

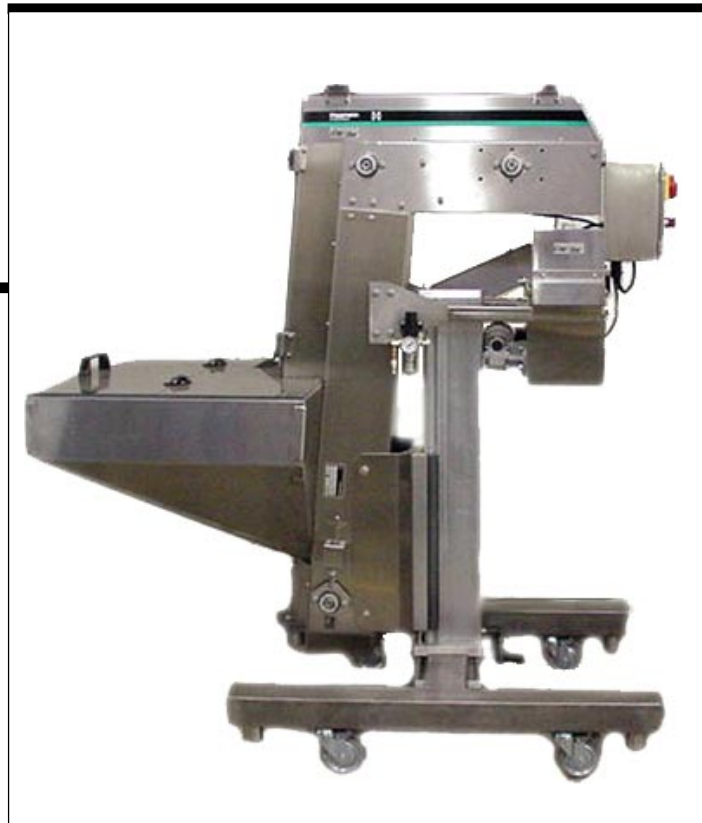


## CapStar Cap Feeder

### *ANSI/Metric Installation & Maintenance Manual*

*Refer all servicing to  
qualified personnel.*

*This manual is intended  
for use by qualified  
mechanics and electricians  
who install or service the  
CapStar Cap Feeder*



*Please copy this  
information from the  
CapStar  
serial plate.*



Inventory/Serial Number:

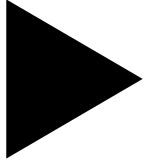
Inventory Number (Check One):

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> FCCPSTLDSA | <input type="checkbox"/> FCCPSTRDSA |
| <input type="checkbox"/> FCCPSTLASM | <input type="checkbox"/> FCCPSTRASM |

First Edition, Publication Version, All Rights Reserved  
Copyright © 2002 by Hoppmann Corporation.  
15395 John Marshall Highway  
Haymarket, VA 20169  
**Phone:** (703) 753-8888  
**Toll Free:** (800) 368-3582  
**Fax:** (703) 753-7485  
<http://www.hoppmann.com>



# Quick Start



## About this Manual

**Assumptions** Hoppmann Corporation assumes that all procedures contained in this manual will be performed by a qualified mechanic or electrician who must install or service the CapStar Cap Feeder. All procedures in this manual should be performed by qualified personnel or under their direction.

**Models Covered** This manual covers four models. For spare parts purposes and/or troubleshooting, locate the inventory number on the serial plate of the equipment prior to contacting Hoppmann.

### *Inventory No.*

FCCPSTLDSA..... Left Hand, SS, 90 Volt DC Motor  
 FCCPSTLASM ..... Left Hand, SS, 50 Hz AC Motor  
 FCCPSTRDSA ..... Right Hand, SS, 90 Volt DC Motor  
 FCCPSTRASM..... Right Hand, SS, 50 Hz AC Motor

**Caution Symbols and Messages** Caution symbols and messages in this manual call attention to hazardous voltages, moving parts and other hazardous conditions.



The exclamation point caution symbol denotes possible personal injury and/or damage to the equipment.



The lightning bolt caution symbol denotes possible personal injury and/or damage to the equipment from electrical hazards.

## Before You Start

**Tools You Will Need** The CapStar Cap Feeders are offered in both ANSI and metric versions. For maximum compatibility, ANSI units are classified as “soft ANSI” construction, meaning that metric threads and hardware are used throughout. Both metric and ANSI units require metric tools for repair or adjustment.

### Equipment Improvements & Document Revisions Notice

Hoppmann Corporation continually improves its products and reserves the right to change or discontinue specifications and designs shown in this manual without notice and without incurring obligation. Hoppmann Corporation has made every effort to verify the information contained in this manual, but reserves the right to correct any error at the time of the manual’s next revision. This manual is subject to change without notice.

7/22/02

# Table of Contents

	Page	Chapter
<b>Quick Start</b>	2	About this Manual
	2	Before You Start
<b>CapStar Description &amp; Specifications</b>	5	The CapStar Cap Feeder: An Overview
	6	Cap Feeding Process
		<i>Figures/Tables:</i>
	5	Figure 1-1. CapStar Cap Feeder
	7	Figure 1-2. CapStar Head
	8	Figure 1-3. CapStar Tooling
	9	Table 1-1. CapStar Feeder Specifications
10	Figure 1-4. CapStar Feeder Specifications	
<b>Safety Precautions</b>	11	Warnings
<b>Installation &amp; Startup</b>	13	If the CapStar Cap Feeder is Already Set Up
	13	Unpacking and Inspection
	14	Physical Setup
	15	Setup
	15	Initial Settings
	17	Making Tooling Adjustments
	19	Motor/Speed Reducer/Idler Assembly
	22	Electrical Wiring
		<i>Figures:</i>
	14	Figure 3-1. Adjusting the Height
	17	Figure 3-2. Secondary Hopper Location
	18	Figure 3-3. CapStar Tooling
	19	Figure 3-4. Height Adjustment
	19	Figure 3-5. CapStar Speed Reducer
	20	Figure 3-6. DC ANSI Suggested Wiring Diagram
21	Figure 3-7. AC Metric Suggested Wiring Diagram	
23	Figure 3-8. CapStar Wiring Schematic	
24	Figure 3-9. CapStar Wiring Schematic	



# Table of Contents Continued

	Page	Chapter	
<b>Repair and Maintenance</b>	25	Preventive Maintenance	
	25	General Maintenance	
	25	General Cleaning	
	25	Conveyor Belt Installation and Replacement	
	28	Elevator Belt Installation and Replacement	
		<i>Figures:</i>	
	26	Figure 4-1. Conveyor Belt Replacement - Exploded View	
<b>Replacement Parts</b>	29	Notice to Hoppmann Corporation Customers	
	31	Warranty	
	32	Scheduled Preventive Maintenance Log	
		<i>Figures:</i>	
	29	Figure 5-1. Serial Plate Layouts	

