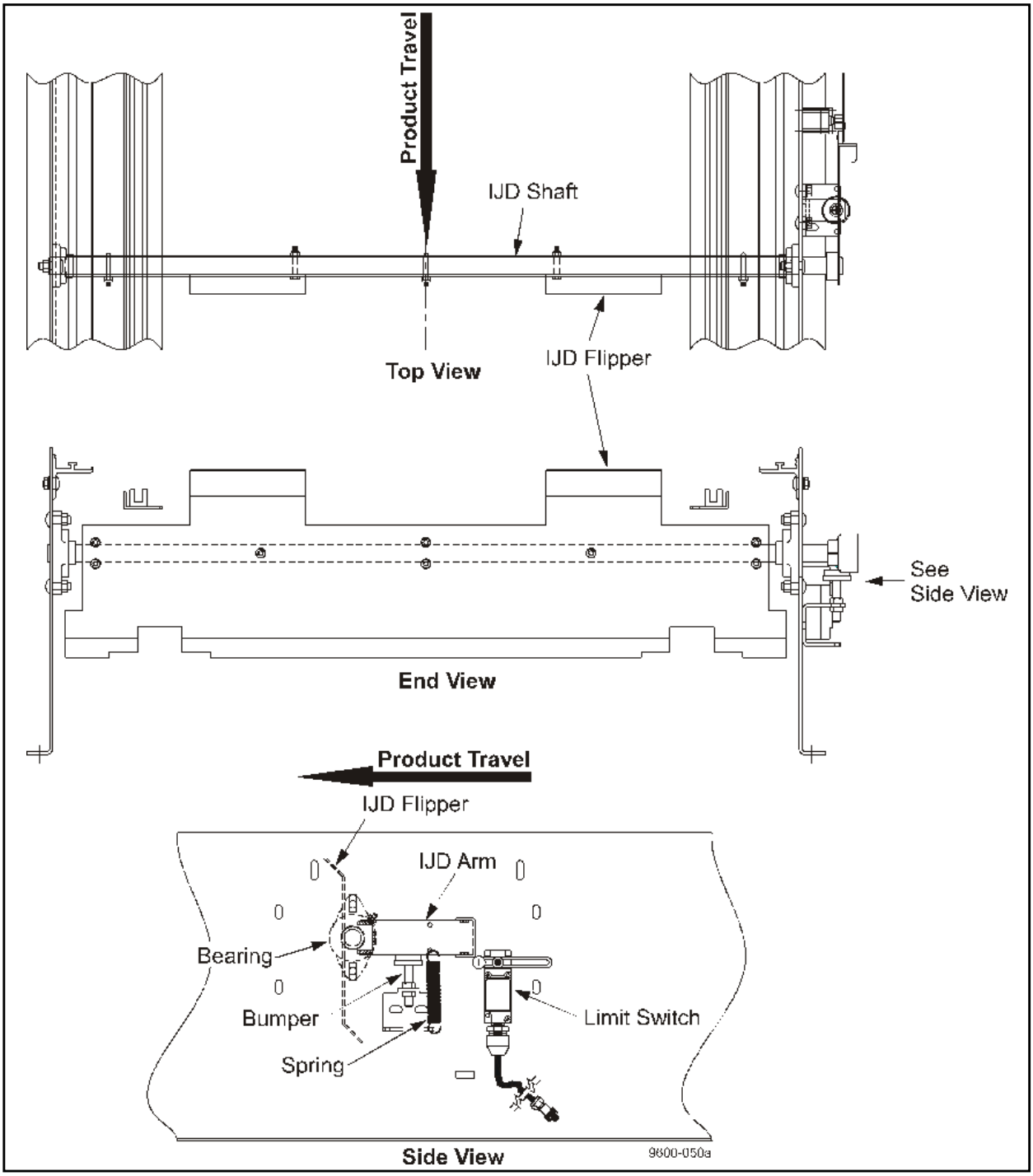


Figure 6 - 15 Internal Jam Detector

Reducer Maintenance

NOTE: If the unit is not going to be operated for an extended period of time, fill the unit completely with the proper oil. This will help prevent internal oxidation of the critical parts. Before resuming use, be sure the oil is of the proper type and at the proper level. Operating a unit full of oil causes overheating and leakage through the oil seals and the breather plug.

⚠ WARNING

Store the reducer in a dry location where the temperature remains relatively constant, not passing through the dew point. Do not store the unit outdoors. If the temperature passes through the dew point, moisture will condense on the inside of the unit. This will reduce the life of the reducer. Failure to follow this instruction may result in serious equipment damage.

Check the unit for oil leaks and the source of those leaks.

The most common leak points are pipe plugs, oil seals, and the cover gasket. Rather than waiting for parts during unscheduled down time, you may wish to order replacement parts when the leaks are minor. Occasionally the breather plug is not properly located at the highest point in the unit. Relocate the breather plug, if required, especially if the lubricant is foaming out of the breather. Many leaks are caused by overfilling the unit with oil. Check the proper oil level. Do not let any leak go unattended as loss of oil will eventually cause a failure.

Be careful not to confuse the fill plugs with the oil level hole. The reducer has fill plugs in several locations because it can be mounted in four different positions.

In cases of severe service applications, such as extreme exposure to water, high humidity, dirty or dusty environment, or chemicals in the air which react with lubrication oil, the oil change interval must be shortened depending on the severity of the conditions.

For better drainage, drain the oil when the unit is warm. Remove and examine the magnetic drain plug for metal chips and particles. An excessive amount of metal particles signals internal problems. Consult Intelligrated if you think the amount is excessive. Small amounts of metal particles are normal and should simply be cleaned off prior to reinstallation. After draining, remove debris by thoroughly flushing the inside of the unit with clean oil. Remove and clean the breather plug to ensure that the air passage is clear. Reinstall the drain plug and breather plug after using a thread sealant.

For units that see a significant seasonal swing in ambient temperature, change the grade of oil as needed (thinner oil in winter, thicker oil in summer). See Scheduled Maintenance topic in this section.

Reducer Temperature

Do not allow the reducer to become covered with dirt, dust or other debris. The insulating properties of these coverings could cause the unit to overheat. This will lead to a breakdown of the lubrication, causing premature failure of the reducer components.

Check the reducer temperature with an infrared thermometer. Measure the temperature at several locations and use the highest reading. The reducer temperature must not exceed 175°F (80°C) (90°F (32°C) ambient temperature).

Other Reducer Maintenance

Be sure the reducer shaft set screws are properly torqued.

Check the torque arm fittings for tightness and wear.

When an optional backstop is installed, be sure the set screw on the OD of the cap is tight against the output shaft.

At oil change intervals during normal maintenance, add grease to the grease fitting on the shaft seal or the optional puller cap (whichever is installed), as instructed in the reducer assembly instructions.

Check the V-belts for wear and proper tension.

Check the V-belt sheaves for tightness to the motor and input shafts.

Check the electrical connections to the motor.

Ensure that all required guard and safety devices are in place and function properly.

In environments where a buildup of unwanted surface coverings is expected, clean the outer surfaces of the reducer often. Ensure that the breather is clear after cleaning.

7 Replacement Parts

This chapter contains the contact information and procedures for ordering replacement parts. Read the information below to ensure receipt of the correct parts, on time, and shipped to the correct location.

Contact Information

Parts Orders

Voice (Toll-Free):	(877) 315-3400, select “1” at the prompt
Voice (Local):	(513) 701-7346
Fax:	(513) 701-7349
E-mail:	parts@intelligrated.com
On-Time Parts Catalog:	www.OnTimeParts.com

The Parts Department’s normal working hours are Monday through Friday, 8:00 AM to 5:00 PM, Eastern Time, except holidays. For Emergency parts support outside of normal business hours, call the Toll-Free number and select “2” at the prompt.

Warranty Part Order Procedures

The Warranty Replacement Parts program is designed to replace parts used from the customer's spare parts inventory and not for supplying emergency replacement parts. To maximize system up-time, have a well stocked inventory of spare parts.

The warranty period for the conveyor equipment is detailed in the sales contract. The standard conveyor equipment warranty period is (one) year.

Parts may be ordered by phone, fax, e-mail, or by using our On-Line Parts Catalog. The On-Linie Parts Catalog displays a complete description and illustration of the part and also shows the current price and availability.

During the warranty period, all parts that have failed due to defects in material and/or workmanship will be replaced at no cost.

Damage caused by misuse, accidents, mis-adjustment, improper installation, improper maintenance, modification by anyone except Intelligrated personnel, lack of preventive maintenance, power failure or surge, air conditioning or humidity control, transportation, or causes other than a defect in the materials or workmanship are also not covered.

Use the following procedure when requesting a warranty replacement part(s):

1. Make a copy of the Warranty Parts Request Form located at the end of this section and complete the information requested on the form. Provide as much information about the equipment and part as possible, including the description, manufacturer, any information stamped on the part, and all the informatin from the label on the conveyor. Part numbers may also be easily found in the appropriate maintenance manuals.

Figure 7 - 1 Example of Conveyor Label

   Contact the Parts Department via e-mail, fax, phone, or through the On-Time Parts Catalog to request a copy of the form. The Parts Order Processor will fax or e-mail a Warranty Part Request Form.

2. Sign the form and fax it to the Parts Department at 513-701-7349.

3. Upon receipt of the completed Warranty Part Request Form, the Parts Order Processor will enter the warranty order into the ordering system and issue a Returned Material Authorization (RMA) number.

4. The Parts Order Processor will record the Returned Material Authorization (RMA) on the completed Warranty Part Request Form and indicate on the form if the part(s) must be returned to Intelligrated.

5. The Parts Order Processor will return the Warranty Part Request Form to the customer by fax or e-mail.

6. If indicated on the form, return the defective part to Intelligrated at the following address. Be sure to package it to prevent damage during shipment. Also, include a copy of the Warranty Part Request Form inside the package and clearly mark the Returned Material Authorization (RMA) number on the outside of the package.

   Intelligrated Returns
   4436 Muhlhauser Road Suite 300
   Attn: Returns
   Hamilton, OH 45011
   RMA#_____

   Parts received without an RMA number will be returned to the customer.

   If Intelligrated does not receive the defective part(s) within 30 days, the customer will be billed for the part(s).

7. The order will be processed and the replacement part(s) will be shipped to the customer as soon as possible.

   Warranty orders are always shipped via ground service. Other shipping arrangements may be made, but the customer will be billed for all shipping charges.

Non-Warranty Part Order Procedures

Use the following procedure when ordering a non-warranty replacement part(s).

1. Contact the Parts Department via e-mail, fax, or phone, or by using our On-Time Parts Catalog to request the replacement part. Provide as much information about the equipment and part as possible, including the description, manufacturer, any information stamped on the part, and all the information from the label on the conveyor (see label illustration on the previous pages). Part numbers may also be easily found in the appropriate maintenance manuals.
2. Parts may be purchased using company issued purchase orders or by credit card (Visa, MasterCard, American Express and Discover).

NOTE: There is a $100 minimum order for non-warranty orders.

Order Processing and Shipping

Orders for stock items are normally shipped the next business day.

Non-stock orders are subject to the lead time of the part. Orders are shipped via ground service (Freight Prepaid and added to invoice) unless otherwise requested. Emergency service to ship via package carrier or scheduled airlines is also available for an additional charge.

Warranty orders are always shipped via ground service. Other shipping arrangements may be made, but the customer will be billed for all additional shipping charges.

New Parts Warranty

All parts purchased from Intelligrated carry a one-year warranty. All parts supplied at no cost as a warranty replacement for a component assume the warranty of the part being replaced.

Intelligrated will repair or replace, at our option (F.O.B. shipping point), parts which prove to be defective in material or workmanship within the warranty period. Intelligrated reserves the right to deny any warranty claims if during inspection it is determined that failure or damage was caused by accident, abuse or neglect by the user.

Parts damaged in shipment must be handled by submission of a claim to the shipper. Please save all boxes and packing materials and contact the Parts Department.

Recommended Spare Parts

Intelligrated can prepare and recommend a spare parts list for a customer's specific material handling system. The spare parts list will take into account the expected failure rate of each component and the criticality of each part for each segment of a specific material handling system.

On-Time Parts Catalog

The Intelligrated On-Line Parts Catalog (OPC) is the only comprehensive material handling on-line parts catalog. Our unique "One Stop Shop" makes it easier to find, order and receive all replacement and spare parts for Material Handling Systems, sub-components and assemblies.

Accessing the On-Time Parts Catalog

The On-Time Parts Catalog (OPC) can be accessed via the Web by two methods:

1. Go to www.OnTimeParts.com.
2. Go to www.intelligrated.com. Click the On-Time Parts link at the top of the page, or move the mouse cursor to the "Support Services" link, move the mouse to "Parts" and then click the "On-Line Parts Catalog" link on the submenu.

