



A200 MULTILINE CONVEYOR

3, 4, 5 POSITION - 48" MACHINES

USERS GUIDE

CVP P/N: M-0243-0943 REV. B

2518 Wisconsin Ave.
Downers Grove, IL 60515 USA

Phone: (800) 422-4720 (US, Canada & Mexico)
(630) 852-1190 (International)

Fax: (630) 852-1386

Website: www.cvpsystems.com

Sales E-mail: sales@cvpsystems.com

Parts E-mail: spareparts@cvpsystems.com

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SERIAL #: _____

TABLE OF CONTENTS

SECTION: 1	OVERVIEW
FOREWORD	1
CUSTOMER SERVICE	2
Ordering Parts.....	2
USING THE MANUAL	3
SAFETY	4
Safety Precautions.....	4
Operational Safety	4
MSDS SHEETS.....	5
Physical and Chemical Changes	5
Fire and Explosion Risks	5
Reactivity Risks.....	5
Exposure Health Risks.....	5
Precautions to Reduce Risks.....	5
ABOUT THE MULTILINE	6
MACHINE UTILITY REQUIREMENTS	7
Electrical	7
Compressed Air	7
PRODUCTION LAYOUT	8
Planning the Layout	8
Infeed Conveyor.....	8
Take-Away Conveyor.....	8
BAG AND CONTAINER INFORMATION	9
Container Handling	9
Bag and Container Sizes	9
Top Loaded Bag Formula	9
SECTION: 2	INSTALLATION
INSTALLATION PREPARATION AND REQUIREMENTS	13
Work Area.....	13
Required Equipment	13
Utilities	13
UNPACKING THE MULTILINE	14
Uncrating the Multiline	14
Contents of the Crate.....	14
Spare Parts	14
ASSEMBLING THE MULTILINE	15
Lifting the Multiline	15
CONNECTING UTILITIES	16
Electrical Connections	16
Main Air Supply.....	18
Gas Supply	18

TABLE OF CONTENTS

ADJUSTMENTS TO MULTILINE COMPONENTS	20
Clamp Stop	20
Blade Stops.....	20
Pushers.....	20
Transfer Conveyor	20
Photoeyes.....	20
SECTION: 3 OPERATION	
MACHINE OPERATION.....	23
Machine Cycle	23
Electrical Enclosure	24
Operator Interface.....	25
OPERATION PRECAUTIONS	26
Safe Operating Practices	26
SECTION: 4 CONTROL DETAILS	
OPERATOR SWITCHES	29
Power On.....	29
Vacuum Pump	29
Conveyor Start/ Stop.....	29
Emergency Stop	29
MAIN MESSAGE SCREEN.....	31
Display Areas.....	31
Function Keys	31
Timer Menu.....	31
Preset Functions	33
Box Count	34
Stop Manual switches	35
Configuration Menu.....	36
Alarms.....	36
PHOTOEYE SETUP AND ADJUSTING	38
Photo eye Display	38
Photoeye setting	38

TABLE OF CONTENTS

MACHINE COMM. CABLES	39
SECTION: 5	VACUUM SYSTEM
GENERAL INFORMATION	43
SECTION: 6	GAS SYSTEM
GAS FLUSH SYSTEM	47
General Information	47
Determining Gas Time	47
Gas Connection	48
Gas Sensor	48
A200 Head Connection.....	49
SECTION: 7	CONVEYORS
CONVEYOR SAFETY.....	53
GENERAL INFORMATION	54
Conveyor Belts.....	54
Conveyor Drives	54
Conveyor Tails	55
Conveyor Frame	55
REPLACING THE CONVEYOR BELTS	56
Removing the Belts.....	56
Replacing the Belts	57
Adjusting the Tension of the Belt	57
SECTION: 8	COMPONENTS
CLAMP STOP	61
Clamp Stop Description	61
Clamp Stop Operation	61
Clamp Stop Adjustments	61
BLADE STOPS	62
Blade Stop Description	62
Blade Stop Operation.....	62
Blade Stop Adjustment	63
PUSHERS	64
Pusher Description.....	64
Pusher Operation.....	64
Prox Switches	64
Pusher Adjustments.....	64
TRANSFER COMPONENTS	66
Transfer Filler.....	66
Transfer Conveyor	66

TABLE OF CONTENTS

SECTION: 9	CLEANING
CLEANING INFORMATION.....	69
VACUUM MANIFOLD CLEANING INSTRUCTIONS.....	70
SECTION: 10	MAINTENANCE
MULTILINE MAINTENANCE SCHEDULE.....	73
REGULAR MAINTENANCE.....	74
Visual Inspection.....	74
Air Supply Regulator / Lubricator.....	74
Gas Supply	74
VACUUM PUMP MAINTENANCE	75
Primary Sediment Bowl.....	75
Secondary Sediment Bowl.....	76
SWITCHES	77
Gas Pressure Switch	77
Prox Switches	77
SECTION: 11	TROUBLESHOOTING
TROUBLESHOOTING THE PLC	81
I/O Status Lights	81
Other Status Indicators	82
Terminal Configuration.....	83
Troubleshooting The I/O Status Lights	84
TROUBLESHOOTING CONVEYOR COMPONENTS.....	85
No Control Power.....	85
Conveyors don't start	85
Stops 1 and/or 2 Not Operating	85
Tote Stop not operating	86
Feed Conveyor supplying Multiline not operating correctly	86
Pushers not operating.....	86
Load won't dump to the exit conveyor	87
Photoeye Indicators	87
Drive Inverter	89
CONVEYOR OPERATOR INTERFACE FAULT DISPLAY.....	90
Error Messages.....	90
SECTION: 12	ASSEMBLIES
MACHINE ASSEMBLIES	95
Customer Service	95
Ordering Parts.....	95
STAND ASSEMBLY, 3 POSITION CONVEYOR	96
D-0243-0859	

TABLE OF CONTENTS

STAND A ASSEMBLY, 4 & 5 POSITION CONVEYOR	98
D-0243-0816	
STAND B ASSEMBLY, 4 & 5 POSITION CONVEYOR	100
D-0243-0818	
ELECTRICAL ENCLOSURE ASSEMBLY	102
D-0243-0930	
ELECTRICAL PANEL ASSEMBLY	106
D-0243-0932	
FILTER/ REGULATOR LUBRICATOR ASSEMBLY	108
C-9743-1206	
MOTOR/REDUCER ASSEMBLY	110
B-0243-0644	
TOP CONVEYOR FRAME ASSEMBLY, 3 POSITION	112
D-0243-0908	
TOP CONVEYOR FRAME ASSEMBLY, 4 POSITION	114
D-0243-0935	
BLADE STOP ASSEMBLY	116
D-0243-0904	
SQUEEZE STOP ASSEMBLY	118
C-0243-0542-1	
PUSHER ASSEMBLY	120
C-0243-0610	
TRANSFER CONVEYOR ASSEMBLY	122
D-0243-0605	
PHOTOEYE ASSEMBLY	124
B-0243-0620	
VALVE BANK ASSEMBLY, 3 POSITION	126
C-0243-0612	
VALVE BANK ASSEMBLY, 4 POSITION	128
C-0243-0900	
TOP WEAR STRIP ASSEMBLY, 3 POSITION	130
B-0243-0759	
TOP WEAR STRIP ASSEMBLY, 4 POSITION	132
B-0243-0815	
TOP CONVEYOR BELT	134
C-0243-0190	
TOP CONVEYOR COVER ASSEMBLY	136
C-0243-0789	
BOTTOM CONVEYOR FRAME ASSEMBLY, 3 POSITION	138
D-0243-0862	
BOTTOM CONVEYOR FRAME ASSEMBLY, 4 POSITION	140
D-0243-0821LR	
BOTTOM CONVEYOR FRAME ASSEMBLY, 5 POSITION	142
D-0243-0895	
GAS INLET STATION ASSEMBLY.....	144
B-0243-0544	

TABLE OF CONTENTS

GAS MIDDLE STATION ASSEMBLY	146
B-0243-0545	
GAS END STATION ASSEMBLY	148
B-0243-0546	
BACKSTOP ASSEMBLY	150
C-0243-0535	
BOTTOM WEAR STRIP ASSEMBLY, 3 POSITION	152
B-0243-0558	
BOTTOM WEAR STRIP ASSEMBLY, 4 POSITION	154
B-0243-0812	
BOTTOM WEAR STRIP ASSEMBLY, 5 POSITION	156
B-0243-0898	
BOTTOM CONVEYOR BELT	158
0243-0784	
BOTTOM CONVEYOR COVER ASSEMBLY	160
C-0243-0778	
GUIDE RAIL ASSEMBLY.....	162
C-0243-0100	
GUIDE RAIL ASSEMBLY.....	164
C-0243-0033	
42.5" GUIDE RAIL ASSEMBLY, LEFT HAND	166
B-0243-0615L	
42.5" GUIDE RAIL ASSEMBLY, RIGHT HAND	168
D-0243-0615R	
33" GUIDE RAIL ASSEMBLY	170
B-0243-0613	
ANGLE GUARD RAIL ASSEMBLY.....	172
D-0243-0524	
ANGLE GUARD RAIL ASSEMBLY.....	174
D-0243-0808	
16" GUARD RAIL ASSEMBLY.....	176
B-0243-0528	
32" GUARD RAIL ASSEMBLY.....	178
D-0243-0526	
SIDERAIL ASSEMBLY.....	180
B-0243-0416	

SECTION: 1

OVERVIEW

FOREWORD

This manual contains information which is vital to the proper installation, operation, and maintenance of the CVP A200 Multiline Conveyor.

Failure to follow the procedures herein outlined shall void the limited warranty.

Additions, modifications, or deletions from the procedures herein outlined may be made by CVP Systems Inc., at its sole option, without liability of any sort accruing to CVP Systems Inc.

This manual shall be considered current as of the date of any such addition, modification or deletion.

Photos, drawings, and illustrations used in this manual are representative and may vary from your equipment.

CUSTOMER SERVICE

When calling, either for parts or service, have the model and serial numbers available for our customer service representative. This will allow us to more accurately assist you with your machine.

The serial number tag for the A200 Multiline is located on inside of the main electrical enclosure door. Figure 1-1 shows the location inside the enclosure.

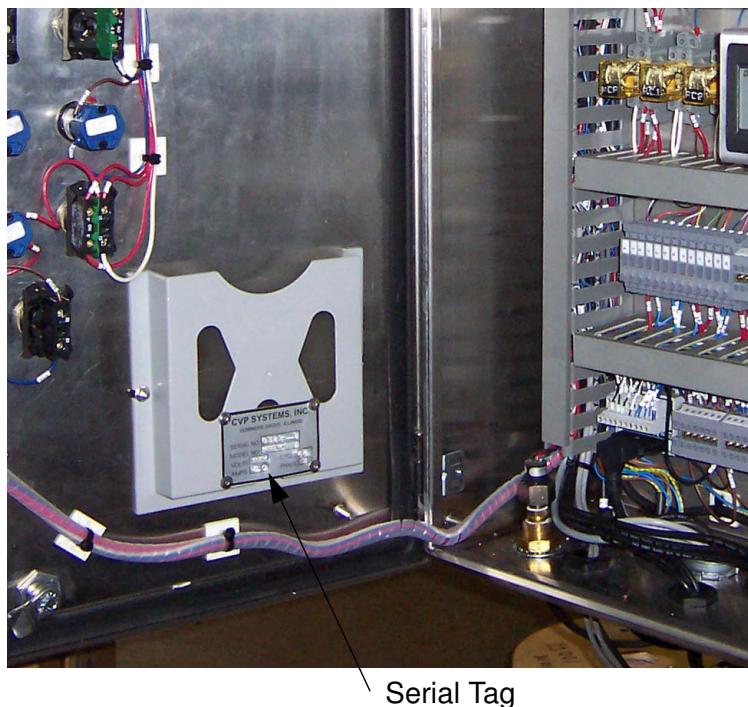


Figure 1-1. Serial Tag Location

Ordering Parts

Ordering parts from CVP Systems can be accomplished in three different ways; by phone, fax or e-mail. Please include model and serial numbers in all correspondents to CVP Systems.

Phone: 800-422-4270 (US, Canada, & Mexico)
630-852-1190 (All others)

Fax: 630-852-1386

E-Mail: spareparts@cvpsystems.com

USING THE MANUAL

The following sections of this manual provide an overview for your A200 Multiline and installation. They describe the utility requirements, installation instructions and maintaining the A200 Multiline system.

Information about basic A200 Multiline operation and maintenance is also provided. It is recommended that anyone involved with the operational mechanics of this machine read the manual before operating or servicing the unit.

The prints and manuals included with the machine contain information which is important to service the unit. They should be stored in a cool, dry location away from the machine so that they are not exposed to high humidity and harsh chemicals.

SAFETY

Safety Precautions

It is important that all SAFETY PRECAUTIONS are followed closely when working around the A200 Multiline.

Get acquainted with all of the warning labels and safety features of the machine. They are provided for your safety and benefit.

- DO NOT ATTEMPT TO STAND OR WALK ON THE CONVEYOR. RISK OF FALLING WHICH COULD RESULT IN SERIOUS INJURY OR DEATH
- ONE OF TWO EMERGENCY STOPS IS LOCATED ON THE FRONT OF THE ELECTRICAL ENCLOSURE. THE SECOND IS LOCATED ON THE OPPOSITE END OF THE TOP CONVEYOR.
- KEEP HANDS AND LOOSE CLOTHING AWAY FROM THE CONVEYOR, PUSHERS AND STOPS DURING OPERATION.
- DO NOT OPERATE EQUIPMENT WITH BROKEN AND/OR MISSING PARTS.
- DO NOT WORK ON MACHINE WHILE POWER IS ON, UNLESS INSTRUCTED TO DO SO BY OUTLINED PROCEDURES WITHIN THIS MANUAL, OR BY QUALIFIED CVP SERVICE PERSONNEL.

SERIOUS INJURY OR DEATH COULD RESULT IF THE POWER SUPPLY IS NOT TURNED OFF BEFORE WORKING WITH CERTAIN COMPONENTS SUCH AS HIGH VOLTAGE LEADS!!!

- DO NOT BYPASS OR ALTER ANY SAFETY COMPONENT.
- DO NOT OPERATE IF GUARDS AND SAFETY DEVICES ARE REMOVED.
- WHEN POSSIBLE, USE RECOMMENDED TOOLS FOR REPAIR AND ADJUSTMENT.

Operational Safety

It is important to develop good safety habits to ensure a safe and efficient packaging process. Please adhere to the following:

- USE MACHINE AS DIRECTED BY THIS MANUAL AND CVP PERSONNEL.
- KEEP SURROUNDING AREA FREE OF CLUTTER AND HIGH VOLUMES OF TRAFFIC.
- ONLY USE MACHINE FOR INTENDED PURPOSE.
- FOR APPLICATIONS OTHER THAN PACKAGING, PLEASE CONSULT WITH YOUR CVP SALES REPRESENTATIVE.

MSDS SHEETS

A Material Safety Data Sheet (MSDS) is an instructional sheet concerning a specific chemical that explains hazards and emergency procedures.

CVP provides MSDS sheets for vacuum pump oils we sell upon request.

Before using vacuum pump oil or any other chemical supplied by CVP, read its MSDS sheet to learn the following:

Physical and Chemical Changes

- Normal appearance and odor
- Temperature, boiling or melting point, at which its form changes
- How fast it evaporates and rises in air
- Solubility in water

Fire and Explosion Risks

- Lowest temperature at which vapors catch fire
- Highest and lowest vapor concentrations that can catch fire or explode
- Fire fighting instructions

Reactivity Risks

- Chance of chemical change or disintegration
- Dangerous reactions to air, water, or specific chemicals
- Decomposition by-products

Exposure Health Risks

- Hazards and symptoms of inhaling, swallowing, skin, or eye contact
- Fast (acute) or gradual (chronic) appearance of health problems
- Cancer hazard
- Health conditions exposure could make worse
- First aid until medical help arrives

Precautions to Reduce Risks

- Controls such as ventilation and hygiene
- Respirators, gloves, or other personal protective equipment (PPE)
- Handling spills, leaks, or accidental release

ABOUT THE MULTILINE

The Multiline is an automated distribution system consisting of a distributing upper conveyor and a discharging lower conveyor. The Multiline distributes a container into one of two or three A200 "Heads". The A200 machine for the Multiline has a special base frame to accept the containers and transfer them to the lower conveyor. The lower conveyor discharges the container out from the Multiline on to a takeaway conveyor. The Multiline uses a PLC to efficiently and safely control the distribution of the containers. Sensors monitor critical areas of the Multiline to prevent avoidable jams and inform the operator when a fault has occurred.

Note: "Container(s)", as referenced throughout the manual, can be either a plastic tote or a corrugated box. See "BAG AND CONTAINER INFORMATION" on page 9 for additional information about containers

The figure below shows the components of the A200 Multiline's Electrical Panel.

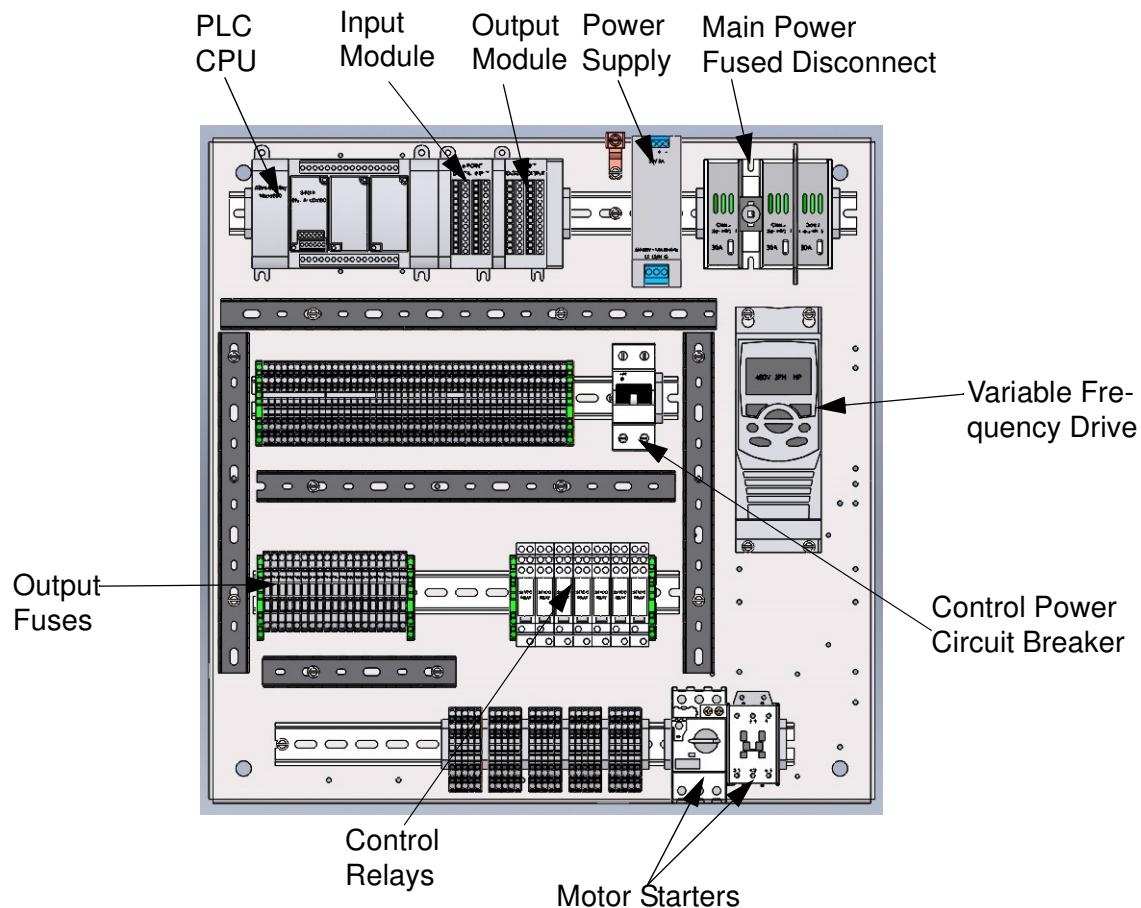


Figure 1-2. Electrical Enclosure

MACHINE UTILITY REQUIREMENTS

Electrical

The A200 Multiline requires a dedicated electrical service. The required voltage and amperage is indicated on the serial plate.

The supply line can be connected via rigid conduit, or flexible cord, depending on local codes and/or plant procedures. Three phase power supply should be four-wire cord with one wire (usually green) used as a ground. Your supply and conductors must be capable of delivering the specified power to the A200 Multiline. If you choose to use a flexible cord with a plug, make sure the plug ends are waterproof. This type of connection will make your machine more convenient to move and adjust when necessary.

Power Requirements are as follows

- 208/220 Volts, 3 Phase, 20 Amps
- 460 Volts, 3 Phase, 15 Amps

Note: A cord connector is provided at the upper right corner of the electrical enclosure. If rigid conduit is to be used, simply remove the cord connector and replace with the proper conduit connector.

Compressed Air

A supply of clean, dry, compressed air is required for proper functioning of the A200 Multiline. The air supply regulator is factory preset to the recommended 80 PSI (5.4 bar).

For your convenience, we have provided a quick disconnect adapter on the air supply regulator/lubricator. If a quick disconnect is not used, mount a shut off valve near the regulator. The size of the air supply line is critical to the performance of the machine. Before connecting air to the A200 Multiline make sure the supply line can supply adequate air pressure to the machine. The supply lines noted below in the air requirements is based on a main supply line running within 50 feet (15.2 m) of the machine.

Compressed air requirements are as follows:

- Standard machines - 80 PSI* (5.4 bar), 5 CFM (141.5 L/min), 1/2" (12.7 mm) supply line

*The recommended air pressure supplied to the machine is 100 PSI (6.8 bar), the indicated air pressure is the regulator setting.

Important: A dedicated air supply is required for the A200 Multiline conveyor. Separate air supplies must be supplied to the A200 machine heads.

PRODUCTION LAYOUT

Planning the Layout

The Multiline configuration is required before the A200 Multiline can be assembled. Due to existing plant layouts and floor space the plant layout must be planned out, this will determine the flow of the Multiline. The flow direction of the A200 Multiline is best described as "In From, Out To" as viewed from the operator's position.

For example a "Left to Right" Multiline means the tote or box enters the A200 Multiline on the upper conveyor from the left side of the A200 machines. They are then discharged or exit the A200 Multiline to the right of the A200 Machine. The machine flows are as follows:

- Left to Left
- Left to Right
- Right to Left
- Right to Right

To plan the layout contact your CVP Systems representative for assistance. CVP System's engineers will assist in the layout to assure proper placement of the A200 Multiline.

Important: CVP Systems does not supply Infeed and Take-Away conveyors. Damage to the A200 Multiline caused by the infeed or takeaway conveyors is not the responsibility of CVP Systems.

Important: Poor performance of the A200 Multiline caused by the infeed and/or the takeaway conveyor renders the performance guarantee null and void.

Infeed Conveyor

The Infeed Conveyor transports containers to the Multiline. The infeed conveyor must allow accumulation of the containers. As containers enter the upper conveyor of the Multiline the containers are indexed, one at a time, into the Multiline. Positive drive conveyors with anti slip surfaces, will cause damage to boxes and possibly dump totes off of the conveyor on to the floor.

Take-Away Conveyor

The Take-Away conveyor transports containers from the A200 Multiline to the next stage of production. There are no specific requirements for this conveyor other than where the product is going to next. If accumulation will take place, the lower conveyor of the Multiline is capable of accumulating 80 Lb. (36.3 kg) containers for the full length of the conveyor. However this back up will also continue on the top and infeed conveyor.

BAG AND CONTAINER INFORMATION

Container Handling

"Containers" are considered plastic totes and corrugated boxes, including wax coated boxes. Corrugated boxes with flaps must have the flaps folded to the outside of the box. Flaps not folded down could prevent the box from transferring onto the A200 head. The box could also be damaged by the A200 head when the adjustable head lowers. The A200 Multiline is designed for packaging a top loaded tote or box only.

Bag and Container Sizes

The correct bag size is important for packaging products. There are 4 factors to determine the size of a bag:

- Width of Container
- Length of Container
- Height of Container
- Style of Container (Top or End Load, this is not a factor since only top loaded boxes are used on the A200 Multiline)

Top Loaded Bag Formula

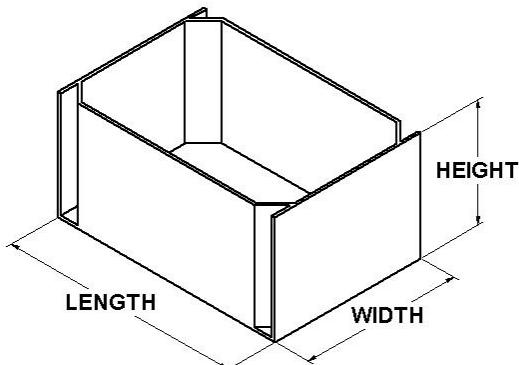


Figure 1-3. Top Loaded Box Dimension Reference

Bag Width (Opening) = Width (Box) + Length (Box) + 3" (76.2 mm)

Bag Length = Width (Box) + Height (Box) + 6" (152.4 mm)

EXAMPLE:

Using the formula a bag size will be determined based on an end loaded box with the following dimensions:

Length = 21 inches

Width = 15 inches

Height = 10 inches

Bag Width (Opening) = 15 (Box Width) + 21 (Box Length) + 3 = 39 inches

Bag Length = 15 (Box Width) + 10 (Box Height) + 6 = 31 inches

BAG SIZE = 39 inch (W) X 31 inches (L)

With the bag in the box, check to see that the end of the bag will reach above the heat seal bar. The bag should extend a short distance above the top surface of the rear manifold rubber support.

SECTION: 2

INSTALLATION

INSTALLATION PREPARATION AND REQUIREMENTS

To ensure a successful installation, it is important to adhere to the requirements for installation. Be sure that you can meet all of these requirements so that your installation will go as smooth as possible.

Work Area

The area used to setup the A200 Multiline should be open and clear for you to work, allowing room for a fork truck to lift the Multiline.

Required Equipment

Below is a list of equipment and tools needed to uncrate and install the A200 Multiline:

- **FORK LIFT WITH FORK EXTENSIONS** (To lift the Multiline off the crate and move in place)
- **ADJUSTABLE WRENCH** (10 or 12 inch).
- **COMBINATION WRENCH** (3/4 and 9/16 inch).
- **PLIERS** (standard or channel lock).
- **SCREWDRIVERS** (large standard tip & #2 Phillips)
- **VOLTMETER** (minimum rating of 500 VAC)
- **SIDE CUTTERS** (to cut wire ties)

Utilities

Run the utilities to the operating location prior to setting the machine in place. Refer to Section 1 for details.

UNPACKING THE MULTILINE



Warning:

WHEN MOVING THE MULTILINE CONVEYOR ON THE CRATE, DO NOT LIFT MORE THAN TWO FEET OFF THE FLOOR. DAMAGE TO THE CONVEYOR AND INJURY MAY OCCUR.

Uncrating the Multiline

In most cases, this step has already been completed by the time you are reading this manual. However, in the event you received the manual prior to the machine, follow the next steps to uncrate the machine:

1. Remove the stretch wrap from around the Multiline.
2. Locate and remove the clamp brackets securing the Multiline frame to the crate.
3. Remove boxes and additional items sitting on the lower conveyor of the Multiline.

Contents of the Crate

Before continuing, inspect the contents of the crate and the condition they are in. Below is a list of what you will find with the machine:

1. Electrical schematic and Pneumatic drawings for the machine. (Located inside the electrical enclosure.)
2. Parts Box

Before continuing, check the contents of the parts box. You should find the following items:

3. Oil-CVP Vacuoil: Use for maintenance of the rotary vacuum pump, if equipped, and air supply lubricator.
4. Spare fuses: One for each used on the Multiline.
5. Spare Conveyor Belt: two to three feet of each width.

There may be additional items inside the crate depending on the options purchased with the machine.

Spare Parts

In addition to the spare fuses an optional New Customer Spare Parts Kit is also available. A list of these parts is available upon request.

ASSEMBLING THE MULTILINE

Lifting the Multiline

To remove the Multiline from the crate, a forklift with fork extensions must be used. If fork extensions are not available, then two forklifts must be used. Follow these steps to safely lift the Multiline.



Warning:

**DO NOT LIFT THE MULTILINE BY THE CONVEYOR SIDE RAILS.
SEVERE DAMAGE TO THE CONVEYORS WILL OCCUR.**

1. Using a forklift with fork extensions, position the fork truck on either side of the Multiline. Depending on the options, the center of gravity can be anywhere from 6" (152.4 mm) to 24" (610 mm) from the center toward the electrical enclosure. Forks must reach the tube frame on the opposite side of the Multiline. If two fork trucks are used, position the trucks on each end of the Multiline.
2. Slowly raise the Multiline off the crate, making sure to balance or keep the Multiline level at all times.
3. Move the Multiline into the area in which the machine will be operated.
4. While the Multiline is raised, set the six adjustable legs in the base frame to the required height.
5. Set the machine back down on the floor
6. Level and adjust the machine to the desired height.
7. It may be necessary to lift and adjust the leveling feet until the desired height is achieved.

Additional height adjustment is covered in the A200 Multiline Head manual.

CONNECTING UTILITIES

Electrical Connections



Warning:

HIGH VOLTAGE! WHEN WORKING ON THE A200, THE POWER SUPPLY MUST BE OFF. SERIOUS INJURY OR DEATH CAN RESULT FROM ELECTRICAL SHOCK.

1. Insert the SO cord through the cord connector and tighten. (Rigid conduit may also be attached to the enclosure with the wire to connect to the machine.)
2. Strip approximately 1/2" (12.7 mm) of insulation off from all 4 conductors.
3. Place the green ground wire in the ground terminal and tighten securely.
4. Place remaining three wires in the terminals at top of main disconnect fuseholder and tighten securely.



Figure 2-1. Fuse Block

5. Verify that the power supply is properly grounded to the ground lug at the top of the electrical panel.

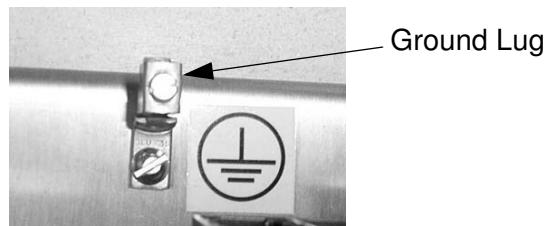


Figure 2-2. Power Supply Ground Lug

6. Turn on the electrical power to the unit.
7. Check the position of the “EMERGENCY STOP” switches, located on the front of the electrical enclosure and on the remote station at the opposite end of the Multiline. Make sure the switches are pulled out in the reset position.
8. On the lower right section of the electrical panel are three motor starter/overloads labeled MSP1 to MSP3. MSP1 and MSP2 are for the two conveyor drive motors. MSP3 is for the vacuum pump, if equipped” Turn the manual switches on the overloads to the off (“O”) position
9. If equipped with vacuum pumps, remove the clear sediment bowls to allow air flow into the vacuum pump.
10. With the enclosure door open, turn the MAIN DISCONNECT to the “ON” position by turning the square shaft on the fuse disconnect block.
11. Turn the manual switch on the overload labeled MSP1 to the on (“I”) position.
12. Depress the recessed button on the MS1 contactor for overload MSP1. This will start the top conveyor, check the flow of the conveyor.
13. If the conveyor flow is incorrect, switch either two of the three wires on the overload terminals labeled T1, T2 and T3. The flow should be correct.
14. Repeat steps 11 through 13 on overload MSP2 for the lower conveyor.
15. If equipped with electric vacuum pumps, repeat steps 11 through 13 on MSP3. However, in step 13 feel the pump exhaust. If pump rotation is correct, you will notice air expelling from the pump exhaust. If rotation is reversed, you will notice a suction at the pump exhaust and the pump will be very noisy.



Warning:

DO NOT RUN VACUUM PUMP IN REVERSE! SERIOUS DAMAGE CAN OCCUR FROM A REVERSED PUMP. THE PUMP SHOULD ROTATE IN THE DIRECTION INDICATED ON THE PUMP HOUSING. IF

THE PUMP IS REVERSED SIMPLY SWITCH THE LOCATION OF ANY TWO OF THE THREE ELECTRICAL SUPPLY LEADS.

Main Air Supply

Connect your air supply line to the air regulator. Turn the air supply line "ON" and check regulator. It must read a minimum of 80 PSI (5.6 bar).



Figure 2-3. Air Connection

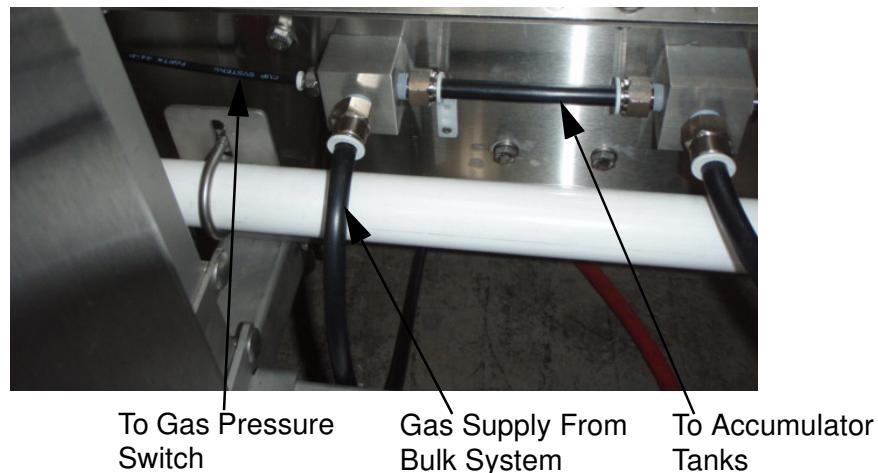


Figure 2-4. Gas Manifold

Gas Supply

1. Install a high flow gas regulator to your gas supply line or gas cylinder.
2. Connect a gas supply hose from the gas regulator to the center fitting of the first gas manifold block, located on the face of the lower conveyor, behind the electrical enclosure. The push-to-connect style fittings feature integral shut-off valves. Turn the gas supply "ON". Set gas regulator from 60 to 80 PSI (4.1 bar to 5.4 bar).