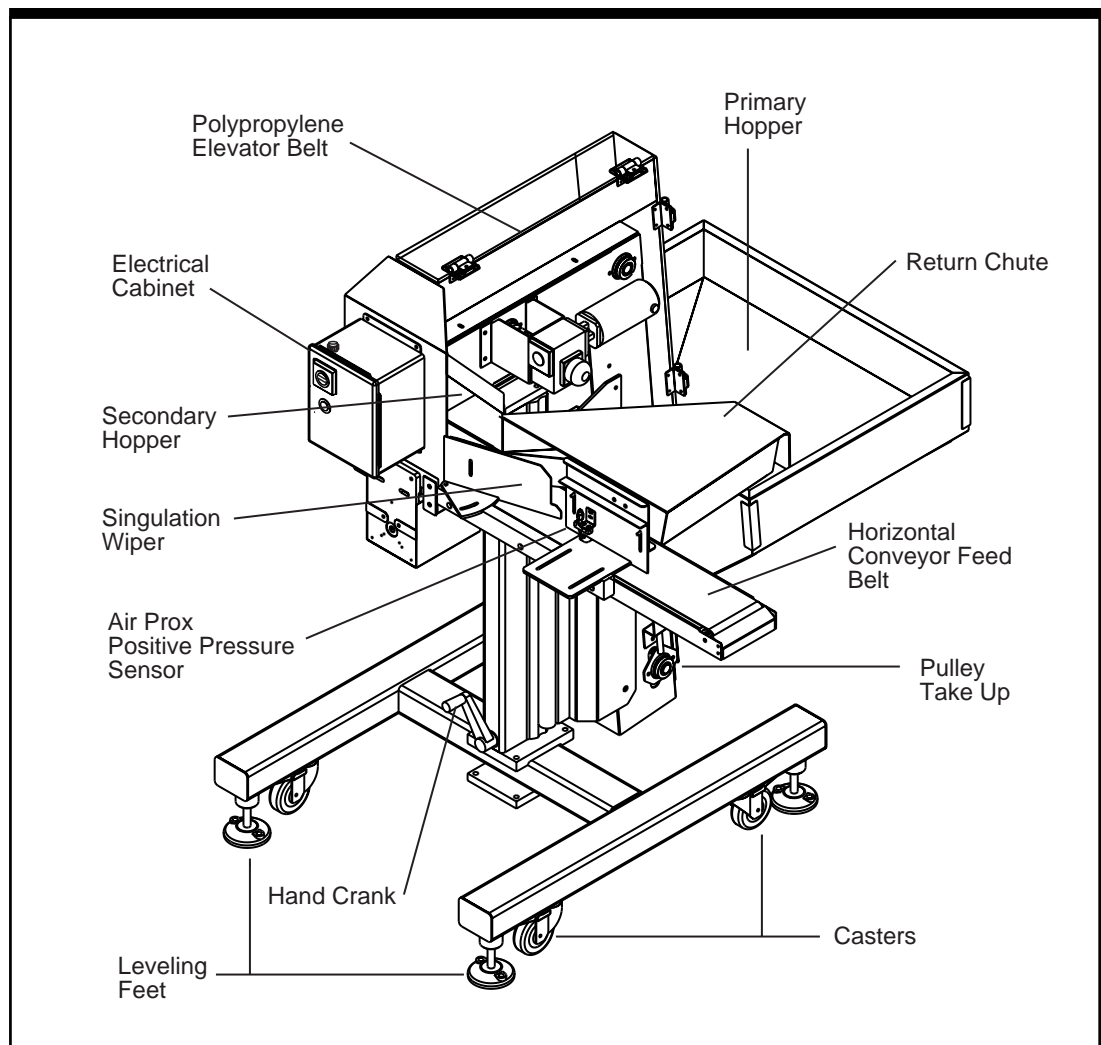
# Description & Specifications

## 1

### *The CapStar Cap Feeder: An Overview*

The CapStar Cap Feeder will integrate into an in-line product handling system, or stand-alone and orient caps (see *Figure 1-1*).

**Function** The CapStar Cap Feeder is designed to dispense a wide variety of cap sizes and shapes, at a cap delivery speed of 40 to 600 parts per minute. Changeover from one cap style to another takes less than five minutes and is straightforward. No special training is needed.



*Figure 1-1. CapStar Cap Feeder (Right Hand Unit)*



**Standard Equipment  
Features**

Standard design features of the CapStar Feeder are:

- ▶ Simple design and ease of use
- ▶ White polypropylene cleated belt
- ▶ FDA approved white urethane impregnated continuous belt
- ▶ No tools required to changeover to another cap style
- ▶ Small footprint
- ▶ Easy retrofit to existing cappers
- ▶ Right-hand and left-hand cap feeders available

## *Cap Feeding Process*

The following description explains the cap feeding process as the cap goes through the CapStar Cap feeder starting with a description of the unit and then how the CapStar works. Understanding the process will help the operator or technician in setting up the machine as well as servicing and troubleshooting the equipment. Positioning, initial setup and powering the cap feeder with electrical and pneumatic power will be described in Chapter 3.

The CapStar Cap Feeder is bolted onto an adjustable center stand using two support arms. The support arms ride on friction guides that are used to raise and lower the unit when the hand crank is turned. The vertical movement combined with the caster wheels allow the unit to be positioned exactly where it is needed.

Caps are loaded into the primary hopper bin (see *Figure 1-1 previous page*). The elevator uses a continuous belt to transport a steady supply of caps from the hopper, up and over the center stand where they are then loaded into a secondary hopper (see *Figure 1-2*). The secondary hopper is a settling area to prevent caps from bouncing away from the horizontal feeder belt.

The caps settle onto the horizontal FDA approved white urethane feed belt. The belt carries the caps past the singulation wiper and the height qualifier (see *Figure 1-2 and 1-3*). These two tooling features allow only single file caps (one cap diameter at a time) to pass by and continue down the conveyor. Caps which are

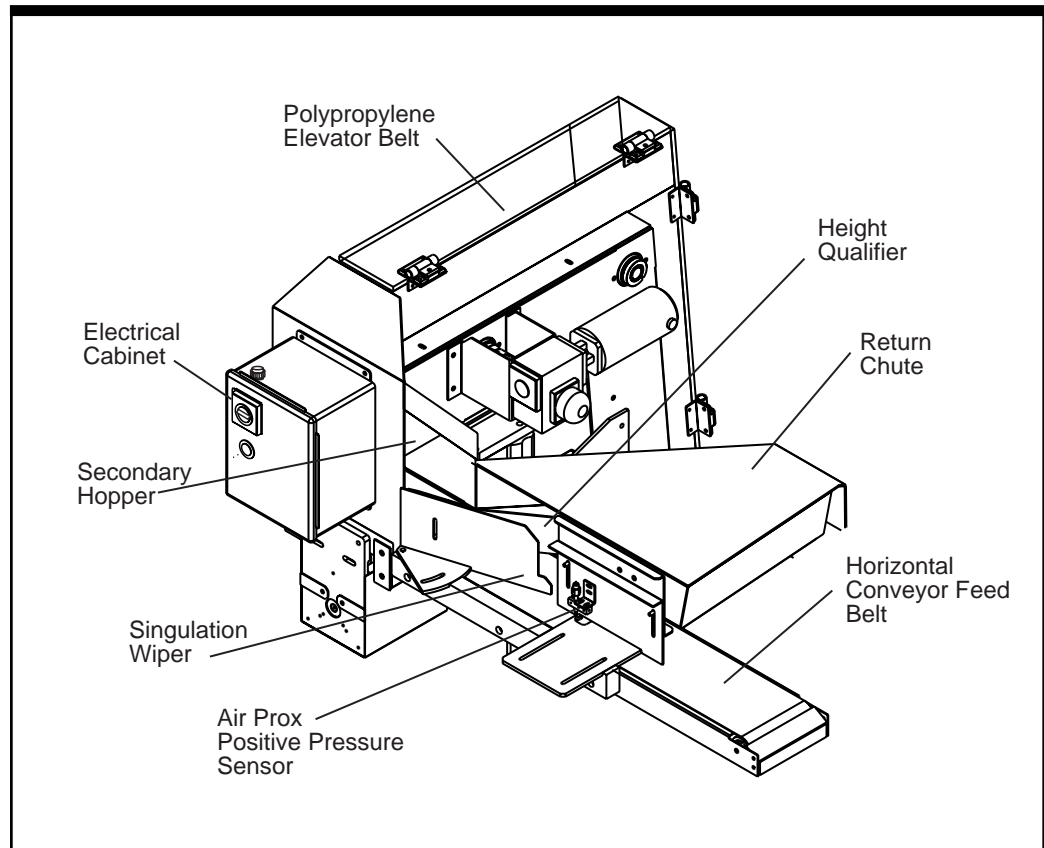


Figure 1-2. CapStar Head

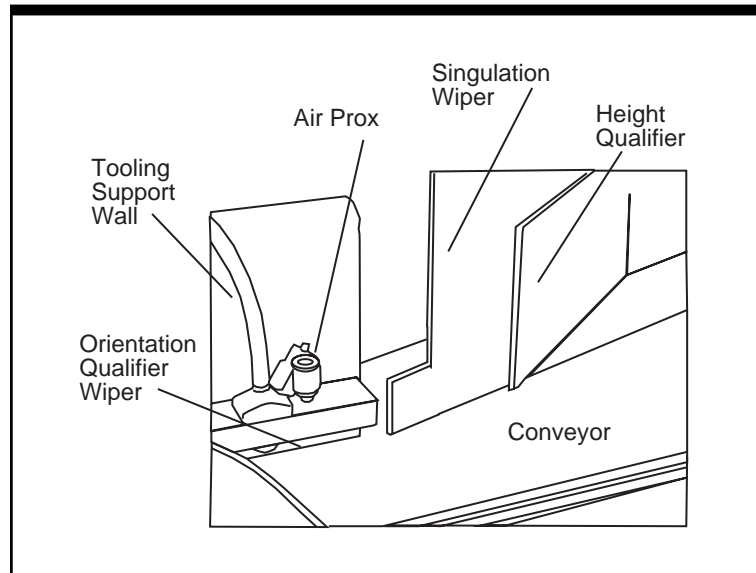
misoriented or do not meet the requirements set by the wiper and qualifier are deflected down the return chute and recirculated.