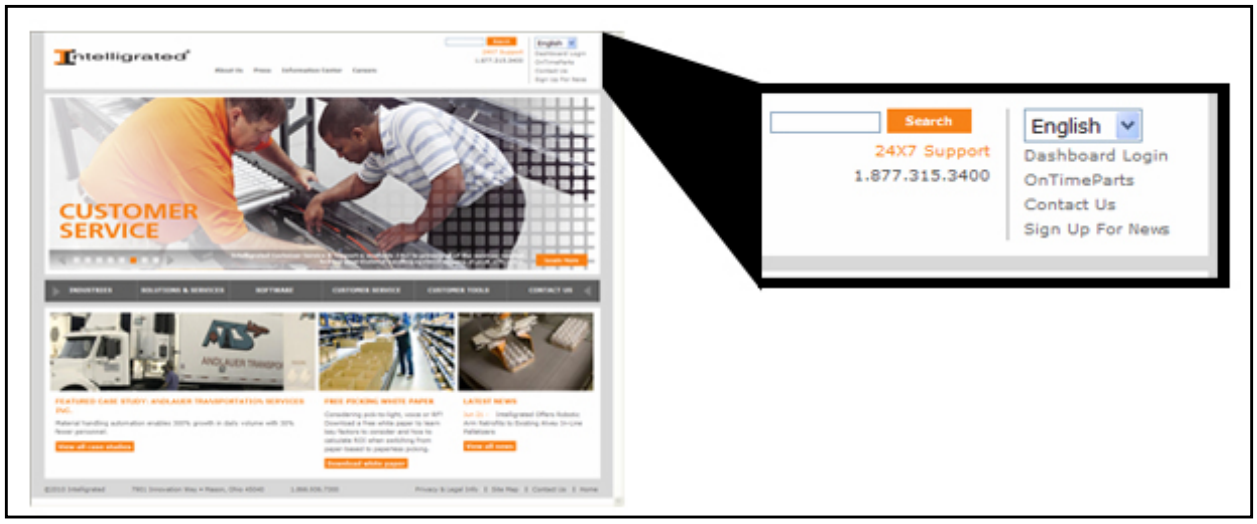


Figure 7 - 2 On-Time Parts Link

With the Intelligrated On-Line Parts catalog, it is easy to place orders on-line. In addition, phone support is available any time toll free at 1-877-315-3400. Intelligrated is also available by email; just click on the parts@intelligrated.com link on the OPC home page.

Online parts orders are risk free. Intelligrated provides a full money back guarantee if the customer is not totally satisfied with the service of the On-Line Parts Catalog.

Intelligrated has included contact information, policies, and how-to information. Just click on the “Help Desk” link at any time.

Click “Help Desk” link and then the “How To” link for details on how to place an order.

Using the On-Line Parts Catalog

To use the On-Time Parts Catalog:

1. Click the Login link. Enter your e-mail address and password and press the “Login” button. To skip the login step the next time, check the "Remember Me" box.

   If needed, click the “Create Account” link and fill in the account information.

2. Enter search information or use the links at the top of the page to select parts by category, Intelligrated product line, or by OEM parts or conveyor cross-reference categories.

3. Choose a part by clicking on the part number or photo. Cross reference and other information will be displayed.

4. Click the “Add to Cart” button and enter the quantity needed. If your company requires a requisition prior to ordering, click the “Add to Requisition” button. Your purchase requisition may be accessed under the “Order Info” link on the left side of the page.

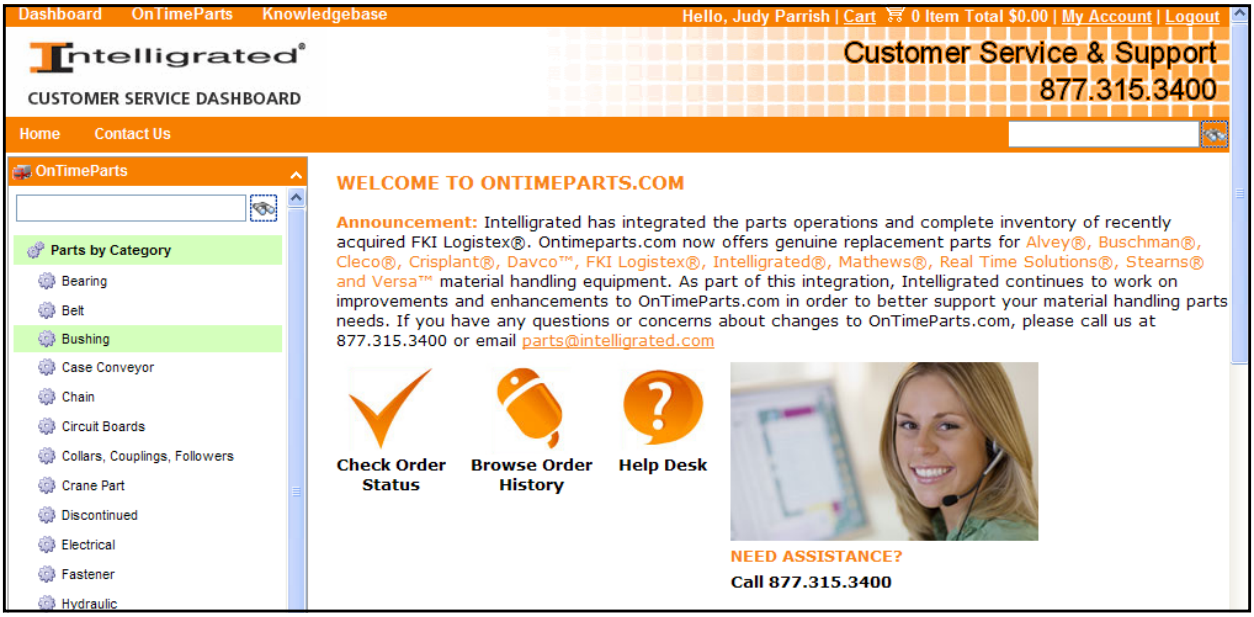
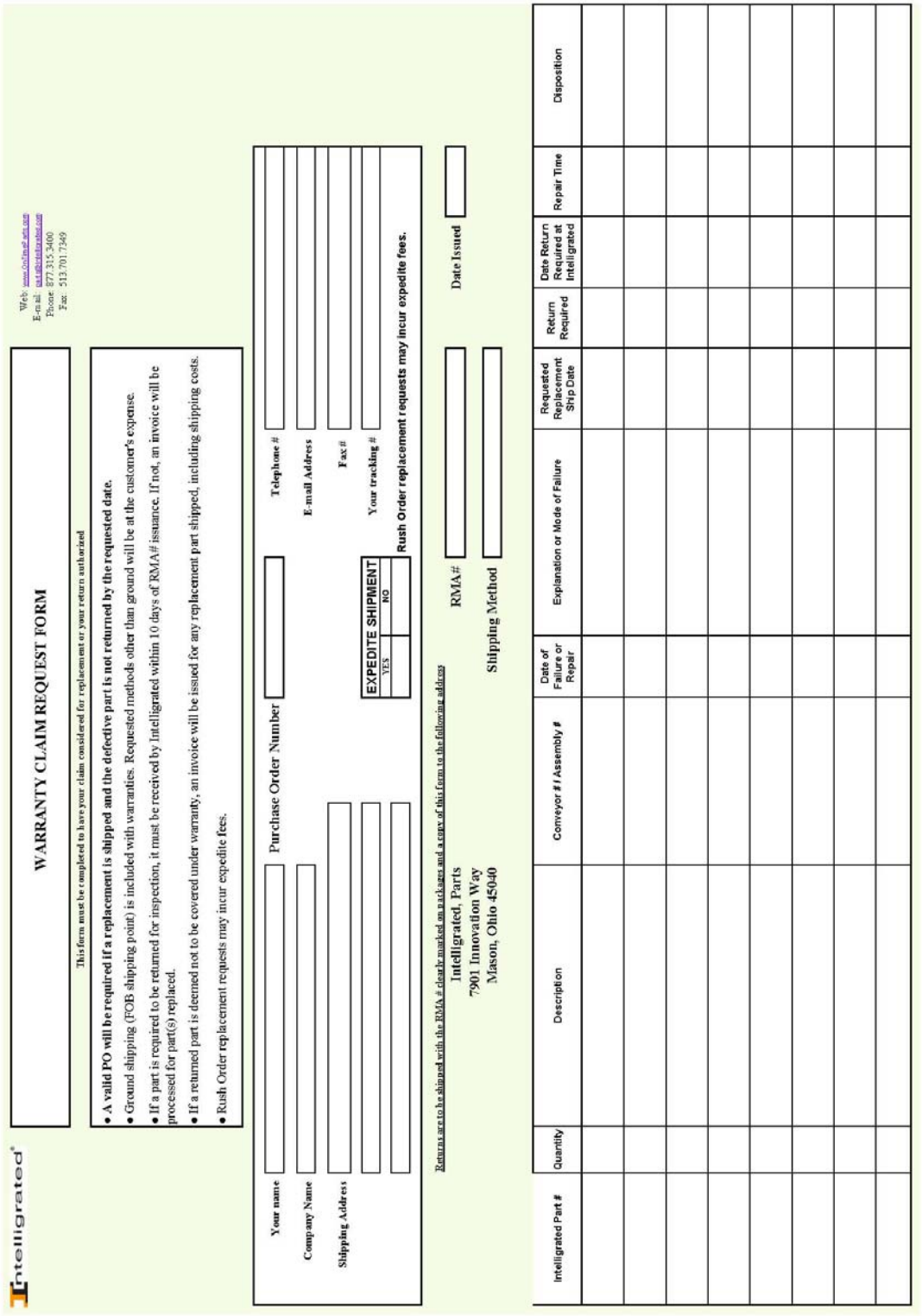


Figure 7 - 1 OPC Main Menu

5. To checkout, click the “Shopping Cart” link on the left side of the page.
6. Verify the order information and click the “Checkout” button to submit your order.
7. Once the order is submitted, click the “Log Off” link to end the session.



Intelligrated

Web www.Intelligrated.com
E-mail mail@Intelligrated.com
Phone 877.315.3400
Fax 513.701.7349

WARRANTY CLAIM REQUEST FORM

This form must be completed to have your claim considered for replacement or your return authorized

- **A valid PO will be required if a replacement is shipped and the defective part is not returned by the requested date.**
- Ground shipping (FOB shipping point) is included with warranties. Requested methods other than ground will be at the customer's expense.
- If a part is required to be returned for inspection, it must be received by Intelligrated within 10 days of RMA# issuance. If not, an invoice will be processed for part(s) replaced.
- If a returned part is deemed not to be covered under warranty, an invoice will be issued for any replacement part shipped, including shipping costs.
- Rush Order replacement requests may incur expedite fees.

Your name
Company Name
Shipping Address

Purchase Order Number
Telephone #
E-mail Address
Fax #
Your tracking #

EXPEDITE SHIPMENT
YES | NO

Rush Order replacement requests may incur expedite fees.

Returns are to be shipped with the RMA # clearly marked on packages and a copy of this form to the following address

Intelligrated, Parts
7901 Innovation Way
Mason, Ohio 45040

RMA#
Shipping Method
Date Issued

Intelligrated Part #	Quantity	Description	Conveyor # / Assembly #	Date of Failure or Repair	Explanation or Mode of Failure	Requested Replacement Ship Date	Return Required	Date Return Required at Intelligrated	Repair Time	Disposition

Figure 7 - 3 Warranty Claim Request Form

Parts Lists and Illustrations

This section provides a list of common spare parts for a preventive maintenance program to minimize downtime. The parts shown in this section apply to the standard product line.

The following pages illustrate the location of spare parts as they apply to each particular unit. For parts not shown in this chapter, refer to the application specific Bill of Material.