3. Connect the A200 heads to the Multiline and connect the gas lines to the accumulator tank on the heads
4. Check for gas pressure in the accumulator tank by pulling the ring on the pressure relief valve. If no gas is expelled check the fittings and hose for obstruction.
5. Move to the remaining machines and repeat the last step.

ADJUSTMENTS TO MULTILINE COMPONENTS

The Multiline conveyor relies on several controls and components to allow proper operation of the system. While most of these are preset at the factory, adjustments will be necessary before the Multiline can be operated. The following describes how to adjust these controls and components, additional information is available throughout this manual.

Clamp Stop

The clamp stop is the first mechanism a container encounters, it's located at the infeed of the top conveyor. The clamp holds the container and those behind it from entering the Multiline.

The clamp uses a pneumatic cylinder to clamp. Two adjustments can be made to the cylinder for efficient operation. A flow control protrudes through the base plate of the clamp stop, above the electrical enclosure. In addition to the flow control the cylinder is equipped with cushions built into the nose and end. For additional information see Section 7.

Blade Stops

The blade stops control the flow of the containers for the remainder of the conveyor. The mounting bracket is slotted to adjust the blade stop in a position that centers the containers to the A200 head. When multiple container sizes are used, adjust the blade stop for the longest. For additional information see Section 7.

Pushers

The pushers transfer the containers into the A200 head. Two factors that effect how well the containers transfer into the A200 head are weight and material. To control the pushers flow controls on the valve manifold are used. Located on both side of the tubing ports a recessed screw head, straight blade, are used to adjust the flow. For additional information see Section 7.

Transfer Conveyor

The transfer conveyor bridges the gap between the upper conveyor and the tilt conveyor on the A200 head. If improperly adjusted, the containers will not transfer into the A200 head. The top of the transfer conveyor should be parallel to the tilt conveyor on the A200 head. For additional information see Section 7.

Photoeyes

The photoeyes are critical to the safe and proper operation of the Multiline. The Multiline uses a diffuse type of photoeye, this eliminates the need for a reflector. The photoeyes position can be adjusted by pivoting the bracket. The distance the photoeye can read is also adjustable, however the photoeyes located at each station for the A200 head on the upper and lower conveyor need to read the maximum distance. The distance for the photoeye located at the first blade stop must not extend beyond the side of the conveyor. For additional information see Section 4.

SECTION: 3

OPERATION

MACHINE OPERATION

Machine Cycle

The Multiline distributes containers to the A200 head, an automated process with no interaction from the operator. The following is a step by step sequence of how the Multiline operates with the A200 head. To better understand how the Multiline operates two containers will be followed through the Multiline. Container "A" is the first to enter the upper conveyor followed by container "B".

1. Container "A" enters the upper conveyor infeed and stops at the first blade stop, also called the staging stop.
2. The location on the conveyor where the containers are pushed into the A200 head are called zones. Zone 1 is the first zone the containers enter, this feeds the first A200 nearest to the Multiline enclosure. When zone 1 is clear, the staging stop lowers allowing container "A" to proceed.
3. When container "A" is clear from the photoeye at the staging zone, the "Tote Stop Clear" timer starts and when it times out, the Infeed stop goes up. Now container "B" is at the staging stop.
4. In the first zone one of two actions will occur to container "A".
 - A container may be needed in the next zone. If so, the blade stop would lower and container "A" proceeds to the next zone. Once the container is clear from the photoeye in the first zone the stop will raise and container "B" will move to the first zone.
 - The A200 head may request a load. The pusher would extend, transferring container "A" into the A200 head.
5. The lower conveyor has a photoeye at each A200 head location angled to see if a container is in the "Dump" zone of the A200 head. Before the container can be "Dumped" to the lower conveyor, the A200 head looks for a "clear to dump" signal. To achieve this signal the zone in front of the machine and the zone feeding into it must be clear. When ready and the signal is given, the A200 head dumps containers" on to the lower conveyor and the container is transported off the Multiline.

Note: Step by step sequence of operation for the A200 are found in the A200 head's manual.

OPERATOR CONTROLS

Electrical Enclosure

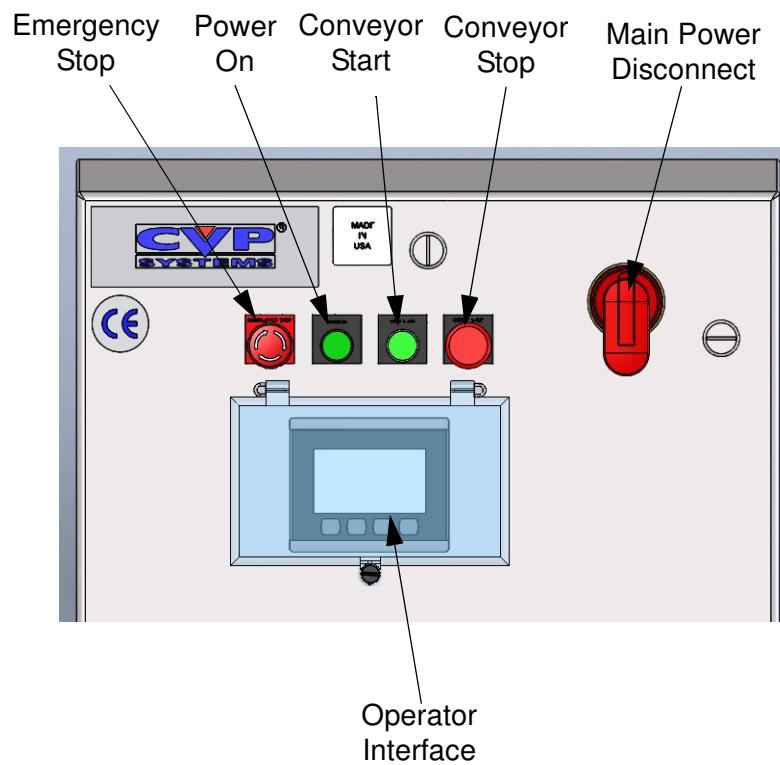


Figure 3-5. Multiline Control Panel

The electrical enclosure, located at the infeed of the upper conveyor, houses all the necessary controls for the Multiline.

Operator Interface

Figure 3-6. Operator Interface

The operator interface is located outside the electrical enclosure door. The interface gives the operator access to PLC control timers and will also display faults detected by the PLC.

OPERATION PRECAUTIONS

Safe Operating Practices

It is important to know and understand the safety precautions before operating the A200 Multiline. Improper and unsafe operating habits will cause injury to the operator.

- **Do not lean on or near areas of the machine that move.** Loose clothing or parts of your body may become pinched in the machine.
- **Do not operate with loose or damaged parts.** This will only cause harm to the operator and/or additional damage to the machine. Repair or replace faulty parts before operating the machine.
- **Use the machine in the manner for which it was designed.** Operate the machine as directed in this manual or as instructed by a CVP representative. Again, improper use of this machine will result in injury or cause additional damage to the machine.
- **Do not exceed weight limits of the Multiline.** Exceeding the weight limits will cause damage to Multiline belt and frame.

SECTION: 4

CONTROL DETAILS

OPERATOR SWITCHES

Power On

After the conveyor is installed with the A200 machines in place and connected, the Multiline conveyor is ready to be powered up. Make sure the E-stop button is pulled out. Turn on the main power disconnect by turning the handle clockwise to the ON ("I") position to supply power to the conveyor. Next, enable control power by pressing the "POWER ON" push button. When illuminated, conveyors and electric vacuum pumps (if any) can be started.

Vacuum Pump

The Multiline conveyor may be equipped with optional electric vacuum pumps. In this case, the pumps will start when the "POWER ON" button is pressed. Manual motor starters for the vacuum pumps can be shut off inside the enclosure and the conveyor will still operate. This is useful when the A200 machines are in "BYPASS" or "SEAL ONLY" modes and do not require the vacuum pumps.

Conveyor Start/Stop

With the "POWER ON" light illuminated, press the "CONV START" pushbutton on the main panel or remote station to start the upper and lower conveyor drive motors. Pressing the "CONV STOP" pushbutton will stop the conveyor drive motors.

Emergency Stop

There is an emergency stop push-pull switch on the main panel. When pushed in, vacuum pump and conveyor operation is disabled. All PLC outputs are disabled. Stops will be down and pushers back. No conveyor clear signal can be sent to the machines so they cannot automatically dump. When ready to operate again, pull the E-stop button to reset and press the "POWER ON" button again.



Figure 4-1. Conveyor front push buttons



Figure 4-2. Conveyor is stopped

MAIN MESSAGE SCREEN

Display Areas

The boxed display area shows operator prompts and alarm messages. In normal operation, it will indicate if the conveyor is stopped or running. When alarms occur a message is displayed and the background will change to flashing red.

The lower display line shows the menus that can be jumped into by pressing their function keys below.



Figure 4-3. Main Message Screen

Function Keys

Press the TIMER key and the display jumps to the TIMER menu. User password must be entered.

Press the CNTR key and the display jumps to the COUNTER menu.

Press the CONFIG key and the display jumps to the CONFIG menu. Special password protected.

Timer Menu

Press the TIMER key to enter the TIMER menu.

The ENTER PASSWORD popup menu appears. The User and Password are "200". The cursor should be in the User box. Enter "200" then touch the box next to Password. Enter "200" again. Press the ENTER <-- key at the

lower right to advance to the TIMER menu. If the wrong password is entered, access will be denied.



Figure 4-4. Enter Password Popup Screen

There are 10 presets in the menu. The top preset item is Infeed #1 Block time.



Figure 4-5. Top Preset Item (Head Dump Time)

The upper box shows the current value of the preset. Use the DEC key (F3) and INC key (F4) to change the value. The middle box gives the units and adjustable range. Use the PREVIOUS key (F1) and NEXT key (F2) to advance through the 10 individual Preset parameters. Hit the MSG key (F5) to return to the main menu and enable the changed settings.

Hint: To change preset values using the numeric keypad, touch the value you want to change (0.0 in the figure above) on the touchscreen. The popup keypad will appear. Type the new value in and press ENT. You will see the new value in the settings menu.

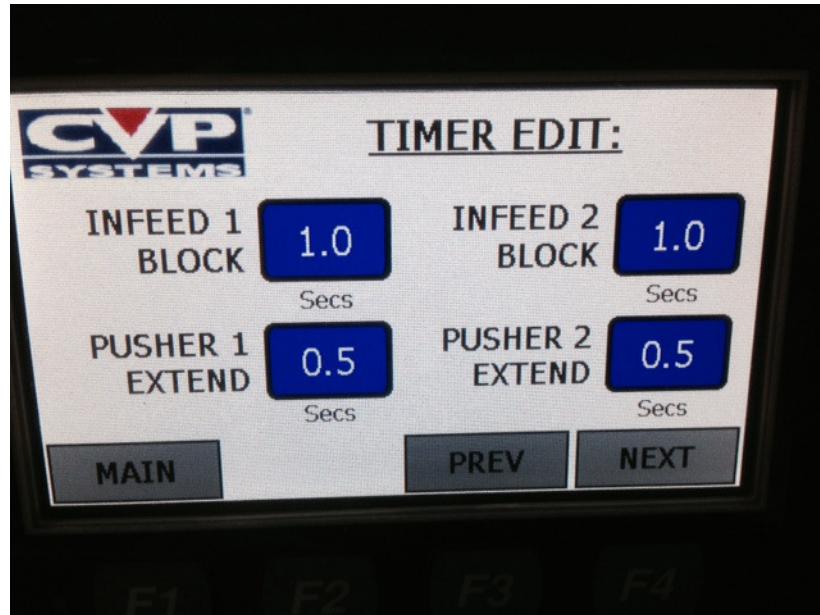


Figure 4-6. Numeric Keypad popup screen

Preset Functions Preset functions are described below in their order on the menu:

TOP OF MENU

1. Head Dump Delay timer should be set to the time it takes a dumped box to clear the downstream machine's dump zone. Factory setting: 2.0 seconds. This timer starts when the upstream photo eye senses a box pass.
2. Tote Stop Clear Timer. When the Infeed tote photo eye no longer senses a box in the zone, the timer starts and when it times out, the Infeed stop goes up. Factory setting: 0.3 second
3. The Exit Block shutdown time: When the exit photo eye is on, the timer starts. After it times out, the exit conveyor will shut down. The exit conveyor will remain shut down until the photo eye is clear and the CONV.

START push button is pressed again. This timer only is set in tenths of seconds. Factory setting: 60.0 seconds

4. FEED CONV OFF delay is the time delay to energize the box clamp and turn off FEED CONV relay after the Infeed approach photo eye senses a second box in the staging area. Contacts for feed conveyor control are normally open. When de-energized, the feed conveyor goes OFF. Factory setting 0.0 seconds
5. The Infeed conveyor loading section 1 photo eye blocked time: Upon a box entering loading section 1, the timer starts. After it times out with stop #1 up, the #1 pusher loader is enabled and will push upon a load request from machine #1. Factory setting: 1.00 second
6. The Pusher 1 extend time: Time the #1 pusher is enabled (extending or extended) before it retracts. Factory setting: 0.50 second
7. The Infeed conveyor loading section 2 photo eye blocked time: Upon a box entering loading section 2, the timer starts. After it times out with stop #2 up, the #2 pusher loader is enabled and will push upon a load request from machine #2. Factory setting: 1.00 second
8. The Pusher 2 extend time: Time the #2 pusher is enabled (extending or extended) before it retracts. Factory setting: 0.50 second
9. The Invert photo eye preset: It should be set to 1 on conveyor models when the exit conveyor flow is the same direction as the top conveyor. These conveyors are on Multilines with “Left to Right” or “Right to Left” configurations. It should be set to 0 on conveyor models where exit conveyor flow is opposite that of the top conveyor. These are on Multilines with “Right to Right” or “Left to Left” configurations. The program needs to know if a particular machine’s exit zone and the upstream exit zone are clear before it can send a “clear-to-dump” signal to that machine. Cannot change from factory setting. READ ONLY.

BOTTOM OF MENU

Box Count

Check the running count by pressing the CNTR key in the main menu.

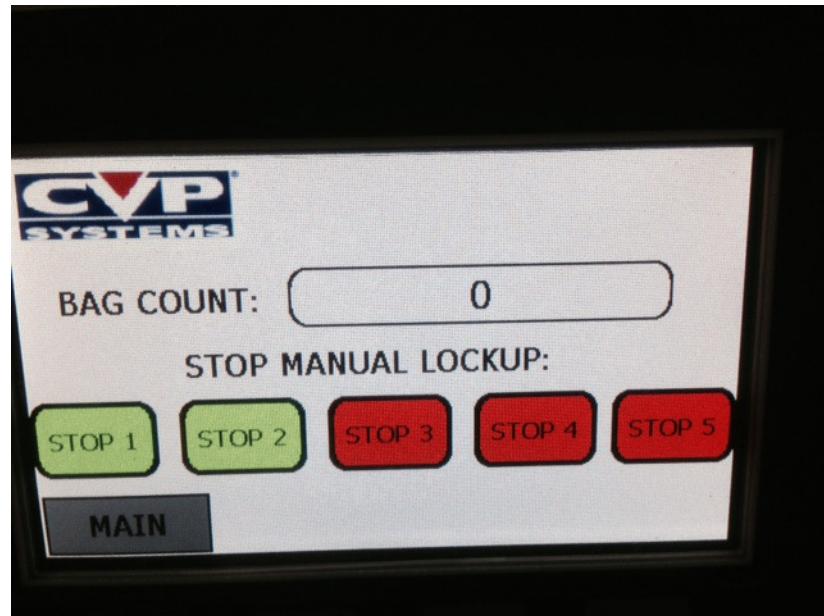


Figure 4-7. Box Count screen

Counters increment every time a box is pushed into a machine. There is a count for each machine and a running total. At 99999999, counters wrap around to zero again. Pressing CLR resets all counters to zero. Press MAIN to return to the main menu.

Stop Manual switches

The STOP MANUAL switches lock the position of the stop blades. Position #1 stops containers in front of the pusher behind the A200 machine closest to the infeed (Machine #1). Position #2 stops containers in front of Machine #2, etc.

When operating all positions of the Multiline the stop switch should be to the green position. Then the stops will automatically raise and lower to control the flow of the containers being transferred into the A200 machines. By turning the switch to the red position the corresponding blades will stay in the up position, preventing containers from passing beyond them.

With only the STOP switches 1 and 2 green (shown above), containers will only transfer into the #1, #2 and #3 machines. No containers would be transferred into the #4 or #5 machine. For a 3 position system, this is the normal setting.

Locking stops up is useful if less than 3 machines would keep up with production or a machine is removed from the Multiline for maintenance.

**Configuration
Menu**

Protected menu to change Infeed Conveyor direction or access the terminal program settings.



Figure 4-8. Configuration menu (protected)

Alarms

Alarms that occur during operation of the A200 Multiline Conveyor must be acknowledged. When alarms occur, an alarm popup window appears on the interface. The background color of the screen will change from green to flashing red to alert the operator.

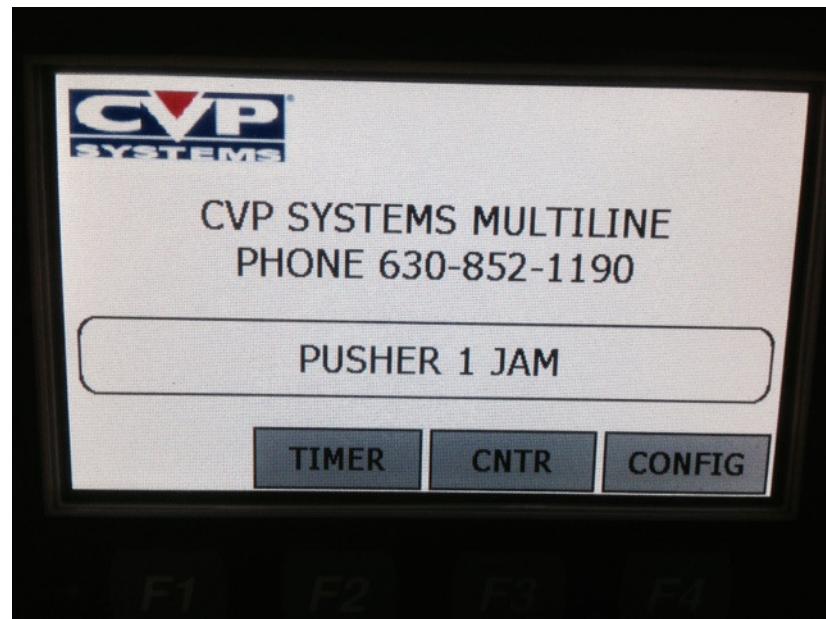


Figure 4-9. Alarm condition - Pusher 1 Fault

The above figure shows a typical alarm popup screen. The following alarm messages may appear:

1. Pusher #1, #2, #3 #4 or #5 Jam

Indicates that the corresponding pusher has been retracted and disabled due to a jam. A jam will occur if the pusher retracted limit switch fails to make within one second after extension. A jam will also occur if the loading photo eye still senses a load immediately after the pusher retracts. Clear the jam by removing the load from the photo eye path. Pressing the CONVEYOR START button will clear the alarm if the load remains in front of the photo eye and attempt to push it again.

2. No Gas Alarm

Indicates that gas pressure is below 20 psi. Pusher operation is disabled. Restore gas pressure to clear the alarm.

3. Exit Conveyor Backup

The exit conveyor photo eye has been blocked for longer than the alarm timer. The lower conveyor will stop. Clear the jam by removing the load from the photo eye path. Press conveyor START push button to restart exit conveyor.

PHOTOEYE SETUP AND ADJUSTING

Photo eye Display

All photo eyes on the multiline conveyor and machines are wired for “dark on” operation. When a target is sensed, the orange operation indicator light on the photo eye will illuminate. The black wire from the photo eye cable is wired to the PLC input which should light at the same time.

There is an adjustment trimmer on top of the photo eye that adjusts its sensitivity. Maximum detection range (fully CW) is 3 feet.

Photoeye setting

On the upper conveyor, the function of the photo eyes is to sense when a box is in a loading zone, ready to be pushed onto a machine for processing.

There is a photo eye for each loading zone. It is mounted just upstream of the zone on the machine side of the conveyor pointing downstream diagonally so that it can see any box in the zone yet not pick up the rail on the opposite side.

These three photo eyes should be set to read the maximum range. Set the adjustment screw fully CW. There are timers for each photo eye that set the delay time for pushing the box after the phot eye senses a load in the zone.

For zone 1 (closest to the feed conveyor), the timer is “Infeed 1 Block”. For zone 2 it is “Infeed Block 2” and for zone 3 it is “Infeed Block 3”, etc. These timers are in the Preset menu of the operator interface. The factory settings are all 0100 = 1 second.

There is an additional photo eye on the upper conveyor that senses when a box is in front of the Infeed Stop.

This photo eye is mounted on the machine side just upstream of the Infeed Stop. It should be set so that it can sense halfway across the conveyor. Set the adjustment screw about midrange. Do not aim it straight across the conveyor or it can pick up reflections. Point it 5 degrees upstream of straight across (away from the Stop) for best results.

The infeed approach photo eye senses when there is a second box in the staging area. Set similarly to the Infeed stop photo eye except to sense the second box in line.

Three photo eyes on the lower conveyor should be set to read the maximum range. Set the adjustment screw fully CW. These phot eyes sense blockages on the lower conveyor and will inhibit dumping from that machine zone and the upstream zone when lit up.

MACHINE COMM. CABLES

The conveyor to machine communication cables must be plugged in for each machine to be able to dump and for the conveyor to be able to push in a box. The network type cable RJ-45 end plugs into the terminal jack in each the machine head. To remove a machine head for service, unplug the cable from the jack and remove it's cord grip from the enclosure so the cable stays with the conveyor.

The communication cables at each station route to the conveyor panel where they are hard wired into terminals blocks.

When a machine along the conveyor has a load request, it's output (O-2, card 2) will be lit. This appears as a load request in the conveyor PLC if the machine cables are connected. If a box stops in the machine's loading zone and there is a load request from that machine, the conveyor will push the box onto the machine load shelf.

When a station along the conveyor is clear to dump, the conveyor PLC sends an output that appears as a conveyor clear signal in the machine PLC. input I-2, card 2 will be lit. When is lit and the machine has finished processing a box, it will automatically dump to the lower conveyor.

SECTION: 5

VACUUM SYSTEM

GENERAL INFORMATION

There are two vacuum systems offered on the Multiline system.

1. Vacuum manifold system with high capacity, rotary vane, vacuum pumps mounted on the Multiline conveyor

See Section 10 for maintenance information regarding this style of vacuum pump.

2. Individual venturi vacuum pumps on the A200 heads.

For additional information on this style of vacuum system see the manual supplied with the A200 sealing head machines.

SECTION: 6

GAS SYSTEM

GAS FLUSH SYSTEM

Important: Do not connect compressed air to the gas system. Compressed air is not a modified atmosphere gas and will contaminate the product.



Warning:

APPLICATIONS USING OXYGEN REQUIRES SPECIAL “OXYGEN CLEAN” COMPONENTS. CONSULT WITH YOUR CVP REPRESENTATIVE FOR FURTHER DETAILS.

General Information

The Multiline has a Gas Manifold system to distribute gas to each A200 head. This provides for a single point connection requiring only one gas supply line run to the Multiline.

Determining Gas Time

For each pound of product a certain amount of gas, in cubic inches, is required to backflush into the bag. The gas amount is controlled by timers in the PLC. The timers can be adjusted through the operator interface, see section 4. To set the timers, cycle an empty bag on the A200 and check the final gas amount in the bag, see below for instruction on how to check the gas amount. Adjust the timers accordingly. If more gas is needed increase the gas timers, if less is needed decrease the timers.

To check the amount of gas follow the instructions below:

1. Place the bag on a flat surface and place another flat object on top of the bag, i.e. a sheet of card board, parallel to the lower flat surface. This will sandwich the bag.
2. Measure the length and width of the bag as well as the distance between the two flat objects.
3. Multiply these dimensions to determine the volume in the bag.
4. Compare this amount to the amount required.

Consult a CVP Systems representative for the amount of gas per pound required for your application.



Figure 6-1. Gas Connection

Gas Connection Connect the gas supply to the center fitting of the first gas manifold block. The manifold blocks are located on the operator side of the lower conveyor frame. The push-to-connect style fitting features an integral shut-off valve.

Gas Sensor The gas sensor is located in the bottom of the electrical enclosure. The gas line runs from the gas manifold to an elbow fitting on the gas sensor. If the gas pressure drops below 20 PSI (1.4 bar), the “NO GAS” light illuminates and the Multiline will not transfer containers in or out of the A200 head.

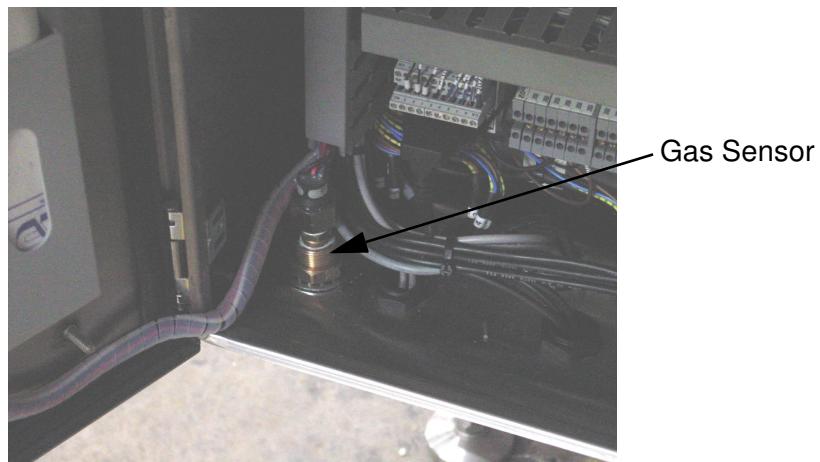


Figure 6-2. Gas Sensor Location

A200 Head Connection

The push-to-connect fittings on the gas manifold blocks feature integral shut-off valves. To remove an A200 head from the Multiline, push the collet on the fitting and pull out the tubing to disconnect the hose. This allows the remaining heads to continue gas flushing.

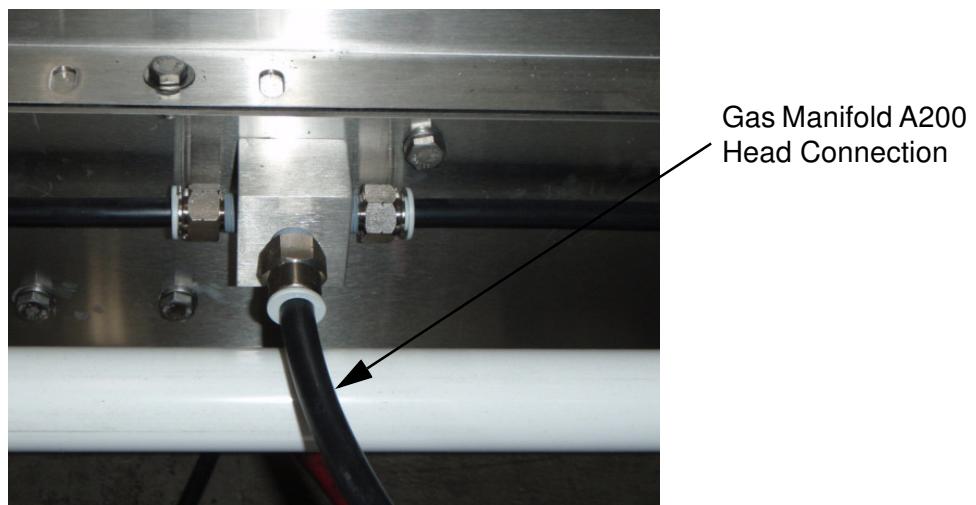


Figure 6-3. Gas Manifold Block

SECTION: 7

CONVEYORS

CONVEYOR SAFETY

- Lockout the main power disconnect before performing maintenance on the conveyors.
- Remove or shut off air supply to the multiline when performing maintenance on pneumatically operated components.
- Do not operate the conveyor with the guards removed unless necessary for maintenance purposes.
- Keep all body parts and loose clothing away from the conveyors during operation.
- Do not walk or stand on the conveyor. Injury could occur if the conveyor starts unexpectedly.

GENERAL INFORMATION

The Multiline consists of two conveyors, an upper and lower. The upper conveyor indexes and transfers containers into the A200 heads. The lower transports the containers out of the Multiline.

Conveyor Belts

The Multiline uses a plastic chain style conveyor belt. The upper conveyor uses a triple chain belt to allow blade stops to raise between the belts and stop the containers in the needed positions. The lower conveyor is a full width belt to allow containers to slide across the belt as it exits the A200 head. The belt is perforated to allow fluids spilled on the belt to drain off.

The conveyors do not have a belt take up to tension the belt; table top chain does not require tension to operate. If the belts become loose, simply remove a link from the belt.

The belts are USDA 3A approved and can be removed for sanitation and maintenance.

The belts run on UHMW rails that provide support and prevent wear to the conveyor belts. The upper conveyor uses an "L" shaped rails to guide the two chains. The lower uses a "T" shape rail on the top carrier belt and a serpentine rail system for the return. The rails can be replaced as they become worn.

Conveyor Drives

The upper and lower conveyor on the Multiline have an independent drive motor and reducer. Both units are identical, as both conveyors operate at the same speed. Proper maintenance will prolong the life of the drives.

The reducer is filled with gear oil, check with the manufacturer's documentation for type and grade of oil. The oil level should be to the middle of the output shaft.

The reducer is equipped with a breather plug located on the side near the top of the housing. The breather plug relieves pressure that builds inside the reducer as the oil heats while in operation. If the vent on the breather plug becomes blocked, pressure in the box could cause the seals to fail.

The reducer has hollow input and output shafts, eliminating the need of couplers. This provides a positive link between the reducer and motor. In the event the motor has to be removed from the reducer, apply anti-seize compound to the shaft when reassembling.

The drive shaft is square to provide a stronger more reliable attachment of the conveyor belt sprockets. The drive sprockets on the upper conveyor are captured by two retaining rings to maintain proper position of the belts. The center drive sprocket on the lower conveyor is captured to prevent the belt from tracking from one side to another. The other drive sprockets on the

lower conveyor are free to move along the square shaft, however when the belt is on the conveyor these sprockets will stay in position.

Each drive has a bearing mounted to the outside of each conveyor frame rail. These bearing have a grease fitting pointed towards the end of the conveyor for easy access. The bearings are packed with food grade grease from the factory and should be greased on a regular basis depending on operating time. The bearings have a cap to prevent grease from dripping during operation.

Conveyor Tails

The tail assemblies for the conveyors are similar to the drive. It uses a square shaft with a captured center sprocket.

The tail assemblies also have bearings requiring the same maintenance as the drive assemblies.

Conveyor Frame

The conveyor construction uses formed frame rails with square crossmembers. The UHMW rails that support the conveyor belts mount to the angle cross members.

The conveyors are mounted on a tubular frame and held in position with square u-bolts. This allows the conveyor position to be adjusted if necessary.

REPLACING THE CONVEYOR BELTS

Important: At least two people will be needed to remove and replace the conveyor belt.

Removing the Belts

To properly and safely remove the conveyor belts, follow the instructions below.

1. Lockout power on the Multiline.
2. Remove the cover on the end of the conveyor.
3. Locate the end of the hinge pin with the flanged head. The head keeps the pin locked in the belt to prevent it from sliding out. Using a 1/4" (6.4 mm) diameter or smaller punch and hammer tap on the pin opposite the head until the pin pops free of the belt.
4. Remove the pin, the belt will now be free.

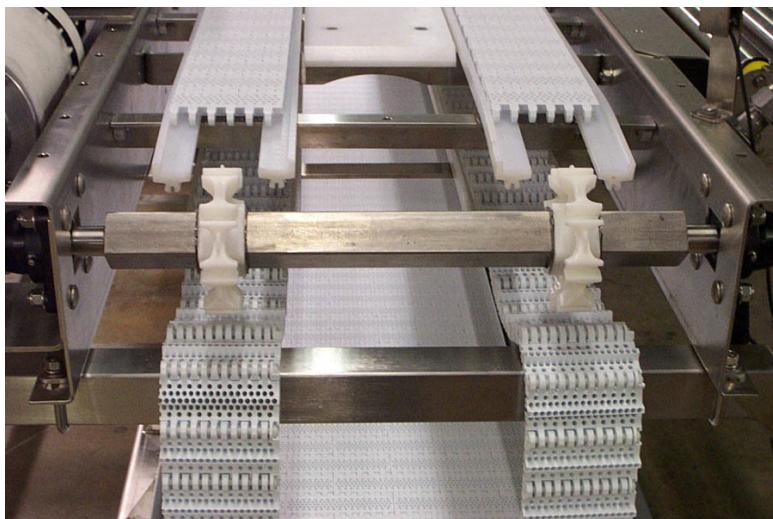


Figure 7-1. Upper Conveyor Belts with Pin Removed at Drive

5. Go to the drive end of the conveyor and pull the top belt off the conveyor. With the top belt removed, pull the lower belt off the conveyor.

Note: If removing the belt on the upper conveyor, remove the belt furthest from the drive first. The free tail sprocket will prevent the other belt from moving making the removal easier.

6. Inspect the sprockets and UHMW rails for wear and damage, replace if necessary.

Replacing the Belts

To properly and safely replace the conveyor belts follow the instructions below

1. From the drive end of the conveyor feed the belt through the belt return with the belt's top surface facing down.

- Note:** When replacing the upper conveyor belt, start with the drive side.

2. When the belt reaches the tail side, one person can pull the belt while the other continues to feed the belt.
3. As the belt reaches an opening in the side rails, the remaining belt can be rolled across the top conveyor.
4. Pull both ends of the conveyor belt to remove all slack from the belt.
5. With the slack removed lay one end of the belt on the rails and hold in position.
6. Pull the other end of the belt over the top of the other and locate where the overlapping belts meet.
7. Remove the excess belt and splice the two ends together.
8. Take a new pin at least 2" (50.8 mm) longer than the belt width and cut the end at approximately a 45 degree angle. Insert the pin into the belt splice until the head hits the belt.
9. Using a punch and hammer, tap the head until it is locked into the belt.
10. With the pin in location, cut the remaining pin extending from the other side using a pair of side cuts. Cut the pin flush to the side of the belt to prevent it from snagging on the conveyor frame.
11. Replace the covers on the end of the conveyor.
12. Turn power back on and start the conveyor. Inspect for improper tracking and adjust if necessary.