The single row of caps pass by a positive pressure sensor (the air prox - see *Figure 1-3*). The positive pressure sensor continually blows a low volume, low pressure stream of air at the caps.

As each cap passes the sensor, the air stream blowing down creates a back pressure. The sensor reads the back pressure, and, if the cap is misoriented, triggers a reject airjet to blow the cap down the return chute. Correctly oriented caps are allowed to pass the airjet and positive pressure sensor, and continue down the conveyor.



## CapStar Feeder Installation/Maintenance Manual



*Figure 1-3. CapStar Tooling*

See *Chapter 3, Installation & Start-up*, for the setup details.

<b>CapStar Cap Feeder Specifications</b>		
<b>Product Specifications</b>	<b>ANSI</b>	<b>Metric</b>
Inventory No.	FCCPSTLDSA FCCPSTRDSA	FCCPSTLASM FCCPSTRASM
<hr/>		
<b>Electrical Specifications</b>		
Elevator Motor Size	1/4 HP	186 Watts
Conveyor/Feed Belt Motor Size	1/5 HP	150 Watts
Supply Voltage	Refer to Chapter 3 Wiring Diagram	
Drive Motor Voltage	Refer to Chapter 3 Wiring Diagram	
Power Usage	Refer to Chapter 3 Wiring Diagram	
Weight	≈1000 lbs	≈453.6 kg
Hopper Capacity	4 ft <sup>3</sup>	115 liters
<hr/>		
<b>Dimensional Specifications</b>		
A. Overall Height	65" - 81"	1655 mm - 2060 mm
B. Load Height	35" - 51"	908 mm - 1314 mm
C. Discharge Height	46" - 62"	1174 mm - 1580 mm
D. Overall Length	60"	1536 mm
E. Overall Width	54"	1371 mm
F. Belt Width (Horizontal)	6"	152 mm
G. Interfaced Conveyor Clearance	7"	178 mm
<hr/>		
<b>Performance Specifications</b>		
Elevator Max Speed	37 feet/min	
Conveyor Max Speed	43 feet/min	
<hr/>		
	<i>Your direct supplier may have changed some of these specifications during tooling to better match your application's requirements.</i>	

Table 1-1. CapStar Cap Feeder Specifications

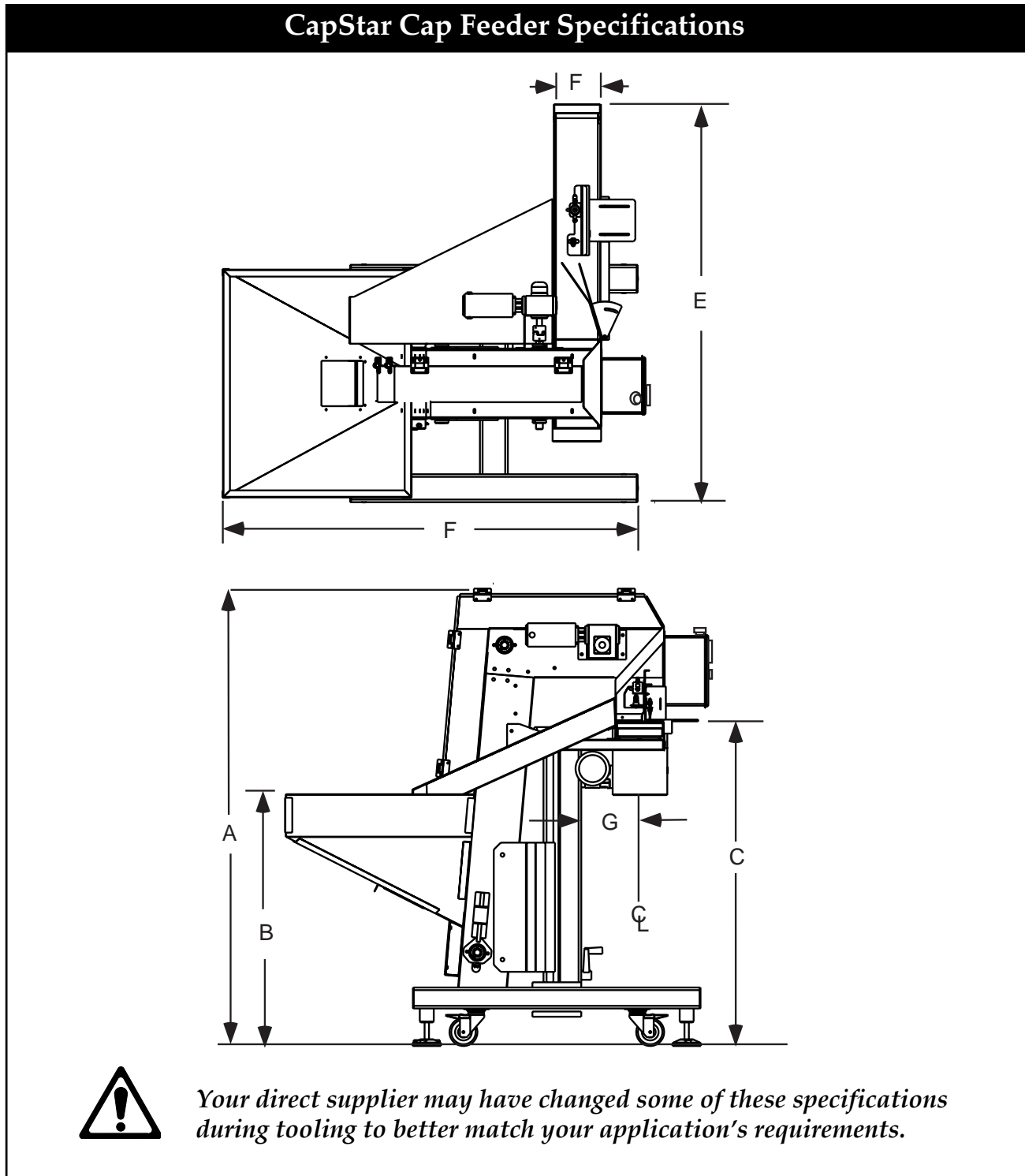


Figure 1-4 CapStar Cap Feeder Specifications

# Safety Precautions

## 2

### Warnings



**Turn Off Power!** Before servicing, make sure you have turned off compressed air and electrical power in a way which prevents accidental reactivation. Padlock and clearly tag the appropriate electrical and pneumatic disconnects. Lockout/tagout procedures are covered in United States Code of Federal Regulation (CFR) Title 29 Part 1910.147, "The Control of Hazardous Energy."



**Dress Appropriately!** Reduce the risk of injury from moving parts by securing loose sleeves and other clothing. Do not wear loose jewelry or neckties near the equipment. Wear safety glasses or other protective eye wear when servicing or operating the CapStar. Never place hands or tools in the equipment when it is operating.



**Avoid Pinch Points!** Exposed pinch points include the elevating belt at the bottom of the hopper and at the intersection of the horizontal belt. At the horizontal belt where the cap sorter guides deflect caps.



**Avoid Dangerous Conditions!** This machine is not designed to work in explosive or wet environments. Dry conditions are critical for a long life. Normal operation inherently causes static electricity to build up; avoid explosive or potentially explosive environments.

