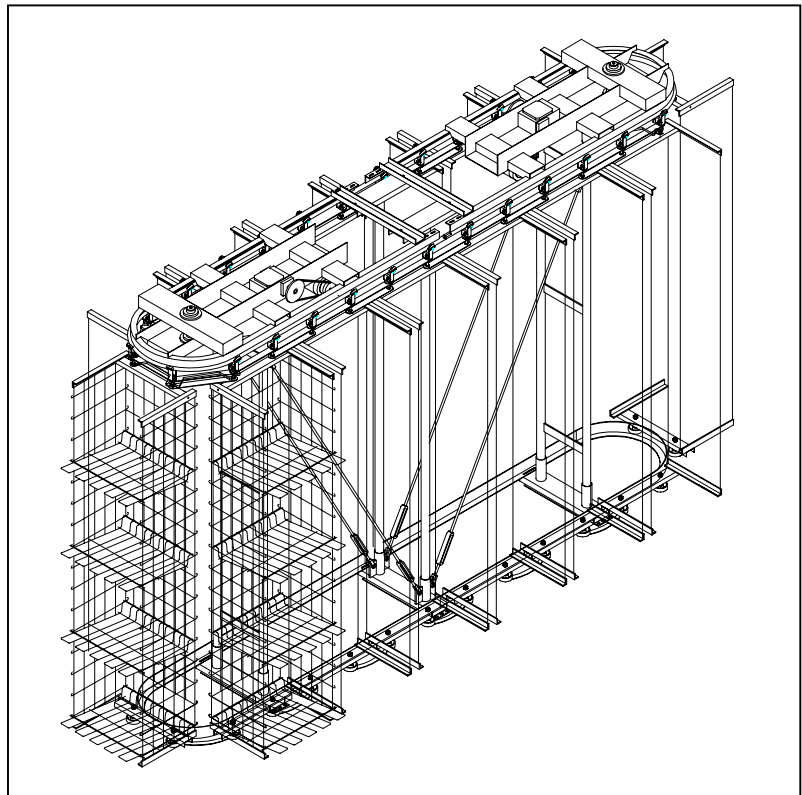

Top Drive Horizontal Carousel

Assembly, Installation, and Maintenance Manual

These instructions are intended for use with all White Top Drive Carousel models including:

MODEL	NOMINAL BIN WIDTH
DG/DP	14.8 inches
YG/YP	18.5 inches
GP/MP	21.0 inches
WG/WM	24.5 inches
SG/SP	28.0 inches
VG/VP	30.0 inches
XG/XP	36.0 inches
TP/TG	32.0 inches

Document Number: 88002
Revision: 2.1



For assistance, contact our **Customer One Protection** technical support group at 1-800-571-8822 or cop@whitesystems.com

WHITE 
A PINNACLE AUTOMATION COMPANY



HORIZONTAL CAROUSEL

ASSEMBLY, INSTALLATION, AND MAINTENANCE MANUAL For All Top Drive Models

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If, during the one-year period, a part proves to be defective in material or workmanship, it will be repaired or replaced without charge, surface freight prepaid.

White's liability under this warranty shall be limited to supplying parts as necessary.

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This warranty is in lieu of any other warranties, expressed or implied. White's warranty does not extend to any incidental or consequential costs, including lost time.

Preface

Purpose of this manual

This is a guide for assembling, installing, and maintaining the Top Drive Horizontal Carousel. The equipment owner should make a copy of this manual available to employees during installation, safety training, and maintenance training. Afterwards, maintenance personnel should keep a copy on file for reference during maintenance, troubleshooting, or when ordering spare parts.

This manual does not cover major rebuilds and overhauls, or component level electronic repairs. Should you encounter any of these situations, please call our Customer One Protection technical support group at 1-800-571-8822.

How to use this manual

For reference purposes, we have divided this manual into separate subjects. Each subject appears in a numbered section following a bold, capitalized title. Key paragraphs within each section are numbered and have bold titles. The Table of Contents lists the numbered sections and paragraphs, forming an index for quick reference.

When possible, we have included illustrations to help explain procedures. Refer to the List of Illustrations to find specific figures. For cases where generic drawings cannot provide adequate detail, we will refer to specific drawings shipped with the equipment.

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1 SAFETY

White has designed the Top Drive Carousel to meet OSHA, ANSI, and NEC standards for safety. We rely on you, our customers, to install, operate and maintain the equipment to these standards. Always follow OSHA Lockout/Tagout procedure when inspecting or maintaining the carousel equipment.

1.1 WARNINGS

When serious injury or loss of life could result from failing to follow the proper procedure, this manual will use the following symbol:



The warning symbol will be enclosed in a text box containing a bold text description of the safety issue and steps to avoid personal injury.

1.2 CAUTIONS

When a less serious injury, or equipment damage, could result from failing to follow the proper procedure, this manual will use the following symbol:



A bold text description of the safety issue will accompany the warning symbol.

2 INSTALLATION

2.1 TOOLS AND EQUIPMENT

- Open end wrench set
- Box wrench set
- Socket wrench set
- Torque wrench
- Hex key set
- 1/4 and 3/8 inch flat blade screwdriver
- Pump oiler
- Bar clamp, fixed head
- Soft face hammer
- Air compressor with blow gun
- Hammer drill and 3/8 x 12 inch carbide bit
- Pry bar
- Tape measure
- Chalk line
- Level-transit and leveling rod
- Plumb bobs: three required
- Bubble level
- Lift truck
- Nylon web sling
- Dolly
- Man lift or 32 foot ladder
- Anchors: 3/8 x 2-1/4 inch (Rawl-Bolt or equivalent)

2.2 REFERENCE DRAWINGS

The following drawings describe components that are different for each application. Please refer to the specific drawings shipped with your system.

- Floor plan
- Carousel layout drawings
- Conduit and wiring detail
- Seismic carousel structure
- Double tier structure
- Special bin assembly

2.3 RESOURCE PLANNING

White recommends a maximum installation crew size of two persons per carousel. As a basis for estimation, mechanical installation of the carousel frame will require 24 man-hours per carousel. White recommends a crew of three persons to assemble and lift a typical bin. Bin assembly will require .5 man-hours per bin.

2.4 INSTALLATION SITE

Make a site survey prior to start of installation. Check the site for undocumented obstructions or tight clearances that will interfere with the equipment. Check the levelness of the floor. Typical practice for carousel system installations is to shim the equipment if the floor level varies more than $\pm 1/4$ inch. Find the high spot of the floor. This will be the grade level of the equipment. Find the low spot. Use this information to estimate the number of shims required.

2.5 UNCRATING

2.5.1 Visual inspection

Before accepting shipment, check the crates for external damage. Open the crates and remove all packing material. Check the components for damaged parts. Submit a freight claim immediately if any components are damaged.