Adjusting the Tension of the Belt

In time, the belts will stretch to the point that too much slack causes the belt to skip on the drive sprockets. This can be repaired by removing a small section of the belt. Below is instruction to adjust the tension of the belt.

1. Lock out the main power.
2. Remove one of the pins to split the belt.
3. Hold one end of the belt in position and overlap the other end.
4. Note where the belts met and remove the excess belt, usually one or two links.
5. Splice the two ends together and replace the pin.
6. Lock the pin into position and remove any excess pin.
7. Restore power and start the conveyor and inspect for proper tracking.

SECTION: 8

COMPONENTS

CLAMP STOP

Clamp Stop Description

The clamp stop is located at the infeed of the upper conveyor, above the electrical enclosure. The clamp stop stroke length will accommodate all container widths capable of running on the Multiline.

Clamp Stop Operation

The clamp stop is activated when a container is needed in the machine zones. Once the clamp stop is activated and the container is clamped, the first blade stop lowers releasing the container ahead of the clamped container. When the container entering the machine zones is clear, the blade stop will raise and the clamp stop retracts releasing the container

Important: The clamped container can stop additional containers accumulating behind it on the infeed conveyor. However, positive drive conveyors limit the number of containers that can accumulate. Eventually enough pressure will build to cause the container to be pushed into the Multiline, even with the clamp stop activated. Containers with tapered sides can cause the containers to lift and spill off of the conveyor when enough pressure is produced.

Clamp Stop Adjustments

The clamp stop uses a linear guided cylinder to extend and retract. The cylinder is equipped with a regulator and air cushions at the end of the stroke. On the rear of the cylinder, a flow control slows the clamp stop as it retracts. This reduces the slamming that occurs when the cylinder has reached the end of its stroke, prolonging the life of the clamp mechanism. The cushions and flow control are adjusted to the proper settings at the factory and should not be readjusted. The air regulator may be adjusted to change the clamping force of the stop to prevent carton damage.

BLADE STOPS

Blade Stop Description

The blade stops are located in the upper conveyor of the Multiline. The blade of the pneumatically operated mechanisms pivots between the belts.

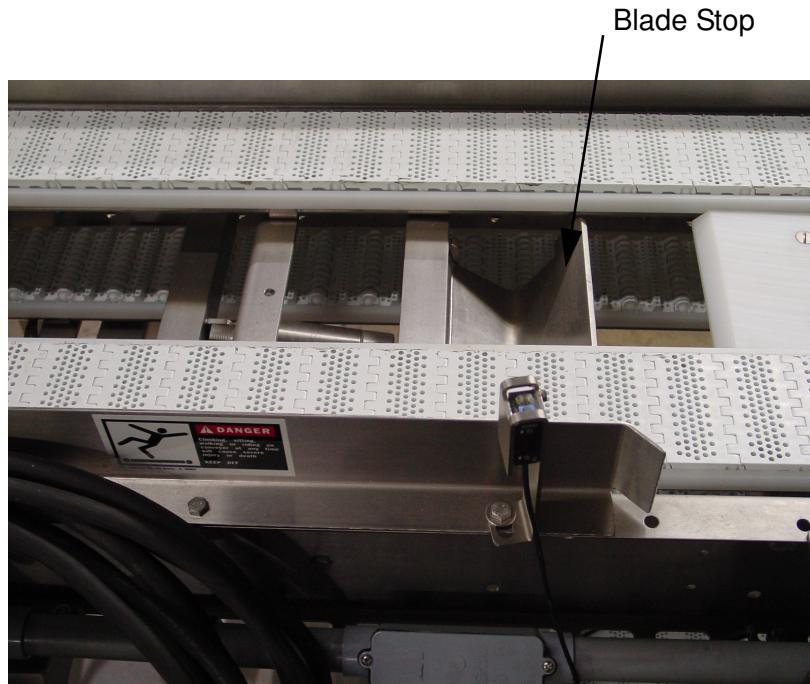


Figure 8-1. Blade Stop in Down Position

Blade Stop Operation

There are two blade stops on a two head Multiline and three on a three head Multiline. The first blade stop is in the indexing, or staging, zone. This blade stop releases one container at a time into the machine zones. In the machine, zones up to two additional blade stops hold the containers behind the A200 heads. The last machine zone uses the end cover to stop the containers.

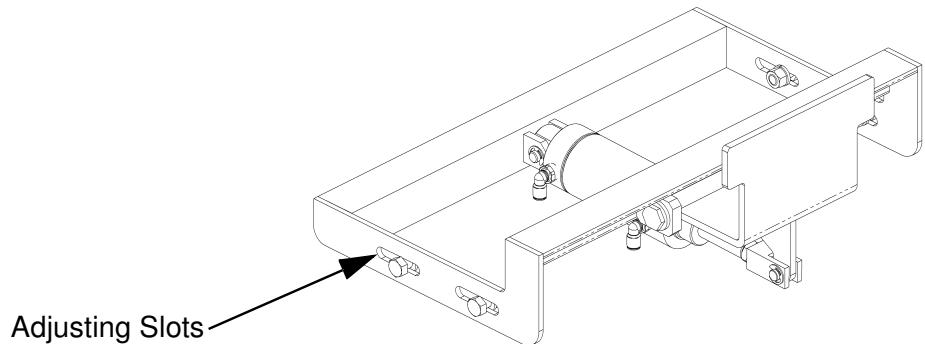


Figure 8-2. Blade Stop Adjustment

Blade Stop Adjustment

The blade stop mounting bracket has slots that allow the mechanism slide into different positions for different box lengths. This will center the container to the A200 machine as it is transferred. To adjust the blade stop, loosen the four mounting bolts and slide the blade stop into the needed position.

PUSHERS

Pusher Description	The pusher is located in each machine zone behind the A200 head. The pusher has a 12" (305 mm) stroke cylinder to push the containers off the upper conveyor into the A200 head.
Pusher Operation	When the A200 machine requests a container and one is in the machine zone on the conveyor, the pusher extends, transferring the container into the A200 head. The pusher stays extended for 1/2 second then retracts. After the pusher is retracted, the infeed photoeye must be clear or it generates a jam alarm. Two seconds after pusher extension, the pusher retracted input must go on again or it generates a jam alarm. If the pusher retracted signal is not received, containers will not be released into that zone.
Prox Switches	A Prox switch on each pusher detects when it is in the retracted position. The switches detect the end of one of the thrust rods on the linear guide when the pushers are fully retracted.



Figure 8-3. Pusher Retracted Prox Switch

Pusher Adjustments	The pusher cylinders are equipped with cushions at each end of the stroke. This reduces the slamming effect that is produced when the cylinders reach
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the end of the stroke. The cushions are adjusted to the required setting at the factory and should not be readjusted. Below are instructions to adjust the prox switches.

1. Remove the cover from the pusher. There are 4 bolts holding it to the frame.



Warning:

THE POWER TO THE MULTILINE CONVEYOR SHOULD REMAIN ON. HOWEVER, TURN OFF THE POWER TO THE A200 HEADS TO PREVENT A LOAD REQUEST. IF A LOAD REQUEST IS MADE AND THE PHOTOEYE BECOMES BLOCKED, SEVERE INJURY WILL OCCUR WHEN THE PUSHER ACTUATES.

2. The switches can be adjusted by loosening the locknuts and adjusting the switch higher or lower off the pusher frame. Adjust so that the end of the prox switch is 1/4 inch from the rod when extended. Never set boxes on the pusher frame because it will flex the frame and may cause the prox switch to come out of range. Sensing range is up to 1/2 inch. The prox switch cable has a quick disconnect to allow for easy replacement.
3. Slide the prox switch along the slot on the pusher frame until the orange light on the switch illuminates.
4. Retighten the lock nuts to secure the switch into position.
5. Identify the valve that actuates the pusher and lock the manual override to keep the pusher fully extended. The valve is located in the bank of valves behind the electrical enclosure. The valve can be identified by the electrical schematic, the pneumatic circuit drawing or by manually overriding the valves until the valve is identified.



Warning:

WHEN MANUALLY OVERRIDING THE VALVES, KEEP PEOPLE AWAY FROM THE PNEUMATIC MECHANISMS TO PREVENT INJURY.

6. Verify that the orange light on the prox switch goes off.
7. Replace the cover and test the pusher with a container. When working properly, containers will index into the machine zone and the pusher will extend and retract.

TRANSFER COMPONENTS

Transfer Filler

The transfer fillers are located between the conveyor belts in each machine zone on the upper conveyor behind the A200 heads. The fillers provide a surface to support the containers to slide across the gap in between the belts while being transferred into the A200 Heads. The plate sits slightly below the top surface of the belts to prevent drag on the containers as they travel down the conveyor. The filler is a fixed component requiring no adjustments.

Transfer Conveyor

The transfer conveyor is mounted to the side of the upper conveyor in each machine zone. There are three rollers in each transfer conveyor to support the containers as they are pushed into the A200 head. The angle of the transfer conveyor is adjustable to efficiently and smoothly transfer the containers.

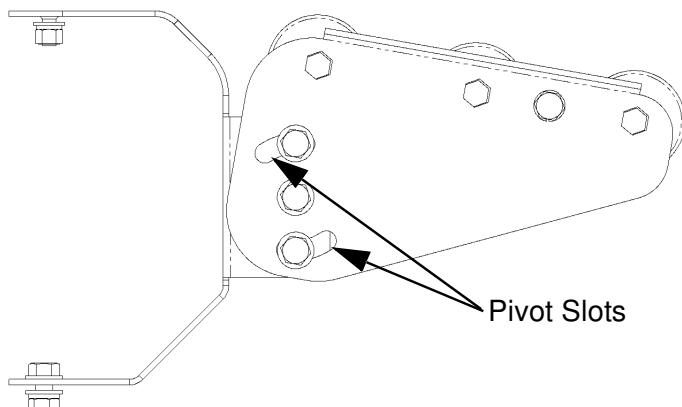


Figure 8-4. Profile of Transfer Conveyor Showing Pivot Slots

To adjust the angle of the transfer conveyor, loosen the three bolts on each side plate. The upper and lower bolts are in radius slots that allow the transfer conveyor to pivot. Raise the tilt conveyor on the A200 machine. Align the transfer conveyor to the angle of the tilt conveyor. Retighten the bolts and transfer a container into the A200 machine.

SECTION: 9

CLEANING

CLEANING INFORMATION

Selection of appropriate and effective cleaning solutions will depend on individual plant needs, sanitation procedures and industry regulatory requirements and are the customer's responsibility.

All cleaners should be checked for their corrosive properties which can have a potential negative impact on the following materials which are used in our product line:

- 303/304/316 Stainless Steel
- Viton
- Teflon
- Polypropylene
- SAN
- PVC

VACUUM MANIFOLD CLEANING INSTRUCTIONS

1. Press E-stop on the main conveyor panel. The electric pump for the manifold is disabled. This is a good time to clean the sediment bowl in the line just before the pump inlet.
2. There is also an inlet filter under the inlet block on top of the vacuum pump. Loosen the plastic union and remove the 4 bolts holding the inlet block to access this filter. This needs to be cleaned only in very dusty conditions.
3. Make sure filter and bowl are back in place with o-ring snug before running vacuum in Pack 1,2 or 3 again. Reassemble all piping.
4. Release E-stop and press POWER ON button on the conveyor panel. Vacuum will draw residual water in the system back into the clear sediment bowl.

Important: Make it standard practice to empty all filter and sediment bowls of water before starting the conveyor.

SECTION: 10

MAINTENANCE

MULTILINE MAINTENANCE SCHEDULE

It is recommended to maintain the Multiline on a regular basis to prevent production down time. The figure below shows the maintenance schedule for the Multiline conveyor.

PROCEDURE	DAILY	3 MONTHS	DONE
OIL LEVEL IN OPTIONAL VACUUM PUMPS	X		
OIL LEVEL IN GEAR BOXES		X	
OIL LEVEL IN AIR LUBRICATOR	X		
EMPTY WATER FROM SEDIMENT BOWLS	X		
INSPECT CONVEYOR BELTS FOR DAMAGE	X		
INSPECT CONVEYOR FOR LOOSE OR MISSING HARDWARE	X		
GREASE BEARINGS ON CONVEYOR DRIVES AND TAILS	X		
INSPECT FOR AIR LEAKS	X		
INSPECT GAS MANIFOLD FOR LEAKS	X		
INSPECT OPTIONAL VACUUM MANIFOLD FOR LEAKS	X		
REPLACE OIL AND FILTERS IN VACUUM PUMP		X	

Figure 10-1. Maintenance Schedule

REGULAR MAINTENANCE

Regular maintenance is the key to product longevity with the A200 PLC machine or any other machine. When a preventive maintenance schedule is followed, the operating efficiency of the machine is maintained and breakdowns are reduced. This section of the manual will take you through an extensive routine check of the unit. This is the same type of inspection used by CVP Service personnel to evaluate the condition of older equipment.

Items which need regular attention and/or service are brought to your attention below.

Visual Inspection

1. Check overall appearance of the machine. Look for things which obviously need attention such as broken/ missing parts, worn out parts, etc.
2. Observe the machine while it is running.
3. Determine if the machine is operating satisfactorily. Get input from the operators and area supervisors. They can readily inform you of any recent malfunctions.
4. Start the conveyor and cycle the machines.

Air Supply Regulator / Lubricator

Check air pressure:

- Air supply regulator: 80 PSI (5.4 bar)
- Check oil level in lubricator DAILY

Remove air pressure from the system (this can be accomplished by either removing air supply line, when quick disconnect is used, or by turning regulator pressure down to zero), remove oil bowl and check contents. Fill with CVP Vacuoil, mineral oil, or 10W oil. The rate of oil delivery is controlled by turning the adjusting screw CCW for more or CW for less oil delivered. CVP sets the oil rate at one drop of oil every 17-20 cycles.

Gas Supply

Check gas pressure:

- Recommended pressure is 60 to 80 PSI (4.1 to 5.4 bar).

Important: Inspect supply line for kinks, leaks, or any other physical damage which may adversely affect gas flow.

VACUUM PUMP MAINTENANCE

High capacity vacuum pumps oil level should be to the top of the sight glass located on the pump's side (facing outward from rear of Multiline). Notice the color of the oil. Compare it to the color chart near the sight glass. Oil will range in color from almost clear to brown. Change oil and oil filter when color is darkened. Use only recommended oils, such as CVP Vacuoil III (CVP P/N 7707-VO3). Do not use detergent type oils, like hydraulic oil, motor oil, penetrating oil, etc.



Figure 10-2. High Capacity Pump

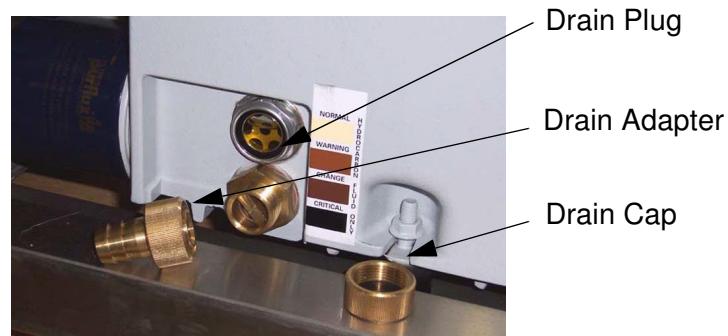


Figure 10-3. High Capacity Pump Drain Components

The drain plug on the high capacity pump is equipped with a spring loaded shut off valve. A supplied drain adapter opens the plug when threaded on the drain plug. The hose can be attached to this adapter to allow the oil to be drained into a container, providing a cleaner oil change. During normal operation of the A200 the drain plug cap must be in place.

Primary Sediment Bowl

Check primary sediment bowl (clear acrylic): Water or other foreign particles must be emptied from the bowl. Turn vacuum pump off. Press the red button on top of the filter cap to relieve the vacuum pressure. Make sure to

replace the black O-ring after emptying. Vacuum loss will occur if the O-ring is missing or improperly installed.

Secondary Sediment Bowl

Check the secondary sediment bowl (aluminum filter can): Empty any water or other foreign particles. Check condition of filter, (brown in color). If filter is noticeably dirty, damaged or missing, replace at once. Vacuum loss, pump overheating or pump failure can result from operating pump without adequate filtration. These filters are relatively inexpensive and should be kept in stock for immediate replacement.

Vacuum Exhaust System

Located inside the exhaust port is a demister filter. This filter removes the oil mist from the air circulating inside the pump. This filter needs to be replaced periodically. A plugged demister filter will cause the pump expel smoke from the exhaust port.

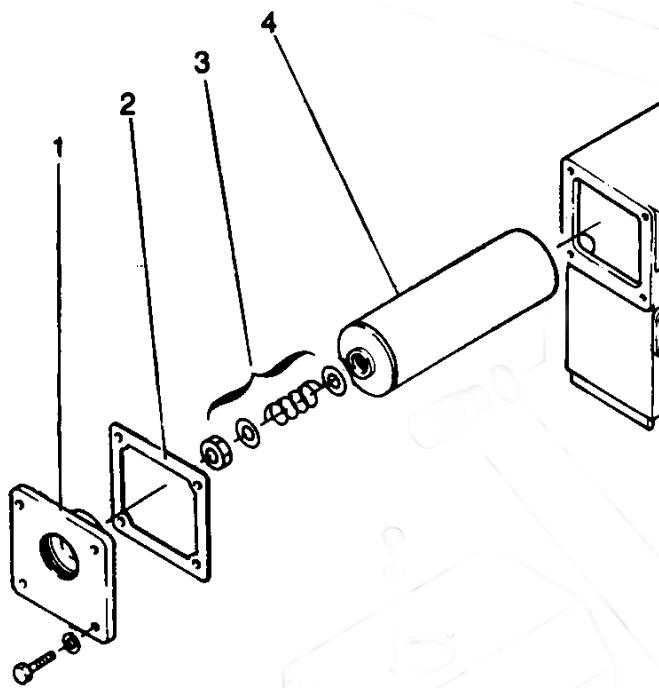


Figure 10-4. Demister Filter Assembly

The figure “Demister Filter Assembly” has four items called out. These items are as follows:

1. Exhaust flange
2. Gasket
3. Nylon stop nut with washers and spring
4. Exhaust demister filter element (CVP P/N 7707-2099)

SWITCHES

Gas Pressure Switch

The Gas Pressure Switch is actuated when gas pressure falls below 20 PSI (1.4 bar). If gas pressure drops below 20 PSI, the “NO GAS” alarm will appear on the electrical enclosure.

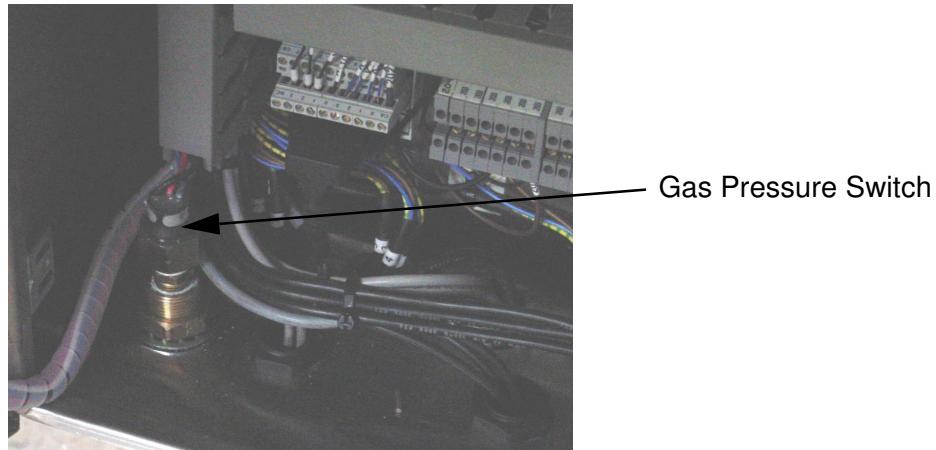


Figure 10-5. Gas Pressure Switch

Note: The pressure switch (pictured) is preset to 20 PSI and does not require further adjustment.

Prox Switches

A Prox switch on each pusher detects when it is in the retracted position. The switches detect the end of one of the thrust rods on the linear guide when the pushers are fully retracted. These switches can be adjusted by loosening the locknuts and adjusting the switch higher or lower off the pusher frame. Adjust so that the end of the prox switch is 1/4 inch from the rod when retracted. Never set boxes on the pusher frame because it will flex the frame and may cause the prox switch to become out of range. Sensing range is up to 1/2 inch. The prox switch cable has a quick disconnect to allow for easy replacement.



Figure 10-6. Pusher Retracted Prox Switch

SECTION: 11

TROUBLESHOOTING

TROUBLESHOOTING THE PLC

I/O Status Lights

The I/O status lights on the PLC, I/O cards and valve bank are important tools used in troubleshooting the A200 conveyor. There are 14 inputs and 10 outputs on the main PLC. Input terminals are on top and output terminals are on the bottom. The main status lights for inputs 0-13 are to the left of the main input terminal block. The main status lights for outputs 0-9 are to the left of the main output terminal block. The main input and output blocks are removable with the 2 screws on the outside.

There may be optional combo cards in top slot 1, 2 or 3 that have 4 inputs and 4 outputs each. Each card has its own status lights in the upper left corner. All top mount cards can be removed by depressing the tab on top and pulling straight out.

There are side mounted cards in expansion slot 1 and 2. Slot 1 is a 16 point input card. Slot 2 is a 16 point output card. Each card has its own status lights along the left edge. All side mount cards can be removed by raising the locking tabs on the top/ bottom and pulling out straight sideways. Note there can be a maximum of 4 side mounted cards and the last one must always have an end terminator CVP# 7707-3250 attached.

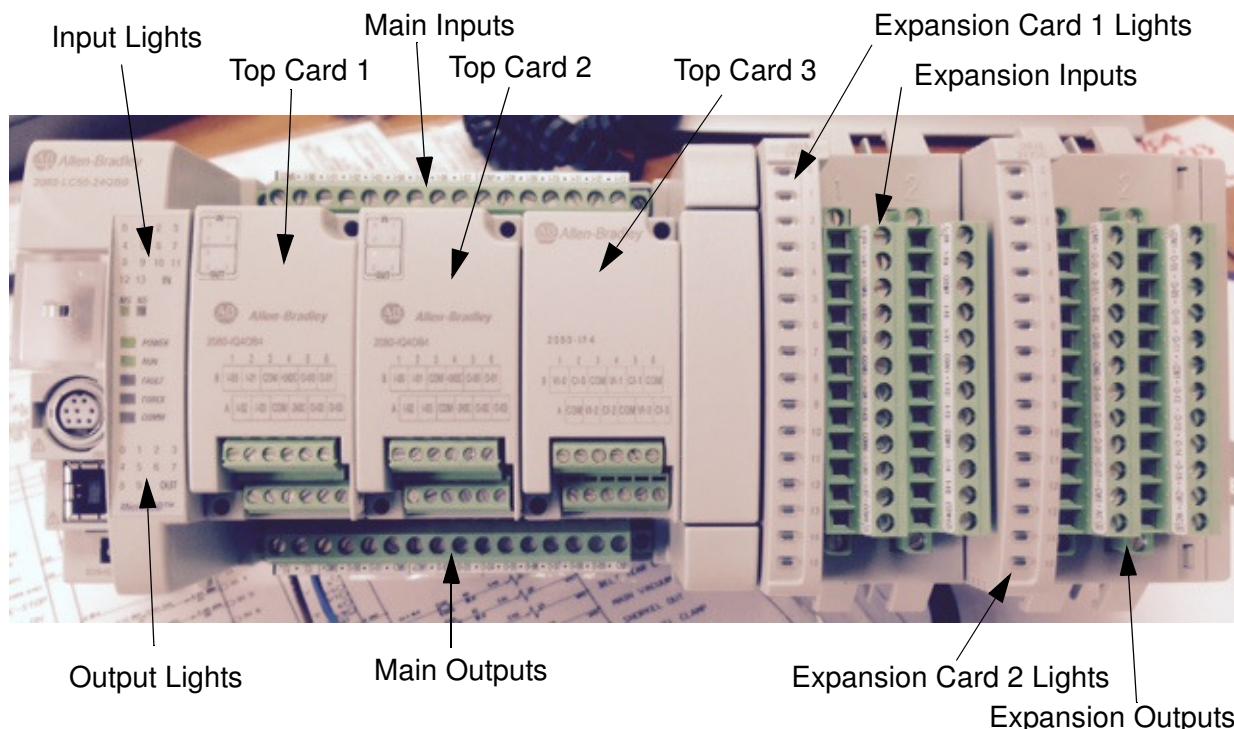


Figure 11-1. Status Lights on the PLC

The interface communicates with the PLC via a serial cable running from the comm. port on the PLC to the comm. port on the side of the interface. The cable has an 8-pin mini-DIN connector on the PLC end and a 9 pin female DSUB connector on the interface end. For communication to take place, the POWER and RUN indicators on the PLC must be lit.

The PLC requires a 24 VDC power source. Check for DC power at the +DC24 and -DC24 terminals (left most terminals on the lower main terminal) if the POWER status indicator is not lit. If you wish to check the status of an input or output, determine which input or output is used. Check the electrical schematic included with your machine. Make a note of the input or output you wish to check.

Other Status Indicators

1. MS (Module Status) - Should be on (solid) GREEN when module cards are operational.
2. NS (Network Status) - Should be on (solid) or flashing GREEN when transmitting through the ethernet port. This should be the case when a network cable is connected to the PLC for programming.
3. POWER - Should be solid GREEN when input power to the PLC is ON.
4. RUN - If OFF, user program not being executed. Flashing GREEN indicates program transfer in progress. Solid GREEN indicates user program is executing.
5. FAULT - When RED a fault condition exists that requires power cycle.
6. FORCE - Should always be off. Lights AMBER when forces are active.
7. COMM - Should be on (solid) or flashing when transmitting through the RS232 port. This should be the case when the interface cable is connected to the touchscreen.

The lower left corner of the PLC has a MODE SWITCH. It must be in the REMOTE or RUN position for normal operation. For programming, the switch must be in REMOTE. Switch to RUN to disable program changes over the network.

Terminal Configuration



Figure 11-2. Terminal Config File Manager screen

Normally, the terminal is executing the program as loaded by CVP. A terminal in configuration mode is shown above. You cannot enter terminal configuration mode except from the password protected Machine Configuration screen.

Terminal Configuration is the screen you would want to be in if a new screen program were to be loaded from a thumb drive. Where it says SOURCE in the upper left, select USB. If there is an appropriate *.cha file on the thumb drive it will appear. Select it and press COPY. It will ask if you want to unload the current application. YES. Then switch the source back to Internal and the new program should appear. Select SET AS STARTUP so it appears on the bottom of the screen. Hit RUN to run the new application.

Or hitting the MAIN button on the right will jump to the main menu where you can adjust date/ time, calibrate the screen and more.

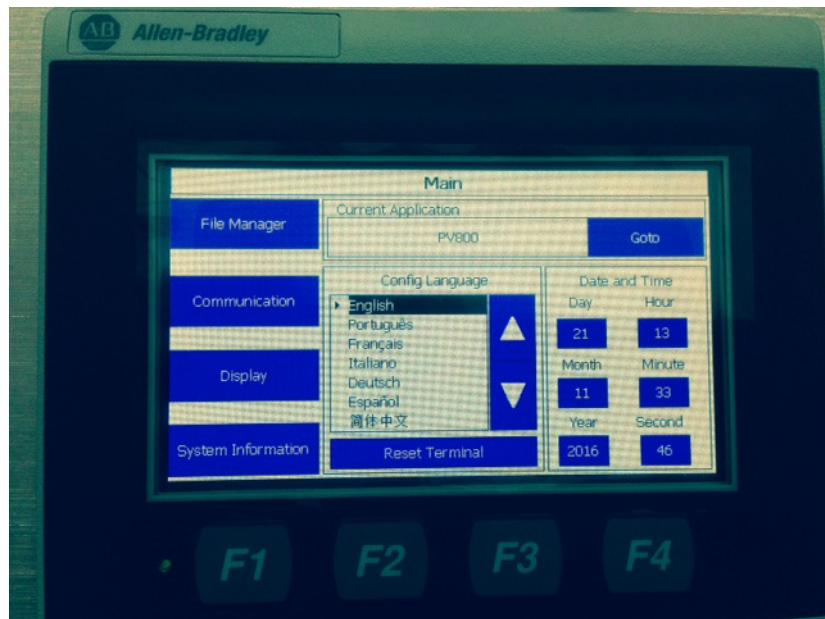


Figure 11-3. Main Config screen

When done, jump back to the FILE MANAGER SCREEN and select RUN.

Troubleshooting The I/O Status Lights

- The exact point in the machine's sequence of operations where a problem is occurring can be pinpointed by monitoring the status lights.
- Determine where in the sequence of operation the machine is failing to function. For example, "the #2 pusher is not coming out"; or "the exit conveyor #1 should be clear at this point, but it isn't".
- Consult the electrical schematic and note which output controls the action that is at issue. For example, output 3 extends pusher #2; or output 5 indicates the conveyor #1 zone is clear.
- Check to see if inputs are in the proper state. For example, does input 7-main come on when infeed zone #2 photoeye is blocked?
- If the output is correct, then check the output's fuse, solenoid, valve, and relay (if any). The goal is to examine each component between the PLC and the activating component, and discover which is not functioning.
- If the output is not being activated then most likely the machine is waiting for an input. Determine from the schematic which inputs must be made before the required output will trigger. For example, for pusher #2 to push, inputs for infeed #2 (input 7-main), pusher #2 retracted (input 3-main) and gas pressure (input 13-card) must be on. If they are not on it can be seen that the problem is with missing input signal(s), not the pusher output circuit. In addition, machine 2 must be online and sending a load request.

TROUBLESHOOTING CONVEYOR COMPONENTS

No Control Power	If the POWER ON pushbutton is pressed and doesn't illuminate, check the following items. <ol style="list-style-type: none">1. Power to the machine is connected.2. Main disconnect is in the ON ("I") position.3. E-stop on the main panel and at the remote station are pulled out.4. Check main power fuses.5. Check control power circuit breaker CB-1 and fuse FU-102.
Conveyors don't start	<ol style="list-style-type: none">1. Confirm that the machine has power. POWER ON light must be on.2. Check the MCR relay for power. If there is no power, check fuse FU102.3. Verify that there is 24 VDC at the output of power supply PS-1.4. Check the operator interface for error messages. If there is an error message, troubleshoot as shown in the error messages section.5. Verify that the Power and RUN lights on the CPU are lit. Confirm that there is DC power feeding the outputs on wire 29.6. If the PLC Power light is lit but the RUN light is not, see if cycling the mode switch on the lower left of the PLC to PRG and back to RUN will bring it back into RUN mode. Try this also if the fault light on the PLC is flashing.7. Check the if the lower conveyor motor overload, MSK2 has tripped.8. See if there is a fault code on the display of the upper conveyor motor inverter. For example, 2001 indicates a motor overcurrent and 2003 indicates undervoltage. 2003 is a common fault when power is cycled off then on again before drive capacitors have fully discharged. Cycle power to reset the drive after the fault condition has been corrected. All fault codes and corrective actions are listed in the FAULT TRACING section of the ABB 355 drive manual.9. If the last exit photoeye has been blocked continuously for longer than the EXIT CONVEYOR SHUTDOWN TIME set in the operator interface, the lower conveyor will shut down. Manual restart is required after the photoeye is clear again. Make sure that the photoeye is functioning properly. The last photoeye before the exit is either in zone 1 or the last zone depending on how your machine is built.
Stops 1 and/or 2 Not Operating	<ol style="list-style-type: none">1. If the stops on the conveyor are not working at all, check the air supply to the conveyor system. Moving the STOP switches on the panel to the up position should raise the stops if the air supply is connected. Move STOP switches back to the down position for automatic operation.

2. If the #1 or #2 stops are not working, check the infeed section photoeye downstream of the stop for function. Placing a hand over the face of the photoeye should illuminate the corresponding Infeed input light on the PLC. The infeed photoeyes should be aimed horizontally and from one corner of the loading section to the other. #1 and #2 stops are normally down and go up (output energized) if the downstream loading zone is filled.
3. If the output light for the stop is illuminated, check the output fuse and solenoid for the valve. Check connections inside the solenoid connector and junction block.

Tote Stop not operating

1. If the stops on the conveyor are not working at all, check the air supply to the conveyor system.
2. If the tote stop is not working, check the #1 infeed section photoeye for function. Placing a hand over the face of the photoeye should illuminate the corresponding Infeed input light on the PLC. The #1 infeed photoeye should be aimed horizontally and from one corner of the loading section to the other. The tote stop is normally up and goes down (output energized) if the #1 loading zone is free.
3. Check the tote infeed section photoeye for function. Placing a hand over the face of the photoeye should illuminate the corresponding Infeed input light on the PLC. The tote infeed photoeye should be aimed horizontally and across the conveyor in front of the tote stop. Set the photoeye (input 2- sidecard) so it can “see” about halfway across the conveyor. Aiming it slightly away from perpendicular toward the infeed will prevent reflections from the conveyor rail causing false readings.
4. If the output light for the tote stop is illuminated, check the output fuse and solenoid for the valve. Check connections inside the solenoid connector and junction block.

Feed Conveyor supplying Multiline not operating correctly

1. The feed conveyor run dry contact (NO terminals of C-9 in Multiline panel) must be wired into the start circuit of the conveyor motor supplying the Multiline.
2. The Feed Conveyor Approach photoeye (input 7- side card) must be placed so that it senses when a second box is behind the one in back of the tote infeed stop. This will depend on box sizes run. If the eye senses a box continuously for more than the FEED CONVEYOR OFF TIME, C-9 will de-energize, shutting down the feed conveyor. The FEED CONVEYOR OFF TIME is set in the TIMER menu of the operator interface.
3. Both photoeyes, input 2 and 7 side card, must be energized for the FEED CONVEYOR OFF TIMER to start.

Pushers not operating

1. If the pushers on the conveyor will not extend, check the air supply to the conveyor system. Try to manually extend pusher #1, #2 or #3 by press-

ing the yellow button on V3, V4 or V5. Check that the pusher retracted input light goes off when the corresponding valve is manually actuated.