UniSort XV Infeed

UniSort XV Infeed Belt, PTO - Parts Listing

Key	Description	Part Number		
		22 inches	28 inches	34inches
1	Belt	Refer to site specific “Spare Parts List”		
2	Infeed Roller	7012410	7012409	7012404
3	Roller	7005185	7005009	7005186
4	Axle	7005189	7005010	7005190
5	PU, 5.5x.134,[“W+12.75],RL, 45mm SFT	7012457	7014186	7012036
6	Bearing	7013194		
7	Roller	7005193	7005011	7005194
8	Axle	7005197	7005012	7005198
9	Sprocket	7001556		
10	BU,TL,DODGE,2012X45mm,14x3.8 KS	7115238		
11	Timing Belt	7014060		
12	Roller	7061011	7061012	7065042
13	Axle	7065040	7065041	7065043
14	Roller	7085044	7085047	7085051
15	Tensioner Drive	7002214		
16	Idler Pulley	7002213		
17	Idler Shaft	7002212		

UniSort XV Infeed Belt, PTO - Drawing

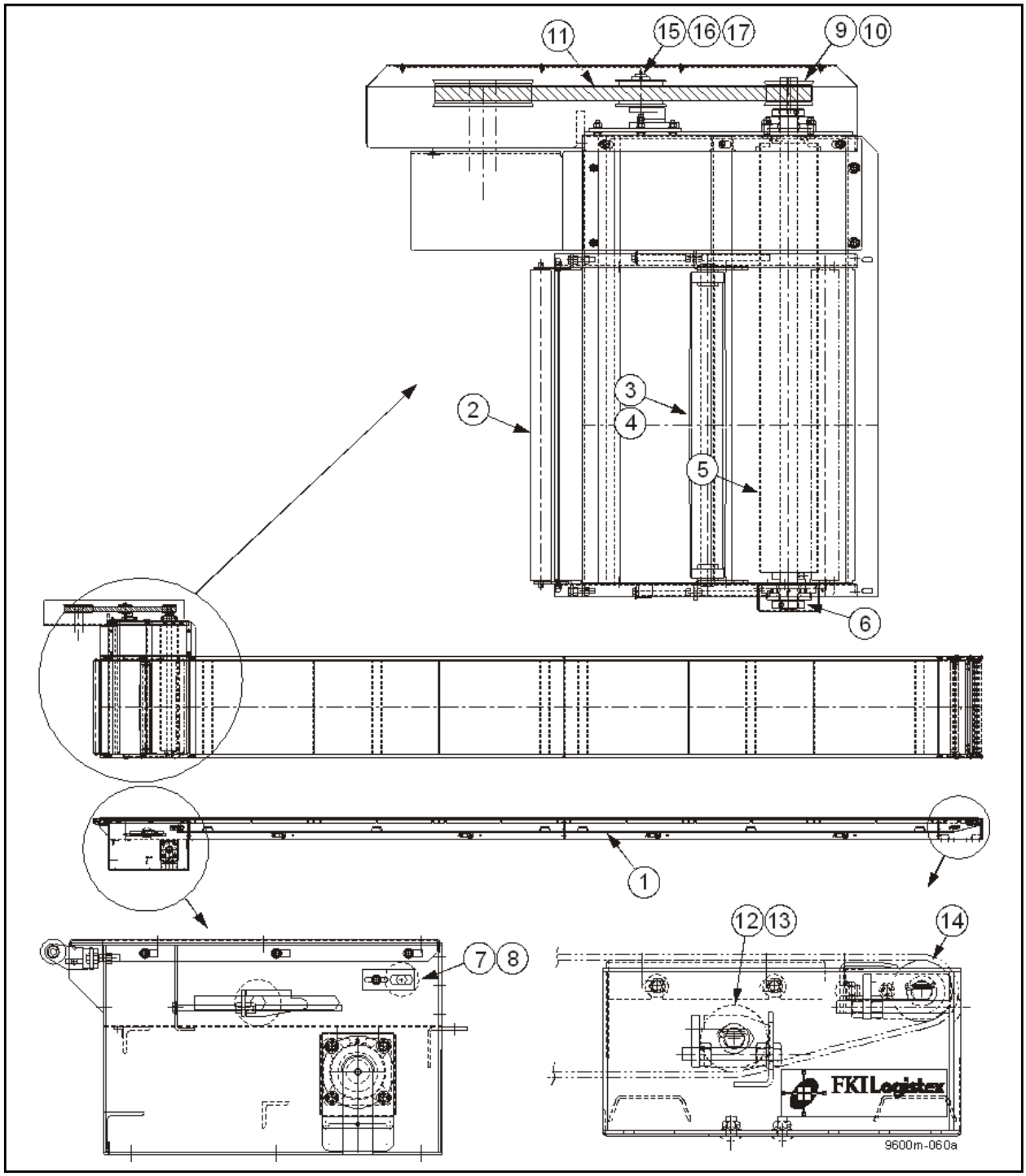


Figure 7 - 4 UniSort XV Infeed Belt, PTO

UniSort XV - Conveyor Sections

Idler/Intermediate Section - 16°/21° LH and RH Divert - Part Listing

Key	Description	Part Number	
		LH	RH
1	Disc, Split, Cam - Return	7006321	
2	Sprocket, Idler, Keyed	7030538	
3	Bearing, Pillow Block	7035129	
4	Switch, Assembly, Divert	7085886	7085885
5	Cam Guide, Assembly, 116.4” Lg. (22” W)	7028605	7028604
	Cam Guide, Assembly, 132.0” Lg. (28” W)	7034726	7034727
	Cam Guide, Assembly, 144.0” Lg. (34” W)	7062939	7067940
6	Pusher Guide, Re-entry, Block	7030342	7030341
7	Return Cam Guide, Assy, Divert, 242.0” Lg.	7012146	7012145
	Strut, Cam Guide, 240.0” Lg.	7028308	
	UXV, Cam Guide, Flat, Divert, 121.1” Lg.	7014020	
	UXV, Cam Guide, Flat, Divert, 121.1” Lg.	7011309	
	UXV, Brg Impact Track, 47.0” Lg.	7011308	
8	Return Block, UHMV	7006322	
9	Sprocket, Idler, Bushed	7370564	

Idler/Intermediate Section - 16°/21° LH and RH Divert - Drawing

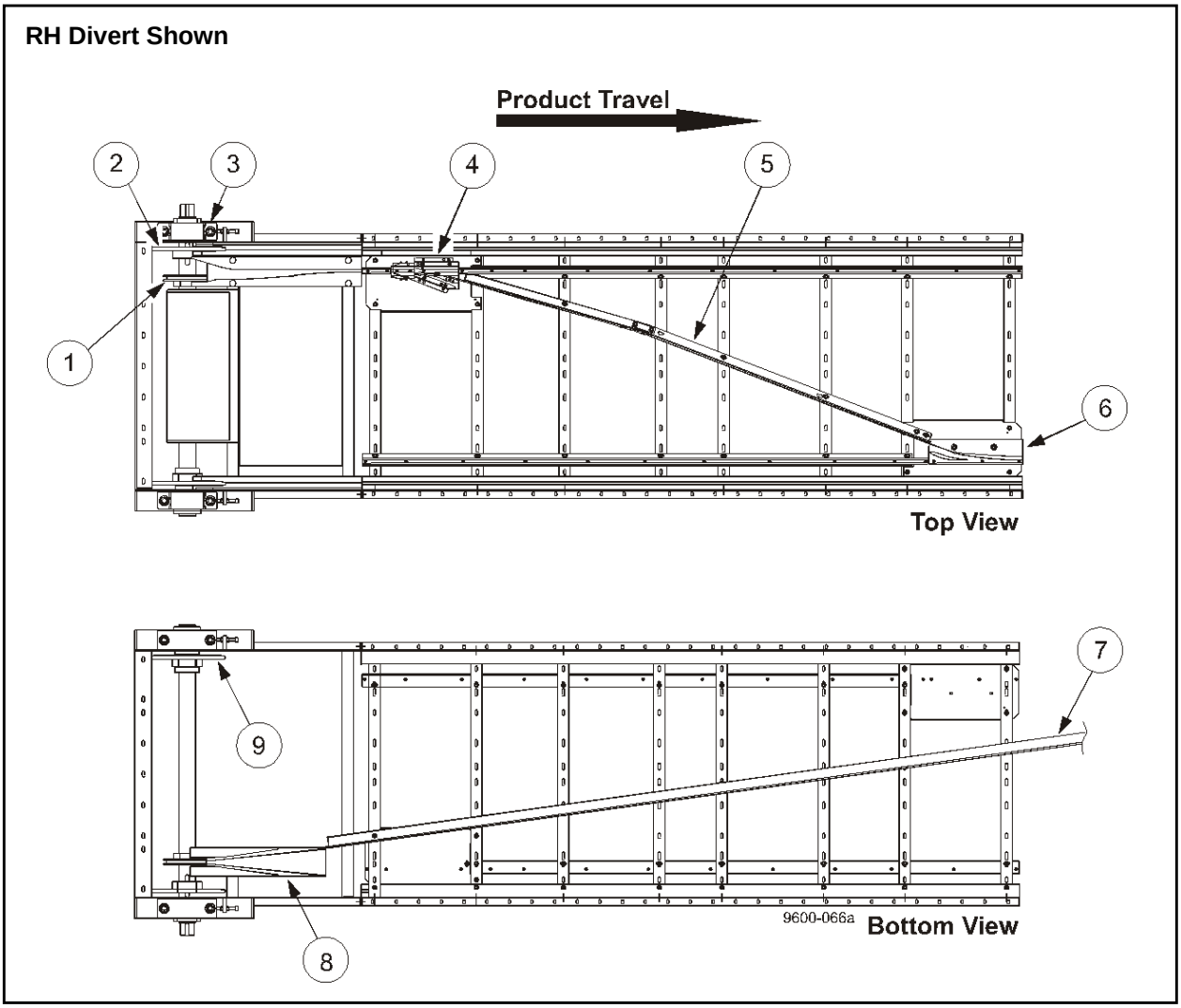


Figure 7 - 5 Idler/Intermediate Section 16°/21° RH Divert - Drawing

Idler/Intermediate Section - 20° and 30° LH and RH Divert - Part Listing

Key	Description	Part Number			
		20° Divert		30° Divert	
		LH	RH	LH	RH
1	Disc, Split, Cam - Return	7006321			
2	Sprocket, Idler, Bushed	7370564			
3	Bearing, Pillow Block, 2.938	7035129			
4	Switch, Assembly, Divert	7085882	7085881	7085884	7085883
5	Cam Guide, Assembly (22” W)	7021650	7016350	7013494	7014315
	Cam Guide, Assembly (28” W)	7006311	7013049	7014210	7012379
	Cam Guide, Assembly (34” W)	7020920	7020963	7030400	7030399
6	Return Cam Guide, Assy, Divert, 242.0” Lg.	7012146	7012145	7012146	7012145
	Strut, Cam Guide, 240.0” Lg.	7028308			
	UXV, Cam Guide, Flat, Divert, 121.1” Lg.	7014020			
	UXV, Cam Guide, Flat, Divert, 121.1” Lg.	7011309			
	UXV, Brg Impact Track, 47.0” Lg.	7011308			
7	Pusher Guide, Re-entry, Block	7030342	7030341	7030388	7030387
8	Sprocket, Timing, Gates #8MX-90S-36	7033171			
9	Sprocket, Idler, Keyed	7030538			
10	Return Block, UHMV	7006322			