# Installation & Startup

## 3

### *If the CapStar is Already Set Up*

If you buy a Hoppmann CapStar Cap Feeder as part of a Hoppmann feeder system, then your direct supplier will have performed all the procedures in this chapter. You will still need to:

- ▶ **Position your CapStar Cap Feeder.** Follow the equipment layout drawing provided by your direct supplier.
- ▶ **Connect Electrical Wiring.** Follow as-built electrical diagrams provided by your direct supplier.
- ▶ **Make Pneumatic Connections.** If your CapStar has a hopper agitator, your direct supplier will provide you setup specifications.
- ▶ **Install and Test the Rest of the System.** Installation is complete.

*If the Hoppmann CapStar Cap Feeder is drop-shipped to your location, follow the procedures in this chapter to finish setting up the feeder.*

### *Unpacking and Inspection*



**Step □1—Inspect and Unpack the Crate.** Remove packing materials from sensors, tooling and moving parts. Make a visual check to be sure parts have not come loose during shipping. If you find any concealed damage, call the shipping carrier and your direct supplier immediately. *Do not attempt to fix the problem yourself unless told to do so by your direct supplier.*

**Step □2—Record Serial Number of the CapStar** If you have not already done so, record the CapStar's inventory / serial number on the front of this manual. *This information is necessary when ordering replacement parts or service.*

The CapStar Feeder is secured to the floor of the crate and the weight of the unit is on four leveling footpads. When the unit is lifted from the floor of the crate, the leveling feet can be raised to allow the casters to rest on the shop floor. Once the unit has been positioned, the casters can be locked or the footpads can be lowered for a stable footing. The leveling feet can be used to level the unit and they have anchor holes to allow anchoring.



## Physical Setup

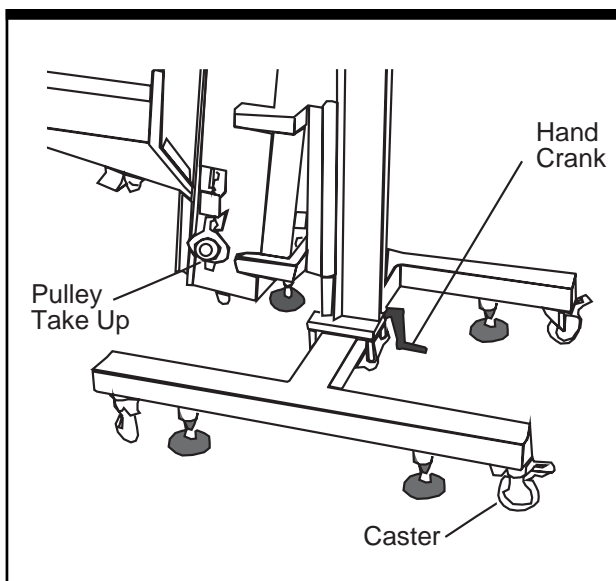
**Step 1—Position the CapStar Cap Feeder.** Place the feeder as shown on the equipment layout drawing provided by your direct supplier.

**Step 2—Position the CapStar Cap Feeder.** The CapStar can be moved around on its casters into position. Press the tab on each wheel to lock the wheel and keep it from turning. The casters are locked by stepping down on the locking tabs. When the wheel is free, step on or press down on the outer edge of the locking tab. The brake engages the wheel and the wheel brake tab protrudes above the larger locking tab.

To release the brake, step on the small wheel brake tab or lift up on the larger locking tab.

Lower the feet until the weight is transferred to the feet and engage the locknuts.

A level should be placed on the horizontal continuous belt and the unit should be leveled.



The unit can be raised or lowered into position by turning the hand crank that is located at the bottom of the center post. The hand crank can be turned with little effort in either direction (refer to *Figure 3-1*).

- ⇒ To raise the unit:
  - turn the hand crank clockwise.
- ⇒ To lower the unit:
  - turn the hand crank counterclockwise.

Figure 3-1. Adjusting the Height

## Setup

The CapStar Cap Feeder must be setup to run the particular style of cap. As a point of reference, the hand crank and electrical box is on the front of the machine. The hopper is the back. The hand crank is at the bottom and electrical box is at the top of the unit. Left and right hand CapStar units are distinguished by standing at the front of the unit and looking back to the hopper. The pneumatic regulator is located on the support arm.

## Initial Settings

*To setup for the initial run or to change to another size or style of cap, block the end of the qualifier with a recirculating plate. This will allow a quantity of caps to be run without introducing them into the system.*

**Step 1—Adjust the Height.** Adjust the height qualifier wiper by loosening the knob and setting the height  $\frac{1}{8}$ " to  $\frac{1}{4}$ " above the cap.

**Step 2—Set the Angle.** Set the angle of the singulation wiper by loosening the hand knob and pivoting the wiper so that only one cap (by diameter) can pass the wiper.

The CapStar Cap Feeder is now setup to send a line of caps to the orientation qualifier.

**Step 3—Orientation.** The orientation qualifier is set to allow one cap (one cap diameter from the edge of the belt to the face of the singulation wiper) to pass along the conveyor. Any side-by-side caps will be rejected and pushed by a reject airjet down the return chute for recirculation. Additionally, the orientation qualifier has a height adjustment. The adjustment is based on height of one cap with an allowance of approximately  $\frac{1}{8}$ ". To adjust the height loosen the knobs holding the plate in place, and raise/lower the plate so that there is a gap of  $\frac{1}{8}$ " between the qualifier and a cap. Retighten the hand knobs.

Continued ►



**Step 4—Fill Hopper.** Fill the hopper with a quantity of product to be fed.



*Before connecting air, turn the pneumatic regulator counterclockwise to prevent the system from becoming pressurized when the shop air is attached.*

**Step 5—Connect Power and Air** Connect the CapStar to power and compressed air to the regulator and set the pressure to an initial setting of 40 - 50 psi (see *Figure 3-1*).



*The orientation sensor bleeds air continuously. This is normal. Since bleeding air makes noise, feel around the air lines and the air line connectors for leaks.*

Connect the electrical power by plugging in the end of the power cord into a properly grounded 115 VAC receptacle. The plug end should prevent connecting to the wrong voltage.

Turn the main power switch on. Rotate the switch clockwise to energize. The EMERGENCY STOP switch should be pulled out and illuminated. When the EMERGENCY STOP switch is pushed in the electrical power is cut off and the light is off.



*If the motors do not start to run, turn the speed controls up until the elevator belt starts to lift caps out of the hopper. It is recommended to start at a slow belt speed through the setup.*

Watch the caps as they are dropped onto the horizontal feed belt. Watch the caps pass by the height qualifier. Stacked caps should be pushed aside and sent down the return chute.

A single line of caps should be passing under the orientation qualifier. Cavity up caps should pass through and cavity down caps should be blown down the return chute.

Once the setup is complete, press the stop button.



*Remove the recirculating plate from the downstream path of the caps.*

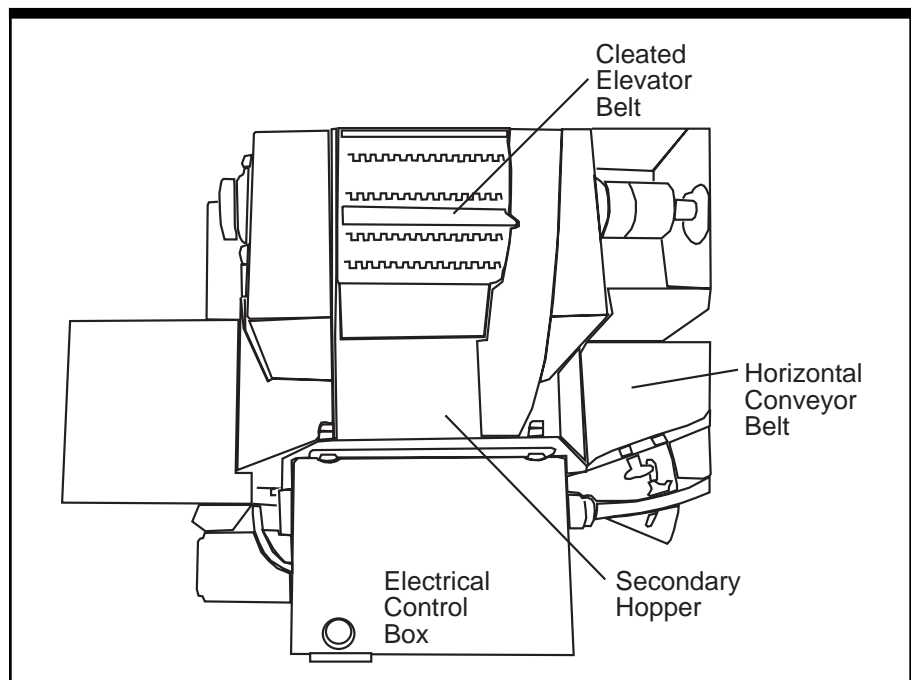
The CapStar Cap Feeder is now ready to feed cavity up caps into the system.