2. Check that the pusher retracted reed switch on the cylinder is lit. This switch must be lit in order to energize the extend output solenoid. Check the corresponding input light on the PLC. If this is not lit but the reed switch is, the cable might be faulty.
3. Check that there is not a Pusher Jam message on the interface. Pusher operation is disabled until the jam is cleared. Check photoeye operation in the loading zone. One second after the pusher begins to retract, the infeed photoeye must be clear or it generates a jam alarm. One second after the pusher output goes off, the pusher retracted input must go on or it generates a jam alarm.
4. If the output light for the pusher is illuminated, check the output fuse and solenoid for the valve. Check connections inside the solenoid connector and junction block.
5. Check gas pressure. Pushers are disabled if gas pressure drops below 20 psig. Input 6 on the side card must be lit.
6. Check that the load request signal for the pusher zone is received. The network cables from each machine to the network switch must be plugged in. The load request (output 2- topcard2) in the machine head control panel for that zone must be on (lit). If it is on, then the corresponding Head Load Request input light should be lit in the conveyor PLC.

Load won't dump to the exit conveyor

1. The network interface cable between the A200 and the conveyor may be disconnected or faulty. The conveyor clear input (# 2- topcard2) in the machine head control panel for that zone must be on (lit) for the machine to dump. If it is off, then check the corresponding Exit Clear relay in the conveyor PLC. If it is also OFF, then most likely, the discharge photoeye in the dump zone or upstream dump zone is seeing a box.
2. The discharge photoeye (input 0- topcard 1) on the machine or its upstream neighbor looking at the exit conveyor flow is blocked by a jam. This photoeye is below the tilt shelf on the right side of the machine. This photoeye must be clear for the shelf to go back up also.
3. The tilt shelf up reed switch on the cylinder must be lit indicating that the shelf is up before it can go down. The corresponding input (input 3-main) in the machine head control panel must also be lit up. Check cable connections.

Photoeye Indicators

All photoeyes on the multiline conveyor and machines are wired for “dark on” operation. When a target is sensed, the orange operation indicator light on the photoeye will illuminate. The black wire from the photoeye cable is wired to the PLC input which should light at the same time.

The green indicator light on top of the switch next to the operation light should be lit whenever the photoeye has power.



Figure 11-4. Photoeye in Upper Conveyor Load Zone

There is a photoeye for each loading zone of the upper conveyor. These photoeyes should be mounted on the machine side, upstream of each particular loading zone aiming downstream diagonally so they pick up the loading zone but not the opposite rail. They should be set for maximum range (adjustment screw fully CW).

There is an additional photoeye on the upper conveyor that senses when a box is in front of the Infeed Stop.

This photoeye is mounted on the machine side just upstream of the Infeed Stop. It should be set so that it can sense halfway across the conveyor. Set the adjustment screw about midrange. Do not aim it straight across the conveyor or it can pick up reflections. Point it 5 degrees upstream of straight across (away from the Stop) for best results.

The infeed approach photoeye senses when there is a second box in the staging area. Set similarly to the Infeed stop photoeye except to sense the second box in line.

On the lower conveyor, the function of the three photoeyes is to sense if a particular machine's exit zone is clear. If so, an "Exit Conveyor Clear" signal is sent to that machine.

There is a Preset in the operator interface called “PE Order” that is set according to the flow direction on the lower conveyor. If flow is the same direction as the upper conveyor, it should be set “CONVS. SAME”. If flow is opposite the upper conveyor, it should be set “CONVS. OPP.”. This can only be changed from the password protected Machine Configuration menu.

All photoeyes are interchangeable but as you can see, some of their pre-sets must be different.

Drive Inverter

The UPPER conveyor drive motor is controlled by a motor inverter. When the tote infeed stop drops, the upper conveyor can run at a higher speed for a short period of time to achieve separation between the box behind it.

Then when the box clears the photoeye before the tote infeed stop, the TOTE STOP CLEAR timer starts. When this times out, the stop goes back up. This time is adjustable in the PRESET menu of the Panelview interface.

The normal speed of the upper conveyor is set in parameter 1202 of the Motor Inverter. The accelerated speed is set in parameter 1204. Factory defaults are both 70 hertz (no accel). All factory default settings are listed on the electrical schematic for the conveyor.

The drive motor inverter contains capacitors that must be discharged fully when shutting the power off. If the main control power is cycled too quickly a drive fault will result. Cycle power off, wait three seconds, and cycle power on to clear the fault.

See the ABB ACS355 drive manual to troubleshoot any additional drive faults.

CONVEYOR OPERATOR INTERFACE FAULT DISPLAY

Error Messages

1. Pusher #1, #2 or #3 Jam: Indicates that the corresponding pusher has been retracted and disabled due to a jam. A jam will occur if the pusher extended limit switch fails to make within one second during a push cycle. A jam will also occur if the loading photoeye still senses a load immediately after the pusher retracts. Clear the jam by removing the load from the photoeye path.
2. No Gas Alarm: Indicates that gas pressure is below 20 psi. Pusher operation is disabled. Restore gas pressure to clear the alarm.
3. Exit Backup: Indicates that the exit backup photoeye has been blocked for longer than the EXIT CONVEYOR SHUTDOWN TIME set in the operator interface. Manual restart is required after the photoeye is clear again.
4. AC Drive Fault: Drive was commanded to run and the RUNNING signal from the drive was not received by the PLC within 1 second. Ensure the drive is remote control mode. REM should appear in the drive display on the left. Press the LOC/REM button to change from local to remote mode. Check that the drive is not in a fault state (red LED lit). If so, press RESET on the drive panel or cycle power to clear the fault.

The conveyor operator interface display is mounted on the door of the conveyor control cabinet.

ASSISTANCE

When calling, for technical assistance or service, have the model (A200 Multiline) and serial numbers available for our customer service representative. This will allow us to more accurately assist you with your machine.

The serial number tag for the A200 Multiline Conveyor is located inside the main electrical enclosure door on the print pocket.

Contacting CVP Systems can be accomplished in three different ways; by phone, fax or e-mail. Please include model and serial numbers in all correspondents to CVP Systems.

Phone: 800-422-4270 (In the US, Canada, & Mexico)
630-852-1190 (All others)
Fax: 630-852-1386
E-Mail: spareparts@cvpsystems.com

SECTION: 12

ASSEMBLIES

MACHINE ASSEMBLIES

Customer Service

This section contains subassemblies for the A200 Multiline conveyor. By using the subassembly drawings, you will be able to find the part(s) needed to repair the conveyor. If you can not find the part(s) needed, contact CVP customer service for assistance. When calling for parts or service, have the model and serial numbers available for our customer service representative to more accurately assist you:

The serial number can be found on the front cover of this manual. The Serial number is also on a serial tag located inside the electrical enclosure. (See Figure 12-1)

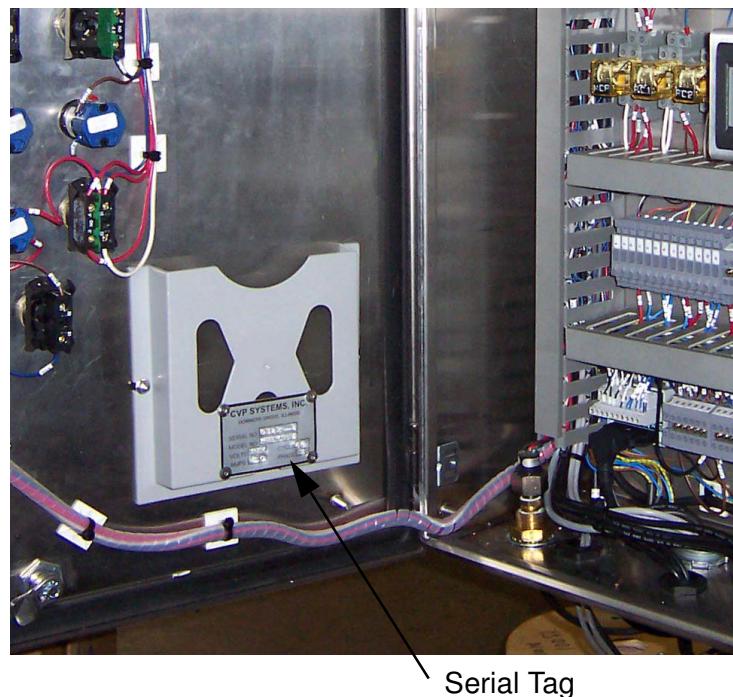


Figure 12-1. Serial Tag Location

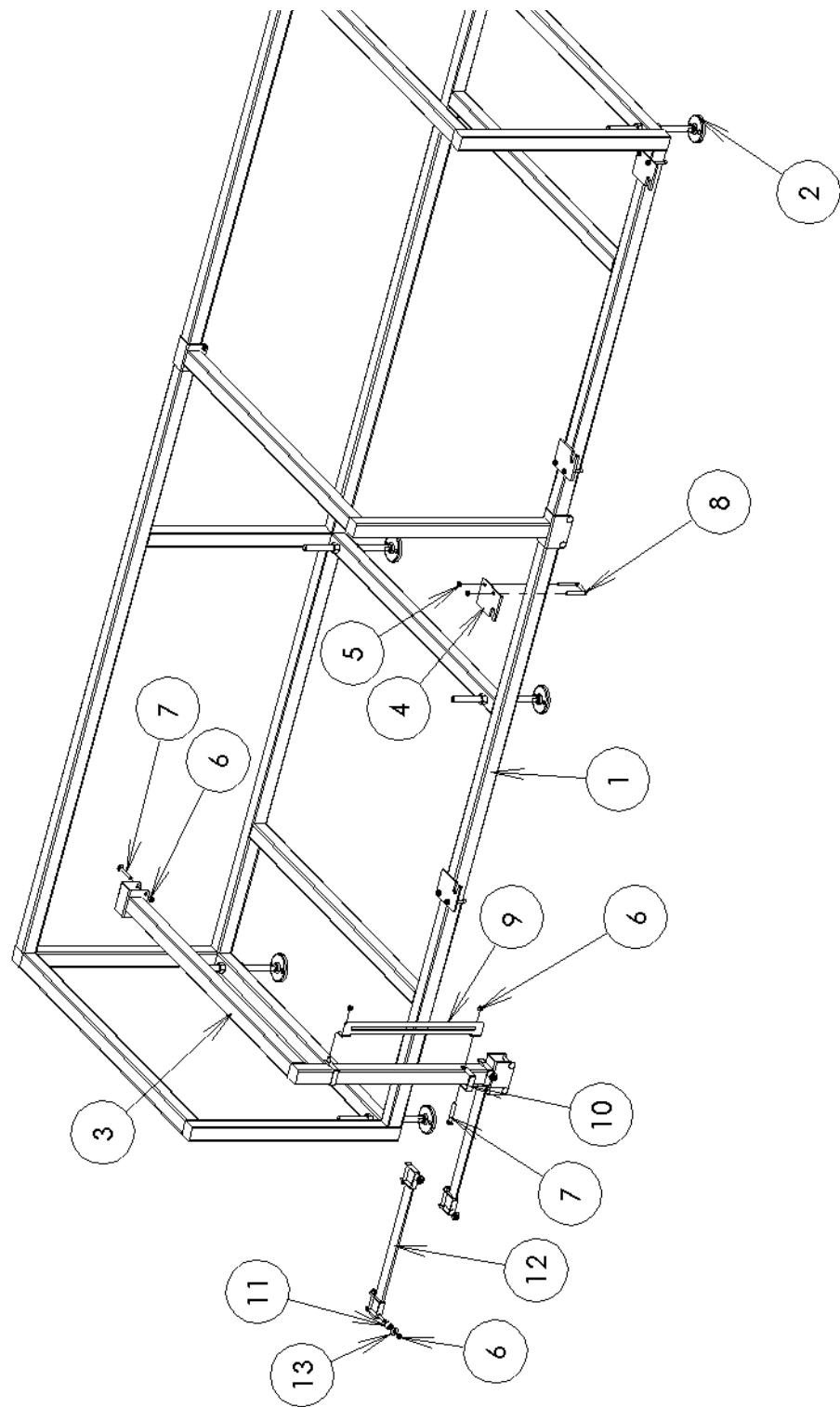
Ordering Parts

Ordering parts from CVP Systems can be done by phone, fax or e-mail. Please include model and serial numbers in all correspondents to CVP Systems.

Phone: 800-422-4270 (In the US, Canada, & Mexico)
630-852-1190 (All others)
Fax: 630-852-1386
E-Mail: spareparts@cvpsystems.com

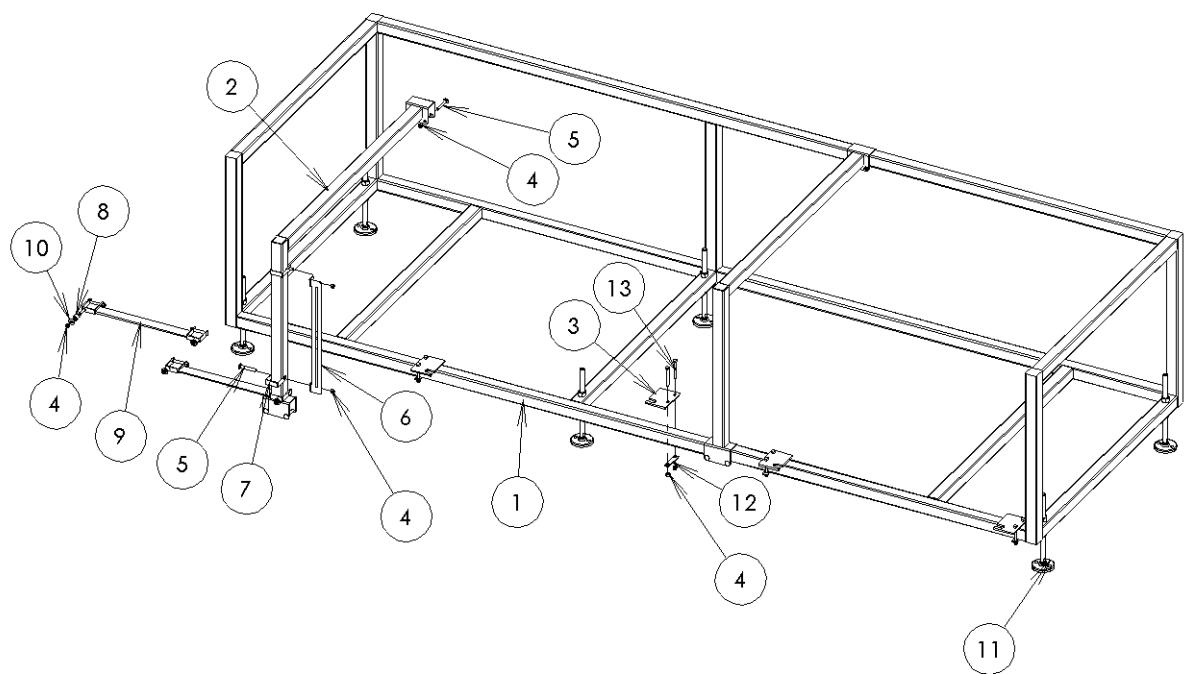
STAND ASSEMBLY, 3 POSITION CONVEYOR

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	D-0243-0817	WELDMENT, TUBE STAND A
2	6	7707-1925	FEET, LEVELING 12"
3	2	C-0243-0792	WELD, MOVEABLE LEG
4	4	B-9743-1273	BRACKET MACHINE CLAMP 3-6 ADJ
5	8	LN3/8-16LP	NUT, LOCK, LOW PROFILE
6	18	LN3/8-16	NUT, LOCK
7	14	CB3/8-16X2-3/4	BOLT, CARRIAGE
8	4	3060T71	SQUARE U-BOLT
9	1	B-0243-0621	CONVEYOR TIE BAR, CONVEYOR BOTTOM
10	2	B-0243-495.02	BRACKET, ELECTRICAL CABINET MOUNT
11	4	0243-0643	SPACER
12	2	B-0243-0633	WELD, ELECTRICAL CABINET MOUNT
13	4	FW3/8-A	WASHER, FLAT

ASSEMBLY NUMBER: D-0243-0859

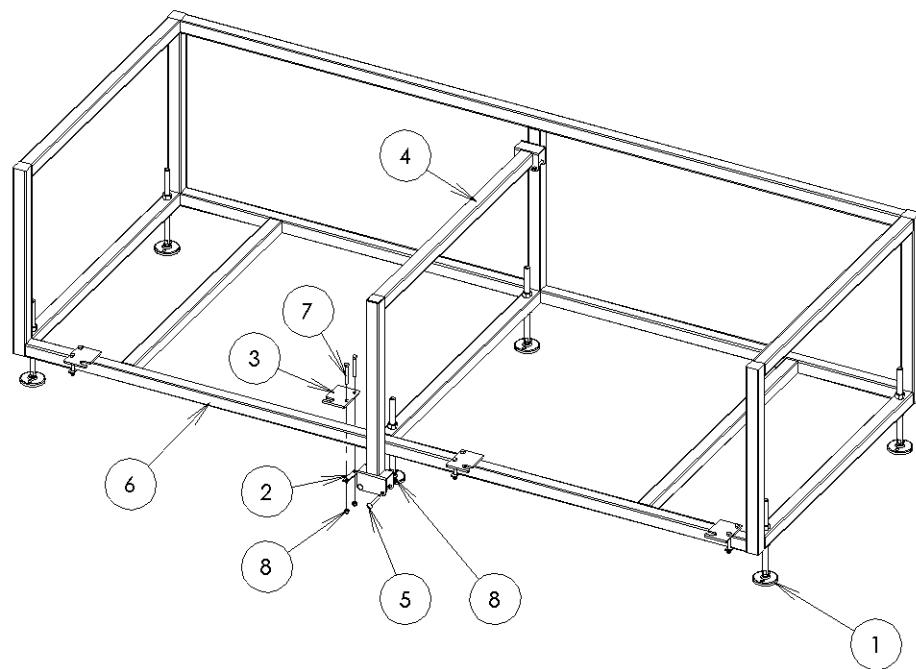
STAND A ASSEMBLY, 4 & 5 POSITION CONVEYOR

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	D-0243-0817	WELDMENT, TUBE STAND A
2	2	C-0243-0792	WELD, MOVEABLE LEG
3	4	B-9743-1273	BRACKET MACHINE CLAMP 3-6 ADJ
4	26	LN3/8-16	NUT, LOCK
5	14	CB3/8-16X2-3/4	BOLT, CARRIAGE
6	1	B-0243-0621	CONV BTM TIE BAR
7	2	B-0243-495.02	BRACKET, ELECTRICAL CABINET MOUNT
8	4	0243-0643	SPACER
9	2	B-0243-0633	WELD, ELECTRICAL CABINET MOUNT
10	4	FW3/8-A	WASHER, FLAT
11	6	7707-1925	ASSEMBLY DROP LEG
12	4	B-9743-1133	BRACKET
13	8	HH3/8-16X3	SCREW, HEX HEAD

ASSEMBLY NUMBER: D-0243-0816

STAND B ASSEMBLY, 4 & 5 POSITION CONVEYOR

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	6	7707-1925	ASSEMBLY DROP LEG
2	4	B-9743-1133	BRACKET
3	4	B-9743-1273	BRACKET MACHINE CLAMP 3-6 ADJ
4	1	C-0243-0792	WELD, MOVEABLE LEG
5	4	CB3/8-16X2-3/4	BOLT, CARRIAGE
6	1	D-0243-0819	WELDMENT, TUBE STAND, DISCHARGE
7	8	HH3/8-16X3	SCREW, HEX HEAD
8	12	LN3/8-16	NUT, LOCK

ASSEMBLY NUMBER: D-0243-0818

ELECTRICAL ENCLOSURE ASSEMBLY

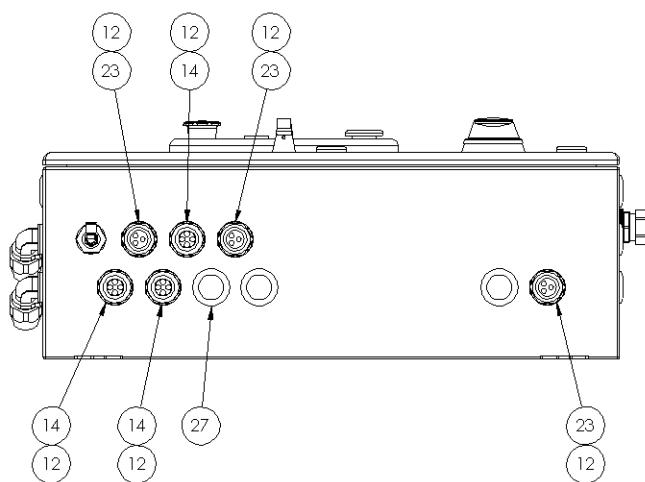
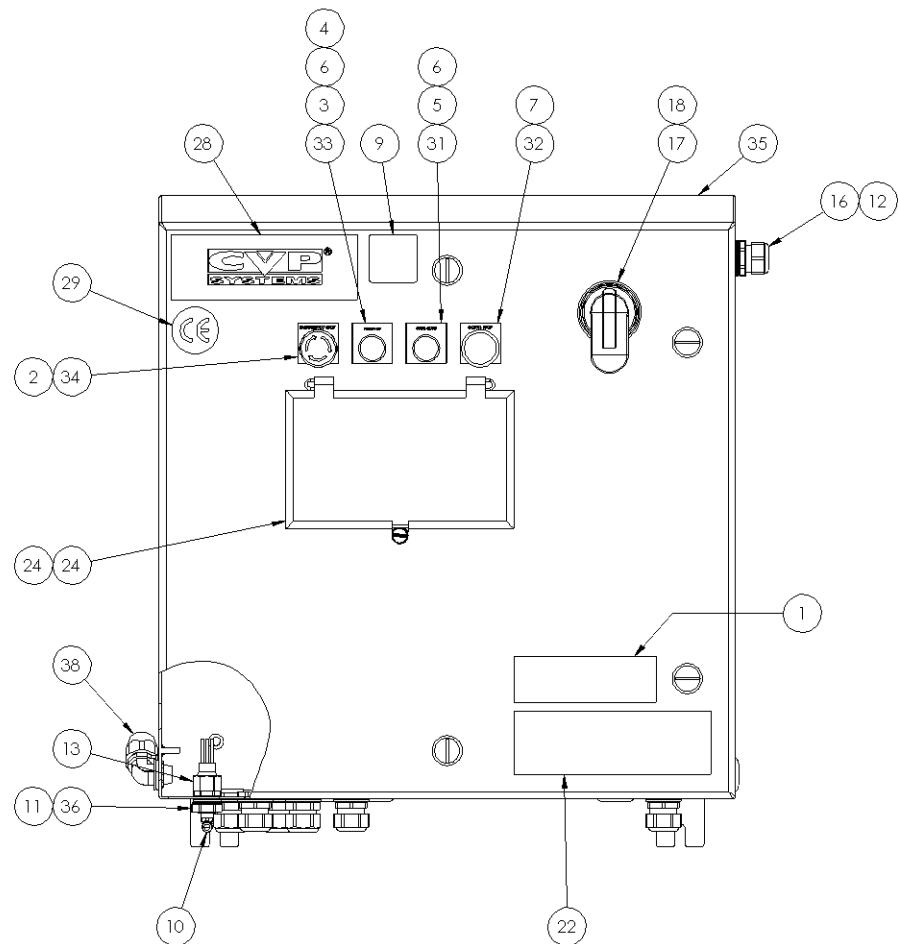
ITEM NO.	-0/QTY.	-1/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
1	1	1	1	0210-1034	WARNING LABEL, READ MANUAL
2	1	1	1	0550-1154	EMERGENCY STOP
3	1	1	1	0651-1511-1	GREEN LIT PB
4	1	1	1	0651-1516-1	24V LIGHT UNIT
5	1	1	1	0651-1518-1	GREEN FLUSH PB
6	3	3	3	0651-1520-1	NO CONTACT
7	1	1	1	0651-1521-1	RED MUSHROOM PB
8	1	1	1	0750-1258	CABLE INTERFACE AB, 2M
9	1	1	1	1110-0078	LABEL, MADE IN USA
10	1	1	1	269P-04-04	FITTING.TBG.ELB.1/4OD X 1/4NPT
11	4	4	4	5262	1/2" SEAL RING
12	7	8	10	5263	3/4" SEAL RING
13	1	1	1	7707-1504	PRESSURE SWITCH
14	3	6	7	7707-1633	3/4" CORD GRIP, 4 HOLE
15	3	3	3	7707-1634	1/2" CORD GRIP, 1 HOLE
16	1	1	1	7707-1655	3/4" CORD GRIP, 1 HOLE
17	1	1	1	7707-2744	HANDLE, DISCONNECT
18	1	1	1	7707-2745	SHAFT DISC. HANDLE
19	2	2	2	7707-2785	RJ45 CABLE, 30FT
20	1	1	1	7707-2935	CABLE RJ45 50'
21	1	1	1	7707-3189-P	HMI TERMINAL, PV800 HMI, 4.3"

OPTIONS-

- 0: 3 POSITION CONVEYOR
- 1: 4 POSITION CONVEYOR
- 2: 5 POSITION CONVEYOR

ITEM NO.	-0/QTY.	-1/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
22	1	1	1	7707-532	LABEL, DANGER HIGH VOLTGE
23	3	1	1	9537-1193	3/4" CORD GRIP, 3 HOLE
24	1	1	1	9537-1219	WINDOW ASSEMBLY
25	-	-	1	9537-1899	3/4" CORD GRIP, 2 HOLE
26	4	4	4	AS050SS	HOLE SEAL.1/2NPT
27	3	2	-	AS075SS	HOLE SEAL.3/4NPT
28	1	1	1	B-0651-1569	LABEL, CVP
29	1	1	1	B-7707-1901	LABEL, CE
30	1	1	1	B-7707-241	SERIAL AND MODEL TAG
31	1	1	1	C-7707-1754-L	LEGEND PLATE , CONV. START
32	1	1	1	C-7707-1754-M	LEGEND PLATE.CONV. STOP
33	1	1	1	C-7707-1754-P	LEGEND PLATE , POWER ON
34	1	1	1	C-7707-1754-S	LEGEND PLATE , EMERGENCY STOP
35	1	1	1	D-0243-0929	ENCL, A-200 ML CNV
36	1	1	1	NPBBH1/4NPT 15/16LG	NPB BULKHEAD ADAPT 1/4 NPT
37	2	2	2	PN12-14HDRL	RING, TERMINAL
38	2	2	2	ST9050	1/2" SEALTITE CON, 90DEG
39	10	10	10	WBL18-AWG	WIRE, 18AWG, BLUE
40	112	112	112	WBR18-AWG	WIRE, 18AWG, BROWN
41	1	1	1	WG14-AWG	WIRE, 14AWG, GREEN
42	51	51	51	WR18-AWG	WIRE, 18AWG, RED

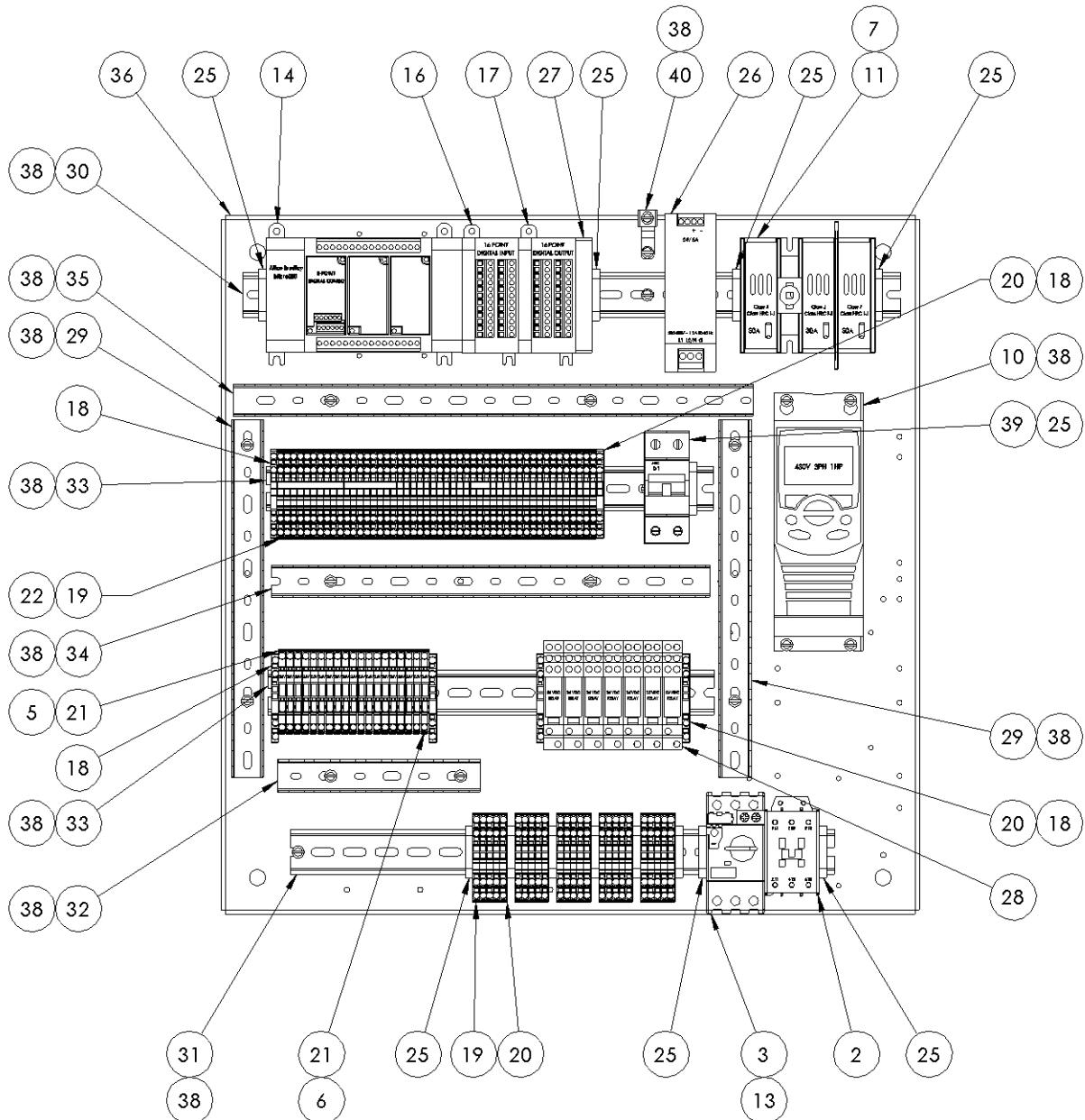
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ASSEMBLY NUMBER: D-0243-0930

ELECTRICAL PANEL ASSEMBLY

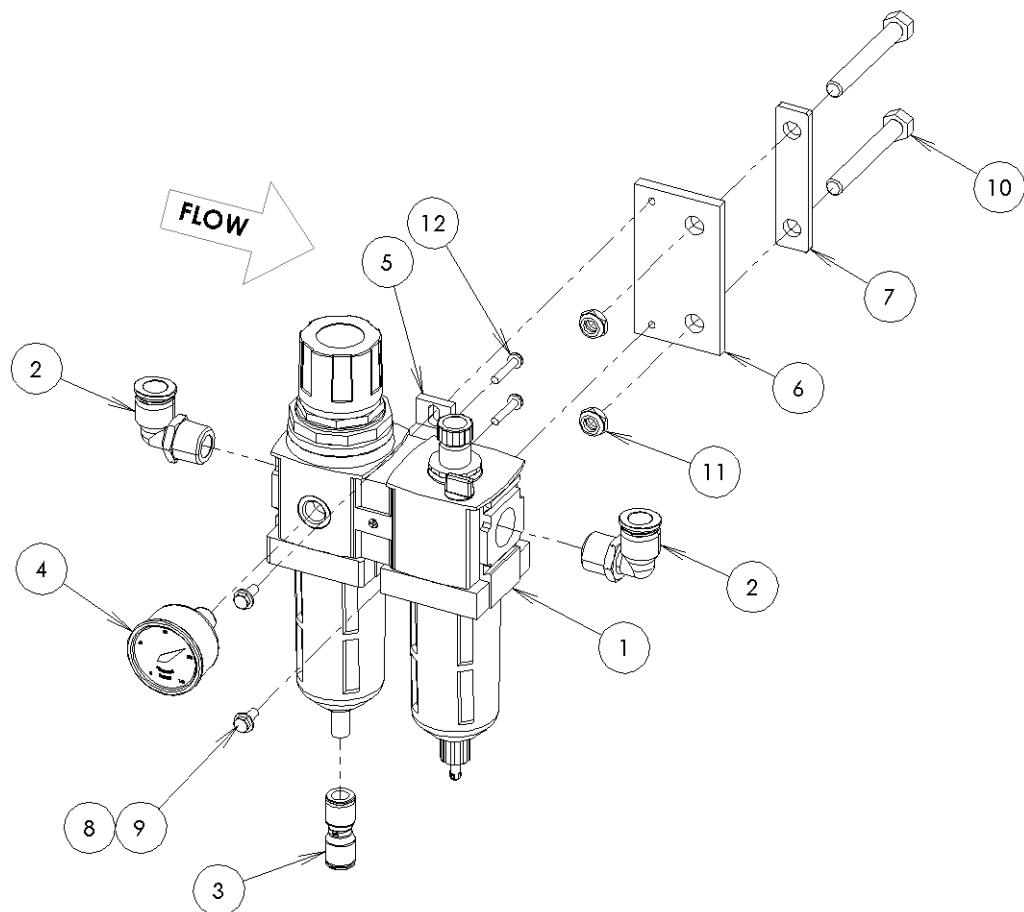
ITEM NO.	-1/QTY.	-0/QTY.	PART NUMBER	DESCRIPTION
1	1	-	0210-591	AC DRIVE, 240V 3PHASE, 1HP
2	1	1	0550-1209	CONTACTOR 24 VDC
3	-	1	0550-1212	MANUAL MOTOR STARTER 1.6-2.5A
4	1	-	0550-1471	MANUAL MOTOR STARTER 2.5 - 4.0 A
5	18	18	217.315	FUSE.5 X 20MM.0.315A
6	1	1	218004	FUSE.5 X 20MM.4.00A
7	-	3	7707-1886	FUSE.600V.15A
8	3	-	7707-1887	FUSE.600V.20A
9	1	-	7707-2098	CIRCUIT BREAKER.2-POLE.2.0A
10	-	1	7707-2614	AC DRIVE, 480V 3PHASE, 1HP
11	1	1	7707-2743	DISCONNECT SWITCH
12	1	1	7707-2784	RJ45 CABLE, 3FT
13	1	1	7707-3148	AUX CONTACT, NO, MANUAL MS
14	1	1	7707-3190-P	PLC, ALLEN-BRADLEY MICRO850
15	1	1	7707-3191	8-PT DIGITAL COMBO CARD
16	1	1	7707-3198	16-PT INPUT MODULE, MICRO850
17	1	1	7707-3199	16-PT OUTPUT MODULE, MICRO850
18	6	6	7707-3224	4-PT GROUND TERM BLOCK
19	73	73	7707-3225	4-PT CLAMPING TERM BLOCK
20	8	8	7707-3227	END PLATE, TERM BLOCK
21	19	19	7707-3228	FUSE TERM BLOCK W/ LED, 24V
22	1	1	7707-3232-10	JUMPER BAR, 10-POLE
23	1	1	7707-3232-3	JUMPER BAR, 3-POLE
24	1	1	7707-3232-8	JUMPER BAR, 8-POLE
25	13	13	7707-3233	END STOP
26	1	1	7707-3245	POWER SUPPLY, 120W
27	1	1	7707-3250	EXPANSION TERMINATOR, MICRO850
28	7	7	9537-1023	RELAY OMRON, 24VDC
29	2	2	B-7707-1645	WIREWAY, 1" W, 11" LG, 5/8" CUT
30	1	1	B-7707-1646	DIN RAIL, 20 1/4", 1/2" CUT
31	1	1	B-7707-1648	DIN RAIL, 16 3/4", 1/2" CUT
32	1	1	B-7707-2063	WIREWAY, 1" W, 6 1/4" LG, 3/4" CUT
33	2	2	B-7707-3090	DIN RAIL, 13 3/4", 0" CUT
34	1	1	B-7707-3091	WIREWAY, 1" W, 13 1/2" LG
35	1	1	B-7707-3102	WIREWAY, 1" W, 16" LG
36	1	1	D-7707-1459	ELEC SUB PANEL, A-200
37	7	7	MLW14AWG	WIRE, 14AWG, BLACK, TYPE M
38	26	26	PH10-32X5/16	SCREW, PAN HEAD
39	-	1	S272-K1	CIRCUIT BREAKER, 2-POLE, 1.0A
40	1	1	SLU-35	GROUND LUG
41	5	5	WBL18-AWG	WIRE, 18AWG, BLUE
42	15	15	WBR18-AWG	WIRE, 18AWG, BROWN
43	4	4	WG18-AWG	WIRE, 18AWG, GREEN
44	10	10	WR18-AWG	WIRE, 18AWG, RED
45	5	5	WW18-AWG	WIRE, 18AWG, WHITE