Idler/Intermediate Section - 20° and 30° LH and RH Divert - Drawing

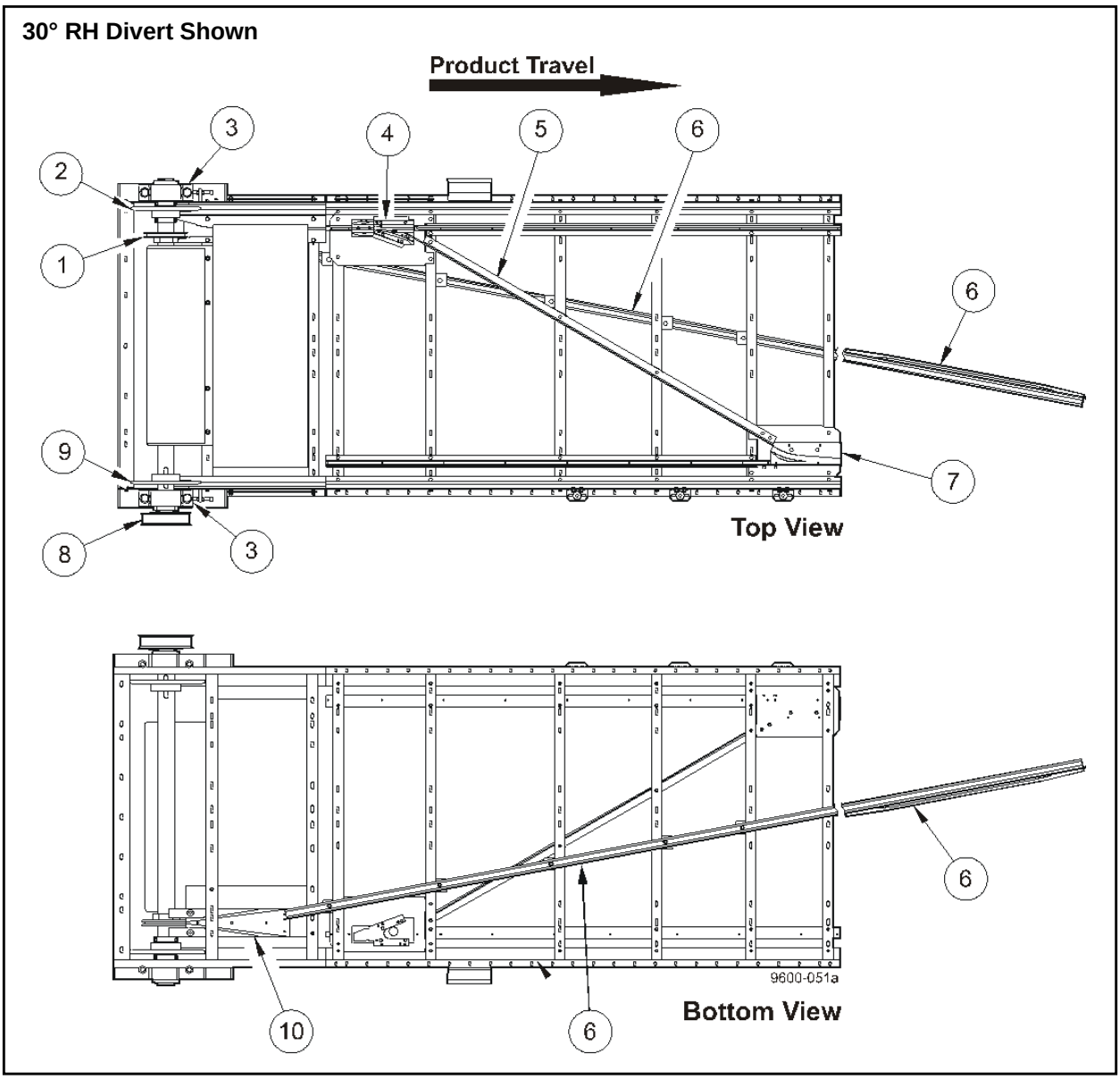


Figure 7 - 6 Idler/Intermediate Section - 20° and 30° RH Divert - Drawing

Idler / Intermediate Section - 20° and 30° Dual Divert - Part Listing

Key	Description	Part Number	
		20° Divert	30° Divert
1	Pusher Guide, Re-entry, Block (RH Top)	7030342	7030387
2	Cam Guide, Assembly (22” W)	7060958	7014286
	Cam Guide, Assembly (28” W)	7014173	7020751
	Cam Guide, Assembly (34” W)	7023750	7031037
3	Cam Guide, Assembly (22” W)	7060952	7014292
	Cam Guide, Assembly (28” W)	7014167	7020757
	Cam Guide, Assembly (34” W)	7014095	7031039
4	Switch, Assembly, LH Divert	7085882	7085884
5	Bearing, Pillow Block, 2.938	7035129	
6	Sprocket, Idler, Bushed	7370564	
7	Sprocket, Idler, Keyed	7030538	
8	Pusher Guide, Re-entry, Block (LH Top)	7030341	7030388
9	Cam Guide, Assembly (22” W)	7060957	7014285
	Cam Guide, Assembly (28” W)	7014172	7020750
	Cam Guide, Assembly (34” W)	7023749	7031036
10	Switch, Assembly, Crossover	7001200	7004500
11	Cam Guide, Assembly (22” W)	7060951	7014291
	Cam Guide, Assembly (28” W)	7014166	7020756
	Cam Guide, Assembly (34” W)	7014094	7031038
12	Switch, Assembly, RH Divert	7085881	7085883
13	Pusher Guide, Re-entry, Block (RH Bottom)	7011062	
14	Pusher Guide, Re-entry, Block (LH Bottom)	7011062	
15	Cam Guide, Assembly (22” W)	TBD	7014362
	Cam Guide, Assembly (28” W)	7014183	7020765
	Cam Guide, Assembly (34” W)	7014819	7013206
16	Cam Guide, Assembly (22” W)	TBD	7014365
	Cam Guide, Assembly (28” W)	7014202	7020768
	Cam Guide, Assembly (34” W)	7014816	7013209
17	UXV, Justify, PI, Hyfax, 1.87 × 3.50	7012315	7011196
18	Switch, Divert, Assembly (RH)	7085881	7085883
	Switch, Divert, Assembly (LH)	7085882	7085884
19	UXV, Pusher Guide, Return	7011263	

Idler/Intermediate Section - 20° and 30° Dual Divert - Drawing

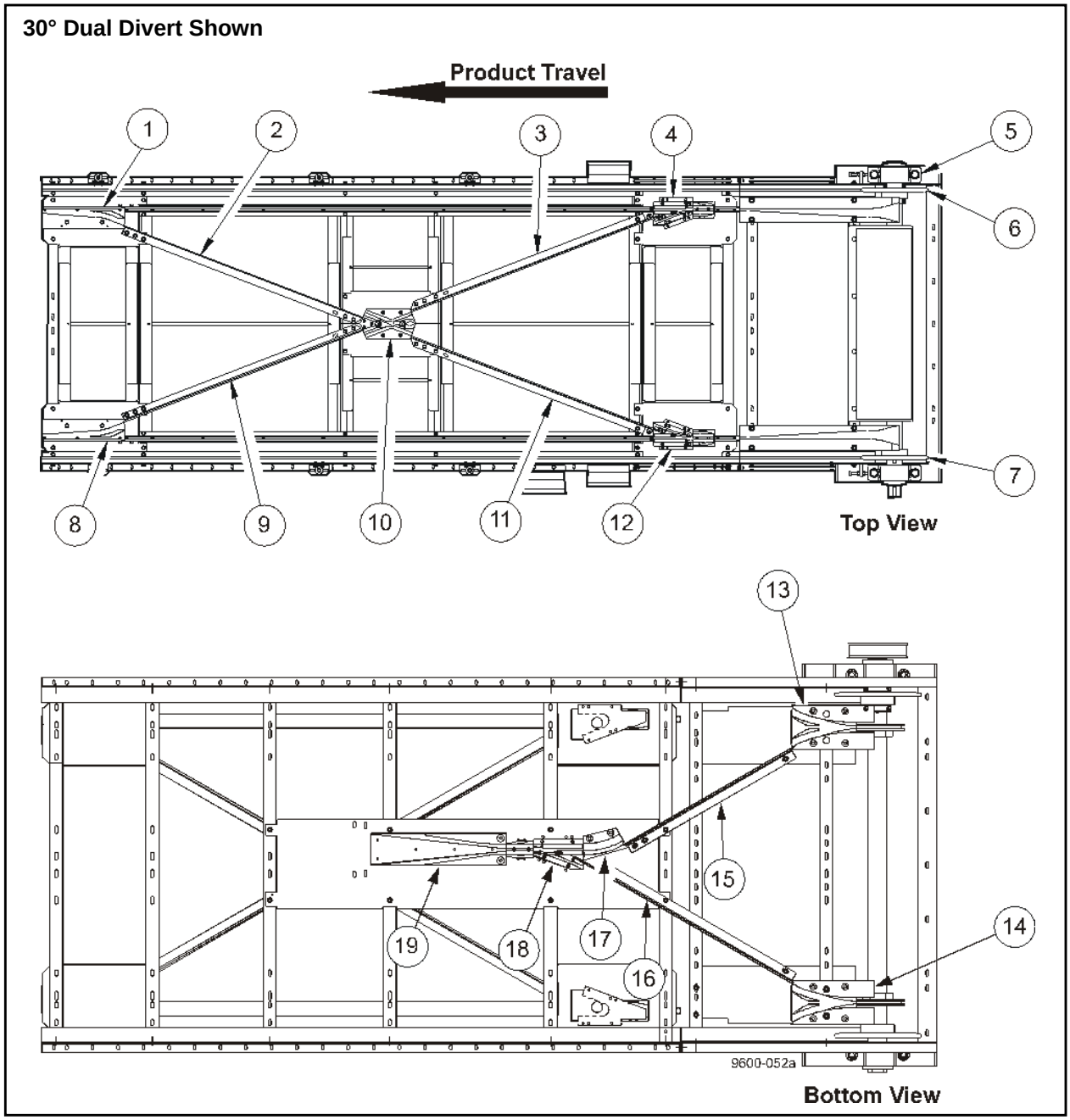


Figure 7 - 7 Idler/Intermediate Section - 20° and 30° Dual Divert - Drawing

Intermediate Section - 16°/21° LH Divert - Part Listing

Key	Description	Part Number
1	Switch, Assembly, Divert	7085886
2	IJD, Assembly, LH-Divert, (22”W)	7021715
	IJD, Assembly, LH-Divert, (28”W)	7006376
	IJD, Assembly, LH-Divert, (34”W)	7030491
3	Pusher Guide, Re-entry, Block	7030342
4	Cam Guide, Assembly, (22”W)	7028605
	Cam Guide, Assembly, (28”W)	7021755
	Cam Guide, Assembly, (34”W)	7067939

Intermediate Section - 16°/21° LH Divert - Drawing

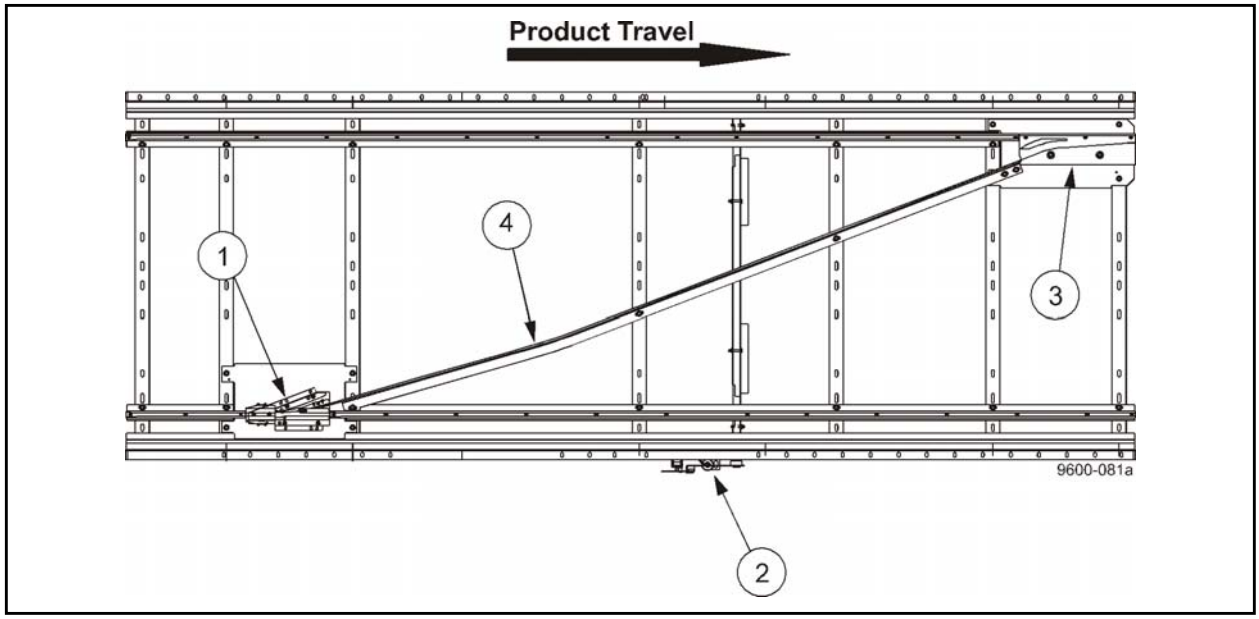


Figure 7 - 8 Intermediate Section - 16°/21° LH Divert - Drawing

Intermediate Section - 16° / 21° RH Divert - Part Listing

Key	Description	Part Number
1	Switch, Assembly, Divert	7085885
2	IJD, Assembly, RH-Divert, (22”W)	7021715
	IJD, Assembly, RH-Divert, (28”W)	7021716
	IJD, Assembly, RH-Divert, (34”W)	7021717
3	Pusher Guide, Re-entry, Block	7030341
4	Cam Guide, Assembly, (22”W)	7028604
	Cam Guide, Assembly, (28”W)	7021756
	Cam Guide, Assembly, (34”W)	7067940