The CapStar Cap Feeder is equipped with a cleanout door in the base of the hopper, and can be used to quickly empty product for changeover.

## *Making Tooling Adjustments*

Product which is carried from the primary hopper by the elevator, belt, is metered into a secondary hopper (see *Figure 3-2*). The secondary hopper assists with settling the parts before they enter the tooling area and horizontal conveyor.

**Step 1—Adjust the Speed.** The speed at which the elevator is run should be set so that the product in the secondary hopper maintains a consistent level. Parts leave the secondary hopper at the same rate or faster than they enter ensuring the proper fill level of the secondary hopper.



*Figure 3-2. Secondary Hopper Location - CapStar Topview*



Product metered from the secondary hopper loads onto the conveyor and into the tooling section of the CapStar for singulation and qualification.

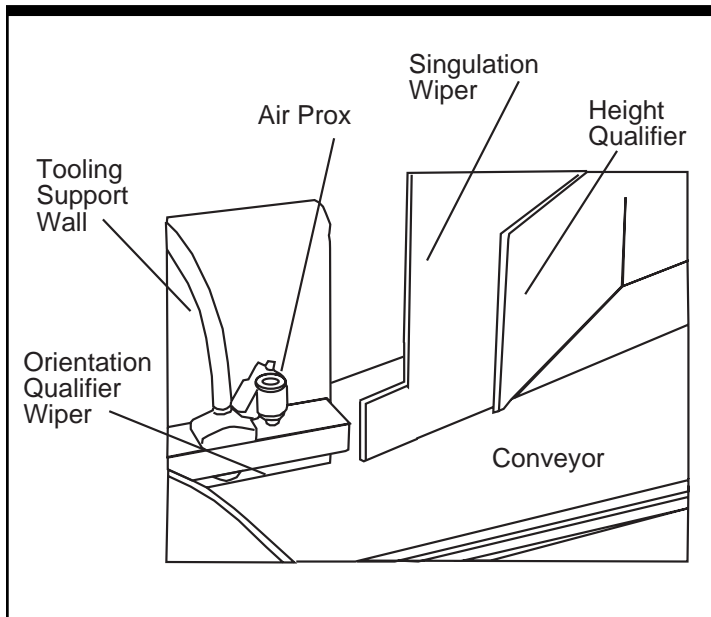


Figure 3-3. CapStar Tooling

**Step 2—Adjust Height Qualifier.** The height qualifier plate is adjusted to allow only one part thickness to pass underneath it. This wiper has 1.88" of vertical adjustment allowance. The height qualifier plate is attached to the deflector plate (see *Figure 3-3*).

**Step 3—Adjust Singulation Wiper.** The singulation wiper is a hinged wall which can be adjusted to different angles. The height qualifier wiper and the singulation wiper work together (see *Figure 3-3*). They are adjusted to allow only one single level of parts to pass in a single file line.

**Step 4—Adjust Air Proximity Vertical and Horizontal Position.** When caps enter the second stage of tooling - or the orientation qualifier area, the air prox will qualify the part to a cavity up position. The air prox is attached to the tooling support wall. To adjust the wall loosen the hand knobs on the back side of the wall, and move it up or down, in or out, based on the cap size being run. Place a cap between two flanges (see *Figure 3-4* following page), leaving an  $\frac{1}{8}$ " gap between the top of the cap and the top flange, and retighten the hand knobs. With regards to the reject airjet, place a cap beneath the airjet nozzle and adjust the nozzle so that the vertical tip is no greater than .100" above the surface of the cap. Adjust the airjet horizontally so that the airflow hits the surface of the cap as close to the centerline as possible.

**Step 5—Set Air Proximity.** The air pressure at the air proximity is to be set just high enough to trigger the airjet which will fire the airjet and reject a cavity down part.

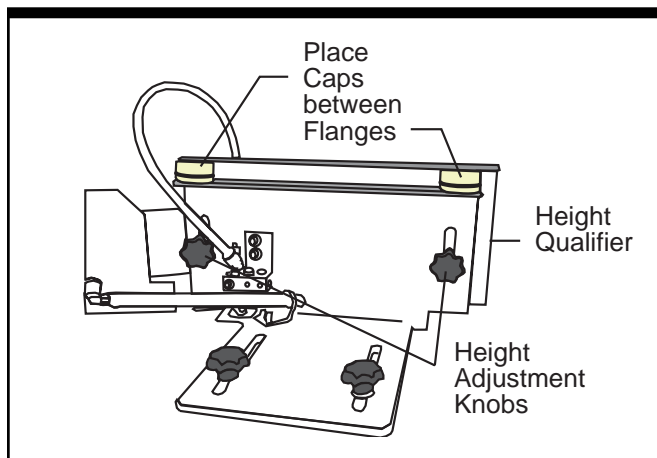


Figure 3-4. Height Adjustment

*Note: All qualified product is discharged at the end of the conveyor in a single stream and continues to the customer's downstream equipment. Any rejected product, enters the return chute and is reintroduced into the system for recirculation.*

## Motor/Speed Reducer/Idler Assembly

**Speed Reducer—No Lubrication Required.** The speed reducer used in the CapStar is lubricated for life with synthetic lubricant and requires no regular maintenance (see Figure 3-5).