2.5.2 Itemized parts checklist

Parts are crated in the following recognizable subassemblies:

- Carousel end sections
- Carousel intermediate sections
- Bottom guide rails
- Stanchion pipe and ladder stanchions
- Joiner sockets
- Tie rods
- Top link assemblies
- Bottom link assemblies
- Bin backs
- Bin sides
- Shelves
- Double tier beam sections
- Product protect photo eyes
- Floor mats
- Control enclosures
- Hardware

Use the packing list accompanying each crate to verify that all subassemblies are accounted for. If any parts are missing or damaged, notify White's Customer One Protection technical support group at 1-800-571-8822.

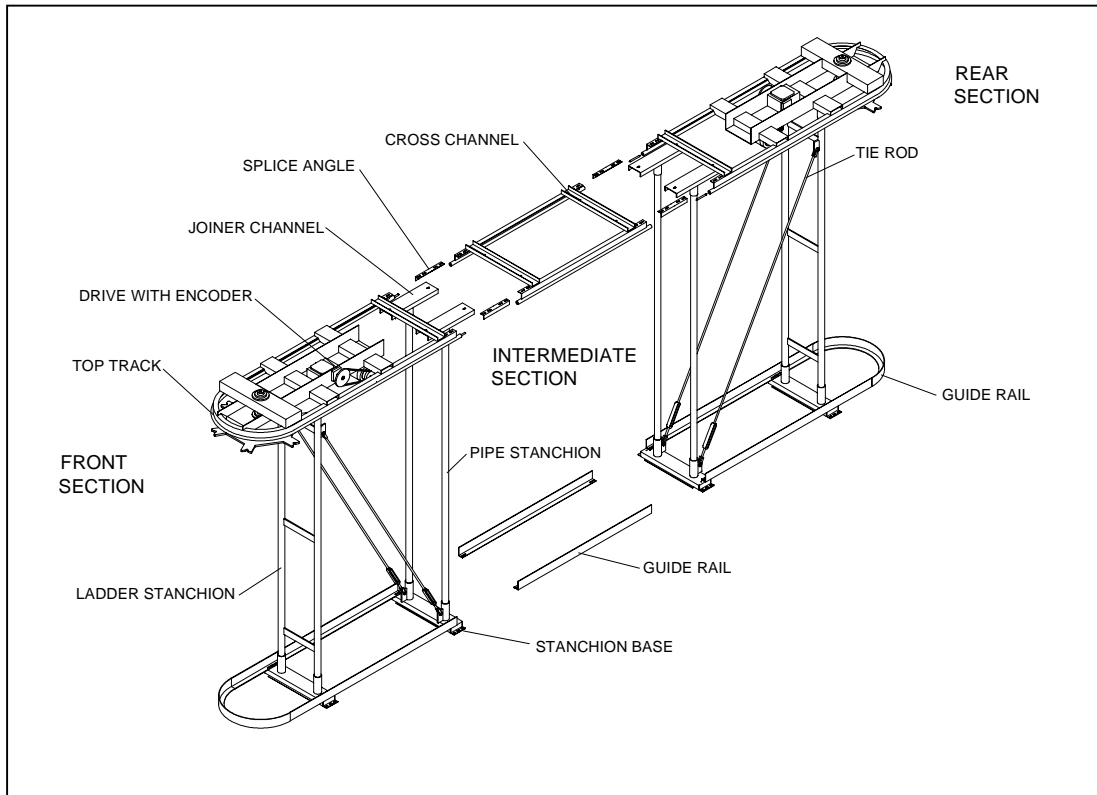


Figure 1. THE CAROUSEL FRAME

2.6 ASSEMBLING THE CAROUSEL FRAME

2.6.1 Layout

In the following steps, refer to the Floor Plan to determine the position of a specific carousel in the facility. Refer to the Carousel Layout Drawings to check the dimensions of the carousel.

1. Snap a chalk line to represent the centerline of the carousel, front to back.
2. Measure the width of a stanchion base. Divide the width by one half. Snap a chalk line parallel to the carousel centerline at this distance. Use this line to center the stanchion bases.
3. At the pick side of the carousel, snap a chalk line perpendicular to the carousel centerline to represent the middle of the first stanchion base.
4. Add lines to mark the positions of the remaining stanchion bases.

2.6.2 Placing the stanchion bases

1. Uncrate the front and rear sections. Remove the stanchion bases from the sections, leaving the short lengths of stanchion pipe in place.
2. Uncrate the remaining stanchion bases.

- Center a base over each of the chalk cross marks.

NOTE: Locate a base with welded tie rod anchor plates in the second-from-front and second-from-rear positions. Orient the bases with the anchor plates facing away from each other. Some applications require more than two pairs of tie rods; consult the carousel layout drawing supplied with your system.

- Use a level-transit and leveling rod to measure the elevation inside both sockets on each base. Record the results.
- Drop round 2-3/8 x 1/8 inch shims (PN 41908) inside the sockets to match the elevation of the highest socket. Record the number of shims used in each socket. Use the level-transit to check the elevation at the top of the shims.

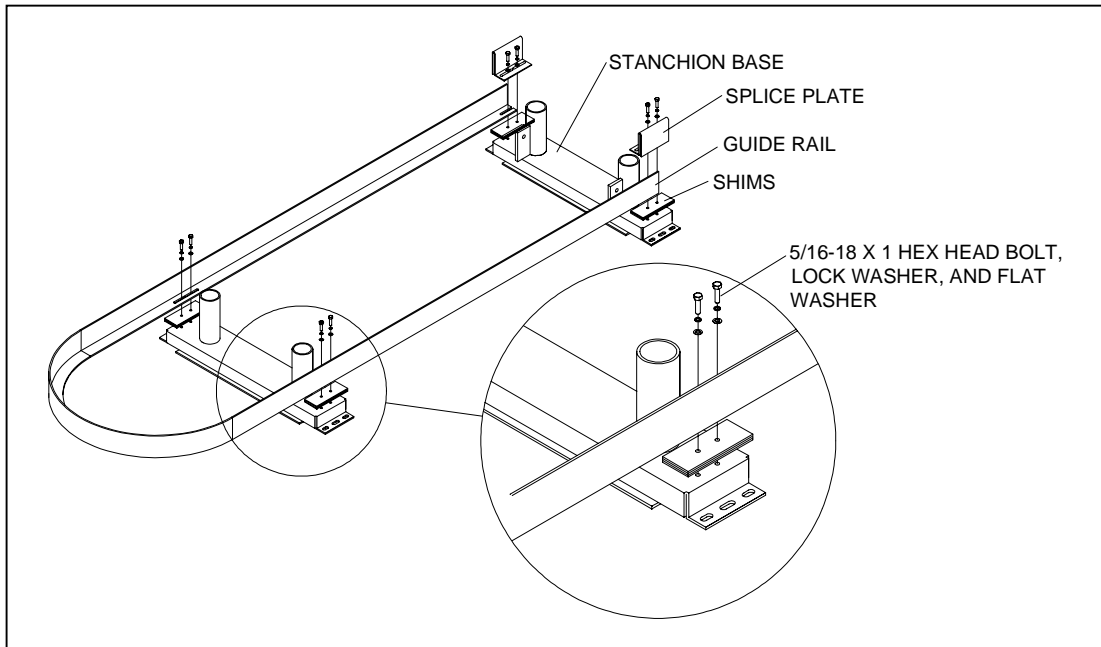


Figure 2. GUIDE RAIL INSTALLATION

2.6.3 Installing the first section

NOTE FOR CAROUSELS EQUIPPED WITH RAISED BINS: The guide rails are elevated and clamped to the stanchions instead of bolting to the stanchion bases. Follow the procedure below, omitting the guide rail installation. Attach and adjust the height of the guide rails according to the carousel layout drawing supplied with your system.