Intermediate Section - 16° / 21° RH Divert - Drawing

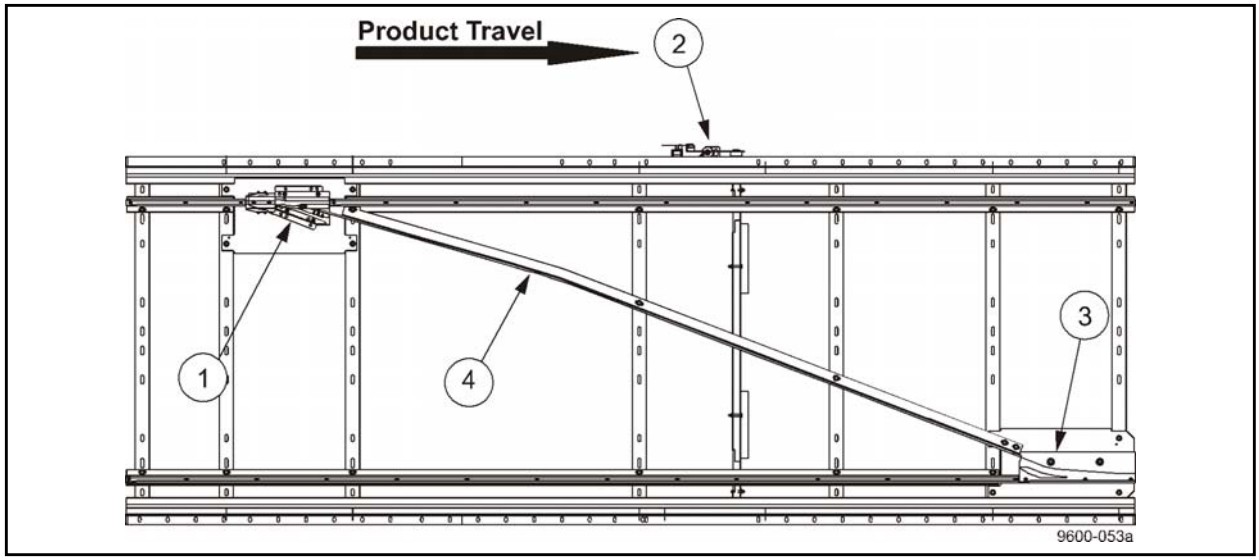


Figure 7 - 9 Intermediate Section - 16° / 21° RH Divert - Drawings

Intermediate Section - 20° and 30° LH Divert - Part Listing

Key	Description	Part Number	
		20° Divert	30° Divert
1	Switch, Assembly, Divert	7085882	7085884
2	Pusher Guide, Re-entry, Block	7030342	7030388
3	IJD, Assembly, RH-Divert, (22”W)	7021715	
	IJD, Assembly, RH-Divert, (28”W)	7021716	
	IJD, Assembly, RH-Divert, (34”W)	7021717	
4	Cam Guide, Assembly, (22”W)	7021650	7013494
	Cam Guide, Assembly, (28”W)	7006309	7014210
	Cam Guide, Assembly, (34”W)	7020970	7030400

Intermediate Section - 20° and 30° LH Divert - Drawing

30° LH Divert Shown

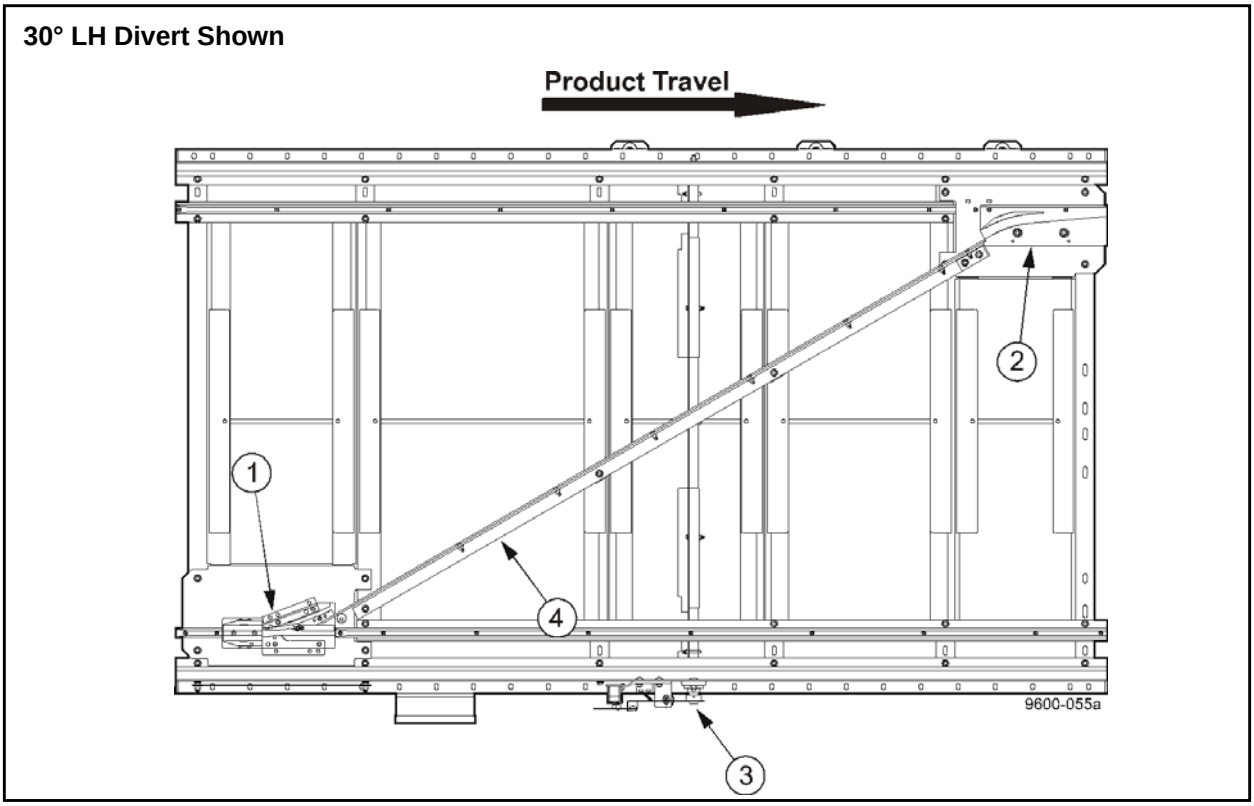


Figure 7 - 10 Intermediate Section - 20° and 30° LH Divert - Drawing

Intermediate Section - 20° and 30° RH Divert - Part Listing

Key	Description	Part Number	
		20° Divert	30° Divert
1	Switch, Assembly, Divert	7085881	7085883
2	IJD, Assembly, RH-Divert, (22”W)	7021715	
	IJD, Assembly, RH-Divert, (28”W)	7021716	
	IJD, Assembly, RH-Divert, (34”W)	7021717	
3	Cam Guide, Assembly, (22”W)	7016350	7014315
	Cam Guide, Assembly, (28”W)	7013048	7012379
	Cam Guide, Assembly, (34”W)	7060874	7030399
4	Pusher Guide, Re-entry, Block	7030341	7030387

Intermediate Section - 20° and 30° RH Divert - Drawing

30° RH Divert Shown

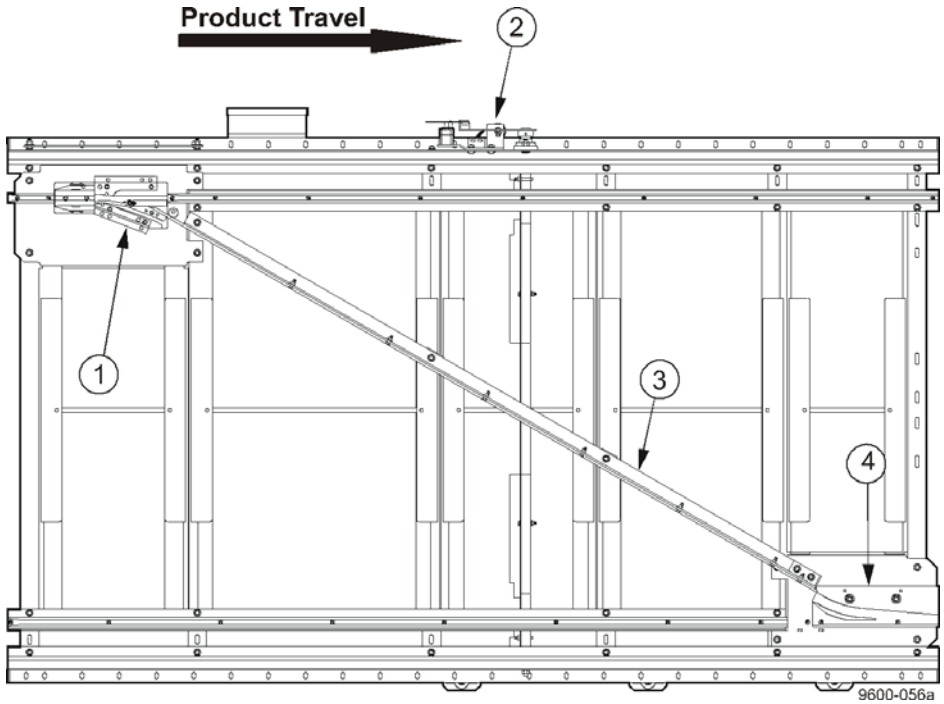


Figure 7 - 11 Intermediate Section - 20° and 30° RH Divert - Drawing

Intermediate Section - 20° and 30° Dual Divert - Part Listing

Key	Description	Part Number	
		20° Divert	30° Divert
1	Switch, Assembly, Divert	7085881	7085883
2	Cam Guide, Assembly, 25.75”, (22”W)	-	7014291
	Cam Guide, Assembly, 31.63”, (28”W)	-	7020756
	Cam Guide, Assembly, 37.75”, (34”W)	-	7031038
	Cam Guide, Assembly, 37.23, (22”W)	7060951	-
	Cam Guide, Assembly, 45.75”, (28”W)	7014166	-
	Cam Guide, Assembly, 58.38”, (34”W)	7014094	-
3	Cam Guide, Assembly, 24.75”, (22”W)	-	7014285
	Cam Guide, Assembly, 30.94”, (28”W)	-	7020750
	Cam Guide, Assembly, 51.25”, (34”W)	-	7031036
	Cam Guide, Assembly, 34.13, (22”W)	7060957	-
	Cam Guide, Assembly, 42.06”, (28”W)	7014172	-
	Cam Guide, Assembly, 50.94”, (34”W)	7023749	-
4	Pusher Guide, Re-entry, Block	7030342	7030388
5	Pusher Guide, Re-entry, Block	7030341	7030387
6	Cam Guide, Assembly, 24.75”, (22”W)	-	7014286
	Cam Guide, Assembly, 30.94”, (28”W)	-	7020751
	Cam Guide, Assembly, 36.87”, (34”W)	-	7031037
	Cam Guide, Assembly, 34.13, (22”W)	7060958	-
	Cam Guide, Assembly, 42.69”,(28”W)	7014173	-
	Cam Guide, Assembly, 51.25”, (34”W)	7023750	-
7	Crossover Switch	7001200	7004500
8	Cam Guide, Assembly, 25.75”, (22”W)	-	7014292
	Cam Guide, Assembly, 31.63”, (28”W)	-	7020757
	Cam Guide, Assembly, 37.75”, (34”W)	-	7031039
	Cam Guide, Assembly, 37.23, (22”W)	7060952	-
	Cam Guide, Assembly, 45.75”, (28”W)	7014167	-
	Cam Guide, Assembly, 58.38”, (34”W)	7014095	-
9	Switch, Assembly, Divert	7085882	7085884

Intermediate Section - 20° and 30° Dual Divert - Drawing

20° Dual Divert Shown

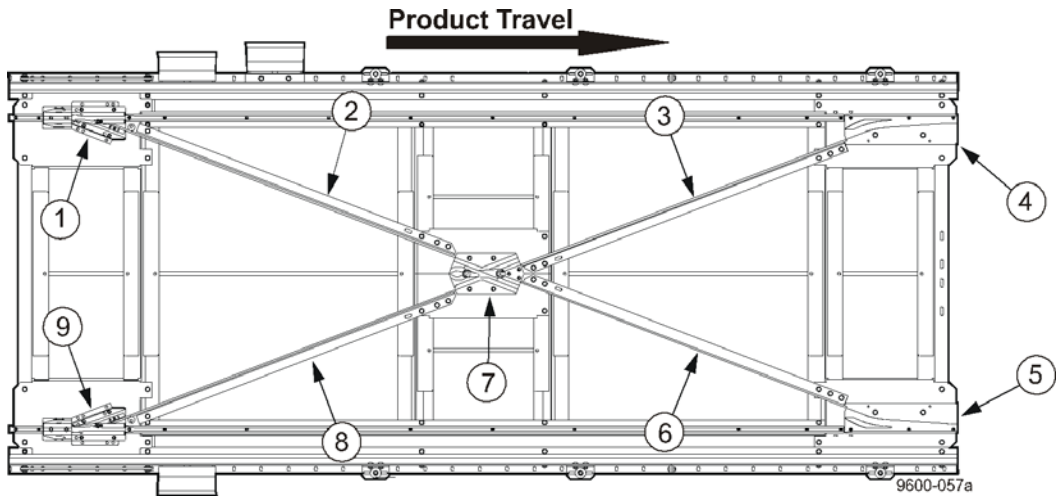


Figure 7 - 12 Intermediate Section - 20° and 30° Dual Divert - Drawing

Drive Section - Part Listing

Key	Description				Part Number
1	Motor Sheave				*
	Motor Sheave Bushing				*
2	Guard, Motor				7004055
3	Motor				See Table 7 2
4	Sprocket, Drive				7885050
5	Sprocket, Drive				7885050
6	Reducer Sheave				*
	Reducer Sheave Bushing				*
7	Reducer				See Table 7 3
8	V-Belts				*
9	Disc Assembly, Shoe Guide				7013185
10	Bearing, Pillow Block, 3.43				7013180
11	Brush	16”	22”	28”	34”
		7002610	7002611	7002570	7002612
12	Guard, Plow (SHN (LH) Drive Assy)	Motor/Reducer Side		Side Opposite Motor/Reducer	
		7003545		7003546	
	Guard, Plow (OPP (RH) Drive Assy)	Motor/Reducer Side		Side Opposite Motor/Reducer	
		7003547		7003544	
* Consult Factory - Provide conveyor motor data and conveyor speed.					