OPTIONS-

ASSEMBLY NUMBER: D-0243-0932

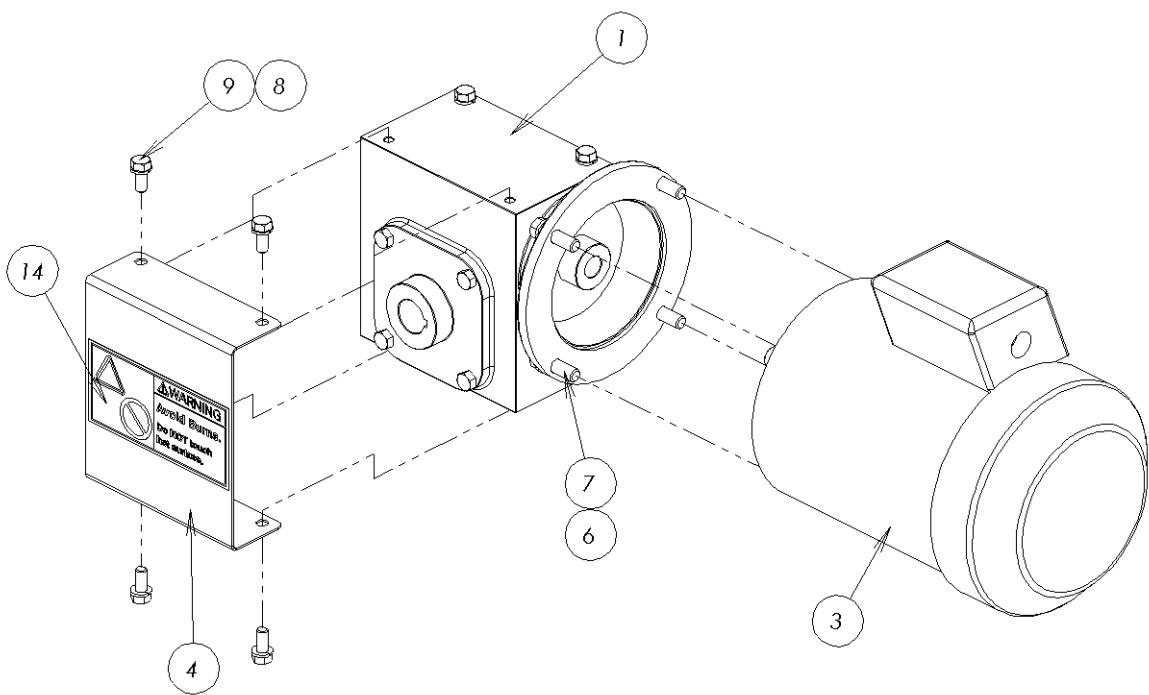
FILTER/ REGULATOR LUBRICATOR ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0243-376	FILTER/ REGULATOR/ LUBRICATOR
2	2	269P-08-08	FITTING.ELB.1/2 NPT TO 1/2 OD
3	1	3106-60-00	FITTING, UNION, 3/8"
4	1	7501-162	GAUGE.PRESSURE.0.25NPT
5	1	8807-125	MOUNTING BRACKET
6	1	B-7707-1588	BRACKET, REGULATOR MOUNT
7	1	B-9743-1133	BRACKET
8	2	FW10-B	WASHER, FLAT
9	2	HH10-32X1/2	SCREW, HEX HEAD
10	2	HH3/8-16X2-3/4	SCREW, HEX HEAD
11	2	LN3/8-16LP	NUT, LOCK, LOW PROFILE
12	2	PH8-32x7/8	SCREW, PAN HEAD

ASSEMBLY NUMBER: C-9743-1206

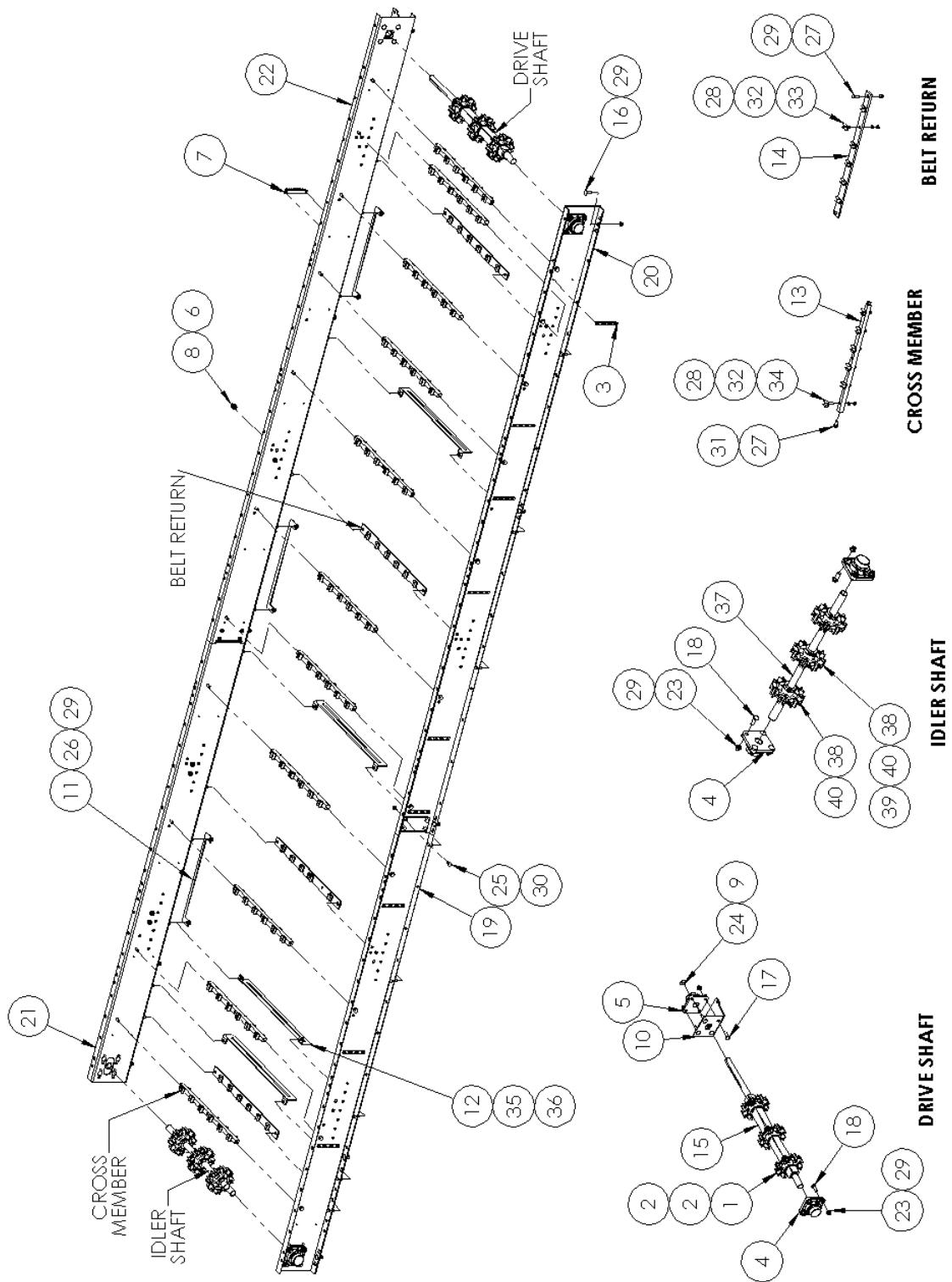
MOTOR/REDUCER ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0243-0617	20:1 GEAR REDUCER
2	1	0243-0089	MOTOR.1.00HP.SS.1750RPM.56C
3	1	B-0243-0591	REDUCER COVER
4	1	B-0243-0509	KEY, 1/4" SQ X 5-1/4"
5	4	LW3/8	WASHER, LOCK
6	8	LW5/16	WASHER, LOCK
7	4	HH3/8-16X1-1/4	SCREW, HEX HEAD
8	8	HH5/16-18X3/4	SCREW, HEX HEAD
9	6	30-073	WIRE NUT
10	1	ST9050	1/2" SEALTITE CON, 90DEG
11	1	ST50	CONNECTOR.SEALTITE.STR.1/2"
12	2	PN12-14HDRL	RING, TERMINAL
13	1	7707-2359	LABEL, DANGER HOT - AVOID BURNS

ASSEMBLY NUMBER: B-0243-0644

TOP CONVEYOR FRAME ASSEMBLY, 3 POSITION

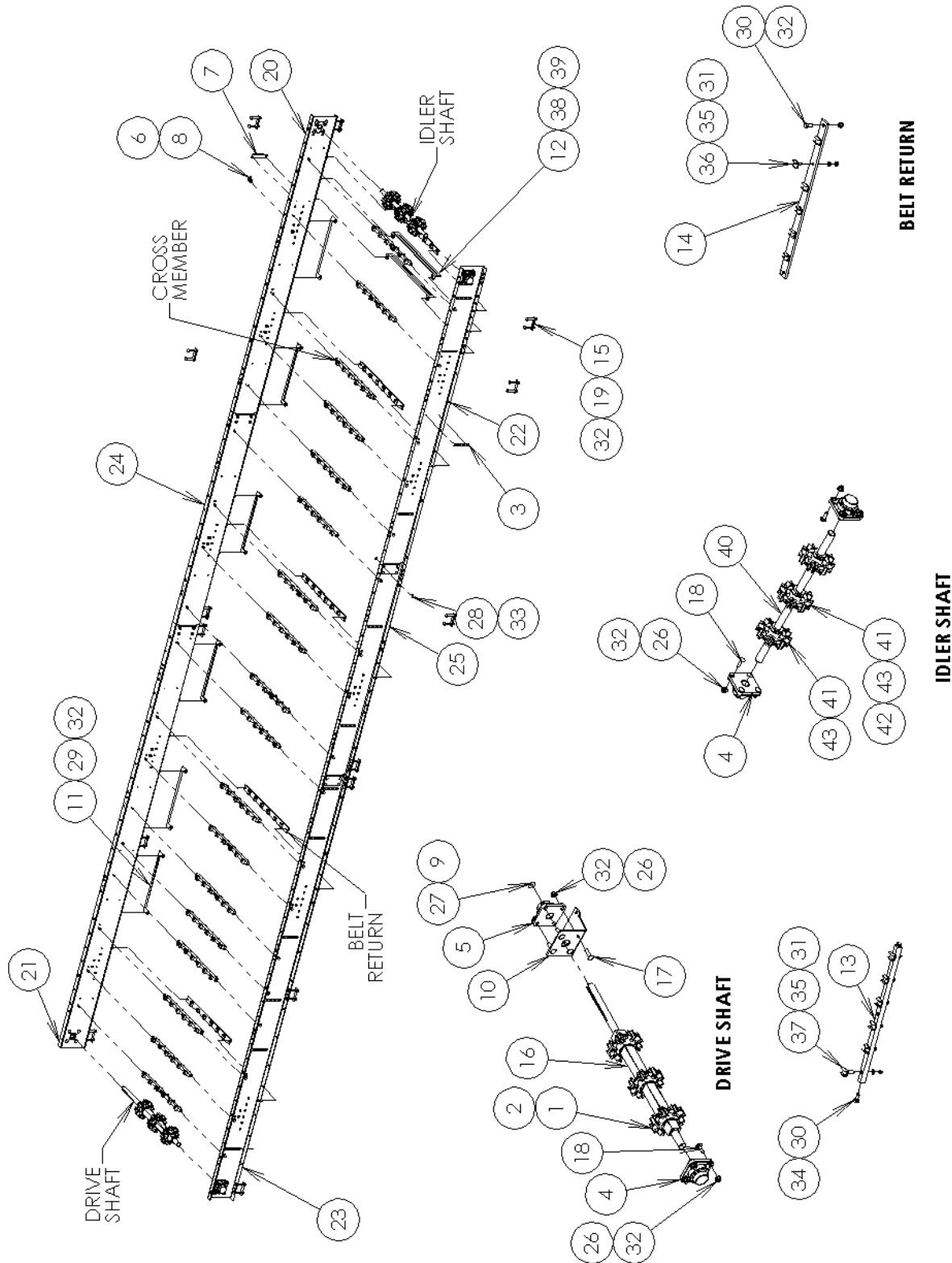
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	3	0243-0135	DRIVE SPROCKET, 1.5 SQ SHAFT
2	6	0243-0136	RETAINING RING, 1.5 SQ SHAFT
3	9	0243-0568	TIE PLATE
4	3	0550-1117	BEARING, 4-BOLT, 1" BORE, CL CVR
5	1	0550-1118	BEARING, 4-BOLT, 1"ID, OPEN CVR
6	6	1110-0036	TUBE BULKHEAD, 1/4 OD
7	9	2216T14	TUBING MOUNT
8	6	3182-56-00	ELBOW, PLUG-IN, 1/4OD
9	1	90313A107	WASHER, FLAT, SS, 1.00D X 0.28ID
10	1	B-0243-0590	REDUCER MOUNT
11	3	B-0243-0622	WIRE TIE BAR 16"
12	4	B-0243-0774	WIRE TIE BAR
13	11	B-0243-0907	CROSSMEMBER BAR
14	4	B-0243-0911	BELT RETURN BRKT, 20.5" BR, TRIPLE BELT
15	1	C-0243-0909	DRIVE SHAFT, 1.5 SQ, 20.5" BR
16	10	CB3/8-16X1	BOLT, CARRIAGE
17	4	CB3/8-16X1-1/2	BOLT, CARRIAGE
18	12	CB3/8-16X1-1/4	BOLT, CARRIAGE
19	1	D-0243-0504	IDLER CONV PANEL, TOP RIGHT
20	1	D-0243-0505	DRIVE CONV PANEL, TOP RIGHT
21	1	D-0243-0506	IDLER CONV PANEL, TOP LEFT
22	1	D-0243-0507	DRIVE CONV PANEL, TOP LEFT
23	16	FW3/8-C	WASHER, FLAT
24	1	HH1/4-20X1/2	SCREW, HEX HEAD
25	8	HH3/8-16X1/2	SCREW, HEX HEAD
26	6	HH3/8-16X3/4	SCREW, HEX HEAD
27	30	HH3/8-16X7/8	SCREW, HEX HEAD
28	90	JN5/16-18	NUT, JAM
29	40	LN3/8-16	NUT, LOCK
30	8	LN3/8-16LP	NUT, LOCK, LOW PROFILE
31	22	LW3/8	WASHER, LOCK
32	90	LW5/16	WASHER, LOCK
33	24	VG-018-02	RAIL CLIP
34	66	VG-018-04	RAIL CLIP, LONG
35	7	HH5/16-18X3/4	SCREW, HEX HEAD
36	7	LN5/16-18	NUT, LOCK
37	1	B-0243-0936	IDEALER SHAFT
38	3	0243-0185	SPROCKET, TAIL, ROUND BORE
39	1	B-0243-0937	KEY, 1/4" SQ. X 1.5" L
40	6	6435K38	SHAFT COLLAR 1"

ASSEMBLY NUMBER: D-0243-0908

TOP CONVEYOR FRAME ASSEMBLY, 4 POSITION

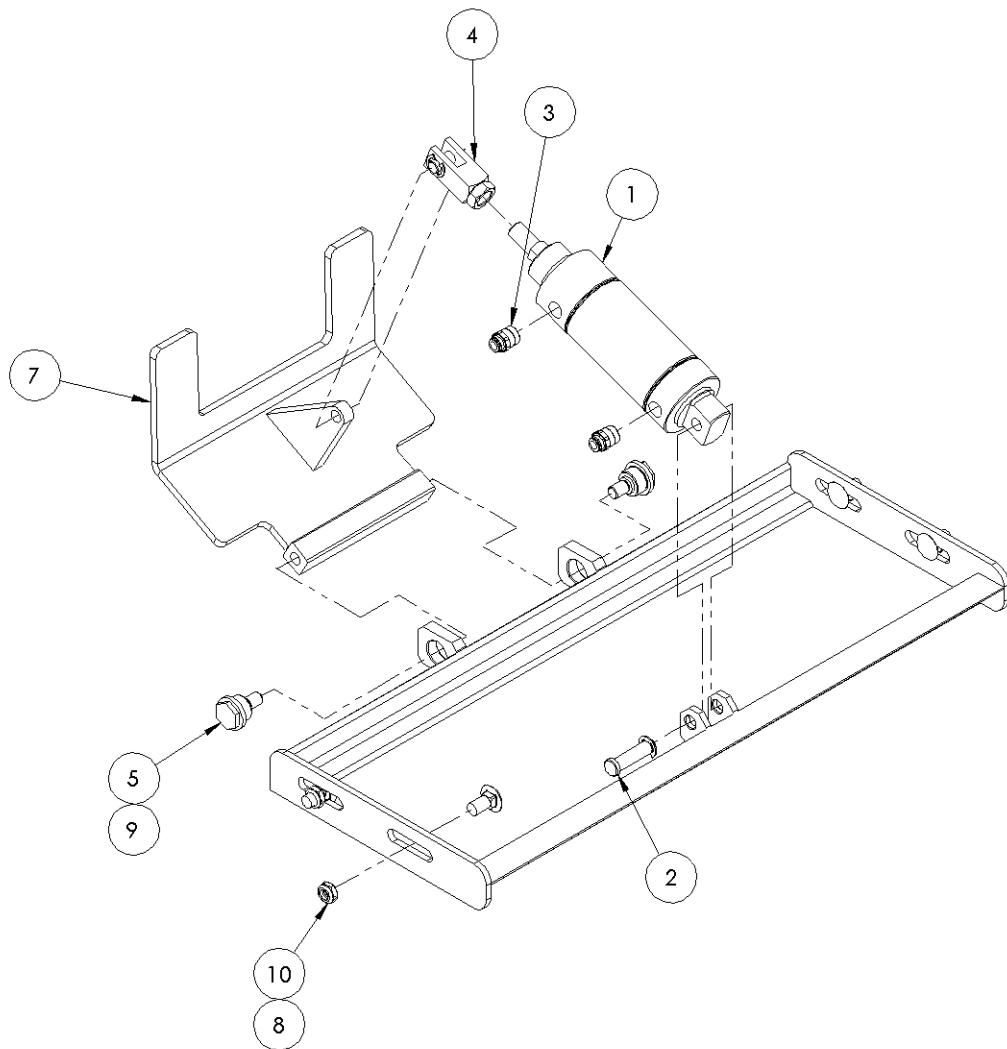
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	3	0243-0135	DRIVE SPROCKET, 1.5 SQ SHAFT
2	6	0243-0136	RETAINING RING,1.5 SQ SHAFT
3	12	0243-0568	TIE PLATE
4	3	0550-1117	BEARING, 4-BOLT, 1" BORE, CL CVR
5	1	0550-1118	BEARING, 4-BOLT, 1"ID, OPEN CVR
6	8	1110-0036	TUBE BULKHEAD, 1/4 OD
7	11	2216T14	TUBING MOUNT
8	8	3182-56-00	ELBOW, PLUG-IN, 1/4OD
9	1	90313A107	WASHER.FLAT.SS.1.00D X 0.28ID
10	1	B-0243-0590	REDUCER MOUNT
11	6	B-0243-0622	WIRE TIE BAR 16"
12	2	B-0243-0774	WIRE TIE BAR
13	18	B-0243-0907	CROSSMEMBER BAR
14	5	B-0243-0911	BELT RETURN BRKT, 20.5" BR, TRIPLE BELT
15	14	B-9743-1133	BRACKET
16	1	C-0243-0909	DRIVE SHAFT, 1.5 SQ, 20.5" BR
17	4	CB3/8-16X1-1/2	BOLT, CARRIAGE
18	12	CB3/8-16X1-1/4	BOLT, CARRIAGE
19	28	CB3/8-16X2-3/4	BOLT, CARRIAGE
20	1	D-0243-0504	IDLER CONV PANEL, TOP RIGHT
21	1	D-0243-0505	DRIVE CONV PANEL, TOP RIGHT
22	1	D-0243-0506	IDLER CONV PANEL, TOP LEFT
23	1	D-0243-0507	DRIVE CONV PANEL, TOP LEFT
24	1	D-0243-0793	INTERMEDIATE CNV FRAME, TOP RIGHT
25	1	D-0243-0795	INTERMEDIATE CNV FRAME, TOP LEFT
26	16	FW3/8-C	WASHER, FLAT
27	1	HH1/4-20X1/2	SCREW, HEX HEAD
28	16	HH3/8-16X1/2	SCREW, HEX HEAD
29	12	HH3/8-16X3/4	SCREW, HEX HEAD
30	46	HH3/8-16X7/8	SCREW, HEX HEAD
31	138	JN5/16-18	NUT, JAM
32	66	LN3/8-16	NUT, LOCK
33	16	LN3/8-16LP	NUT, LOCK, LOW PROFILE
34	36	LW3/8	WASHER, LOCK
35	138	LW5/16	WASHER, LOCK
36	30	VG-018-02	RAIL CLIP
37	108	VG-018-04	RAIL CLIP, LONG
38	4	HH5/16-18X3/4	SCREW, HEX HEAD
39	4	LN5/16-18	NUT, LOCK
40	1	B-0243-0936	IDEALER SHAFT
41	3	0243-0185	SPROCKET, TAIL, ROUND BORE
42	1	B-0243-0937	KEY, 1/4" SQ. X 1.5"L
43	6	6435K38	SHAFT COLLAR 1"

ASSEMBLY NUMBER: D-0243-0935



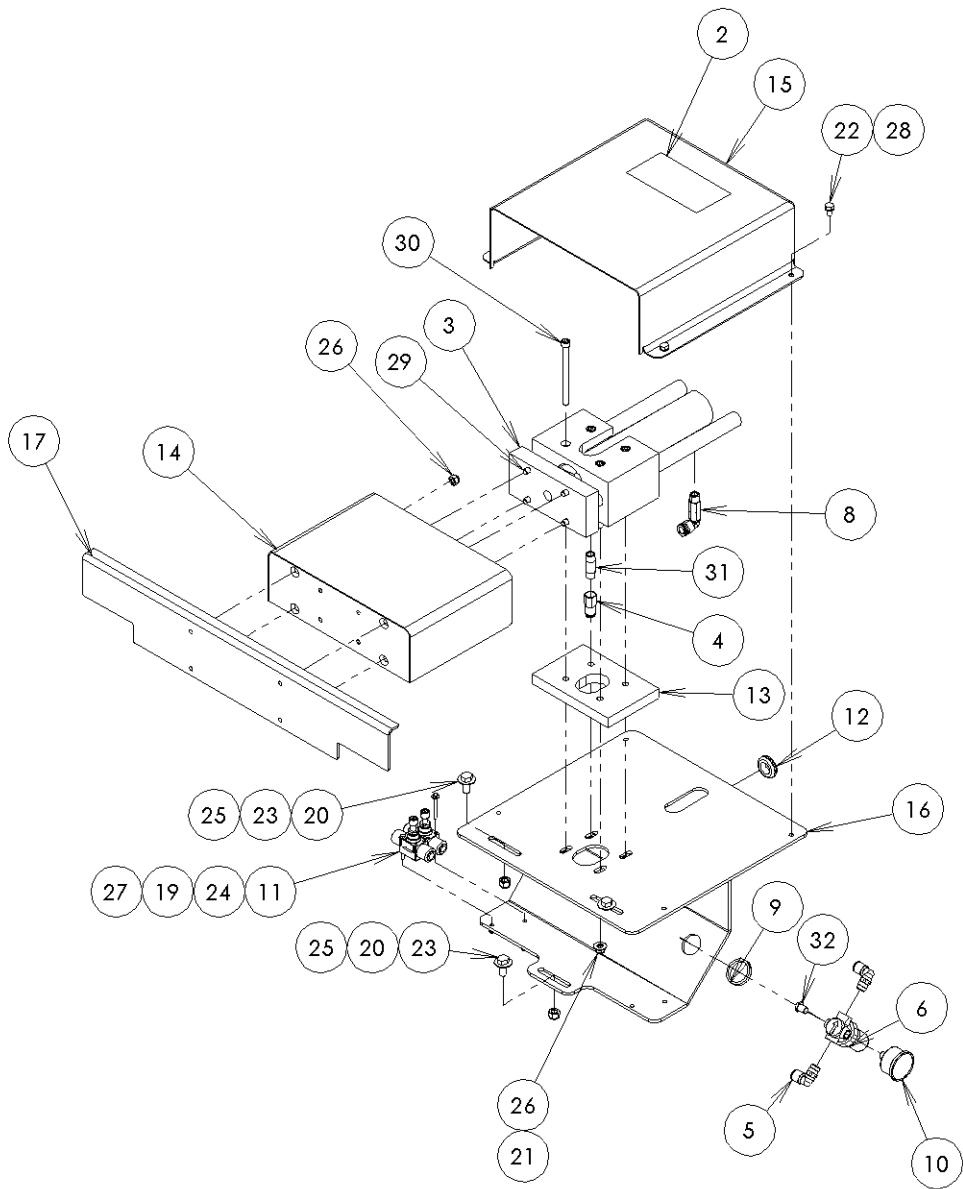
BLADE STOP ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0243-0187	CYLINDER, BLADE STOP
2	1	0243-0863	CLEVIS PIN W/ RET RING, 3/8" X 1 5/16"
3	2	268P-04-04	FITTING.TBG.1/4NPT.1/4OD
4	1	8013-1788	CLEVIS.CYL.2.00BORE.SS
5	2	B-9537-1033	BOLT, SHOULDER - LOW HEAD
6	1	C-0243-0905	TOTE STOP WELDMENT
7	1	C-0243-0906	TOTE STOP BLADE
8	4	CB3/8-16X3/4	BOLT, CARRIAGE
9	2	FB812-4	BEARING, FLG, BR, 0.5ID X 0.75OD X 0.5LG
10	4	LN3/8-16LP	NUT, LOCK, LOW PROFILE

ASSEMBLY NUMBER: D-0243-0904

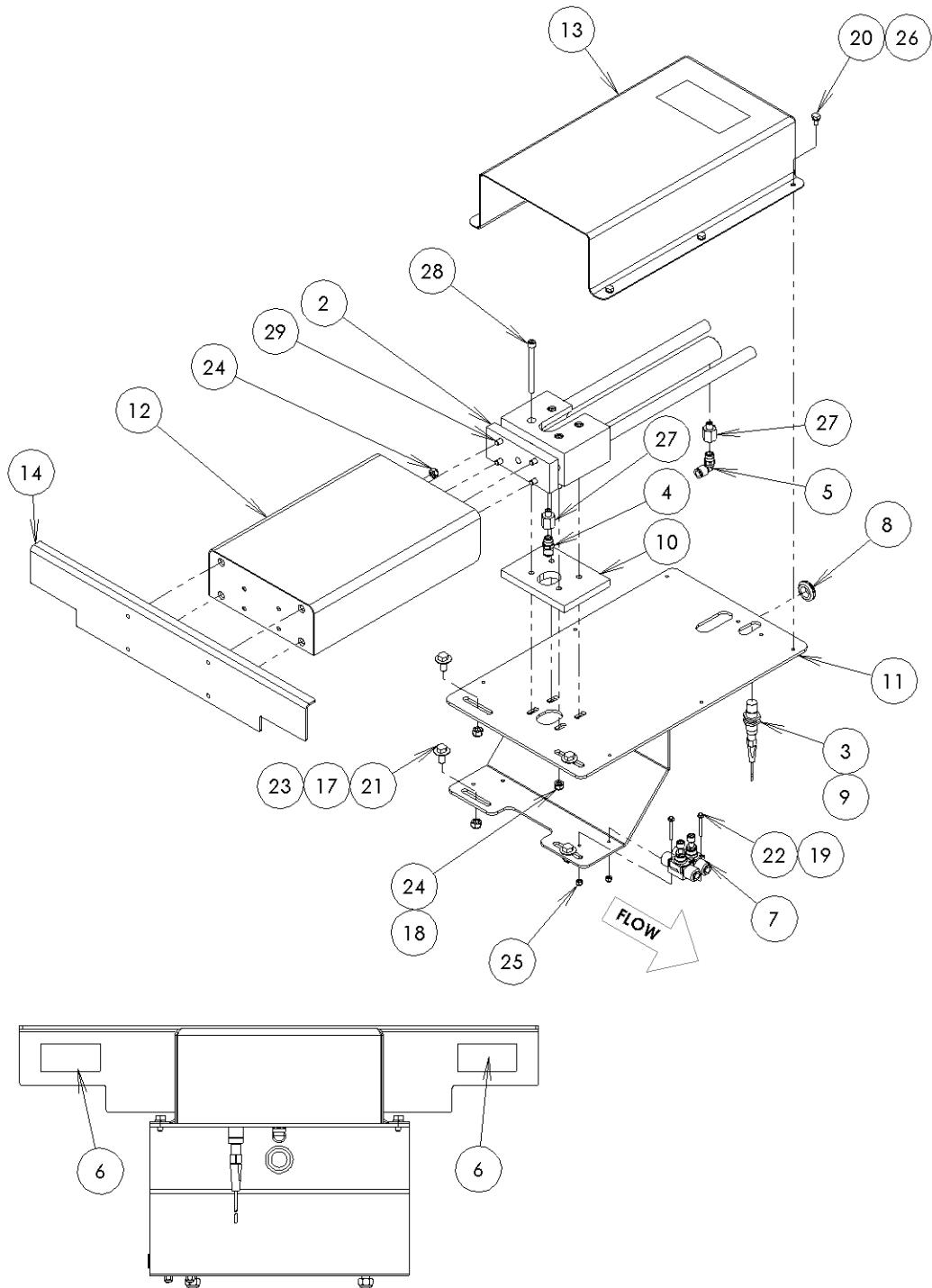
SQUEEZE STOP ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0210-1032	WARNING LABEL, KEEP HANDS CLEAR
2	1	0210-1035	WARNING LABEL, GUARDS IN PLACE
3	1	0243-0094	THRUSTER, SQUEEZE STOP
4	1	266P-06-04	FITTING, 3/8 TUBE X 1/4 NPT
5	2	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
6	1	7707-118	REGULATOR, 1/4NPT 45PSI MAX.
7	1	7707-2360	LABEL, DANGER - MANIFOLD
8	1	7707-2406	FITTING, ELBOW, EXTENDED
9	1	7707-3178	REGULATOR NUT
10	1	7707-489	PRESSURE GAUGE
11	2	9130-1765	VALVE, FLOW CONTROL, 3/8"
12	1	9602K12	GROMMET, RUBBER, 23/32" I.D.
13	1	B-0243-0539	SQUEEZE STOP SPACER
14	1	B-0243-0543	WELDMENT, SQUEEZE STOP
15	1	C-0243-0540	SQUEEZE STOP COVER
16	1	C-0243-0541	WELDMENT, SQUEEZE STOP MOUNT
18	-	FH5/16-18X7/8	SCREW, FLAT HEAD
19	2	FW10-D	WASHER, FLAT
20	3	FW3/8-A	WASHER, FLAT
21	4	FW5/16-A	WASHER, FLAT
22	4	HH1/4-20X1/2	SCREW, HEX HEAD
23	3	HH3/8-16X7/8	SCREW, HEX HEAD
24	2	HH8-32X1-1/2	SCREW, HEX HEAD
25	3	LN3/8-16	NUT, LOCK
26	8	LN5/16-18	NUT, LOCK
27	2	LN8-32	NUT, LOCK
28	4	LW1/4	WASHER, LOCK
29	4	SH5/16-18X1	SCREW, SOCKET HEAD CAP
30	4	SH5/16-18X4	SCREW, SOCKET HEAD
31	1	SN1/4NPTX1-1/2	NIPPLE, 1/4" NPT X 1-1/2"
32	1	SP1/8NPT	HEX PLUG, 1/8" NPT