- Starting at the carousel pick-side, set a curved section of the bottom guide rail on the first two bases. The cut-off ends of the rail should cover one half of the second base. Align the slots in the rail with the threaded holes in the bases.
- Starting at the right front socket, adjust the guide rail height at the base attachment. Determine the number of shims in the socket. Insert the same number of 5 x 2 x 1/8 inch shims (PN 41909) between the guide rail and base at the socket.

3. Secure the guide rail to the base with two 5/16-18 x 1-1/2 inch hex head bolts, flat washers, and lock washers. Do not tighten.
4. Repeat steps 2 and 3 at the left front socket.
5. At the right rear socket, determine the number of shims in the socket. Insert the same number of 5 x 2 x 1/8 inch shims (PN 41909) between the guide rail and base at the socket.
6. Place a splice plate (PN 67010) over the end of the guide rail. Align the center of the splice plate with the end of the guide rail.
7. Secure the splice plate and guide rail to the base with two 5/16-18 x 1-1/2 inch hex head bolts, flat washers, and lock washers. Do not tighten.
8. Repeat steps 5 through 7 at the left rear socket.
9. Insert a ladder stanchion in the sockets of the first base. Orient the ladder with the tie rod anchors at the top facing the rear of the carousel.
10. Insert a pipe stanchion into each socket of the second base.
11. Thread four 5/16-18 set screws into each socket and tighten the screws to secure the stanchions.
12. Locate the front section of the carousel. The pick-side section has an encoder on the input shaft of the reducer (DC motor) or the end bell of the drive motor (AC motor). See Section 2.9.4 for details.
13. Remove the short stanchion pipes.
14. Loosen the joiner attaching bolts.
15. Lift the section into place, inserting the free ends of the stanchions into the sockets on the section.
16. Use a plumb bob to align the guide rail with the top rail. The distance from the outside of the top rail to the outside of the guide rail should be 2-3/16 inch.
17. Tighten the guide rail attaching bolts.

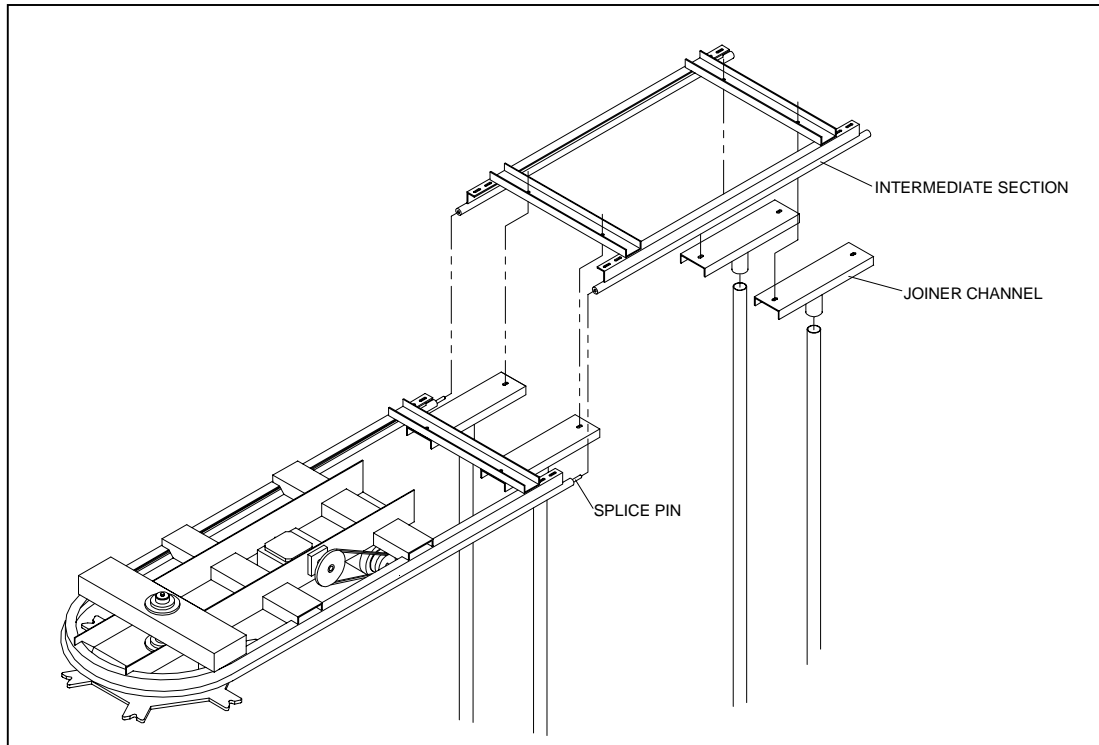


Figure 3. PLACING THE INTERMEDIATE SECTION

2.6.4 Installing intermediate sections

1. Place straight guide rail sections on top of the bases at the free ends of the previous section. Align the slots in the rails with the threaded holes in the bases.
2. Start at the right rear socket. Determine the number of shims in the socket. Insert the same number of 5 x 2 x 1/8 inch shims (PN 41909) between the guide rail and base at the socket.
3. Align the ends of the rails to provide a smooth joint.
4. Secure the guide rail to the base with two 5/16-18 x 1-1/2 inch hex head bolts, flat washers, and lock washers. Tighten the bolts.
5. Repeat steps 2 through 4 at the left rear socket.
6. Insert a pipe stanchion into each rear socket.
7. Thread four 5/16-18 set screws into each socket and tighten the screws to secure the stanchions.
8. Place a joiner channel over the free end of each stanchion pipe. Orient the channels parallel to the length of the carousel.
9. Insert a 1/2-inch splice pin into the free ends of the top track rail. Use a soft face hammer to seat the pins in the bores.