Motors and Reducers

Table 7 2 Motor Table

5 HP	7.5 HP	10 HP	15 HP	20 HP
7022173	7009730	7854734	7827906	7819326
25 HP	**30 HP**	**40 HP**	**50 HP**	**60 HP**
7823759	7823775	7821962	7897753	7897728

Table 7 3 Reducer Table

Manufacturer - Model	Ratio	Part Number
Brown - #307 SMTP	25:1	7035131
Brown - #307 SMTP	15:1	7035132
Brown - #315 SMTP	25:1	7035133
Brown - #315 SMTP	15:1	7035134

Motor and Reducer Sheaves, Bushings, and V-Belts

For sheave, bushing, and V-belt part numbers, refer to the application Bill of Material.

Drive Section - End View

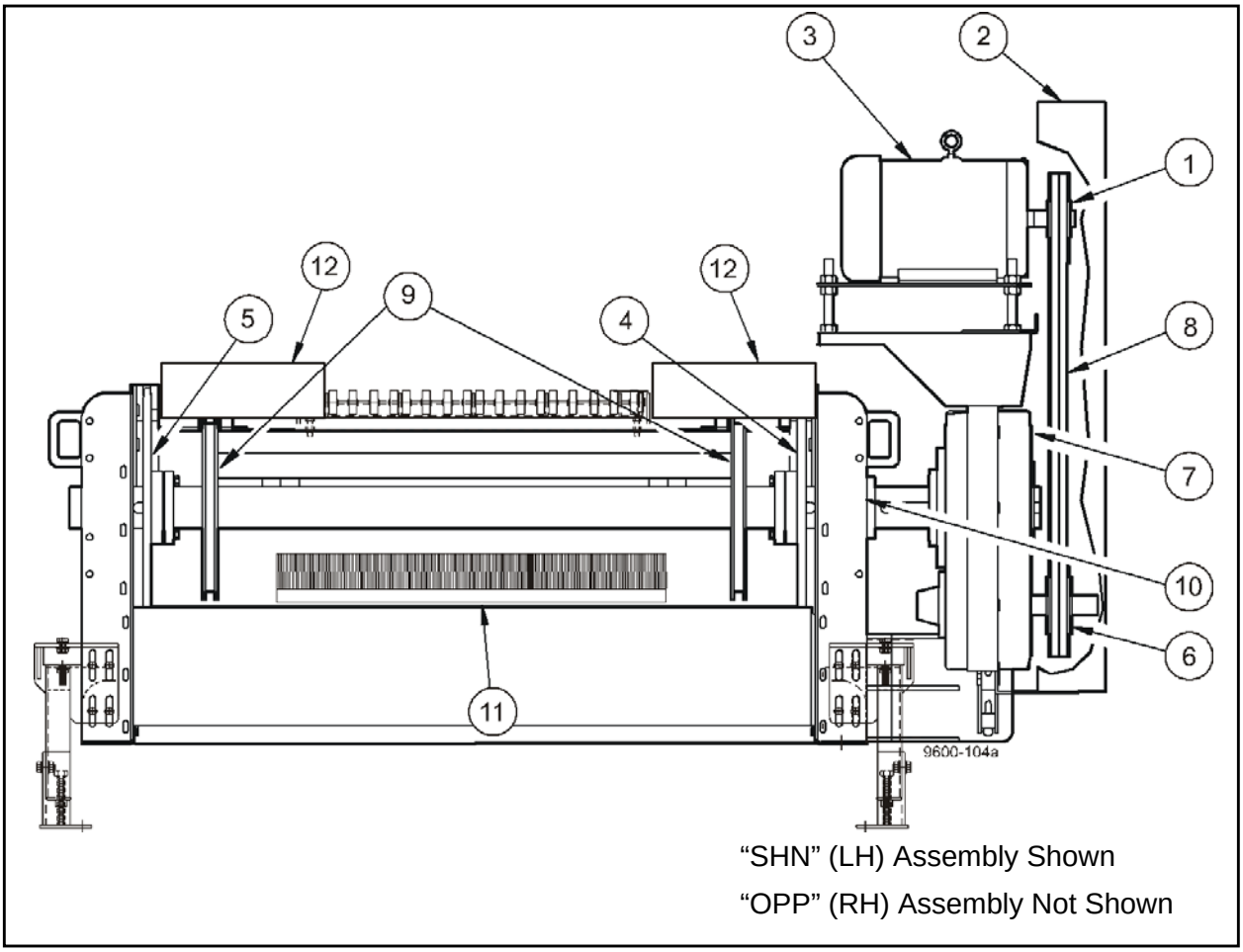


Figure 7 - 13 Drive Section - End View

Intermediate Catenary Section - Part Listing

Key	Description	Part Number
1	Track, Chain, Catenary, Assembly	7004016
2	Track, Chain, Catenary, Assembly	7004015
3	Track, Chain, Catenary, Assembly	7004016
4	Track, Chain, Catenary, Assembly	7004015

Intermediate Catenary Section - Side View

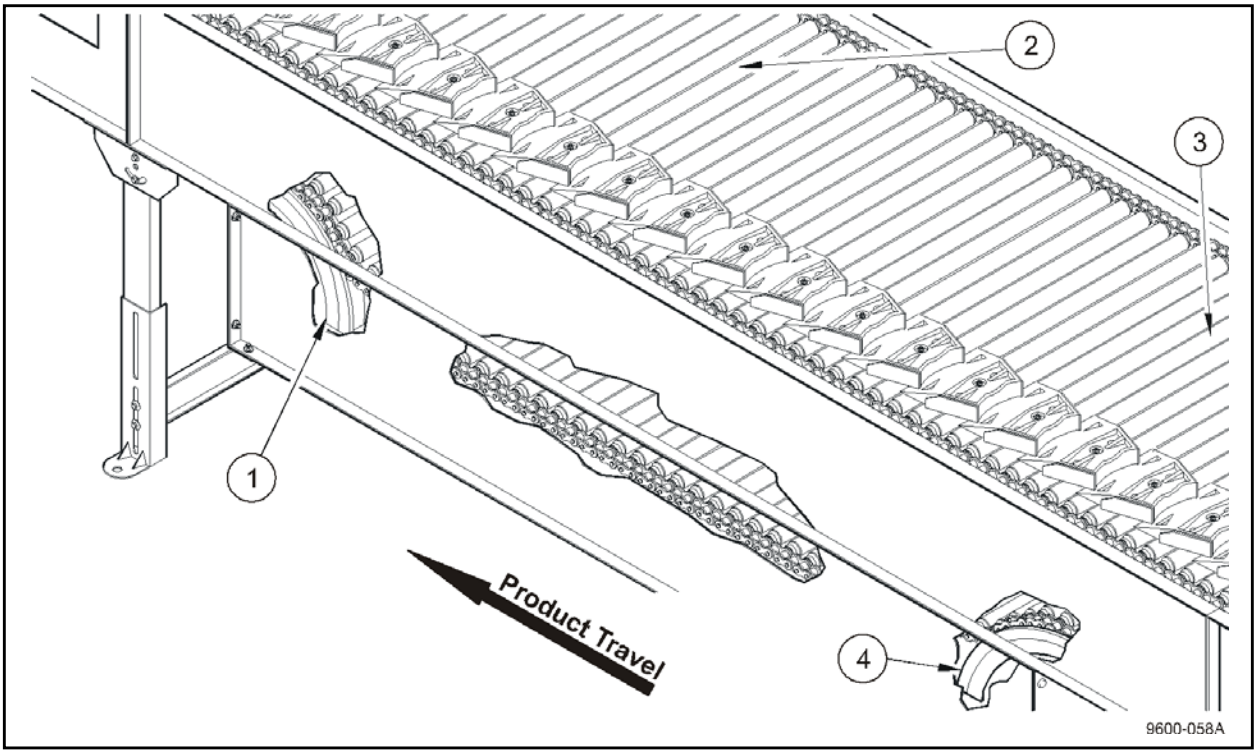


Figure 7 - 14 Intermediate Catenary Section - Side View

UniSort XV - Features

Chain, Carrying Tubes and Slats, and Pushers - Part Listing

Key	Description	Part Number	
		20° Divert	30° Divert
1	Chain, Carrying, Roller #100 (240' long matched set of 2)	7854665	
	Chain, Carrying, Roller #100 (10' long matched set of 2)	7854666	
2	Tube, Carrying, (22"W)/43.5 between frames	7035468	
	Tube, Carrying, (28"W)/49.5 between frames	7035469	
	Tube, Carrying, (34"W)/55.5 between frames	7035470	
	Tube, Carrying, (40"W)/61.5 between frames	7035471	
	Slat, Carrying, (22"W)/43.5 between frames	7004681	
	Slat, Carrying, (28"W)/49.5 between frames	7004682	
	Slat, Carrying, (34"W)/55.5 between frames	7004683	
	Slat, Carrying, (40"W)/61.5 between frames	TBD	
3	Shoe, Carrying Tube LH Divert	7035363	7035364
	Shoe, Carrying Tube RH Divert	7035362	7035364
	Shoe, Carrying Tube Dual Divert	7035361	7035364
	Shoe, Carrying Slat LH Divert	7001441	7001445
	Shoe, Carrying Slat RH Divert	7001440	7001445
	Shoe, Carrying Slat Dual Divert	7001442	7001445
4	Chain Cover (not shown)	7023351	

Chain, Carrying Tubes and Slats, and Pushers - Drawing

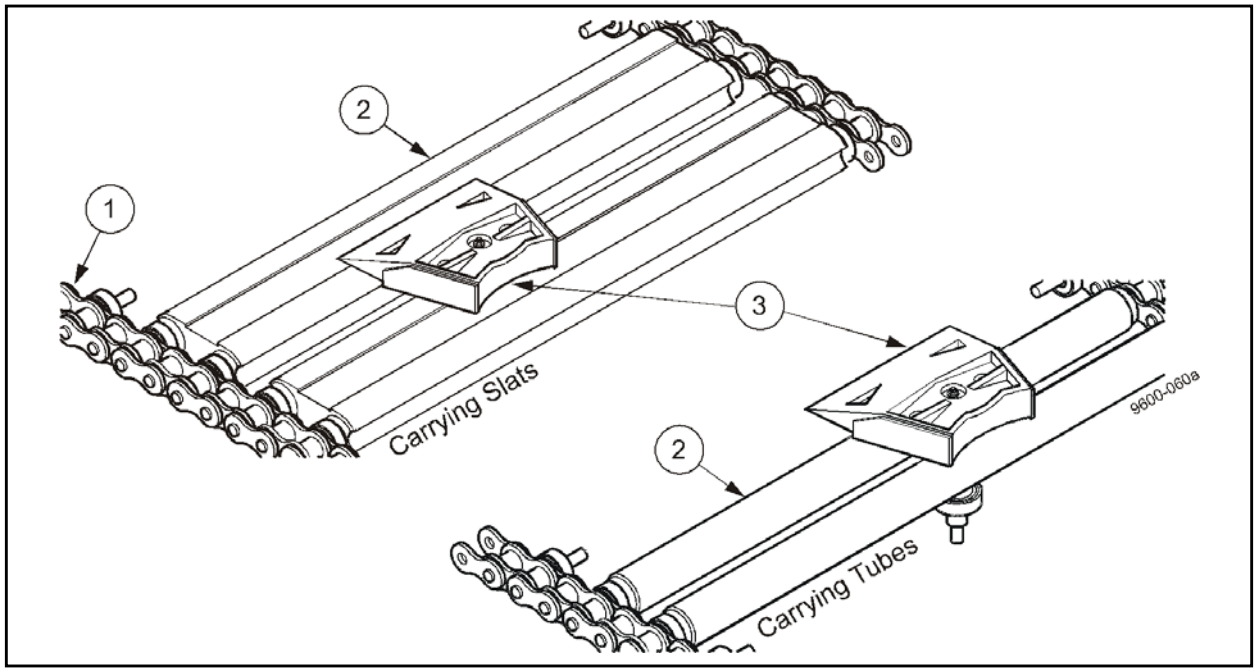


Figure 7 - 15 Chain, Carrying Tubes and Slats, and Pushers

Crossover Switch - Part Listing

Key	Description	Part Number	
		20° Divert	30° Divert
1	Crossover, Assembly	7001200	7004500
2	Trigger, Crossover	7001205	7001212
	Bearing	7740545	
3	Gate, Crossover	7001204	7001211
	Bearing	7740545	
4	Arm, Rocker	7001206	
5	Linkage, Arm, Nylair	7001207	7001213