ASSEMBLY NUMBER: C-0243-0542-1

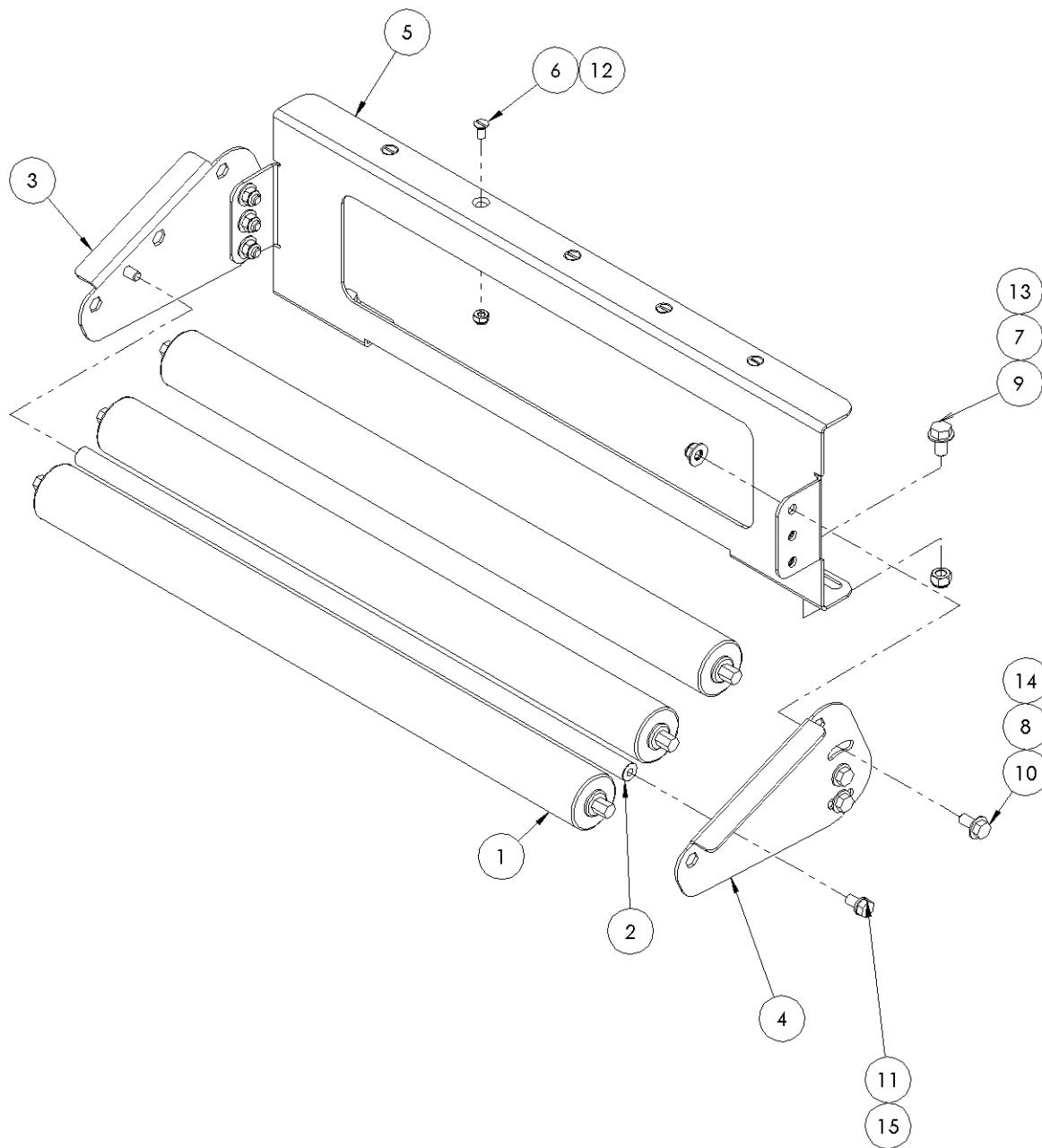
PUSHER ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0210-1035	WARNING LABEL, GUARDS IN PLACE
2	1	0243-0093	THRUSTER, PUSHER
3	1	0750-1131-1	SENSOR.PROX.IND.18MM.DC.3-WIRE
4	1	268P-06-04	FITTING, TBG, STR, 3/8OD X 1/4NPT
5	1	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
6	2	8013-2107	WARNING LABEL, CRUSH HAZARD
7	2	9130-1765	VALVE, FLOW CONTROL, 3/8"
8	1	9602K12	GROMMET, RUBBER, 23/32" I.D.
9	1	9743-1045	CABLE, PHOTOEYE, 10M
10	1	B-0243-0044	SPACER, PUSHER CYLINDER
11	1	C-0243-0548	WELDMENT, PUSHER MOUNT
12	1	C-0243-0549	WELDMENT, PUSHER
13	1	C-0243-0550	PUSHER COVER
14	1	C-0243-0611	24" PUSHER PLATE
17	4	FW3/8-A	WASHER, FLAT
18	4	FW5/16-B	WASHER, FLAT
19	2	FW8-A	WASHER, FLAT
20	6	HH1/4-20X1/2	SCREW, HEX HEAD
21	4	HH3/8-16X7/8	SCREW, HEX HEAD
22	2	HH8-32X1-1/2	SCREW, HEX HEAD
23	4	LN3/8-16	NUT, LOCK
24	8	LN5/16-18	NUT, LOCK
25	2	LN8-32	NUT, LOCK
26	6	LW1/4	WASHER, LOCK
27	2	SA1/4NPTX1/8NPT	ADAPTER, 1/4" NPT X 1/8" NPT
28	4	SH5/16-18X3-1/2	SCREW, SOCKET HEAD
29	4	SH5/16-18X3/4	SCREW, SOCKET HEAD

ASSEMBLY NUMBER: C-0243-0610

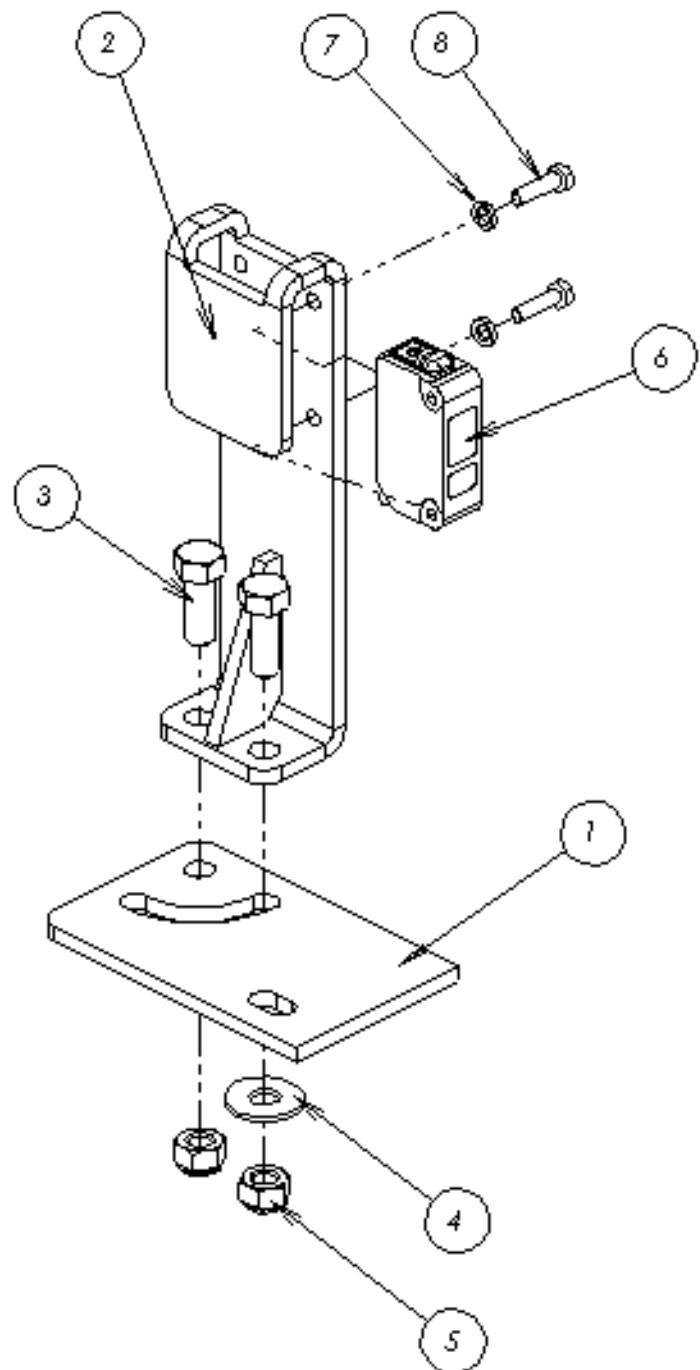
TRANSFER CONVEYOR ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	3	0243-0090	ROLLER
2	1	B-0243-0080	BAR, TRANSFER ROLLERS SPREADER
3	1	C-0243-0079L	PLATE, TRANSFER ROLLERS, LH
4	1	C-0243-0079R	PLATE, TRANSFER ROLLERS, RH
5	1	C-0243-0606	BRACKET, TRANSFER CONVEYOR
6	5	FH1/4-20X1/2	SCREW, SLOTTED FLAT HEAD
7	2	FW3/8-C	WASHER, FLAT
8	12	FW5/16-A	WASHER, FLAT
9	2	HH3/8-16X3/4	SCREW, HEX HEAD
10	6	HH5/16-18X3/4	SCREW, HEX HEAD
11	2	HH5/16-18X5/8	SCREW, HEX HEAD
12	5	LN1/4-20	NUT, LOCK
13	2	LN3/8-16	NUT, LOCK
14	6	LN5/16-18	NUT, LOCK
15	2	LW5/16	WASHER, LOCK

ASSEMBLY NUMBER: D-0243-0605

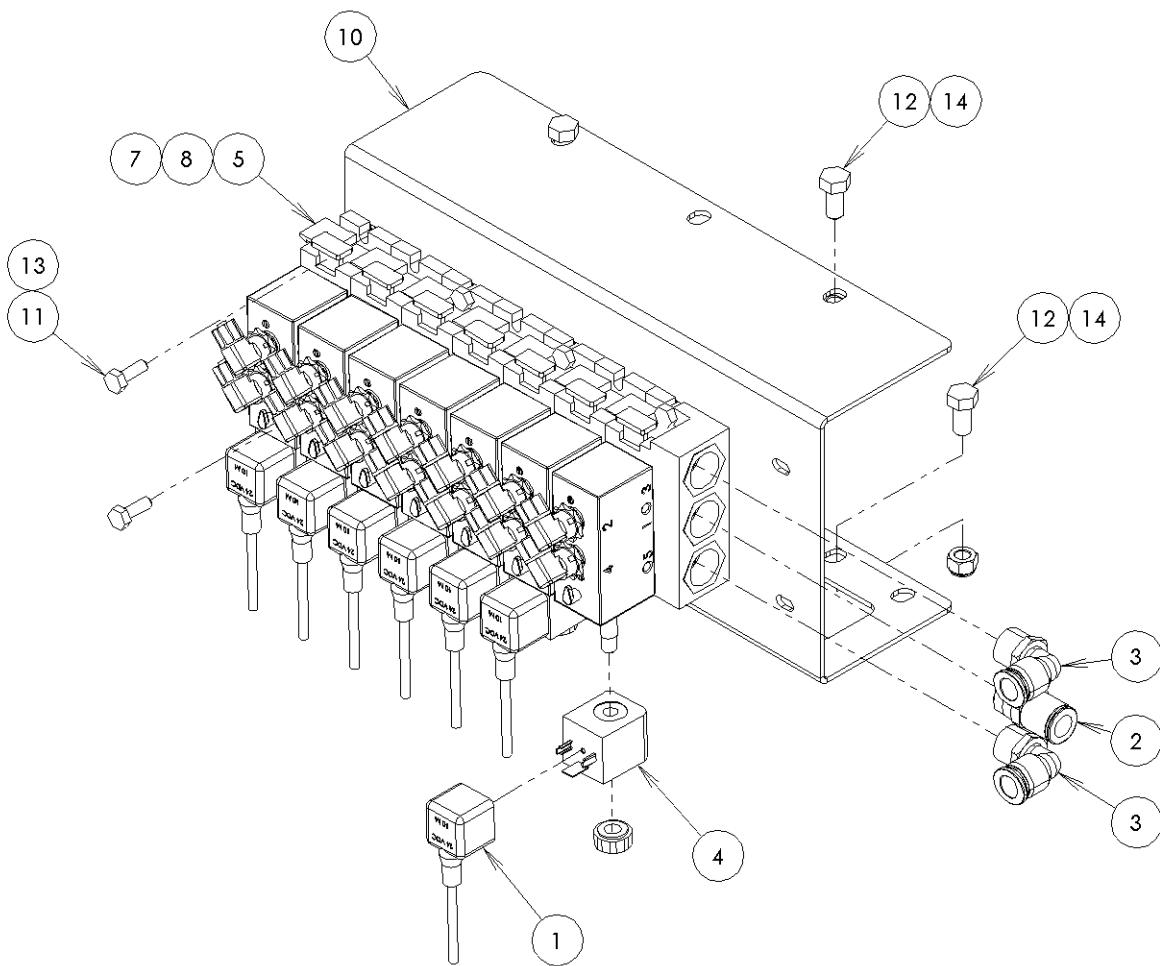
PHOTOEYE ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0618	MTG. BASE, PHOTO EYE
2	1	B-0243-0619	BRACKET, PHOTO EYE
3	2	HH5/16-18X7/8	SCREW, HEX HEAD
4	1	FW5/16-B	WASHER, FLAT
5	2	LN5/16-18	NUT, LOCK
6	1	9743-1281	PHOTOEYE, DIFFUSE
7	2	LW10	WASHER, LOCK
8	2	HHM4x.7x16	SCREW, HEX METRIC
9	1	9743-1045	CABLE, PHOTOEYE, 10M

ASSEMBLY NUMBER: B-0243-0620

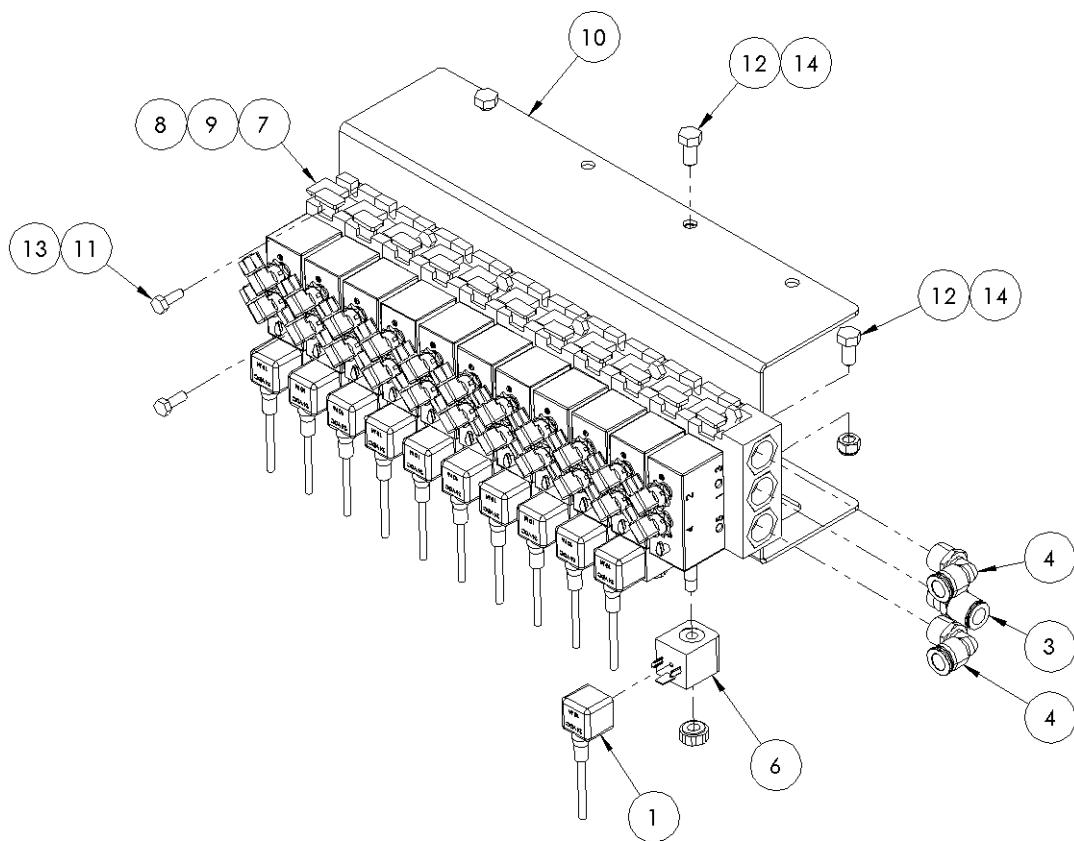
VALVE BANK ASSEMBLY, 3 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	7	0210-2395	ISO DIN CONNECTOR, 24VDC, 10M
2	1	268P-08-08	FITTING.TBG.STR.1/2NPT.1/2OD
3	2	269P-08-08	FITTING.ELB.1/2 NPT TO 1/2 OD
4	7	7707-3248	SOLENOID VALVE COIL, 24 VDC
5	1	7707-3257	6-VALVE BANK
6	1	7707-3260	SOLENOID VALVE W/ COIL CAP
7	1	9130-401	STATION SEGMENT
8	1	C-0243-0556	VALVE BANK MOUNT
9	8	HH1/4-20X3/4	SCREW, HEX HEAD
10	4	HH3/8-16X3/4	SCREW, HEX HEAD
11	8	LN1/4-20	NUT, LOCK
12	4	LN3/8-16	NUT, LOCK
13	8	P68392	VALVE ADAPT ELB, 3/8" TUBE
14	6	P68949	VALVE ADAPT ELB, 1/4" TUBE

ASSEMBLY NUMBER: C-0243-0612

VALVE BANK ASSEMBLY, 4 POSITION

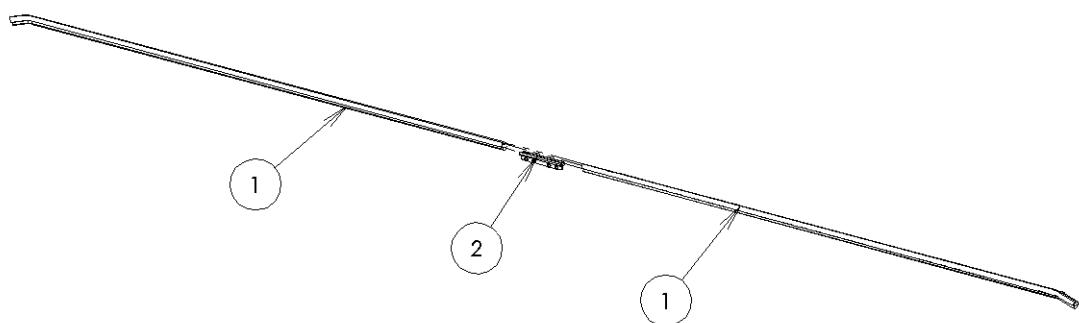
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	11	0210-2395	ISO DIN CONNECTOR, 24VDC, 10M
2	2	262P-04-04	1/4 OD TUBE UNION
3	1	268P-08-08	FITTING.TBG.STR.1/2NPT.1/2OD
4	2	269P-08-08	FITTING.ELB.1/2 NPT TO 1/2 OD
5	4	3106-60-00	FITTING, UNION, 3/8"
6	11	7707-3248	SOLENOID VALVE COIL, 24 VDC
7	1	7707-3257	6-VALVE BANK
8	5	7707-3260	SOLENOID VALVE W/ COIL CAP
9	5	9130-401	STATION SEGMENT
10	1	C-0243-0903	VALVE BANK MOUNT
11	12	HH1/4-20X3/4	SCREW, HEX HEAD
12	4	HH3/8-16X3/4	SCREW, HEX HEAD
13	12	LN1/4-20	NUT, LOCK
14	4	LN3/8-16	NUT, LOCK
15	12	P68392	VALVE ADAPT ELB, 3/8" TUBE
16	10	P68949	VALVE ADAPT ELB, 1/4" TUBE

ASSEMBLY NUMBER: C-0243-0900

TOP WEAR STRIP ASSEMBLY, 3 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	B-0243-0758	WEAR STRIP, CHANNEL, 96.5" LG
2	1	VG-113-08	CLAMP, RAIL SPLICER

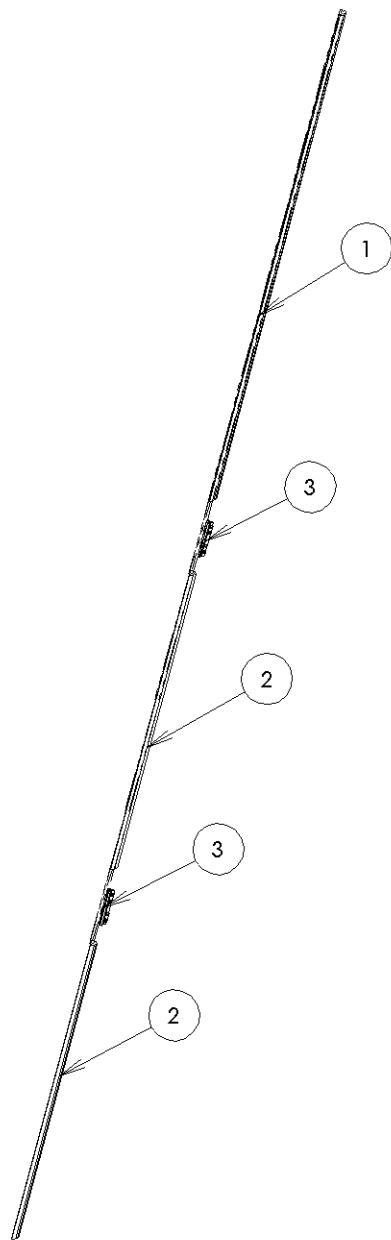
ASSEMBLY NUMBER: B-0243-0759



TOP WEAR STRIP ASSEMBLY, 4 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0813	WEAR STRIP, "L" SHAPE, 120"
2	2	B-0243-0814	WEAR STRIP, "L" SHAPE, 120"
3	2	VG-113-08	CLAMP, RAIL SPLICER

ASSEMBLY NUMBER: B-0243-0815

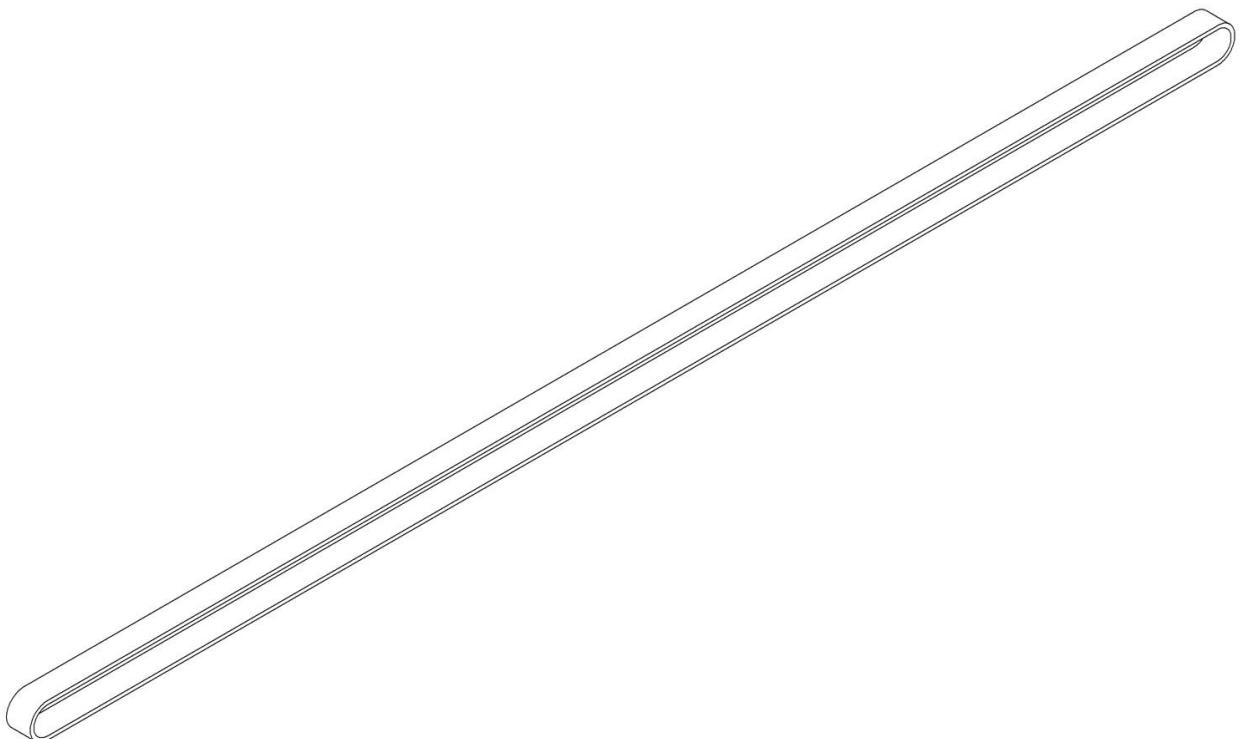


TOP CONVEYOR BELT

BELT SPECIFICATIONS:

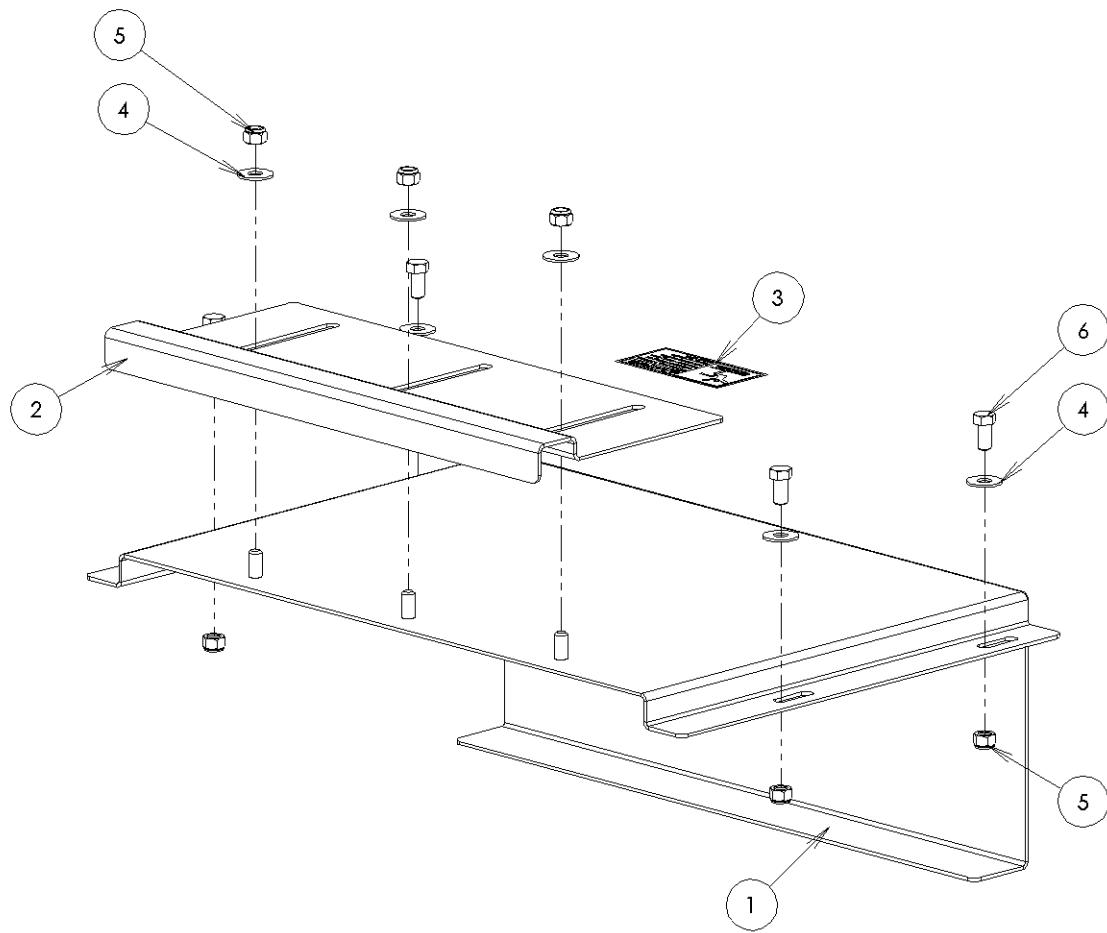
- SERIES 800 WHITE ACETAL
- FLUSH EDGE
- 5/32" DIAMETER PERFORATED ROUND HOLE
- 4" WIDE

ASSEMBLY NUMBER: C-0243-0190



TOP CONVEYOR COVER ASSEMBLY

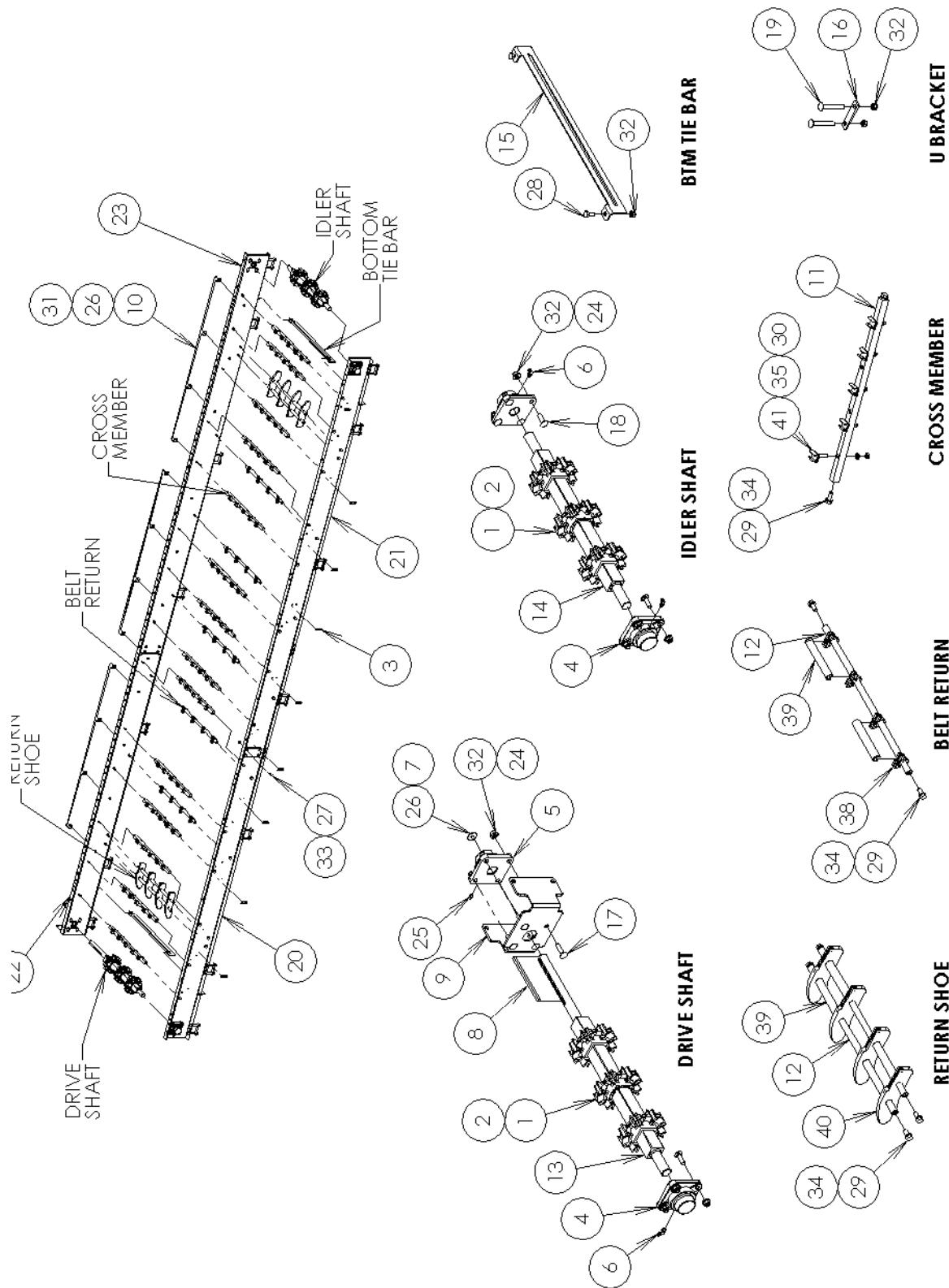
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	C-0243-0790	END COVER
2	1	B-0243-0609	BOX STOP
3	1	86075T51	WARNING LABEL, KEEP HANDS CLEAR
4	7	FW3/8-A	WASHER, FLAT
5	7	LN3/8-16	NUT, LOCK
6	4	HH3/8-16X3/4	SCREW, HEX HEAD