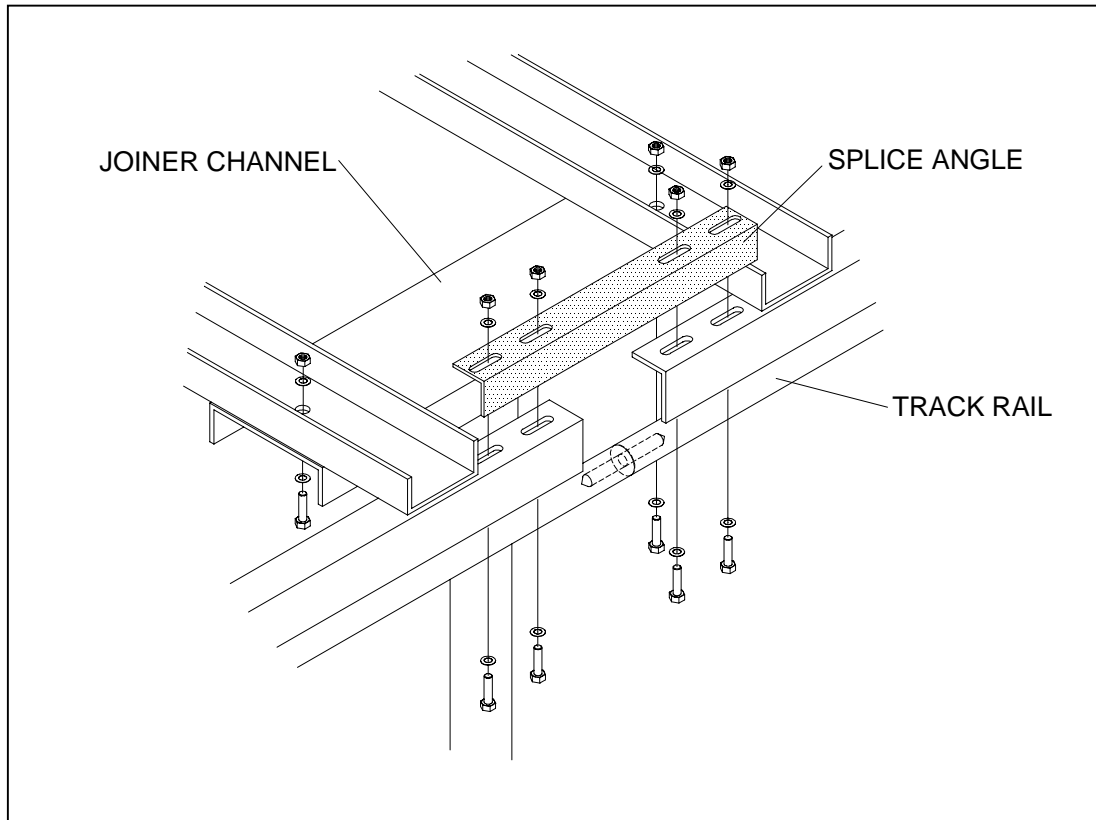


Figure 4. TRACK SPLICE DETAIL

10. Lift an intermediate section and rest it on the joiner channels.
11. Align the track ends so that the pins in the first section enter the holes in the second section. Place a bar clamp over the center of the cross channels at the joint. Tighten the clamp to pull the sections together. Check that the track ends are tightly butted together.
12. Place a splice angle (PN 0680-0) over each track joint. Align the slots and secure each angle with four 5/16-18 x 1 inch bolts, eight flat washers, and four keps nuts. Orient the bolts with the threads up and tighten.
13. Insert a 5/16-18 x 1 inch hex head bolt, flat washer, and keps nut through the holes in the cross channels and slots in the joiner channels.
14. Use a bubble level to set the stanchion pipes plumb front to back. Adjust the stanchions by moving the joiner channels.
15. Secure the joiner channels by tightening the 5/16-18 fastening bolts.
16. Repeat steps 1 through 14 for each intermediate section.

NOTE: The joiner channels for the last intermediate section are shipped attached to the rear section of the carousel. Remove them from the end section before installing the last set of stanchion pipes.

2.6.5 Installing the upper connecting links

1. Standard connecting links are supplied in five link sections. Triple link assemblies are shipped in three link sections.

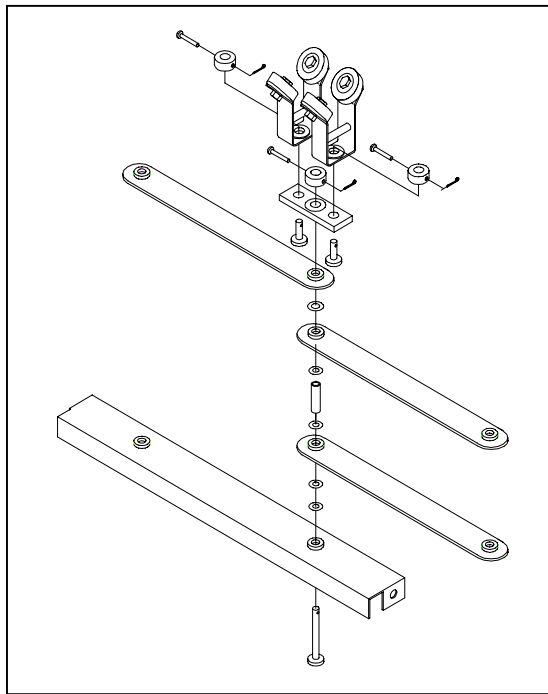


Figure 5. UPPER CHAIN ASSEMBLY

2. Begin by orienting a section of chain with the top channel notches facing away from the carousel.
3. Slide the wheels over the end of the right rail onto the top track of the carousel.
4. Slide a second section onto the top track and connect the two sections together.
5. Engage the chain in the drive sprocket and spin the motor pulley by hand to turn the sprocket (on AC motor units, turn the drive sprocket by hand). Turn the sprocket until the chain has been pulled completely around the curved track section.

6. Continue adding and connecting chain sections until the end of the chain is flush with the end of the right rail.
7. Add and connect chain sections on the left track. Continue until the chain is flush with the end of the rail.

2.6.6 Installing the last section

1. Set a curved section of the bottom guide rail on the last two bases. Align the slots in the rail with the threaded holes in the bases.
2. Determine the number of shims in the right rear socket. Insert the same number of 5 x 2 x 1/8 inch shims (PN 41909) between the guide rail and base at the socket.
3. Align the ends of the rails to provide a smooth joint. Secure the guide rail to the base with two 5/16-18 x 1-1/2 inch hex head bolts, flat washers, and lock washers. Tighten the bolts.
4. Repeat step 2 at the left rear socket.
5. Insert a ladder stanchion in the sockets of the last base.
6. Thread four 5/16-18 set screws into each socket and tighten the screws to secure the ladder stanchion.

7. Locate the rear section of the carousel. This section may or may not have a drive, but does not have an encoder.
8. Fill the rear section with chain using the procedure outlined in Section 2.6.5.
9. Temporarily tie the links in place with wire or rope.
10. Remove the short stanchion pipes.
11. Insert a 1/2-inch splice pin into the free ends of the top track rail. Use a soft face hammer to seat the pins in the bores.
12. Lift the section and rest it on the joiner channels.
13. Align the track ends so that the pins in the first section enter the holes in the second section. Place a bar clamp over the center of the cross channels at the joint. Tighten the clamp to pull the sections together. Check that the track ends are tightly butted together.
14. Place a splice angle (PN 0680-0) over each track joint. Align the slots and secure each angle with four 5/16-18 x 1 inch bolts, eight flat washers, and four kep nuts. Orient the bolts with the threads up and tighten.
15. Insert a 5/16-18 x 1 inch hex head bolt, flat washer, and kep nut through the holes in the cross channels and slots in the joiner channels.
16. Secure the joiner channels by tightening the 5/16-18 fastening bolts.