Crossover Switch - Detail

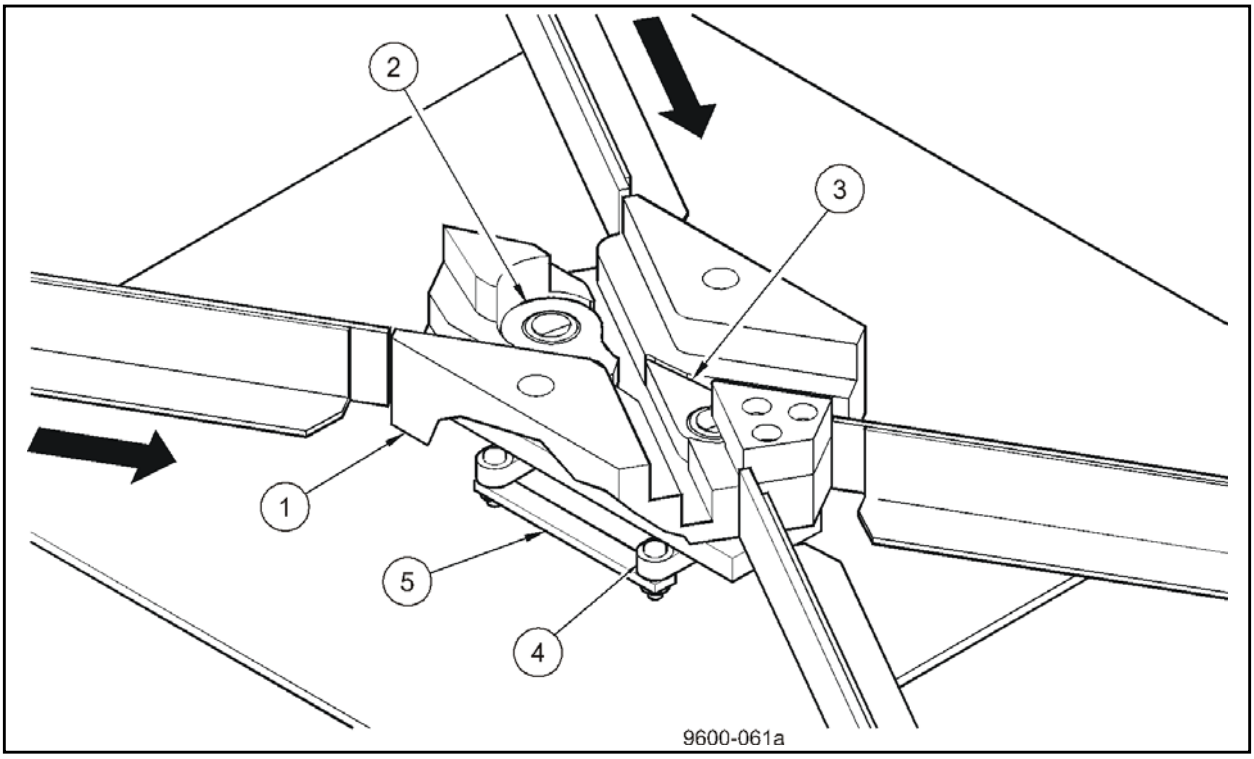


Figure 7 - 16 Crossover Switch - Detail

Divert Switches - Part Listing

Key	Description	Part Number		
		16°/20° Divert	20° Divert	30° Divert
1	Bridge, Switch, LH	7071447	7001422	7001407
	Bridge, Switch, RH	7071446	7001421	7001406
2	Trigger, Switch, LH, Nycast	7085864		
	Trigger, Switch, RH, Nycast	7085863		
3	Lens, Photo-eye	7001128		
	Transmitter, Photo-eye, Connector	7085897		
4	Assembly, Rotary Actuator, LH Includes: Trigger, Spacer Block, Coupling, Rotary Actuator	7085791		
	Assembly, Rotary Actuator, RH Includes: Trigger, Spacer Block, Coupling, Rotary Actuator	7085790		
5	BTA Heat Sink Assembly on a Dual-Sided Sorter Justifier Switch	7043415		
6	Coupling	7085855		
7	RH Actuator	7085887		
8	LH Actuator	7085888		
9	Lock Washer	7085808		
10	Switch, Assembly, LH Divert	7085886	7085882	7085884
11	Switch, Assembly, RH Divert	7085885	7085881	7085883

Divert Switches - Detail

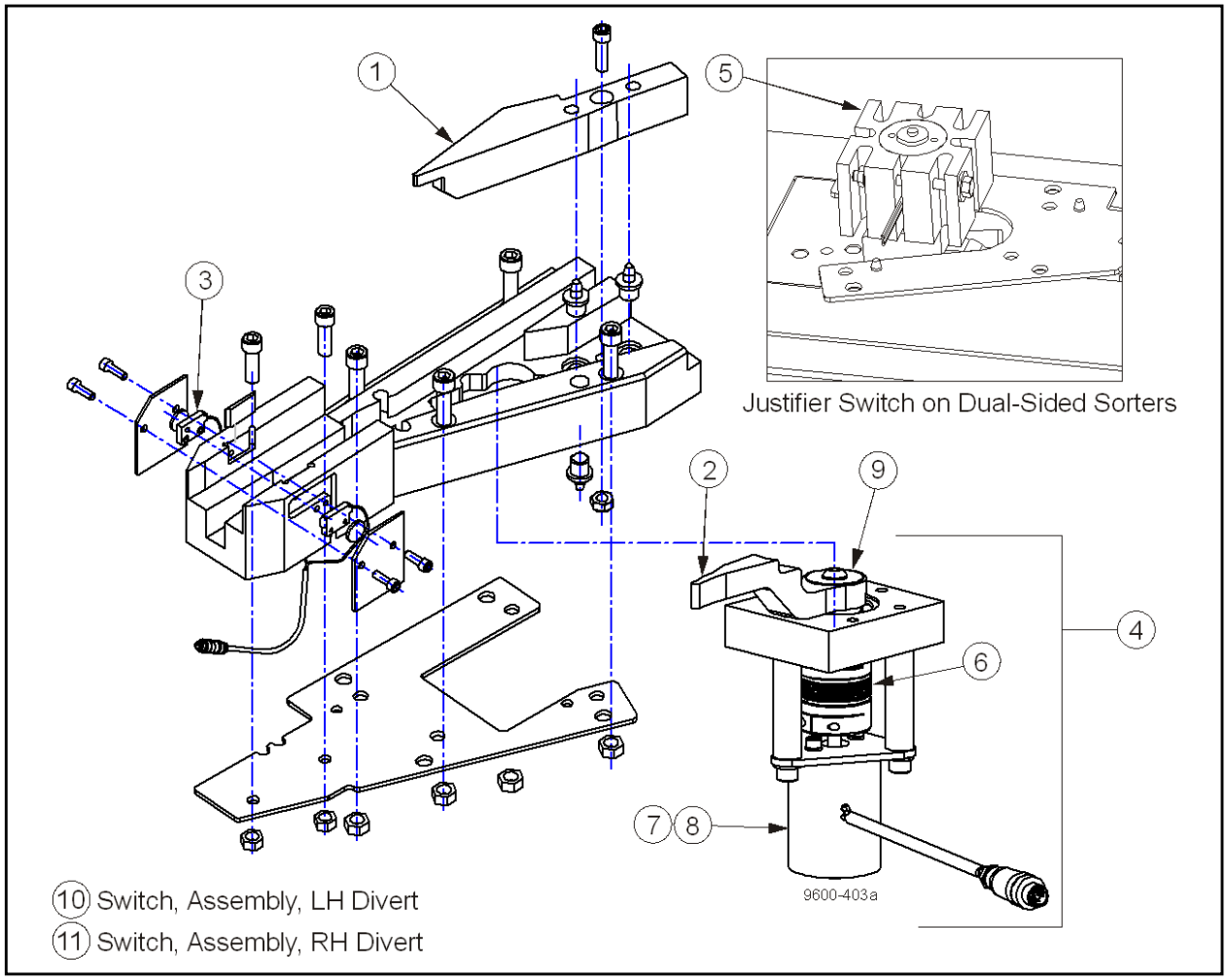


Figure 7 - 17 Divert Switches - Detail

Divert Control Module - Part Listing

Key	Description	Part Number
1	Panel Box	7028212
2	Sub Panel	7028214
3	Divert Board, EBS, Select Program	7087302
	Fuse (3A, 250V, Little, Slo Blow	7861487
4	Terminal Ring	7086958
5	10” AWG Green Wire with Yellow Strip	7086959
Divert Control Module (DCM) Assembly, EBS. Select Program		7087303
Divert Control Module Mounting Bracket (not shown)		7004861

Divert Control Module - Detail

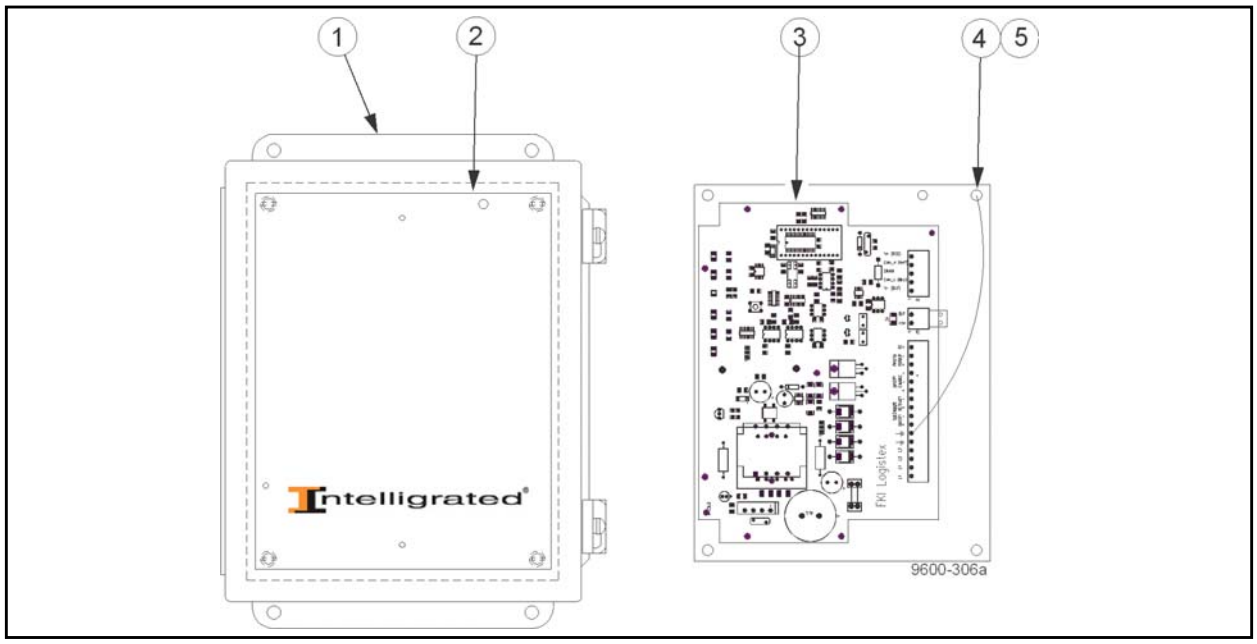


Figure 7 - 18 Divert Control Module - Detail

Internal Jam Detector - Part Listing

Key	Description	Part Number
1	Flipper (22”W)	7021718
	Flipper (28”W)	7021719
	Flipper (34”W)	7021720
2	Arm, Trip	7004062
3	Arm, Limit Switch	7115948
4	Switch, Limit	7115947
5	Spring	7030486
6	Bumper, Rubber	7885294
7	Bearing, Flange	7145018
8	Shaft (22”W)	7013499
	Shaft (28”W)	7013475
	Shaft (34”W)	7013485