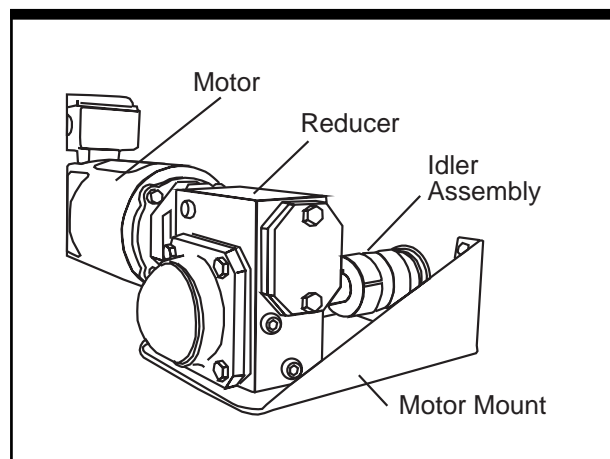


Figure 3-5. CapStar Speed Reducer

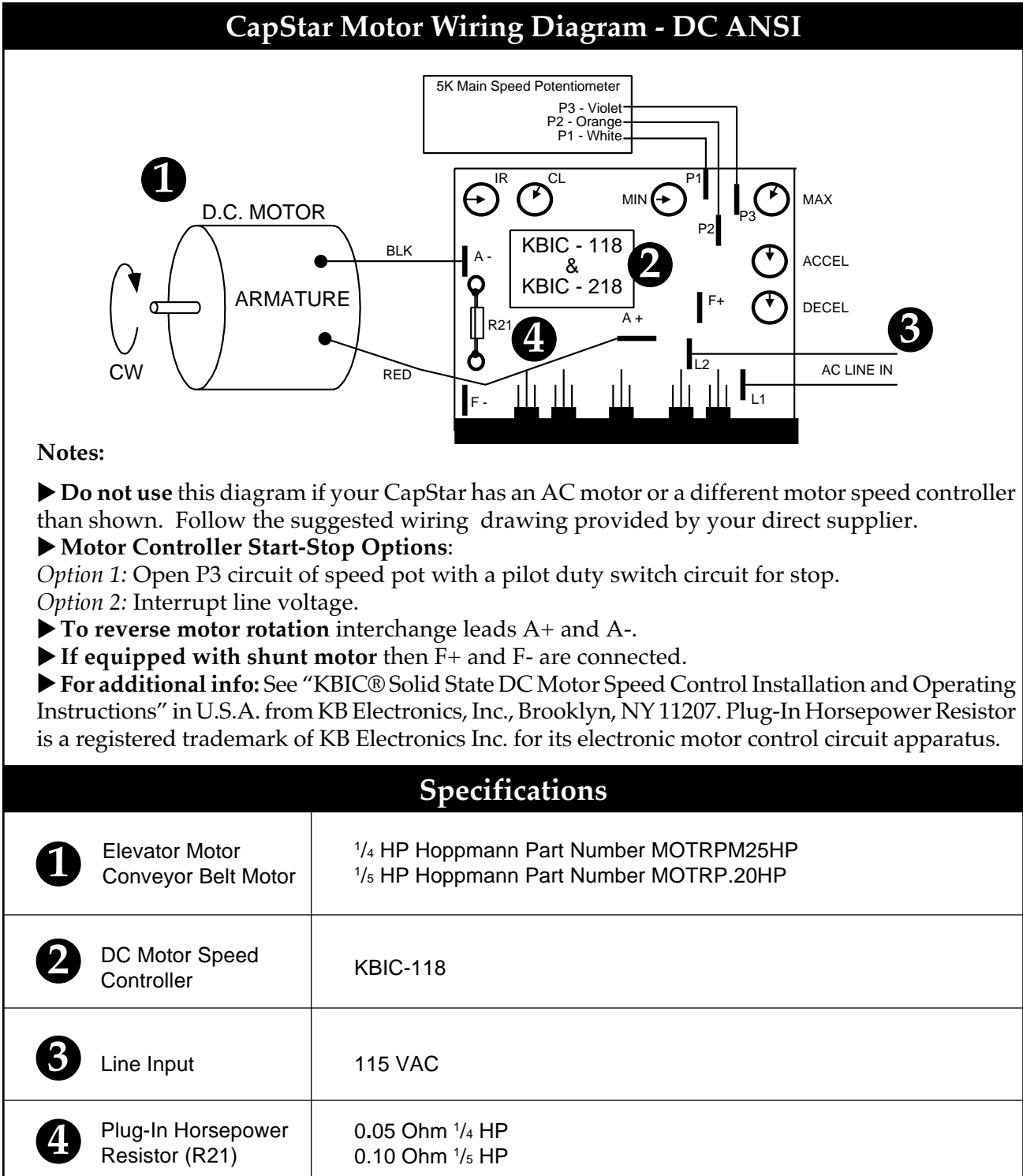


Figure 3-6. DC ANSI Suggested Wiring Diagram

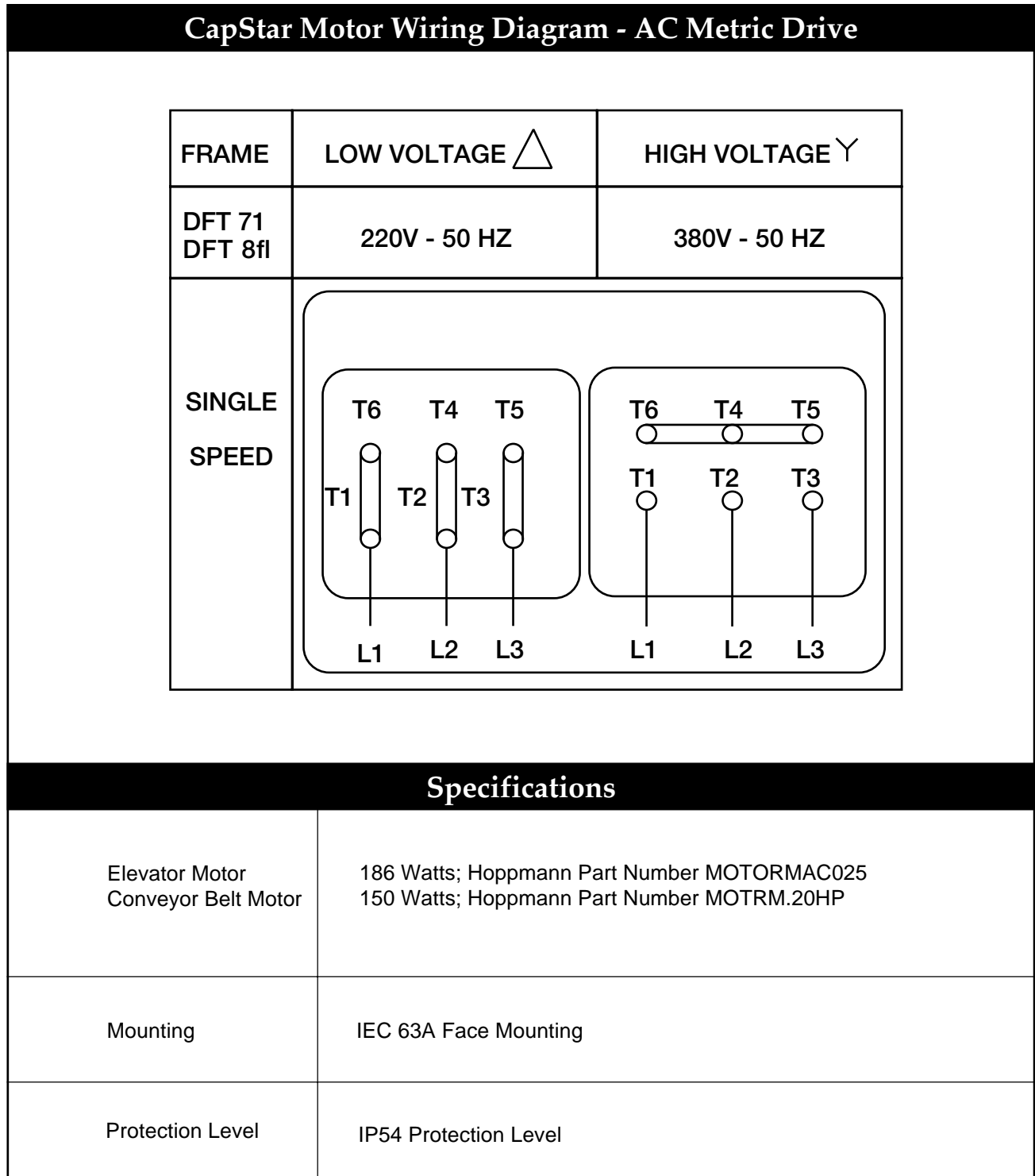


Figure 3-7. AC Metric Suggested Wiring Diagram



## *Electrical Wiring*

The CapStar Cap Feeder is powered by AC current. The two DC motors are controlled individually by dedicated KBIC motor controller cards. An external speed control dial is provided for each motor. The M1 and M2 motor speeds are independent (non-synchronized).

- The Main Power Switch provides power to the electrical box.
- The EMERGENCY STOP cuts power to the controllers and the motors.
- The Main Power Switch *must be turned off before opening the electrical box*. Until the Main Power Switch is turned off, the breaker(s) and the terminal strips are still powered up.
- The Motor 1 (M1) drives the vertical elevating belt.
- The Motor 2 (M2) drives the horizontal conveyor belt.



Refer to *Figures 3-8* and *3-9* for wiring schematics.