2.6.7 Completing the upper link installation

1. Remove the wire or rope ties from the end section.
2. Connect the free ends of the chain.
3. Check the upper connecting links. Be sure that all channels, links, spacers, wheels, yokes, and cotter pins are in place and assembled correctly.
4. Lubricate the bronze connecting link bushings and steel spacer bushings with SAE 30W machine oil.
5. Adjust the lubricator brushes on the end section so that they touch the top of the rollers.
6. Apply 10 to 20 drops of SAE 30W machine oil to the lubricator brush.

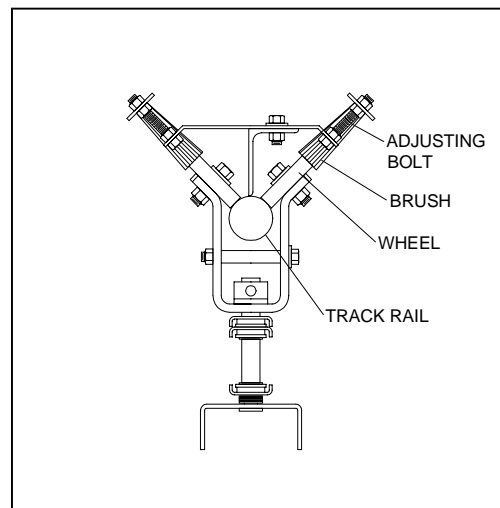


Figure 6. LUBRICATOR BRUSH

2.7 BRACING AND ANCHORING THE CAROUSEL FRAME

2.7.1 Installing the tie rods

Tie rod assemblies vary in length and number depending on the carousel application. Refer to the carousel layout drawing for the correct position of each assembly.

1. Install four 5/16-18 set screws into each joiner socket and tighten the screws to secure the top track.
2. Install the tie rod assemblies in pairs. Start at the front section and position the right tie rod with the turnbuckle at the bottom.
3. Attach the upper tie rod clevis to the anchor plate on the ladder stanchion with a 1/2-13 x 2-3/8 inch hex head bolt and lock nut.
4. Adjust the turnbuckle to align the lower clevis with the hole in the anchor plate on the stanchion base.
5. Secure the clevis with a 1/2-13 x 2-3/8 inch hex head bolt and lock nut.
6. Repeat the process for the left tie rod.



ALWAYS TIGHTEN BOTH TIE RODS, IN A PAIR, EQUALLY. NEVER TRY TO SHIFT THE CAROUSEL SIDE TO SIDE BY TIGHTENING THE TIE RODS UNEQUALLY. EXCESSIVE TENSION COULD DAMAGE THE TURNBUCKLES OR UNSEAT THE LADDER STANCHION.

7. Snug up the tie rods by tightening the turnbuckles until all slack is removed. Tighten the lock nuts on the turnbuckles.
8. Repeat steps 1 through 6 at the rear carousel section. Add additional tie rods as indicated in the carousel layout drawing.

2.7.2 Anchoring the carousel

1. Secure each stanchion base using two 3/8 x 2-1/4 inch drop-in concrete anchors.
2. Use a 3/8-inch diameter bit to drill into the floor slab. The anchor hole should be at least 1/2 inch deeper than the required embedment depth.
3. Blow each hole clean of concrete dust and fragments.
4. Remove the inspection tag from the anchor. Use a soft face hammer to drive the anchor through the base into the anchor hole. The anchor bolt head should seat firmly against the base. Tighten the anchor by turning the bolt head three to four turns. Repeat this process for each of the anchor holes.

2.7.3 Bracing the carousel

Sway bracing reduces structural oscillations produced by the acceleration forces of bins traveling around the end sections of a carousel. It is often field fabricated because of variations in building construction and building codes. The following is a general guideline for field fabricating sway bracing:

1. Sway bracing struts should be constructed of 1-1/2 x 1-1/2 x 3/16 inch angle iron or equivalent.
2. All attachments to the carousel or building steel should be made with bolts, clamps or other removable hardware. Do not weld to the carousel structure or to the building steel.
3. Bracing should be placed at the top of a carousel, perpendicular to the length of the carousel. The struts should attach to the cross channels on the top track assembly. Minimally, the center section and both end sections should be braced.



CAUTION

NEVER ATTACH BRACING DIRECTLY TO THE TOP TRACK. THE CONNECTION COULD CONTACT AND DAMAGE THE CONNECTING LINK WHEELS.

4. When possible, brace single carousels to building columns or load bearing walls. Avoid bracing to roof trusses or joists, because snow loads could cause sufficient roof deflection to misalign a carousel. Brace multiple carousels to each other.

2.8 INSTALLING THE CAROUSEL BINS

2.8.1 Standard bin construction

The standard carousel bin assembly includes a top and bottom channel, two wire sides, a wire or sheet metal back panel, and wire shelves. It is supported by two sets of steel rollers at the top and two rubber guide wheels at the bottom. Connecting links on the top and bottom channels couple the bins. Wire shelves hook into rows of slots in back and sides of the bin. Shelf spacing can be adjusted by removing a shelf and hooking it into a different row of slots. The bins are shipped disassembled.

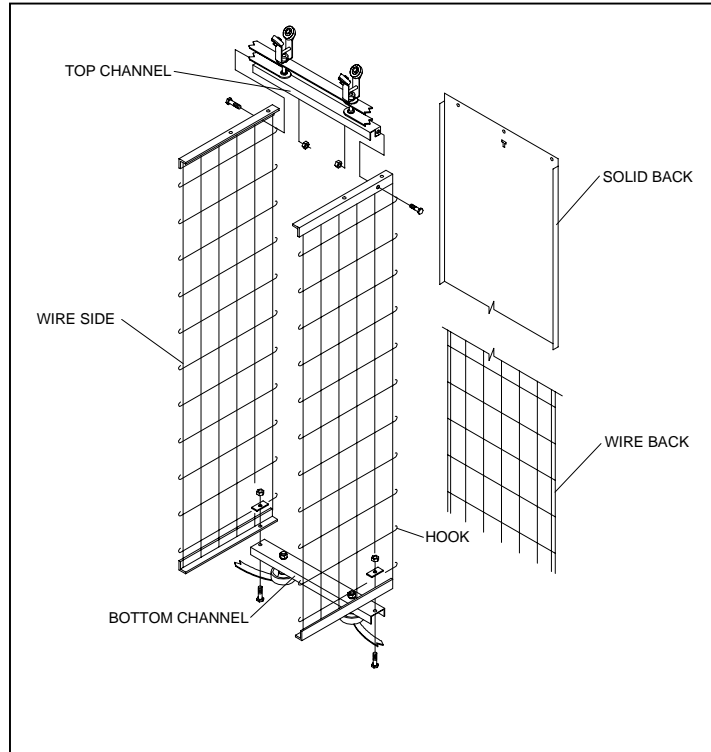


Figure 7. CAROUSEL BIN ASSEMBLY

White recommends a crew of three men to assemble and lift a typical bin.