Internal Jam Detector - Detail

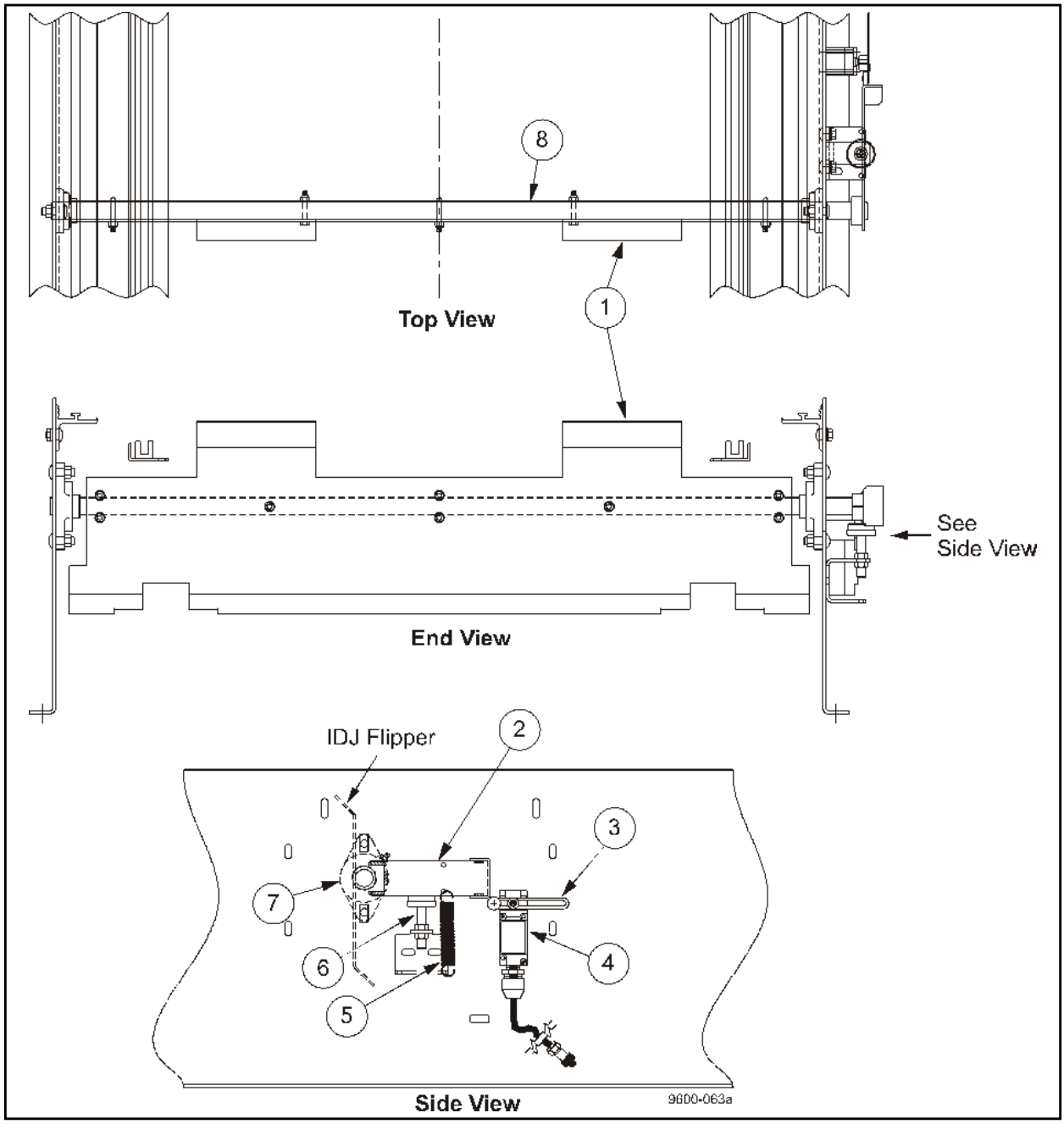


Figure 7 - 19 Internal Jam Detector - Detail

Transfer Assembly - Part Listing

Key	Description	Part Number
-	Pop-Up Roller Assembly - Complete (22”W)	7016028
	Pop-Up Roller Assembly - Complete (28”W)	7013240
	Pop-Up Roller Assembly - Complete (34”W)	7013340
1	Roller (7.50” Long)	7012590
2	Skate Wheel	7221901
3	Roller (22”W)	7016034
	Roller (28”W)	7013251
	Roller (34”W)	7013252
4	Switch, Proximity	7035232

Transfer Assembly - Detail

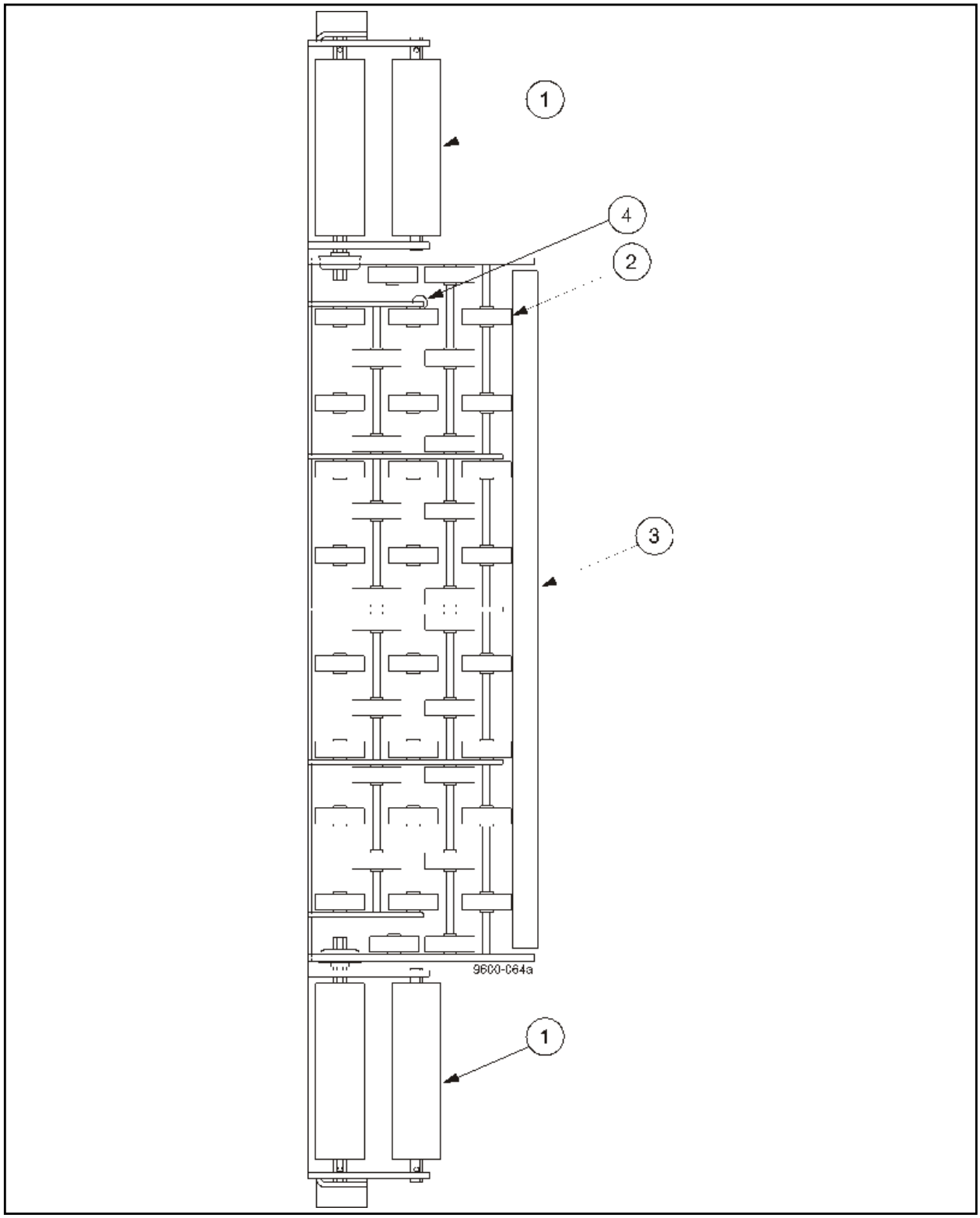


Figure 7 - 20 Transfer Assembly - Detail

Chain Oiler - ORSCO Series VSR0039 - Parts Listing

Key	Description	Part Number	
		24Vdc	120Vac
1	Chain Oiler, Assembly (4 Nozzle) - Complete	7085731	7085730
2	Body, Injector	7060981	
3	Regulator, Air	7060985	
4	Solenoid Valve, Air	7060984	7060983
5	Solenoid Valve, Oil	7060986	
6	Tubing, Nylon, 1/4 OD, Air (100’ long)	7838770	
7	Tubing, Nylon, 3/16 OD, Oil (100’ long)	7838771	
9	Filter, 5 Micron	7060982	
10	Nozzle Bracket	7004175	
11	Nozzle	7853481	
-	Oil, Mobil Oil, 20 wt. DTE Heavy Medium ISO-68 non-detergent (5 gal)	7098825 or 30396800	

Chain Oiler - ORSCO Series VSR0039 - Detail

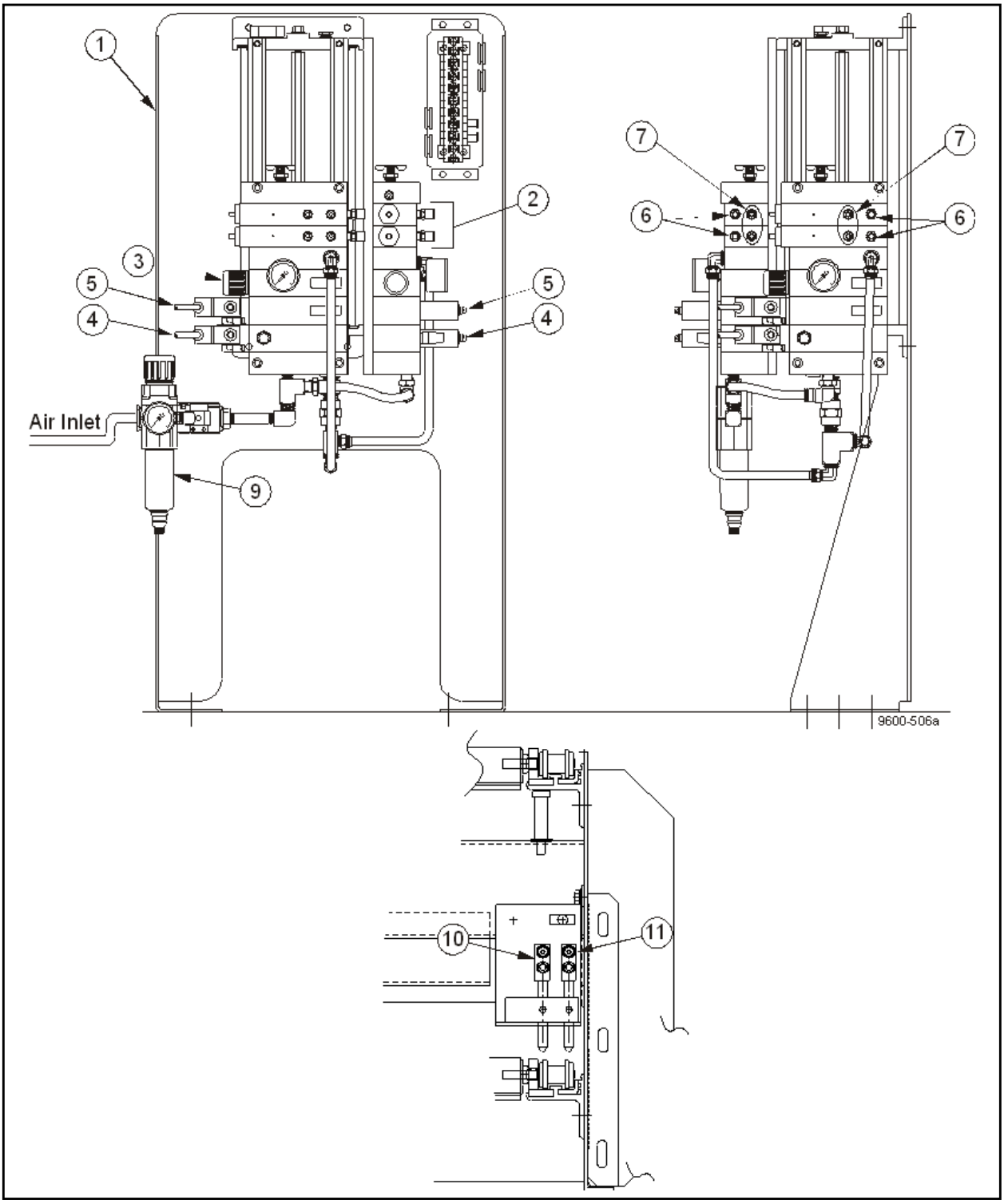


Figure 7 - 21 Chain Oiler - Detail