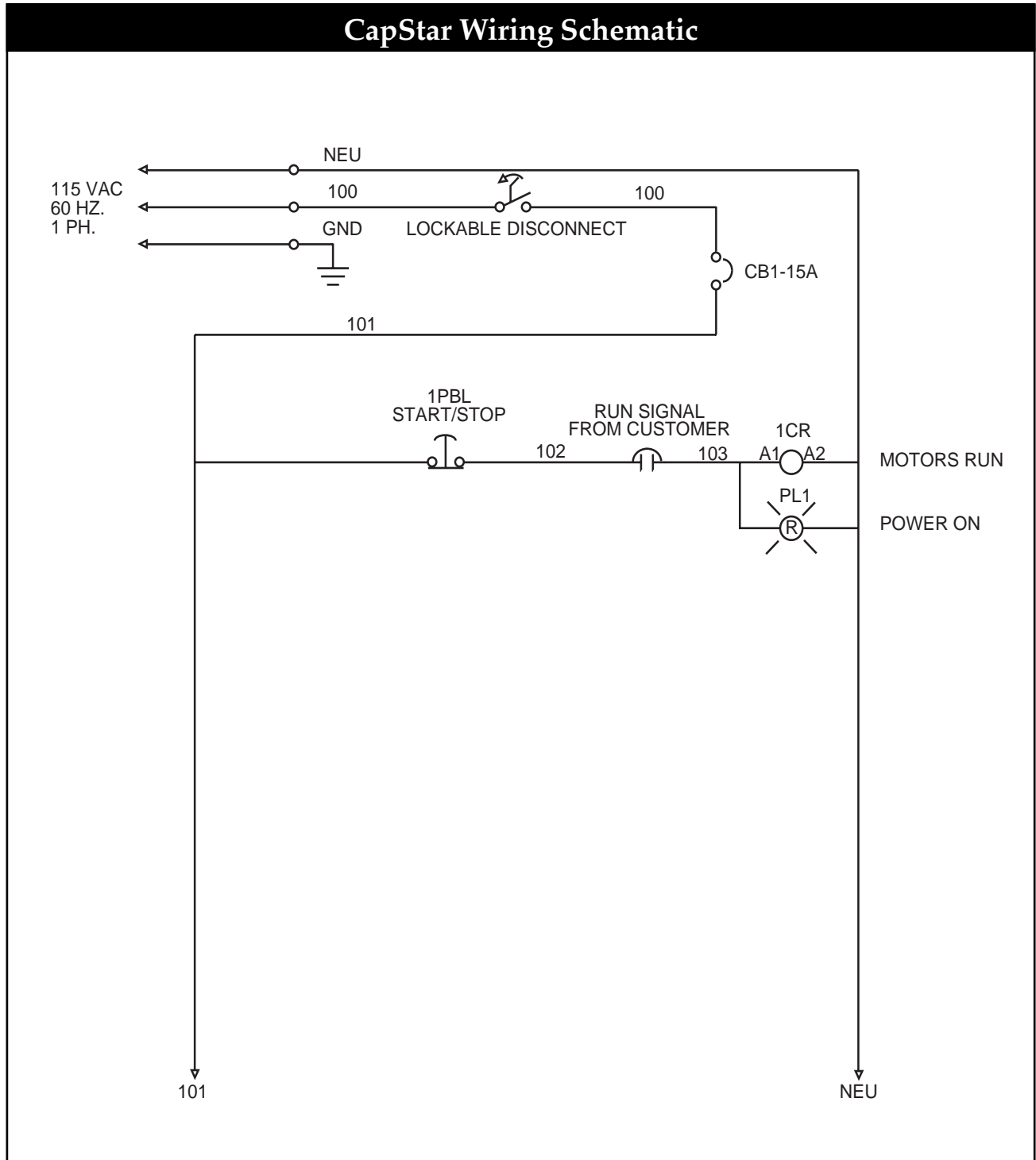


Figure 3-8. CapStar Wiring Schematic

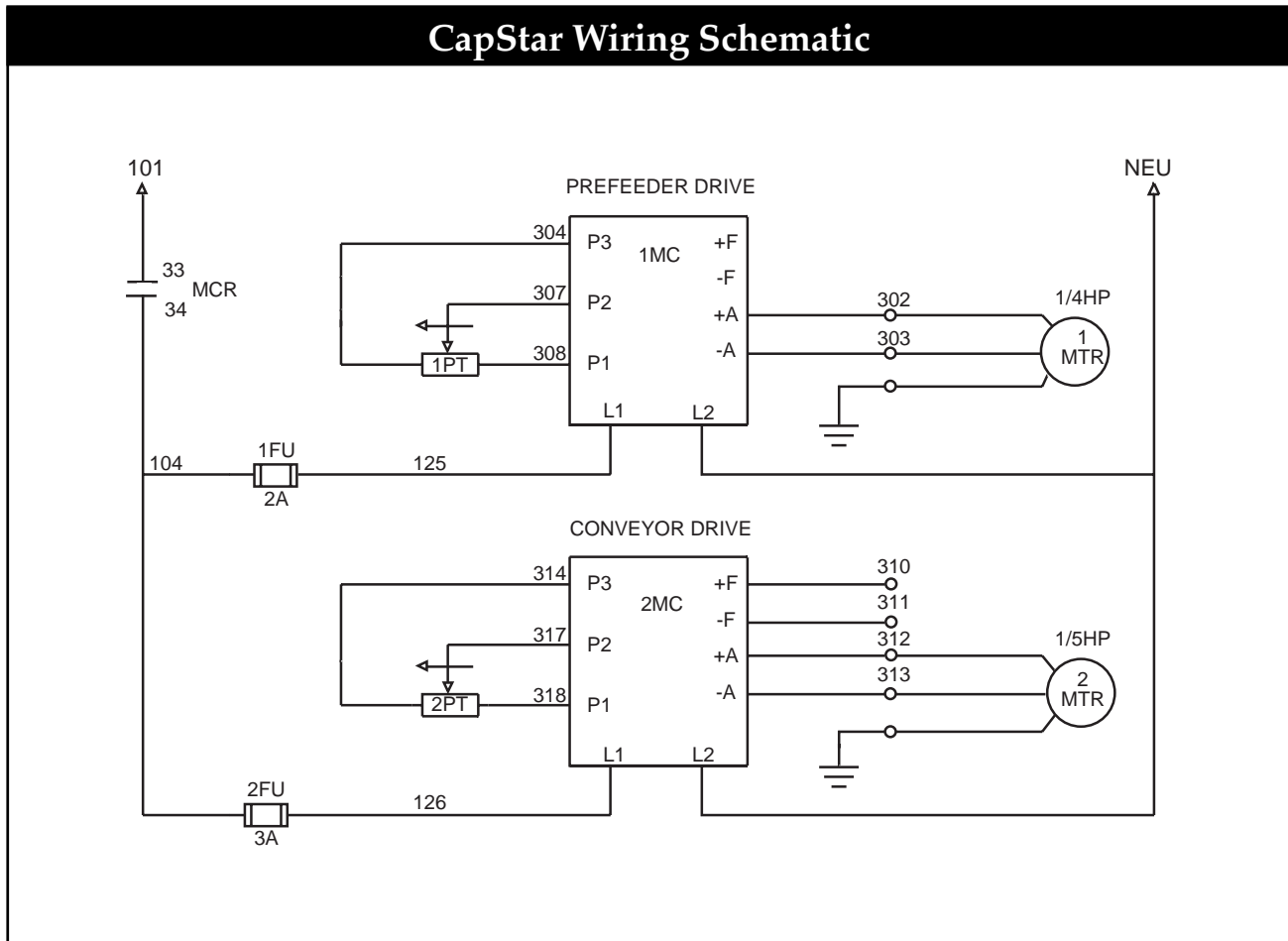


Figure 3-9. CapStar Wiring Schematic

# Repair and Maintenance

## 4

### *Preventive Maintenance*

The following guidelines are provided to help determine the most convenient and beneficial maintenance program that should be used. This information is provided for producing a maintenance schedule. Once familiar with the unit, operators or technicians may add or delete items to the schedule. For any service questions, contact your distributor.

### *General Maintenance*

- Inspect all electrical plugs for secure connections.
- Verify that all components are securely fastened.
- Inspect the unit for loose screws, loose guides, or covers and tighten as necessary.
- Inspect the conveyor belts for wear or fraying.
- Gently clean dust from the hopper.
- Inspect for air leaks.



*The orientation sensor bleeds air continuously. This is normal. Since bleeding air is makes noise, feel around the air lines and the air line connectors for leaks.*

### *General Cleaning*

When necessary, clean the belt surface with a cloth dampened with water or use mild household cleaners. Wipe damp surfaces with a dry, clean cloth.