2.8.2 Hanging the bins

1. Position two wire sides parallel to each other. The hooked wires should be inside and facing in the same direction.

NOTE: The hooks on the side wires face towards the top of the bin.

2. Place a back panel over the wire sides so that the hooked wires fit into the slots along the edges of the panel. Be sure to position the top of the panel at the top end of the bin. If the back panel is wire, the hooks should face towards the bottom of the bin. If the back panel is sheet metal, the "T" mark should be at the top of the bin.
3. Secure the wire sides to the back panel. At the edges of the panel, bend the bottom, center, and top pairs of hooks up at a 45° angle.



WHEN SECURING TOP AND BOTTOM ANGLES, ALWAYS INSERT BOLTS FROM THE OUTSIDE OF THE BIN SO THAT THE LOCK NUTS ARE INSIDE THE BIN. REVERSING THE BOLTS COULD DAMAGE THE CONNECTING LINKS.

4. Lift the three sides of the bin into place. Hook the sheet metal flanges on the bin sides over a top channel on the carousel. Position the channel approximately 2-3/4 inches from the back of the bin. Secure the channel to the flanges with two 5/16-18 x 3/4 inch hex head bolts and lock nuts. Orient the bolts with the threads inside the bin.
5. Repeat steps 1 through 4 until all the bins are hung on the carousel.

2.8.3 Hanging the bottom chain

1. Standard bottom chain and channel assembly is supplied in five link sections. Stretch the assembly out under the hanging baskets. Orient the curved connecting links with the cupped side towards the carousel.
2. Lift the bottom chain assembly and position the channels approximately 2-3/4 inch from the backs of the bins. Use two 5/16-18 x 3/4 bolts, rectangular washers, and lock nuts to secure each channel under the flanges on the wire sides.
3. Repeat steps 1 and 2 to hang a second section of chain. Connect the two sections together.
4. Repeat this procedure until all lower connecting links are in place.

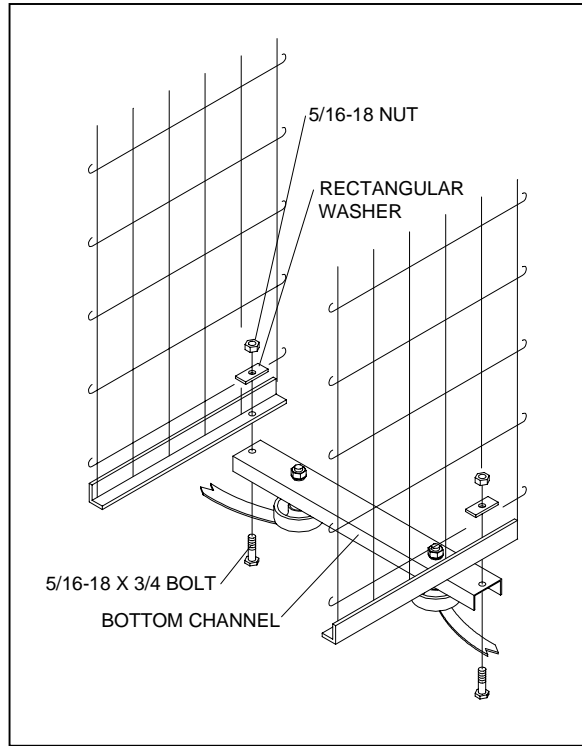


Figure 8. BOTTOM CHANNEL ATTACHMENT

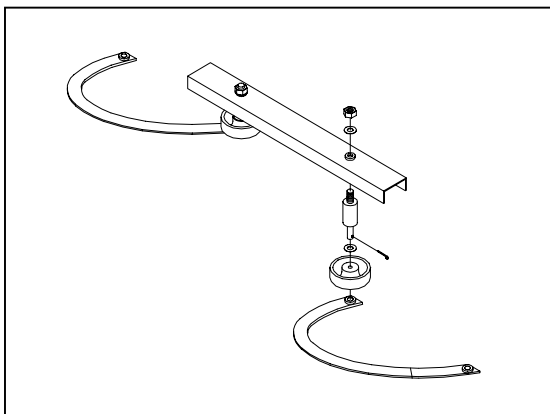


Figure 9. BOTTOM CHAIN ASSEMBLY

5. Check the lower connecting links. Be sure that all links, wheels, spacers, and cotter pins are in place and assembled correctly.
6. Check that the tops of the guide wheels are approximately 1/2 inch below the top edge of the guide track.
7. Lubricate the bronze connecting link bushings and steel spacer bushings with SAE 30W oil.

2.8.4 Installing bin shelves

Install wire shelves after carousel bins are in place.

1. On bins with wire back panels, the shelves are supported by rows of horizontal wires on the back panel and rows of hooked wires on the bin sides. Insert the shelf into the bin approximately one inch above the desired level, set the rear shelf hooks over a horizontal wire, and lower the shelf front bar onto the bin side hooks. The shelf is now locked into place. To remove a shelf, reverse the procedure.
2. On bins with sheet metal back panels, the shelves are supported by rows of slots in the back panel and rows of hooked wires on the bin sides. Insert the shelf into the bin approximately one inch above the desired level, set the rear shelf hooks into the slots, and lower the shelf front bar onto the bin side hooks. The shelf is now locked into place. To remove a shelf, reverse the procedure.
3. Install retaining clips on shelves that are cantilevered more than two inches. The plastic clips "pop" into the sheet metal back panel slots above the rear shelf hooks. Use one clip at the center of each shelf.

2.9 WIRING THE CAROUSEL

2.9.1 Guidelines

1. The customer must provide a lockable disconnect switch between the input power source and the motor controllers, if the motor controllers are not located in a NEMA 12 enclosure equipped with a lockable disconnect switch.
2. Install all wiring to National Electrical Code standards.
3. Ground system and components in accordance with Article 250 of the National Electrical Code.
4. Separate signal wiring and conduit from power wiring and conduit.
5. Use 3/4-inch conduit minimum.
6. Use stranded MTW or THHN wire for all motor wiring.
7. Terminate each sensor cable in a junction box mounted within three feet of the sensor.
8. Keep AC vector motor wires shorter than 150 feet.

2.9.2 Internal conduit and junction boxes

Internal conduit runs and junction box locations are similar for all carousel models. Panel locations and external conduit runs are different for each application. Please refer to specific conduit layout drawings and wiring diagrams for details about your system. Use the information below to identify key components of the system.

2.9.3 Motor

Two families of drives are available on standard carousels:

- **DC 1-2 hp, shunt wound motors:** These motors operate with an armature voltage of 180V DC, and field voltage of 200V DC. They mount with shaft horizontal and connect by V-belt to a right-angle reducer.
- **AC 1-2 hp, vector duty motors:** These motors operate on 460 volt, 3 phase power. They mount shaft-up and connect directly to an in-line reducer.

2.9.4 Encoder

Encoder selection is based on the type of control system operating the carousel.