ASSEMBLY NUMBER: C-0243-0789

BOTTOM CONVEYOR FRAME ASSEMBLY, 3 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	6	0243-0135	DRIVE SPROCKET, 1.5 SQ SHAFT
2	4	0243-0136	RETAINING RING, 1.5 SQ SHAFT
3	9	0243-0631	TIE PLATE, SINGLE
4	3	0550-1117	BEARING, 4-BOLT, 1" BORE, CL CVR
5	1	0550-1118	BEARING, 4-BOLT, 1"ID, OPEN CVR
6	3	1293K23	FITTING, GREASE, 1/4-28, 45 DEGREE
7	1	90313A107	WASHER, FLAT, SS, 1.00D X 0.28ID
8	1	B-0243-0509	KEY, 1/4" SQ X 6"
9	1	B-0243-0592	REDUCER MOUNT, VERTICAL
10	3	B-0243-0632	WIRE TIE BAR
11	14	B-0243-0770	CROSSMEMBER BAR, 20.5" BR
12	9	B-0243-0771	SHAFT, BELT RETURN SUPPORT
13	1	B-0243-0772	SHAFT, DRIVE, 1.5 SQUARE
14	1	B-0243-0773	SHAFT, TAIL, 1.5 SQUARE
15	2	B-0243-0774	WIRE TIE BAR
16	14	B-9743-1133	BRACKET
17	4	CB3/8-16X1-1/2	BOLT, CARRIAGE
18	12	CB3/8-16X1-1/4	BOLT, CARRIAGE
19	28	CB3/8-16X2-3/4	BOLT, CARRIAGE
20	1	D-0243-0512	IDLER CONV PANEL, BTM RIGHT
21	1	D-0243-0513	DRIVE CONV PANEL, BTM RIGHT
22	1	D-0243-0514	IDLER CONV PANEL, BTM LEFT
23	1	D-0243-0515	DRIVE CONV PANEL, BTM LEFT
24	16	FW3/8-C	WASHER, FLAT
25	1	GF 1/4-28	FITTING, GREASE, STR. THREAD
26	13	HH1/4-20X1/2	SCREW, HEX HEAD
27	8	HH3/8-16X1/2	SCREW, HEX HEAD
28	4	HH3/8-16X3/4	SCREW, HEX HEAD
29	46	HH3/8-16X7/8	SCREW, HEX HEAD
30	70	JN5/16-18	NUT, JAM
31	12	LN1/4-20	NUT, LOCK
32	48	LN3/8-16	NUT, LOCK
33	8	LN3/8-16LP	NUT, LOCK, LOW PROFILE
34	46	LW3/8	WASHER, LOCK
35	70	LW5/16	WASHER, LOCK
36	52	VF-CR-3834-100	RETURN RAIL
37	7	VF-CRC-T	CLIP, PINCH LOCK
38	20	VF-CRCP-58	SNAPLOCK WITH PIN
39	18	VF-CRP5-600	SPACER, FULL ROUND
40	8	VF-CRS-34-58	SHOE, CHAIN RETURN
41	70	VG-018-04	RAIL CLIP, LONG

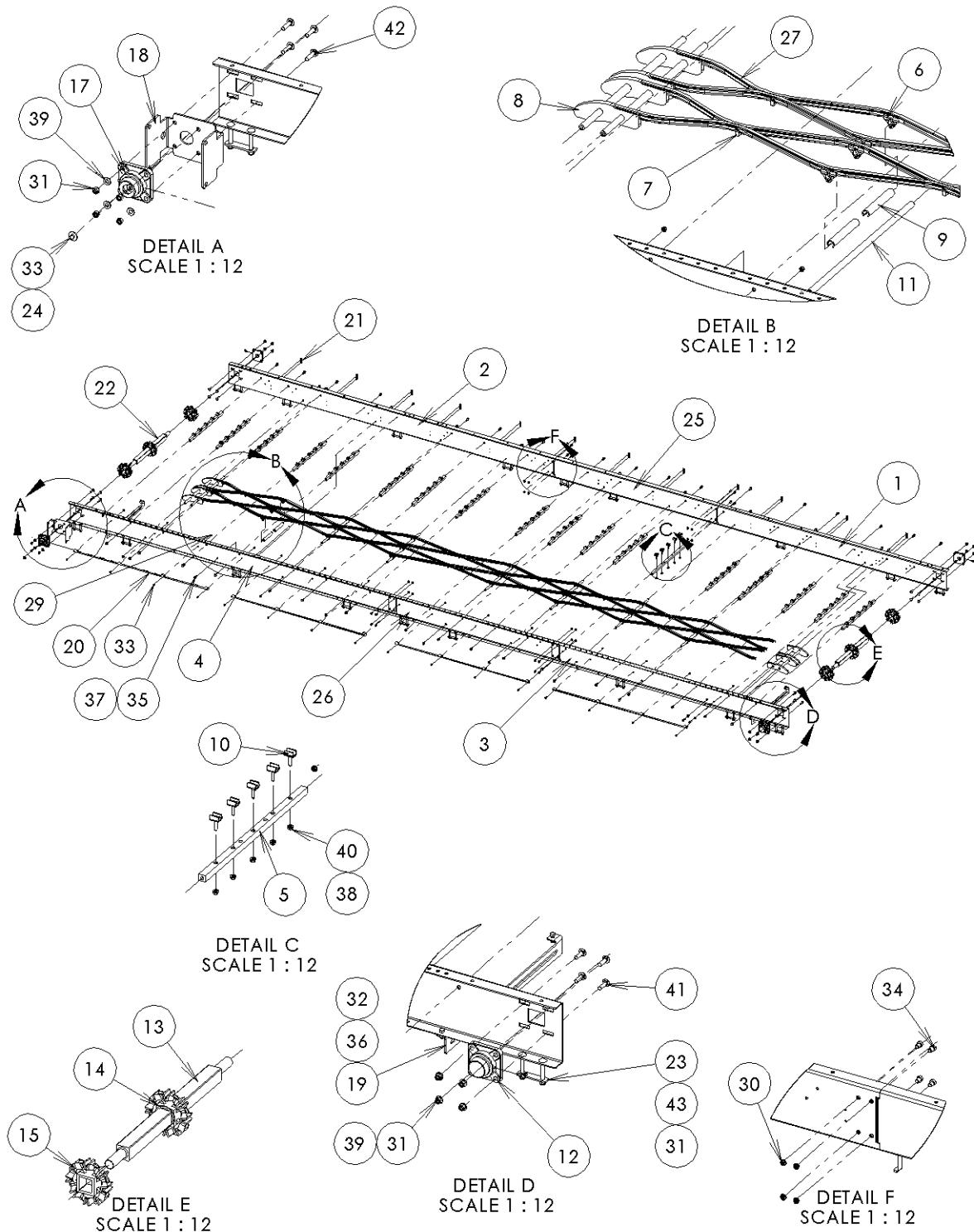
ASSEMBLY NUMBER: D-0243-0862



BOTTOM CONVEYOR FRAME ASSEMBLY, 4 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	D-0243-0512	IDLER CONV PANEL, BOTTOM RIGHT
2	1	D-0243-0513	DRIVE CONV PANEL, BOTTOM RIGHT
3	1	D-0243-0514	IDLER CONV PANEL, BOTTOM LEFT
4	1	D-0243-0515	DRIVE CONV PANEL, BOTTOM LEFT
5	18	B-0243-0770	CROSSMEMBER BAR, 20.5" BR
6	32	VF-CRCP-58	SNAPLOCK WITH PIN
7	16	VF-CRC-T	CLIP, PINCH LOCK
8	8	VF-CRS-34-58	SHOE, CHAIN RETURN
9	22	VF-CRP5-600	SPACER, FULL ROUND
10	90	VG-018-04	RAIL CLIP, LONG
11	11	B-0243-0771	SHAFT, BELT RETURN SUPPORT
12	3	0550-1117	BEARING, 4-BOLT, 1" BORE, CL CVR
13	1	B-0243-0773	SHAFT, TAIL, 1.5 SQUARE
14	4	0243-0136	RETAINING RING, 1.5 SQ SHAFT
15	6	0243-0135	DRIVE SPROCKET, 1.5 SQ SHAFT
16	3	1293K23	FITTING, GREASE, 1/4-28, 45 DEGREE
17	1	0550-1118	BEARING, 4-BOLT, 1"ID, OPEN CVR
18	1	B-0243-0592	REDUCER MOUNT, VERTICAL
19	2	B-0243-0774	CONVEYOR TIE BAR, BOTTOM
20	4	B-0243-0632	WIRE TIE BAR
21	12	0243-0631	TIE PLATE, SINGLE
22	1	B-0243-0772	SHAFT, DRIVE, 1.5 SQUARE
23	18	B-9743-1133	BRACKET
24	1	90313A107	WASHER.FLAT.SS.1.00D X 0.28ID
25	1	D-0243-0797	INTERMEDIATE CNV FRAME, TOP RIGHT
26	1	D-0243-0798	LOWER CNV FRAME, LEFT
27	2	B-0243-0805	RETURN RAIL
28	2	B-0243-0805	RETURN RAIL
29	16	LN1/4-20	NUT, LOCK
30	16	LN3/8-16LP	NUT, LOCK, LOW PROFILE
31	52	LN3/8-16	NUT, LOCK
32	4	LN5/16-18	NUT, LOCK
33	17	HH1/4-20X1/2	SCREW, HEX HEAD
34	16	HH3/8-16X1/2	SCREW, HEX HEAD
35	58	HH3/8-16X7/8	SCREW, HEX HEAD
36	4	HH5/16-18X3/4	SCREW, HEX HEAD
37	58	LW3/8	WASHER, LOCK
38	90	LW5/16	WASHER, LOCK
39	16	FW3/8-A	WASHER, FLAT
40	90	JN5/16-18	NUT, JAM
41	12	CB3/8-16X1-1/4	BOLT, CARRIAGE
42	4	CB3/8-16X1-1/2	BOLT, CARRIAGE
43	36	CB3/8-16X2-3/4	BOLT, CARRIAGE

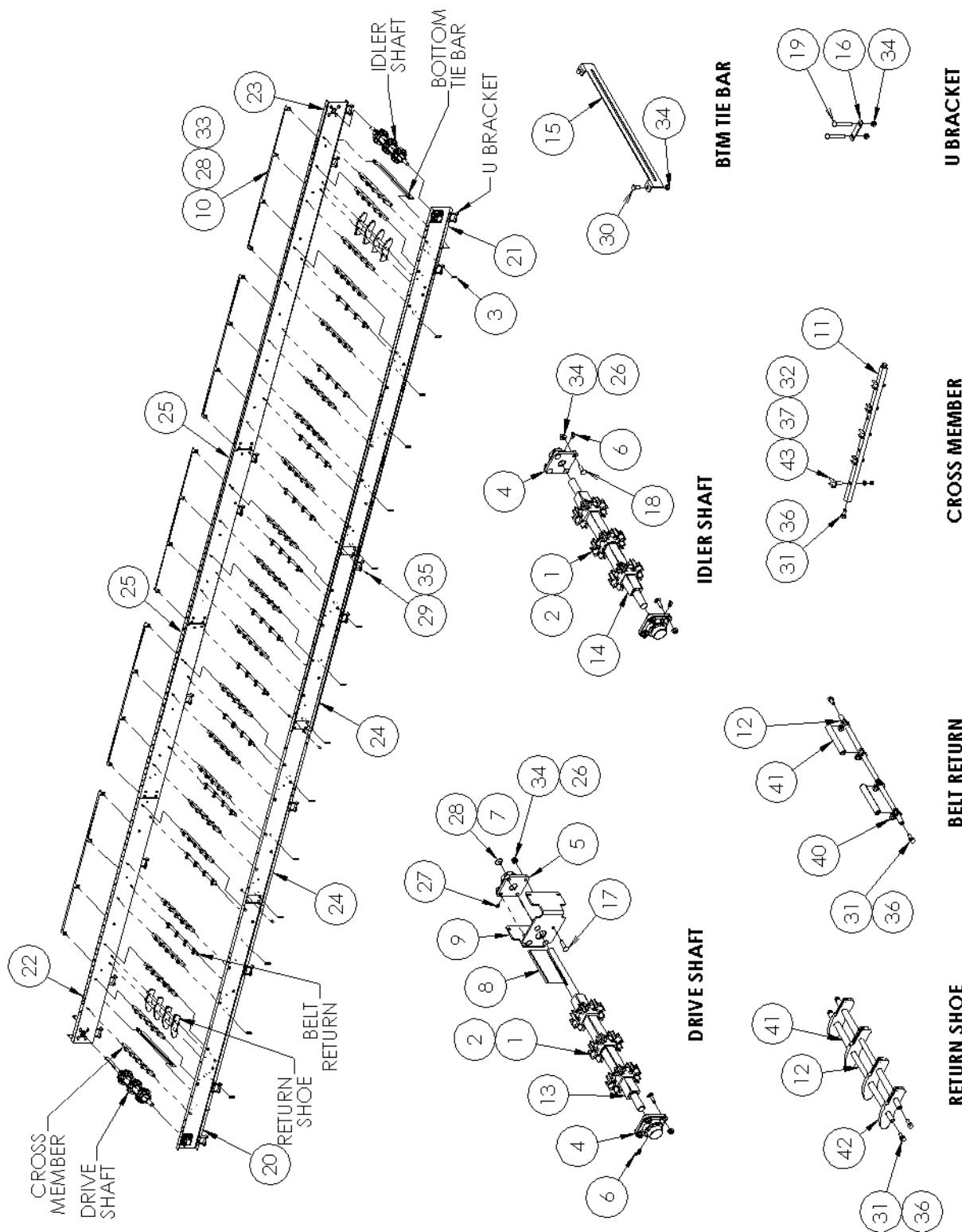
ASSEMBLY NUMBER: D-0243-0821LR



BOTTOM CONVEYOR FRAME ASSEMBLY, 5 POSITION

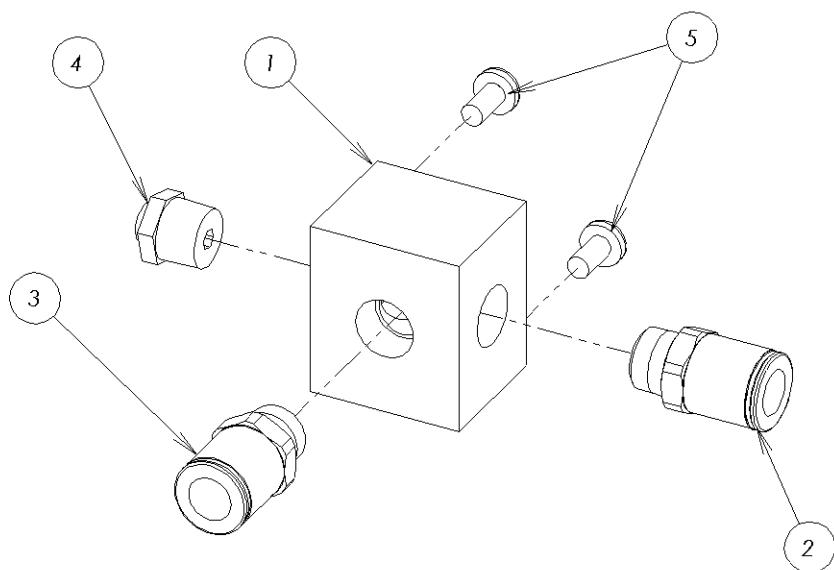
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	6	0243-0135	DRIVE SPROCKET, 1.5 SQ SHAFT
2	4	0243-0136	RETAINING RING, 1.5 SQ SHAFT
3	15	0243-0631	TIE PLATE, SINGLE
4	3	0550-1117	BEARING, 4-BOLT, 1" BORE, CL CVR
5	1	0550-1118	BEARING, 4-BOLT, 1"ID, OPEN CVR
6	3	1293K23	FITTING, GREASE, 1/4-28, 45 DEGREE
7	1	90313A107	WASHER, FLAT, SS, 1.00D X 0.28ID
8	1	B-0243-0509	KEY, 1/4" SQ X 6"
9	1	B-0243-0592	REDUCER MOUNT, VERTICAL
10	5	B-0243-0632	WIRE TIE BAR
11	22	B-0243-0770	CROSSMEMBER BAR, 20.5" BR
12	15	B-0243-0771	SHAFT, BELT RETURN SUPPORT
13	1	B-0243-0772	SHAFT, DRIVE, 1.5 SQUARE
14	1	B-0243-0773	SHAFT, TAIL, 1.5 SQUARE
15	2	B-0243-0774	WIRE TIE BAR
16	16	B-9743-1133	BRACKET
17	4	CB3/8-16X1-1/2	BOLT, CARRIAGE
18	12	CB3/8-16X1-1/4	BOLT, CARRIAGE
19	32	CB3/8-16X2-3/4	BOLT, CARRIAGE
20	1	D-0243-0512	IDLER CONV PANEL, BTM RIGHT
21	1	D-0243-0513	DRIVE CONV PANEL, BTM RIGHT
22	1	D-0243-0514	IDLER CONV PANEL, BTM LEFT
23	1	D-0243-0515	DRIVE CONV PANEL, BTM LEFT
24	2	D-0243-0797	INTERMEDIATE CNV FRAME, TOP RIGHT
25	2	D-0243-0798	LOWER CNV FRAME, LEFT
26	16	FW3/8-C	WASHER, FLAT
27	1	GF 1/4-28	FITTING, GREASE, STR. THREAD
28	21	HH1/4-20X1/2	SCREW, HEX HEAD
29	24	HH3/8-16X1/2	SCREW, HEX HEAD
30	4	HH3/8-16X3/4	SCREW, HEX HEAD
31	74	HH3/8-16X7/8	SCREW, HEX HEAD
32	110	JN5/16-18	NUT, JAM
33	20	LN1/4-20	NUT, LOCK
34	52	LN3/8-16	NUT, LOCK
35	24	LN3/8-16LP	NUT, LOCK, LOW PROFILE
36	74	LW3/8	WASHER, LOCK
37	110	LW5/16	WASHER, LOCK
38	100	VF-CR-3834-100	RETURN RAIL
39	24	VF-CRC-T	CLIP, PINCH LOCK
40	44	VF-CRCP-58	SNAPLOCK WITH PIN
41	30	VF-CRP5-600	SPACER, FULL ROUND
42	8	VF-CRS-34-58	SHOE, CHAIN RETURN
43	110	VG-018-04	RAIL CLIP, LONG

ASSEMBLY NUMBER: D-0243-0895



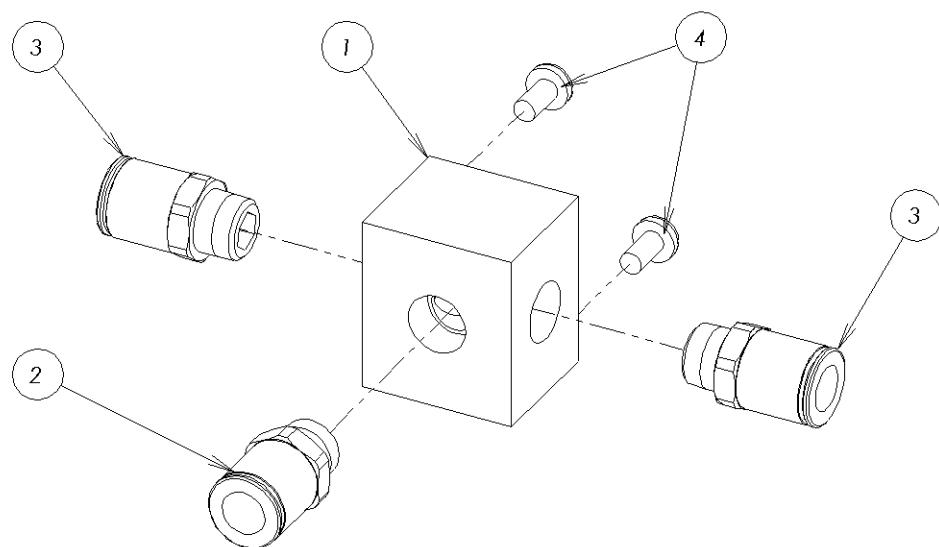
GAS INLET STATION ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0243-424	BLOCK, MANIFOLD, 1 x 3/8NPT
2	1	268P-08-06	FITTING.TBG.STR.1/2OD X 3/8NPT
3	1	0243-0580	FITTING.TBG.SEAL.1/2OD X 3/8NPT
4	1	268P-04-06	FITTING.TBG.STR.1/4OD X 3/8NPT
5	2	PH1/4-20X1/2	SCREW, PAN HEAD

ASSEMBLY NUMBER: B-0243-0544

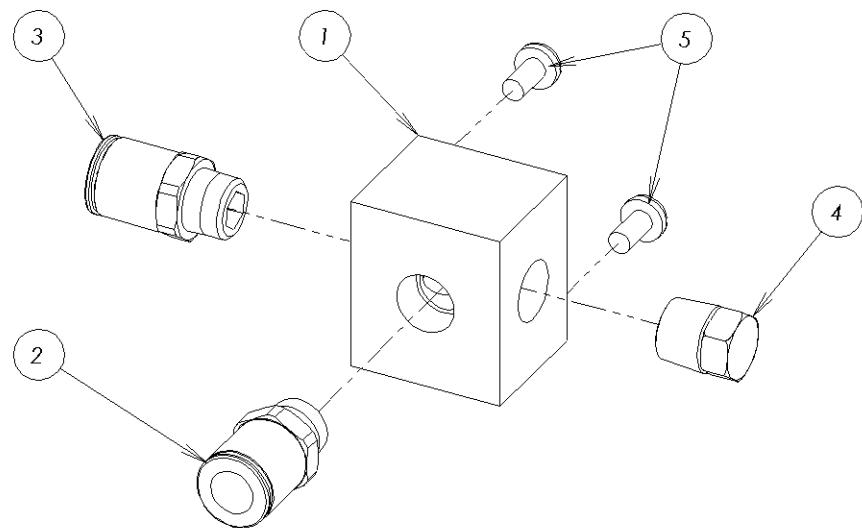
GAS MIDDLE STATION ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0243-424	BLOCK, MANIFOLD, 1 x 3/8NPT
2	1	0243-0580	FITTING.TBG.SEAL.1/2OD X 3/8NPT
3	2	268P-08-06	FITTING.TBG.STR.1/2OD X 3/8NPT
4	2	PH1/4-20X1/2	SCREW, PAN HEAD

ASSEMBLY NUMBER: B-0243-0545

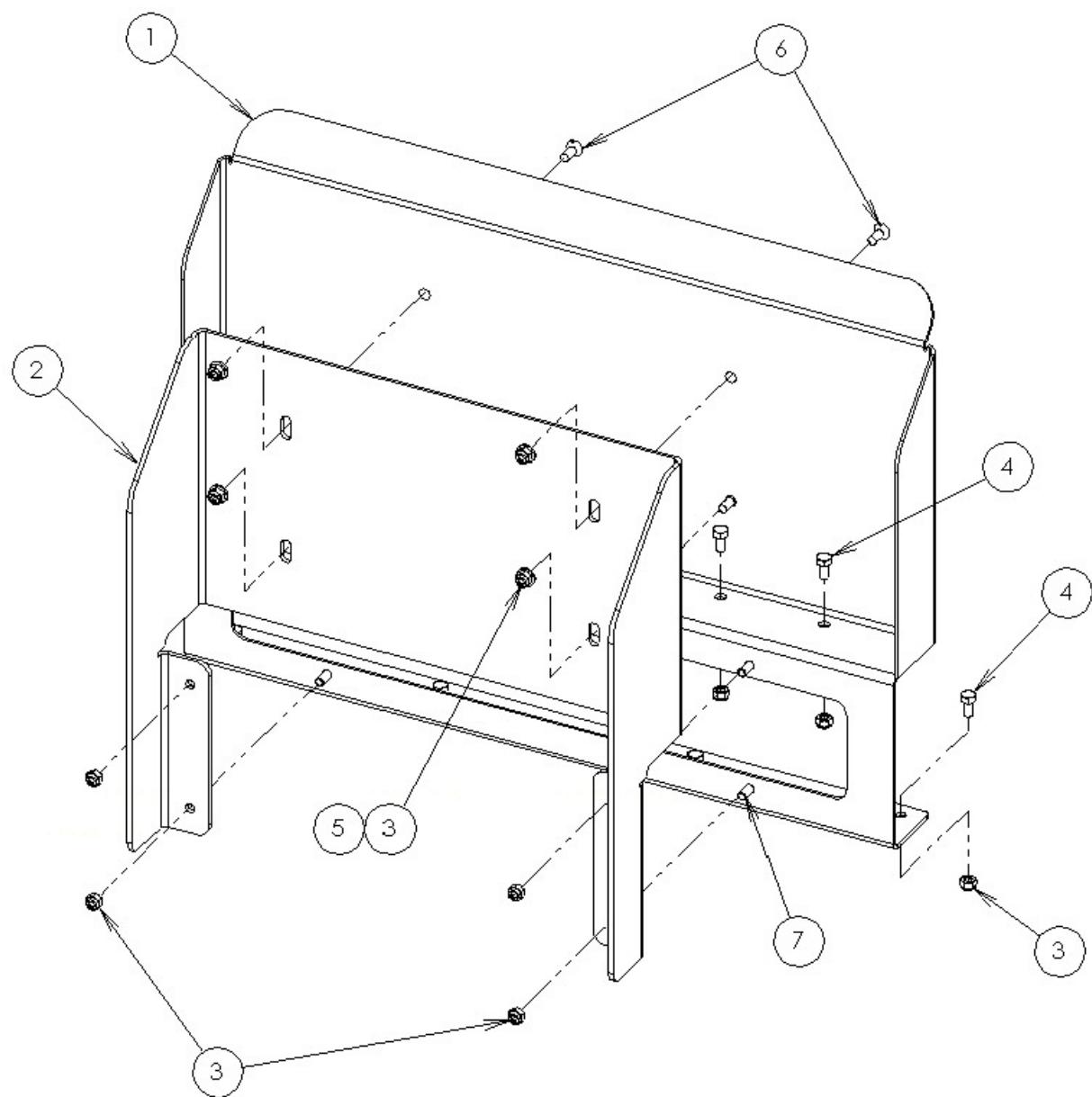
GAS END STATION ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0243-424	BLOCK, MANIFOLD, 1 x 3/8NPT
2	1	0243-0580	FITTING.TBG.SEAL.1/2OD X 3/8NPT
3	1	268P-08-06	FITTING.TBG.STR.1/2OD X 3/8NPT
4	1	4464K333	PLUG.SS.0.38NPT
5	2	PH1/4-20X1/2	SCREW, PAN HEAD

ASSEMBLY NUMBER: B-0243-0546

BACKSTOP ASSEMBLY

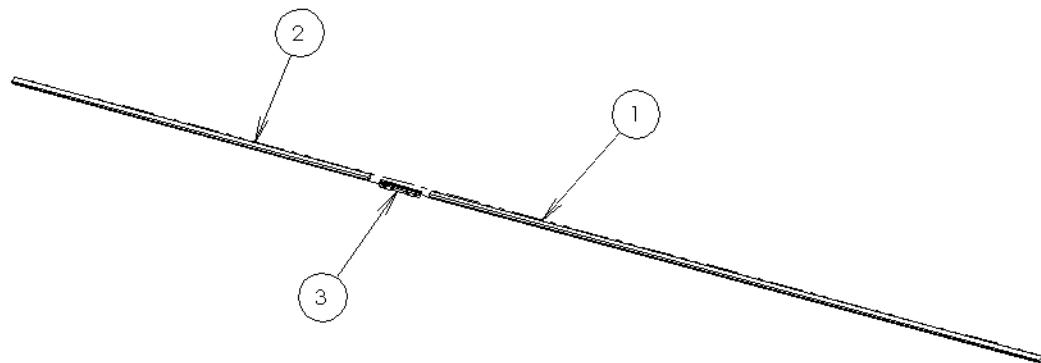
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	C-0243-0536	BACKSTOP, LONG
2	1	C-0243-0537	BACKSTOP REINFORCEMENT, LONG
3	18	LN5/16-18	NUT, LOCK
4	10	HH5/16-18X5/8	SCREW, HEX HEAD
5	4	FW 5/16-C	WASHER, FLAT
6	4	FH 5/16-18 X 3/4	SCREW, FLAT HEAD SLOTTED
7	4	HH5/16-18X3/4	SCREW, HEX HEAD

ASSEMBLY NUMBER: C-0243-0535

BOTTOM WEAR STRIP ASSEMBLY, 3 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	VG-SSTS-1.25-10	WEAR STRIP, SHAPE 'T", 120"
2	1	B-0243-0559	WEAR STRIP, 'T" SHAPE, 70"
3	1	VG-113-08	CLAMP, RAIL SPLICER

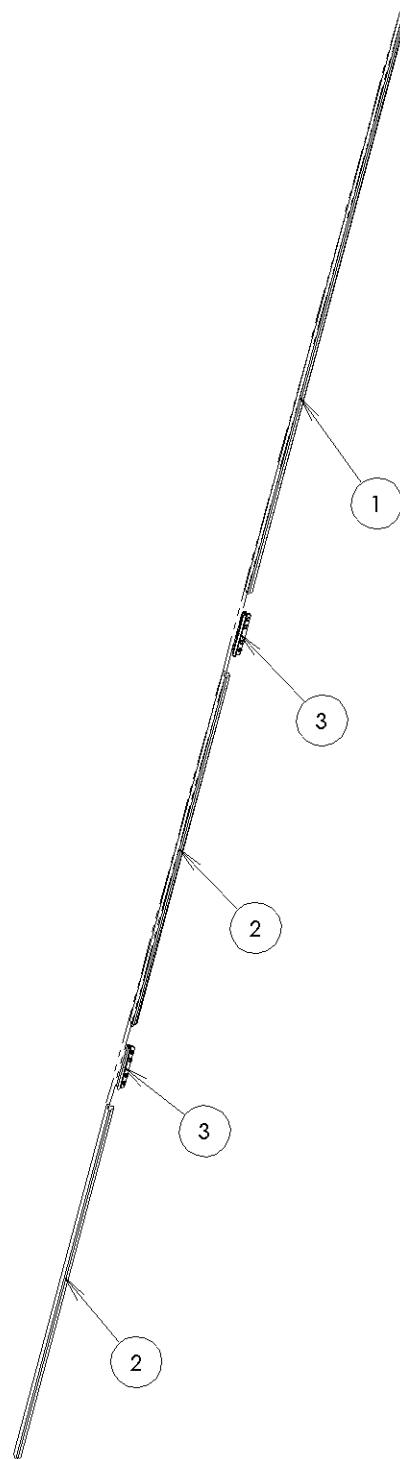
ASSEMBLY NUMBER: B-0243-0558



BOTTOM WEAR STRIP ASSEMBLY, 4 POSITION

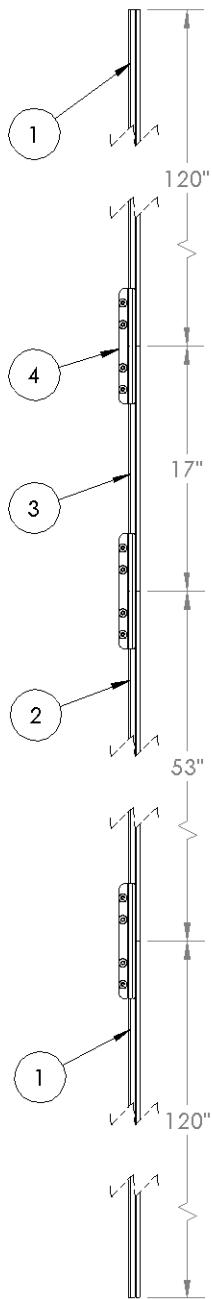
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0810	WEAR STRIP, SHAPE 'T", 120"
2	2	B-0243-0811	WEAR STRIP, SHAPE 'T", 120"
3	2	VG-113-08	CLAMP, RAIL SPLIC

ASSEMBLY NUMBER: B-0243-0812



BOTTOM WEAR STRIP ASSEMBLY, 5 POSITION

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	B-0243-0183	WEAR STRIP, 120" L
2	1	B-0243-0183	WEAR STRIP, 53" L
3	1	B-0243-0183	WEAR STRIP, 17" L
4	3	VG-113-08	RAIL SPLICING CLAMP

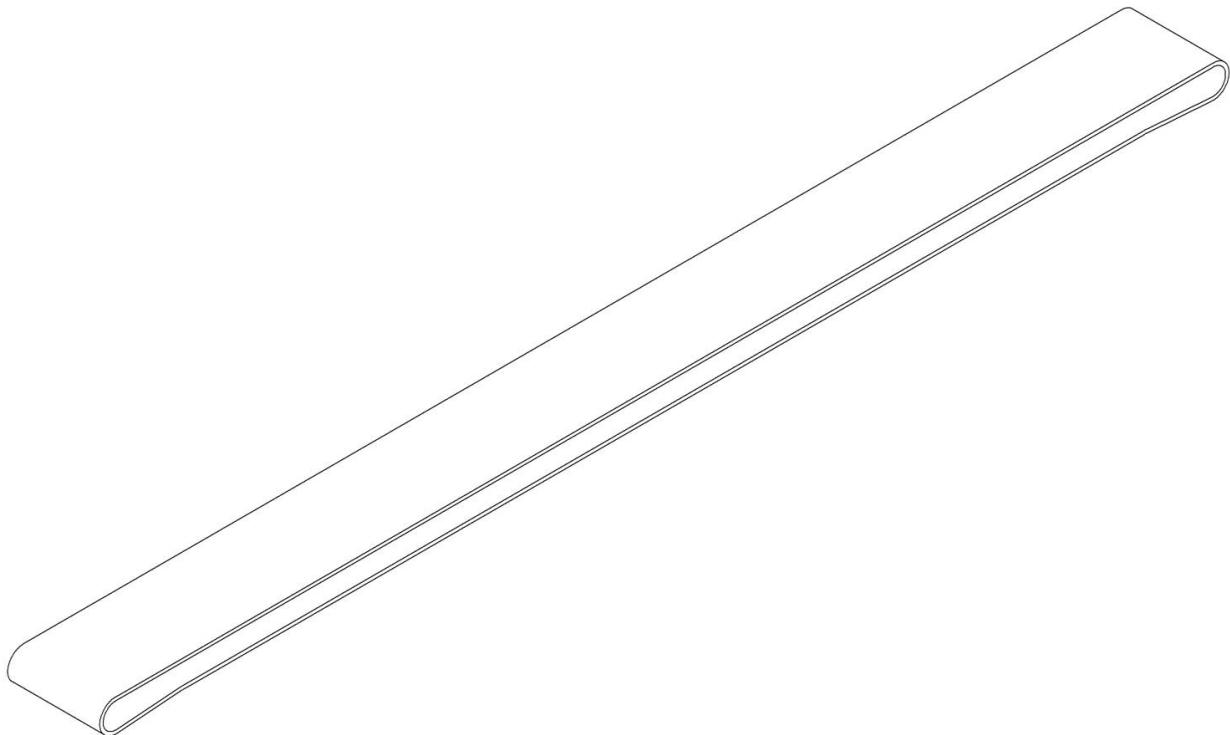
ASSEMBLY NUMBER: B-0243-0898

BOTTOM CONVEYOR BELT

BELT SPECIFICATIONS:

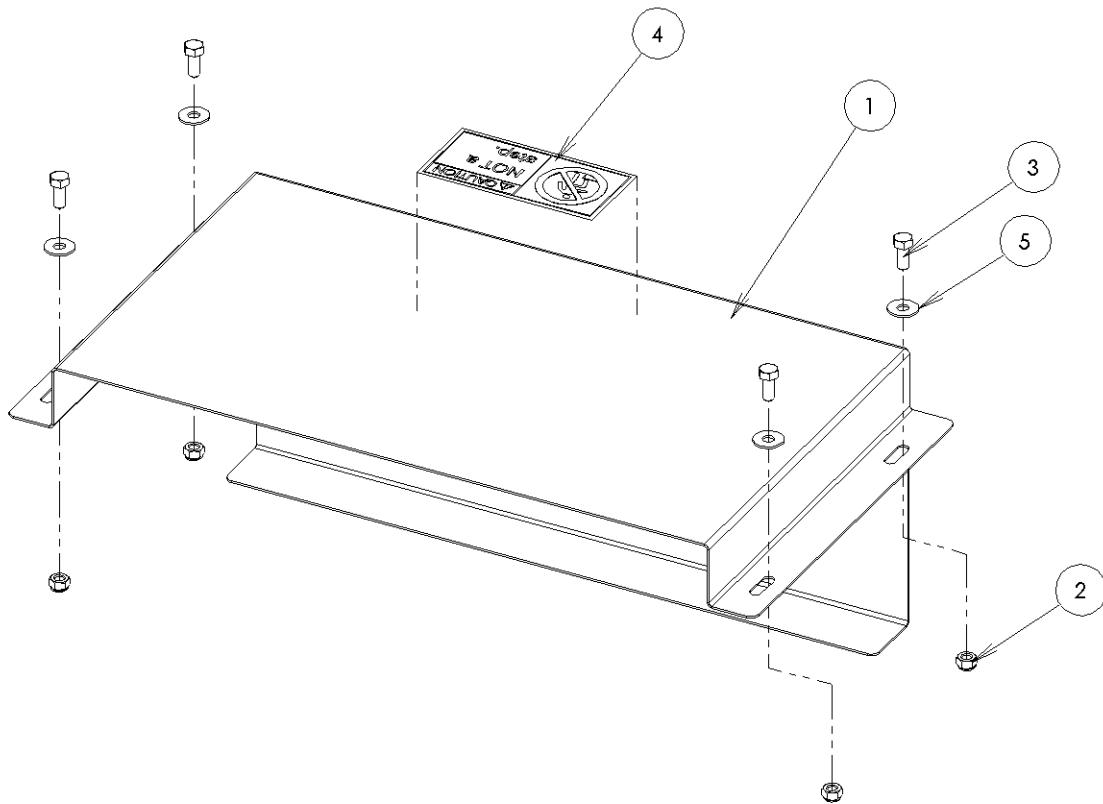
- SERIES 800 WHITE ACETAL
- FLUSH EDGE
- 5/32" DIAMETER PERFORATED ROUND HOLE
- 19.9" WIDE

ASSEMBLY NUMBER: 0243-0784



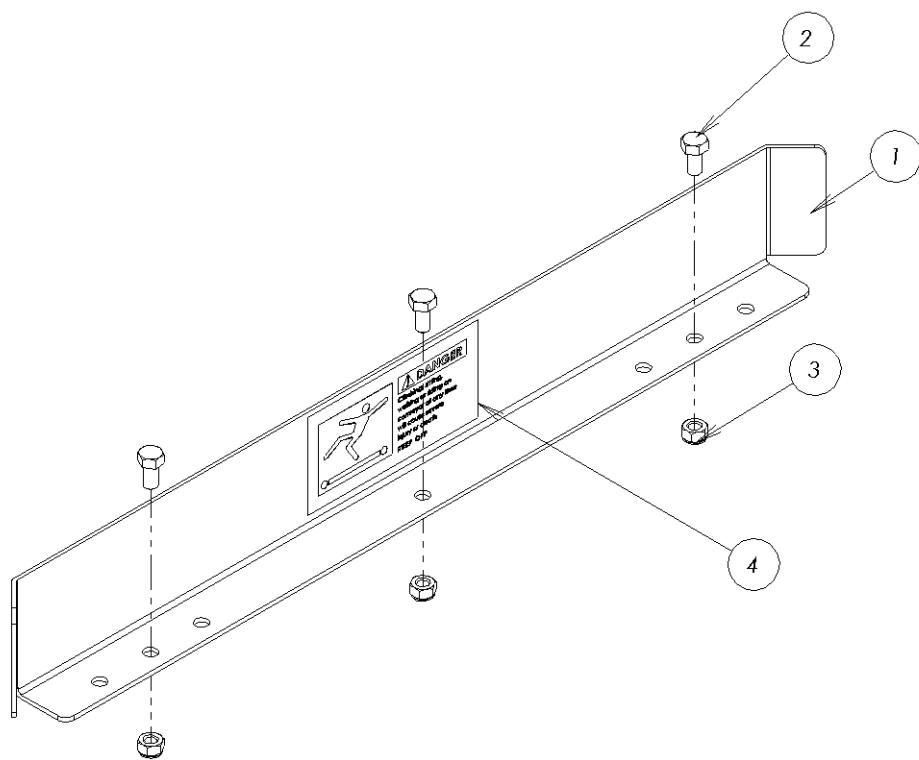
BOTTOM CONVEYOR COVER ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	C-0243-0779	BOTTOM CONV GUARD
2	4	LN5/16-18	NUT, LOCK
3	4	HH5/16-18X3/4	SCREW, HEX HEAD
4	1	0243-0240	LABEL: NOT A STEP
5	4	FW5/16-B	WASHER, FLAT

ASSEMBLY NUMBER: C-0243-0778

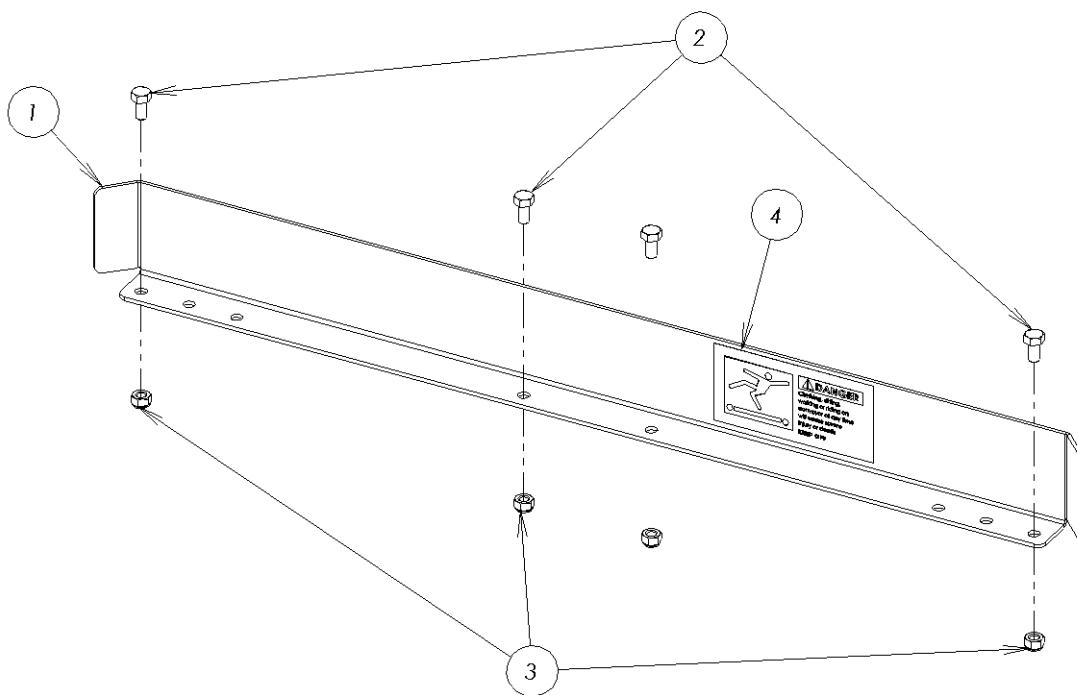
GUIDE RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	C-0243-0098	GUIDE ANGLE
2	3	HH5/16-18X5/8	SCREW, HEX HEAD
3	3	LN5/16-18	NUT, LOCK
4	1	86075T71	LABEL, DANGER, CLIMBING-SITTING

ASSEMBLY NUMBER: C-0243-0100

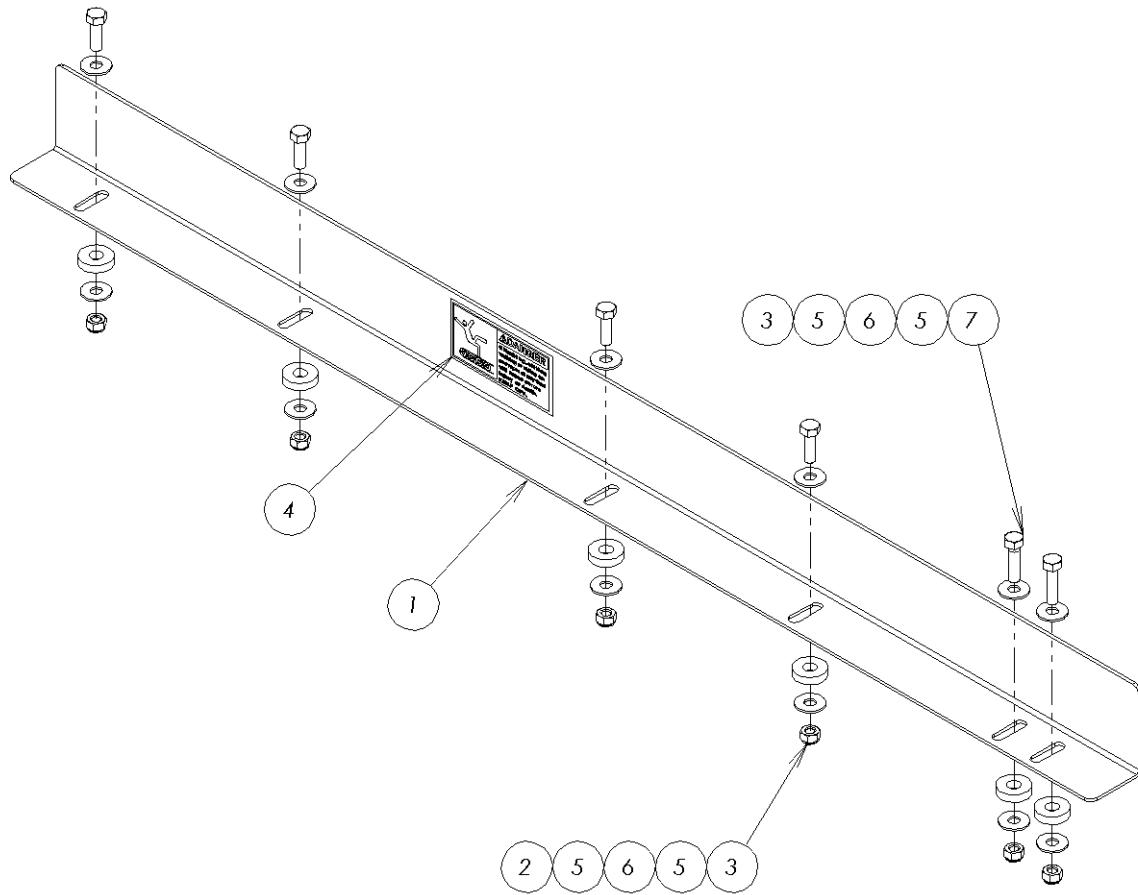
GUIDE RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	C-0243-60	GUIDE RAIL, ANGLE ENDS
2	4	HH5/16-18X5/8	SCREW, HEX HEAD
3	4	LN5/16-18	NUT, LOCK
4	1	86075T71	LABEL, DANGER, CLIMBING-SITTING

ASSEMBLY NUMBER: C-0243-0033

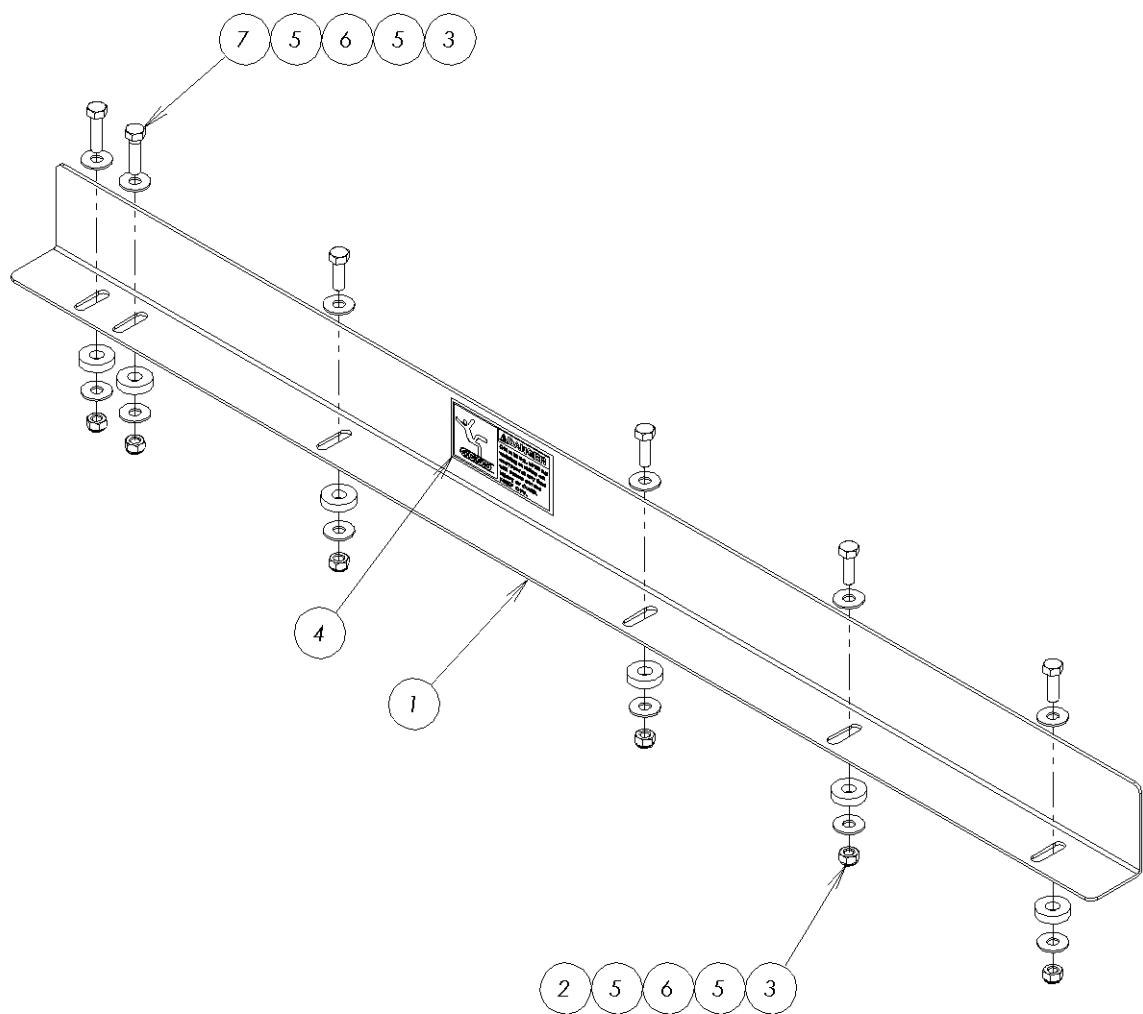
42.5" GUIDE RAIL ASSEMBLY, LEFT HAND

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0616L	CONV GUARD RAIL, 42.5", LH
2	4	HH5/16-18X1	SCREW, HEX HEAD
3	6	LN5/16-18	NUT, LOCK
4	1	86075T51	WARNING LABEL, KEEP HANDS CLEAR
5	12	FW5/16-B	WASHER.FLAT
6	6	B-9537-1635	SPACER, 1"OD X 13/32"ID X 1/4"
7	2	HH5/16-18X1-1/4	SCREW, HEX HEAD

ASSEMBLY NUMBER: B-0243-0615L

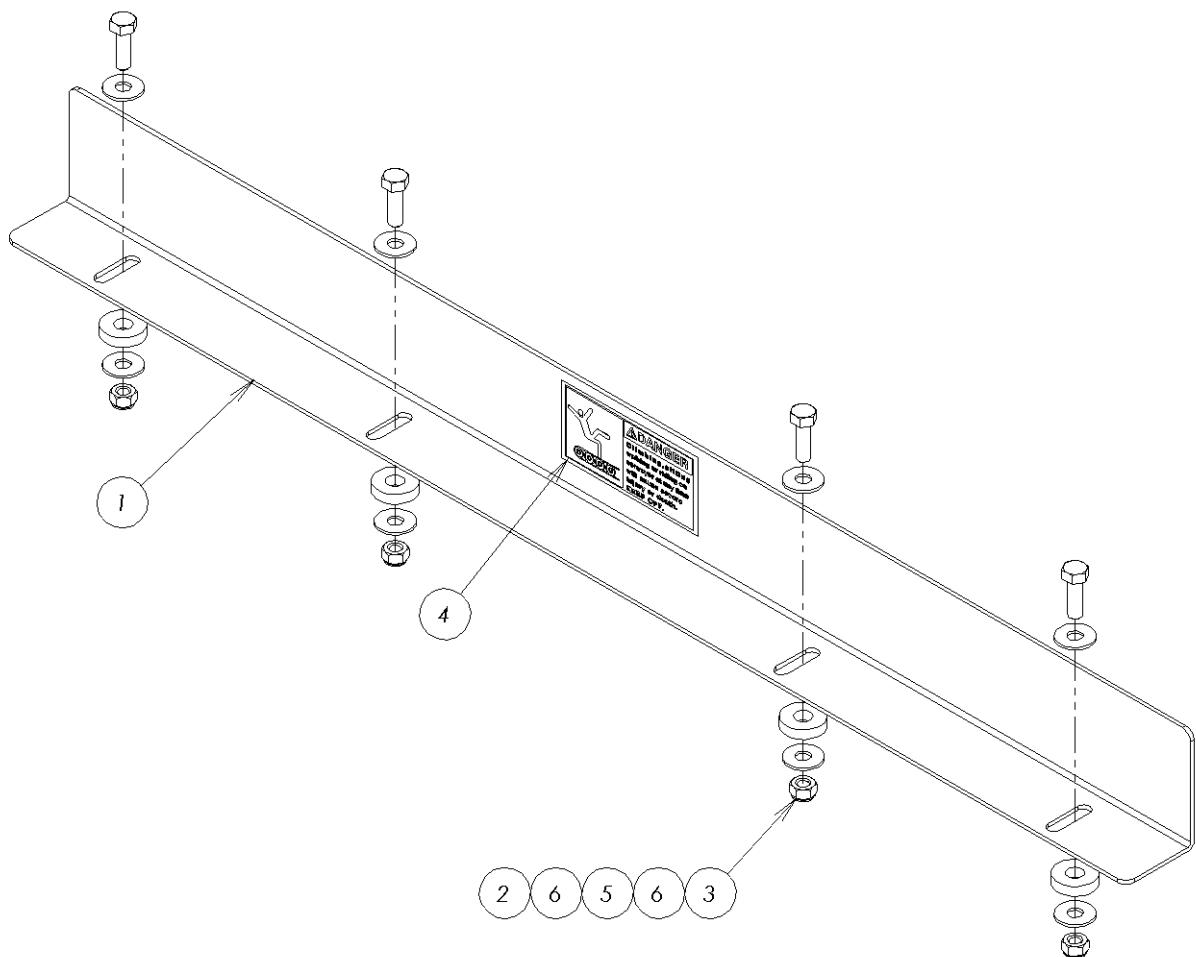
42.5" GUIDE RAIL ASSEMBLY, RIGHT HAND

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0616R	CONV GUARD RAIL, 42.5", RH
2	4	HH5/16-18X1	SCREW, HEX HEAD
3	6	LN5/16-18	NUT, LOCK
4	1	86075T51	WARNING LABEL, KEEP HANDS CLEAR
5	12	FW5/16-B	WASHER.FLAT
6	6	B-9537-1635	SPACER,1"OD X 13/32"ID X 1/4"
7	2	HH5/16-18X1-1/4	SCREW, HEX HEAD

ASSEMBLY NUMBER: D-0243-0615R

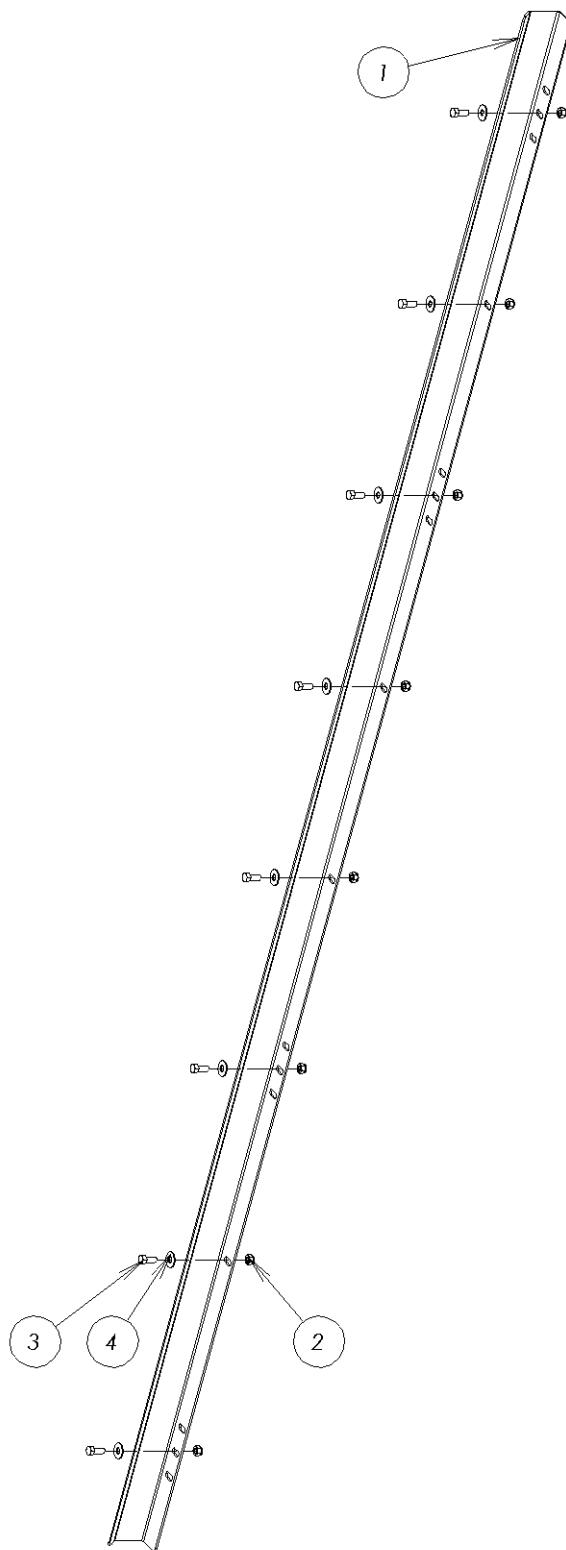
33" GUIDE RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0614	CONV GUARD RAIL, 33"
2	4	HH5/16-18X1	SCREW, HEX HEAD
3	4	LN5/16-18	NUT, LOCK
4	1	86075T51	WARNING LABEL, KEEP HANDS CLEAR
5	4	B-9537-1635	SPACER,1"OD X 13/32"ID X 1/4"
6	8	FW5/16-B	WASHER,FLAT

ASSEMBLY NUMBER: B-0243-0613

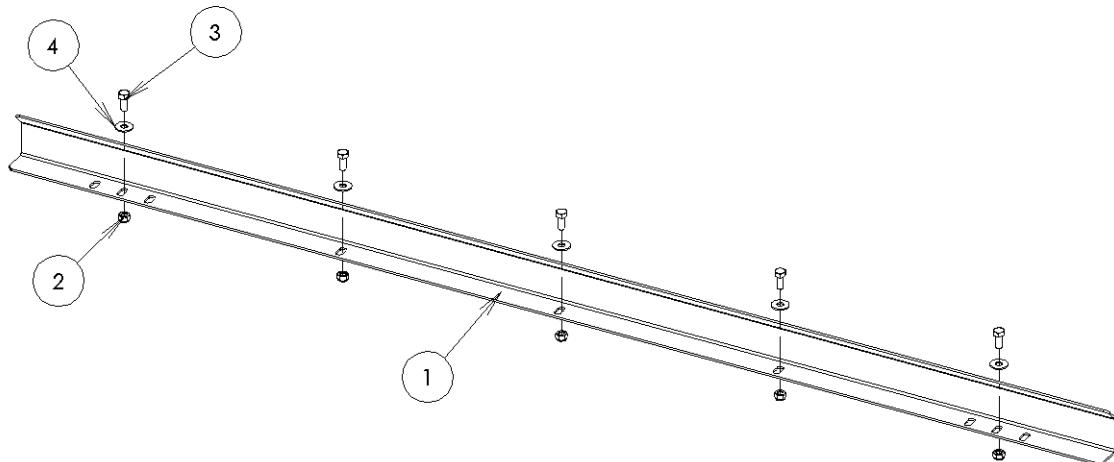
ANGLE GUARD RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0525	ANGLE GUARD
2	8	LN5/16-18	NUT, LOCK
3	8	HH5/16-18X3/4	SCREW, HEX HEAD
4	8	FW5/16-B	WASHER.FLAT

ASSEMBLY NUMBER: D-0243-0524

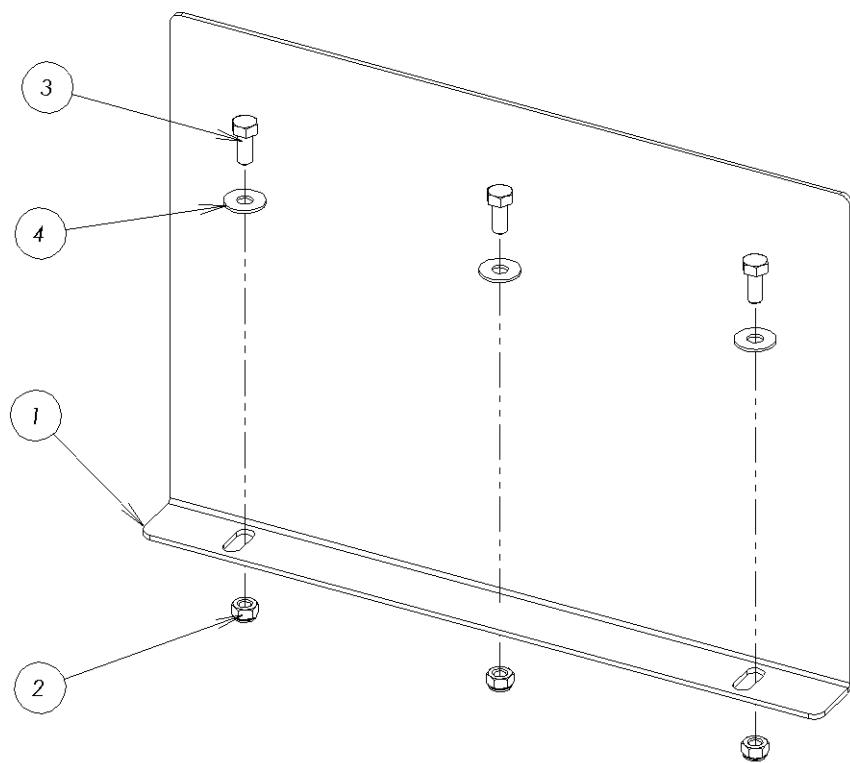
ANGLE GUARD RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0809	ANGLE GUARD
2	5	LN5/16-18	NUT, LOCK
3	5	HH5/16-18X3/4	SCREW, HEX HEAD
4	5	FW5/16-B	WASHER, FLAT

ASSEMBLY NUMBER: D-0243-0808

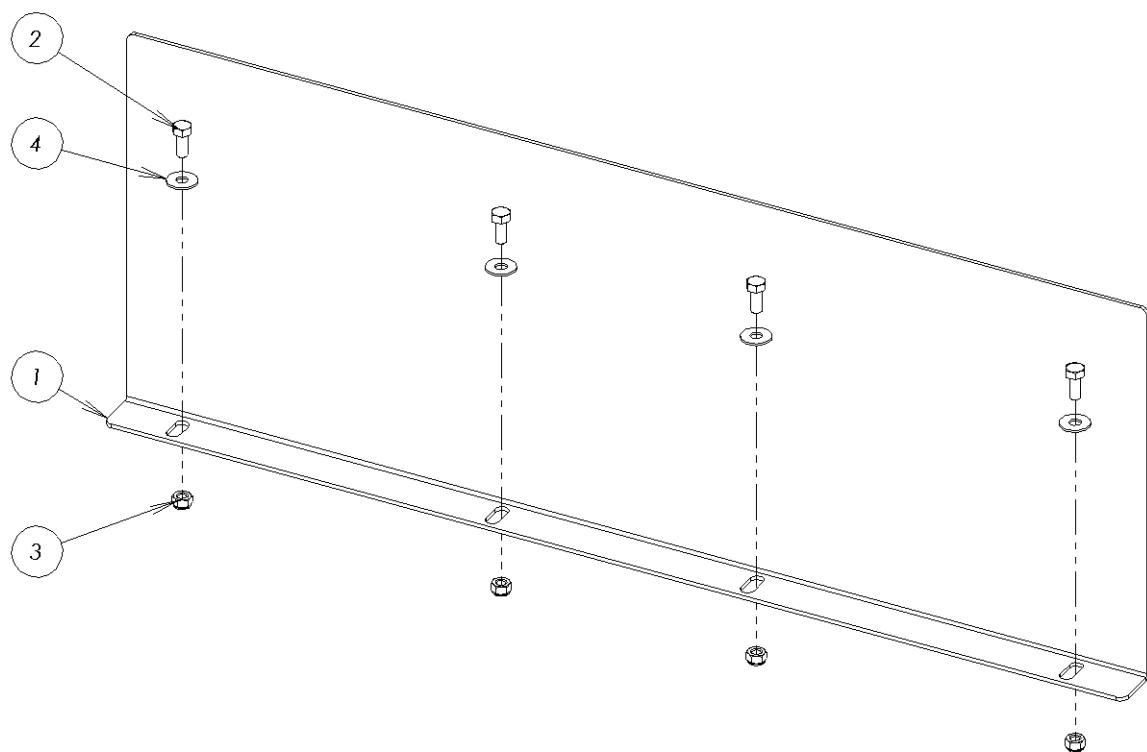
16" GUARD RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0529	GUARD RAIL, 16"
2	3	LN5/16-18	NUT, LOCK
3	3	HH5/16-18X3/4	SCREW, HEX HEAD
4	3	FW5/16-B	WASHER.FLAT

ASSEMBLY NUMBER: B-0243-0528

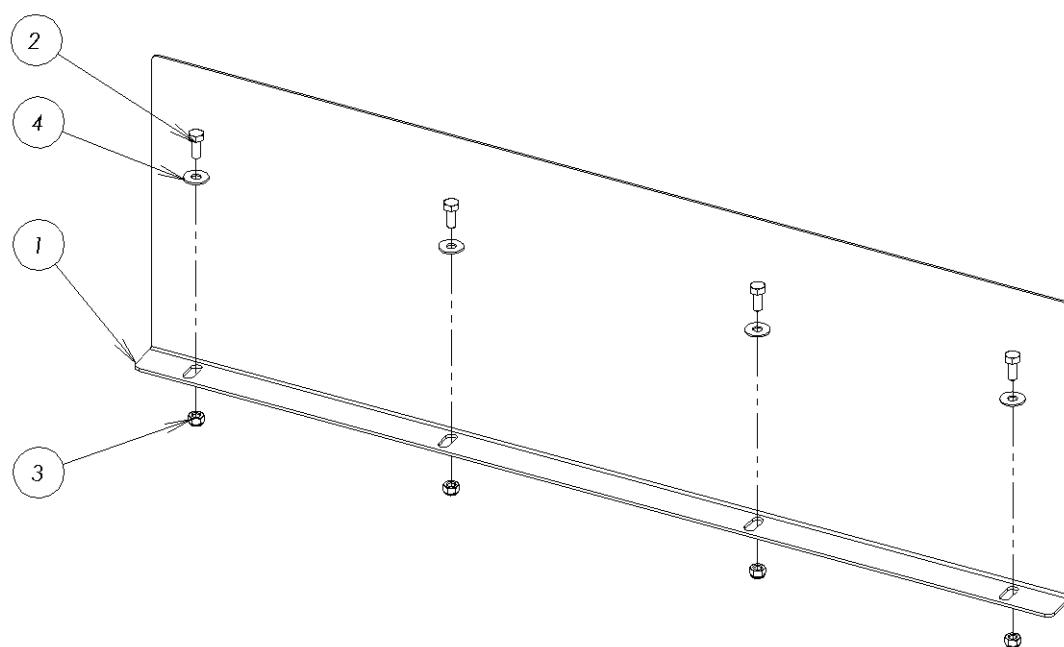
32" GUARD RAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-0527	GUARD RAIL, 32"
2	4	HH5/16-18X3/4	SCREW, HEX HEAD
3	4	LN5/16-18	NUT, LOCK
4	4	FW5/16-B	WASHER.FLAT

ASSEMBLY NUMBER: D-0243-0526

SIDERAIL ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-0243-417	GUARD RAIL, 36"
2	4	HH5/16-18X3/4	SCREW, HEX HEAD
3	4	LN5/16-18	NUT, LOCK
4	4	FW5/16-B	WASHER.FLAT

ASSEMBLY NUMBER: B-0243-0416



**2518 Wisconsin Ave.
Downers Grove, IL 60515 USA**

Phone: (800) 422-4720 (US, Canada, Mexico)
(630) 852-1190 (All Other)
Fax: (630) 852-1386

Website: www.cvpsystems.com
Sales E-Mail: sales@cvpsystems.com
Parts E-Mail: spareparts@cvpsystems.com