### *Conveyor Belt Insallation & Replacement*

**Step 1—Disconnect Power.** Turn off the CapStar and lock out power.



**Step 2—Disconnect Electrical.** Remove the screws that are retaining the electrical cords for both motors.

**Step 3—Remove the Load Box.** Remove the (4) M8 screws that mount the load box. Swing load box out of position and rest on table or work bench. Loosen bolts and remove both end covers and the drive cover.

**Step 4—Remove Drive Cover.** Remove the drive cover from the conveyor (see *Figure 4-1*).

**Step 5—Remove Tooling.**

**Step 6—Remove Covers.** Loosen bolts and remove tail pulley cover.

**Step 7—Remove Dead Plate.**

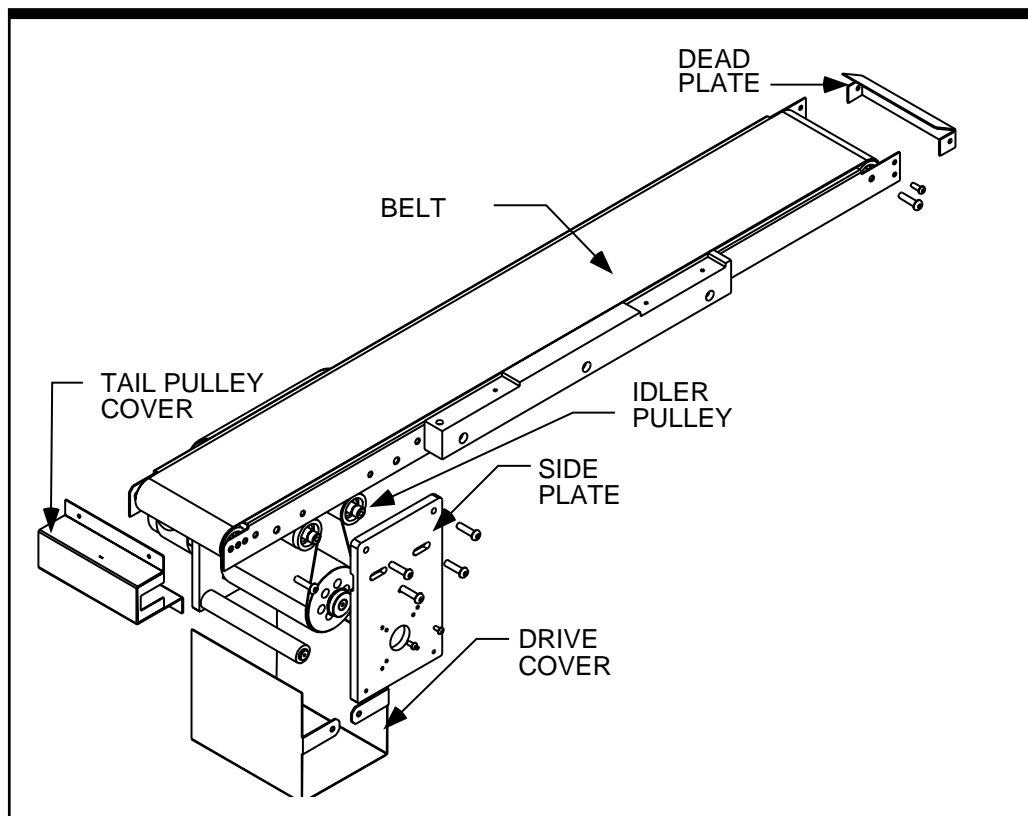


Figure 4-1. Conveyor Belt Replacement - Exploded View

**Step 8—Note the Position.** Take note of the position of the belt throughout the tensioner spools.

**Step 9—Loosen Idler Pulleys.**

**Step 10—Remove Slide Plate of the Conveyor Drive.**

**Step 11—Remove Conveyor Mounting Clips.**

**Step 12—Remove Belt.** Slide the belt off of the lower spools, and then off the conveyor mount.

**Step 13—Replace Belt.** Slide replacement belt over the conveyor mount, and over the spools, threading the conveyor through the lower spools (see *Figure 4-1*).

**Step 14—Reinstall Slide Plate.** Reinstall slide plate of the conveyor drive.

**Step 15—Install Conveyor Mounting Clips.**



**Step 16—Tighten Idler Pulleys.** *Do not overtighten the belt.* When tightening the takeup pulley, apply the minimum tension necessary to take up slack and properly track the belt. If you apply too much tension you can easily destroy the belt or decrease the life of the pulley bearings.

**Step 17—Replace Dead Plate.**

**Step 18—Replace Tooling.**

**Step 19—Replace Drive Cover.** Replace drive cover on the conveyor.

**Step 20—Replace Load Box.** Replace load box and reconnect electrical to both motors.

**Step 21—Replace Covers and Slide Plate.**



## *Elevator Chain Installation and Replacement*

**Step 1—Remove Chain.** Install or replace elevator chain, using a pin located on the underside (return side) of the elevator, loosen both sides of the lower pulley takeup brackets. With the chain loose, remove the one pin.

**Step 2—Install Replacement Chain.** Install the new chain, reinsert pin and tighten the lower take up bracket (refer to *Figure 3-1* in the Installation & Startup - Chapter 3, of this manual for take up bracket location).

# Replacement Parts

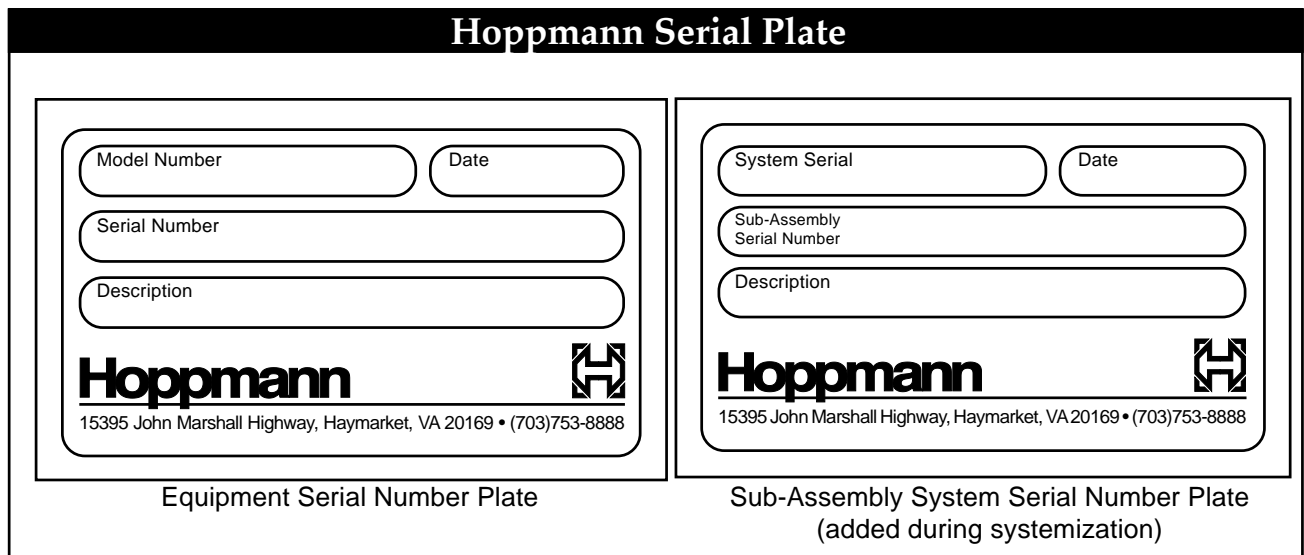
## 5

### *Notice to Hoppmann Customers:*

Replacement part lists for the standard models are stapled in the rear cover of this manual. To ensure receiving the correct replacement part(s) specific to your system, consult your system operations manual.

If you did not receive a Hoppmann customized system, or you do not have a copy of the systems operations manual, contact Hoppmann Corporation. *Prior to contacting Hoppmann, copy down the information from your system's serial plate(s).* This helps eliminate incorrect spare parts, and will assist us in making sure we have the correct parts for your tooled system. See *Figure 5-1* for the two types of serial plates that may be located on your system. *This information is necessary when ordering replacement parts or service.*

Hoppmann Corporation's contact information is listed on the following page.



*Figure 5-1. Serial Plate Layouts - Equipment and System*