- **Series 530 control count and direction sensor:** This device is a low-resolution quadrature encoder mounted on the input side of the carousel drive reducer. It is used with a 680 or 880 motor controller. The count and direction sensor is made up of an open chassis and a shaft mounted encoder disk. Disk selection is determined by the carousel model. For further information, see the *Series 530 Control Keyboard User's Manual*.
- **Integrated Pod Controller count and direction sensor:** This device is a low-resolution quadrature encoder mounted on the input side of the carousel drive reducer. It is used with a 680 or 880 motor controller. The count and direction sensor is made up of an open chassis and a shaft mounted encoder disk. For further information, see the *Integral Pod Controller Installation & Troubleshooting Guide*.
- **Integrated Pod Controller encoder:** This device is a low-resolution quadrature encoder mounted on the end bell of the carousel drive motor. It is used with an AC vector motor controller. The encoder is coupled directly to the motor shaft and has a 10 or 12 pulse per revolution output. For further information, see the *Integral Pod Controller Installation & Troubleshooting Guide*.

2.9.5 Bin reference sensor

The bin reference sensor is used when the system is controlled by an Integrated Pod Controller. It is made up of two components: (1) an emitter/receiver sensor mounted on the top track of the carousel and (2) a triggering stud secured to the top angle of bin one.

2.9.6 Product protect photo eyes

There are two types of photo eye systems. On single level carousels, retro reflective photoelectric sensors located at the top of the carousel read reflectors attached to the floor. The sensors attach to struts at the pick end of the carousel and scan for product overhanging the bin shelves. When product breaks the vertical light beam, bin rotation is stopped.

On multiple level carousels, emitters mount to struts at the top of the carousel stack and receivers attach to the floor. The emitter and receiver units sense product overhanging

the bin shelves at the pick end of the carousel. When product breaks the vertical light beam, bin rotation is stopped.

2.9.7 Floor mat

Pressure sensitive floor mats protect personnel manually loading and unloading carousel bins. When the carousel control circuitry detects pressure on a mat, it halts all carousel rotation at the loading and unloading station. In the event of a broken lead or open connection to the mat, the carousel control circuitry will trigger an Emergency Stop, halting all carousel motion.

2.10 POWERING THE CAROUSEL

2.10.1 Powering the motor control panel

 <p>DANGER</p>	HAZARD OF ELECTRICAL SHOCK OR BURN. DO NOT STAND IN FRONT OF OPEN PANEL WHEN INITIALLY APPLYING POWER. CLOSE AND SECURE ALL PANEL DOORS BEFORE SWITCHING POWER ON AT DISCONNECT.
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1. Check all field wiring point to point, before applying power to the panel.
2. Remove the fuses from the carousel motor drives before starting the system for the first time. Refer to the specific wiring diagram for your system.
3. Pull the power disconnect switch up to the **ON** position. The 120V AC POWER pilot light should light, indicating the presence of power in the panel.

2.10.2 Checking system safeties

1. With panel powered, the indicator LEDs on the product protect photo eyes should be lit. If a sensor LED is not lit, adjust the alignment and sensitivity setting.
2. Reset all Emergency Stop buttons.
3. Clear the floor mat.
4. Enable the control system by pressing the Reset button at the NEMA panel or operator interface.
5. Test each photo eye by blocking its beam, checking that the control system reverts to stop mode, and resetting the control system.
6. Test each floor mat by stepping on the mat, checking that the control system reverts to stop mode, and resetting the control system.
7. Test each Emergency Stop Button by pressing the button, checking that the control system reverts to stop mode, and resetting the button and control system.

2.10.3 Powering the carousel drives (Series 530 Control Keyboard)

1. Pull the power disconnect switch down to the **OFF** position.
2. Replace fuses in the carousel drives. Refer to the specific wiring diagram for your system.
3. Check that personnel are clear of the carousels and that no objects are on the tracks or in the path of the bins.
4. Pull the power disconnect switch up to the **ON** position.
5. Press the **ON** key and momentarily press the **L** key. The carousel bins should move to the left.
6. If the carousel "locks up", pull the power disconnect switch down to the **OFF** position and interchange two of the motor leads *on one motor* at the motor control. Pull the power disconnect switch up to the **ON** position and retest the carousel.
7. If the carousel turns in the wrong direction, pull the power disconnect switch down to the **OFF** position and interchange the two motor leads *on each motor* at the motor control. Pull the power disconnect switch up to the **ON** position and retest the carousel.

2.10.4 Powering the carousel drives (Integrated Pod Controller)

1. Pull the power disconnect switch down to the **OFF** position.
2. Replace fuses in *one* of the carousel drives. Refer to the specific wiring diagram for your system.
3. Check that personnel are clear of the carousels and that no objects are on the tracks or in the path of the bins.
4. Pull the power disconnect switch up to the **ON** position.



WHEN A DRIVE IS POWERED, THE AXIS COULD ACCELERATE UNCONTROLLABLY IF THE ROTATION OF THE MOTOR DOES NOT AGREE WITH THE ROTATION OF THE ENCODER. TO AVOID MECHANICAL DAMAGE, BE PREPARED TO STOP THE CAROUSEL. TO CORRECT THE PROBLEM, INTERCHANGE TWO OF THE MOTOR LEADS ON EACH MOTOR IN THE CAROUSEL.

5. Press the **START** push button on the Operator Control. The carousels should slowly rotate clockwise to the reference position. **If a carousel locks up, oscillates or rotates counterclockwise, PRESS THE STOP BUTTON IMMEDIATELY.**



DANGER

HAZARD OF ELECTRICAL SHOCK OR BURN. POTENTIALLY LETHAL VOLTAGES EXIST IN AC DRIVES FOR SEVERAL MINUTES AFTER POWER IS REMOVED. BEFORE SERVICING AN AC DRIVE, WAIT UNTIL THE DC BUS IS DISCHARGED AND THE BUS CHARGED LIGHT IS OUT.

6. If the carousel "locks up" or oscillates, pull the power disconnect switch down to the **OFF** position and interchange two of the motor leads *on one motor* at the motor control. Pull the power disconnect switch up to the **ON** position and retest the carousel.
7. If the carousel turns in the wrong direction, pull the power disconnect switch down to the **OFF** position and interchange two motor leads *on each motor* at the motor control. Pull the power disconnect switch up to the **ON** position and retest the carousel.
8. Repeat steps 1 through 7 for each carousel.


3 MAINTENANCE AND INSPECTION

3.1 MAINTENANCE SAFETY

1. Equipment owners should set up a maintenance program to keep the carousel equipment in a safe condition.
2. Only qualified, trained personnel shall perform maintenance on the carousel equipment.
3. Maintenance personnel shall conduct routine inspections, and perform preventive/corrective maintenance, to be sure all safety devices function properly. Maintenance personnel shall keep all warning labels in legible condition.
4. Personnel shall not perform maintenance such as adjustments or lubrication on the carousel equipment when it is in operation.
5. When maintenance personnel stop the carousel equipment for servicing, they must lock out all power to the carousel drives in accordance with the OSHA Lockout/Tagout procedure.
6. Some maintenance procedures can only be performed with power to a carousel. When this is the case, power to adjacent carousels must be locked out in accordance with the OSHA Lockout/Tagout procedure.
7. Maintenance personnel shall replace and check that all safety devices, access panels, and guards are in working order before starting the equipment for normal operation.

3.2 SPEED REDUCER DRIVE CHAIN ADJUSTMENT

The roller chain connecting the speed reducer to the drive sprocket is adjusted at the factory. After an initial break-in period, this chain stretches and must be readjusted. Failure to readjust will result in the chain drooping, causing misalignment and accelerated chain wear.

 DANGER	<p>POSSIBLE UNEXPECTED MACHINE OPERATION. BEFORE ATTEMPTING TO SERVICE A CAROUSEL, REMOVE ALL POWER AT THE MOTOR CONTROL PANEL. ADDITIONALLY, REMOVE ALL POWER TO ADJACENT CAROUSELS. INSTALL SAFETY LOCKOUT DEVICES TO ENSURE MECHANISMS DO NOT START UNEXPECTEDLY.</p>
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To adjust the chain, proceed as follows:

1. Lockout/Tagout power at the carousel drives.
2. Loosen the four bolts holding the reducer to the carousel frame.




OVERTIGHTENING THE ROLLER CHAIN MAY DAMAGE THE REDUCER BEARINGS.

3. Loosen the lock nuts on the jack bolts. Turn the jack bolts to move the reducer away from the drive sprocket. Continue turning the bolts until all the slack is removed from the roller chain.
4. Tighten the reducer mounting bolts and jack bolt lock nuts.
5. Readjust the V-belt tension on carousels equipped with DC drives.
6. Restore power to the carousel drives.

3.3 DC MOTOR DRIVE BELT ADJUSTMENT

The drive belt connecting the motor to the speed reducer is adjusted at the factory.

Note: Belt adjustment is critical on carousels with two drives. Belts should be examined every six months for wear and tension. Belt slippage will cause the drives to pull unevenly, resulting in surging bin motion, and motor and reducer overheating.

 DANGER	<p>POSSIBLE UNEXPECTED MACHINE OPERATION. BEFORE ATTEMPTING TO SERVICE A CAROUSEL, REMOVE ALL POWER AT THE MOTOR CONTROL PANEL. ADDITIONALLY, REMOVE ALL POWER TO ADJACENT CAROUSELS. INSTALL SAFETY LOCKOUT DEVICES TO ENSURE MECHANISMS DO NOT START UNEXPECTEDLY.</p>
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To adjust the belts:

1. Lockout/Tagout power at the carousel drives.
2. Loosen the four bolts that secure drive motor to conveyor frame.
3. Use a pry bar to move motor away from the speed reducer.
4. The belt is correctly tensioned when a four-pound load applied midway between the pulleys causes a 1/2 inch deflection.



OVERTIGHTENING THE V-BELT MAY DAMAGE THE MOTOR BEARINGS.

5. Holding the motor in position, check the alignment of the pulleys and tighten the four mounting bolts.
6. Restore power to the carousel drives.

3.4 LUBRICATION INSTRUCTIONS

ITEM	LUBRICATION
Motor	The motor requires no lubrication. Keep the motor end bell louvers clean to allow cooling air to pass through the motor.
Speed reducer	Keep reducer free of dirt to permit heat transfer from the gearbox case. See next section for lubrication instructions.
Roller chain	Lubricate with SAE 30W machine oil every 6 months.
Pillow blocks	Pillow blocks are pre-lubricated for the life of the bearing.
Lower guide wheels	The wheel hub is made of oil-impregnated bronze. Lubricate every 6 months with several drops of SAE 30W machine oil.
Upper wheels	<p>Apply 10-20 drops of SAE 30W machine oil directly to each lubricator brush once a month or when noise and fall-out is evident.</p> <p>As the bristles wear, readjust brush to touch top of wheels.</p>
Upper and lower links	The pressed steel links have oilite bushings at the rotating surfaces. Lubricate with SAE 30W machine oil every 6 months.
Yoke thrust bearing	Lubricate with SAE 30W machine oil every 6 months.

3.5 GEAR REDUCER SERVICE INSTRUCTIONS

3.5.1 Checking reducer lubricant level

The carousel drive reducer is filled with oil prior to shipment. Check the oil level prior to putting the unit into operation.

1. On DC drives with right angle reducers, the oil level should be up to the top of the sight gage.
2. On AC drives, the in-line reducers are filled with Shell Alvania #2 grease and do not require checking.

3.5.2 Replacing lubricant in reducer

1. On DC drives with right angle reducers, replace the oil after the first 500 hours of operation and every six months or 2500 operating hours. Refill with Mobilegear 626 or equivalent.
2. On AC drives, the lubricant is suitable for 20,000 hours of operation without regreasing.

4 RETURNED GOODS

White Machine Company policy requires a Return Authorization Number, or "RAN", for all goods returned. This Return Authorization Number MUST be prominently displayed on the outside of ALL packages returned, on all related paperwork, and referenced in any telephone conversations with White personnel. Packages that do not display the Return Authorization Number will be refused by White and returned to sender.

4.1 OBTAINING A RETURN AUTHORIZATION NUMBER

White Field Service Administration personnel will assign the Return Authorization Number during the normal work week, Monday through Friday, between the hours of 8:30 a.m. and 5:00 p.m. (Eastern Standard Time) at: 1-(201)-272-6700.

THE FOLLOWING INFORMATION MUST BE PROVIDED TO OBTAIN THE RETURN AUTHORIZATION NUMBER:

- Name of caller and contact phone number
- Name of contact person for ship to and bill to information
- Customer Purchase Order number
- Part description and number (if available)
- Part application: horizontal carousel, vertical carousel, I/E, etc.
- Serial number of system and individual components
- Complete description of malfunction or reason for return

4.2 COMPONENTS COVERED UNDER WARRANTY OR MAINTENANCE AGREEMENT

White Machine Company will ship a replacement for any defective component covered under warranty or Maintenance Agreement. The caller, after providing the above listed information, will be instructed to return the defective component(s) to White. Upon receipt of the component, a full credit will be issued subject to the note below. The customer Purchase Order is issued to cover replacement cost only in the event the defective component is not returned.

NOTE: Any repairs necessary to restore the component to its original appearance, i.e., remove paint, decals, repair scratches or dents, customer alterations, including but not limited to replacing of component casing(s) are not covered under warranty. Customer will be billed for such restorative repairs at the prevailing rates.

4.3 COMPONENTS NOT UNDER WARRANTY

White Machine Company will repair or replace, if necessary,* and ship within 10 working days of receipt of defective goods. Repair charges will be charged on to the Purchase Order number provided. White will repair the component to a functional state. No aesthetic repairs will take place unless specified by customer.

White will absorb surface shipping charges on replacement and repaired parts shipped by White. Customer is responsible for any expedited shipping charges as well as the freight on the return of the defective component.

*Irreparable components will not be replaced without prior customer approval of charges.