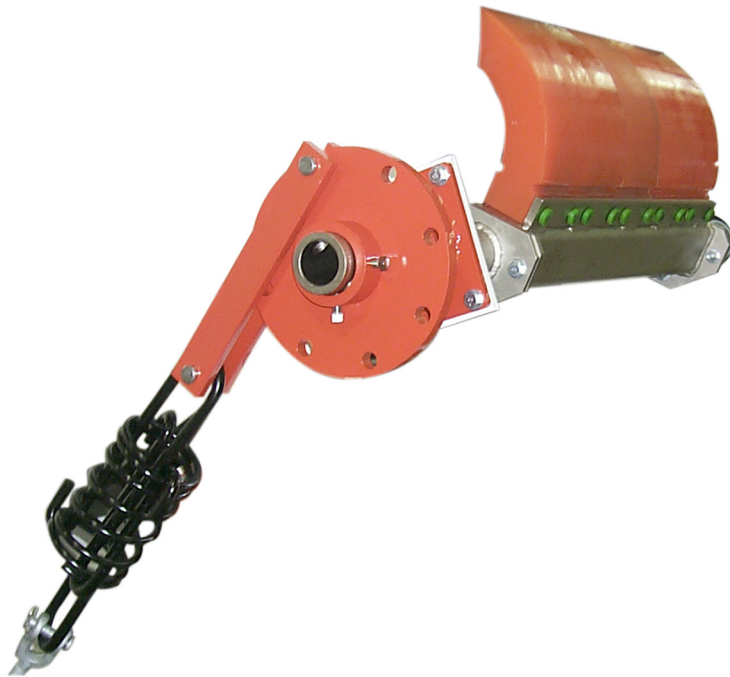


***martin***®

***Martin***® ***ZHD Cleaner &  
Tensioners***



***Operator's Manual***  
***M3542***

# Important

MARTIN ENGINEERING HEREBY DISCLAIMS ANY LIABILITY FOR: DAMAGE DUE TO CONTAMINATION OF THE MATERIAL; USER'S FAILURE TO INSPECT, MAINTAIN AND TAKE REASONABLE CARE OF THE EQUIPMENT; INJURIES OR DAMAGE RESULTING FROM USE OR APPLICATION OF THIS PRODUCT CONTRARY TO INSTRUCTIONS AND SPECIFICATIONS CONTAINED HEREIN. MARTIN ENGINEERING'S LIABILITY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF EQUIPMENT SHOWN TO BE DEFECTIVE.

Observe all safety rules given herein along with owner and Government standards and regulations. Know and understand lockout/tagout procedures as defined by American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements* and Occupational Safety and Health Administration (OSHA) Federal Register, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*.

The following symbols may be used in this manual:



**Danger:** Immediate hazards that will result in severe personal injury or death.



**Warning:** Hazards or unsafe practices that could result in personal injury.



**Caution:** Hazards or unsafe practices that could result in product or property damages.



**Important:** Instructions that must be followed to ensure proper installation/operation of equipment.



**Note:** General statements to assist the reader.

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# Introduction

## General

The Martin® ZHD Cleaner is installed on the face of the head pulley and flexes under tension to provide effective cleaning and to overcome uneven blade wear.

## Installations without chutework

These procedures were written for equipment that is being installed on enclosed pulley chutework. If the pulley is not enclosed, the equipment should be installed using the best available field resources and methods to ensure that the critical dimensions are followed for proper installation.

Martin® XHD Hanger Mounts can be used for installations without chutework.

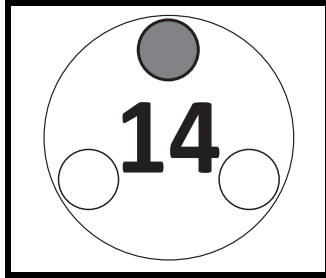
## References

The following documents are referenced in this manual:

- American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements*, American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.
- Federal Register, Volume 54, Number 169, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*, Department of Labor, Occupational Safety Health Administration (OSHA), 32nd Floor, Room 3244, 230 South Dearborn Street, Chicago, IL 60604.

**Table I. Martin® ZHD Cleaner Blade Colors, Materials and Specifications**

URETHANE SELECTION	APPLICATION DESCRIPTION	TYPICAL MATERIALS	CONTINUOUS TEMPERATURE
Orange	<b>Standard Martin® Urethane</b> Suitable for 80% or more of all belt cleaner applications, including abrasive conditions.	Bauxite, Coke, Coal, Overburden Refuse	-20° to 160°F (-29° to 71°C)
Brown (BR)	<b>Chemical-Resistant Urethane</b> Improves resistance to chemicals; reduced absorption of water in high-moisture environments.	Limestone	-40° to 160°F (-40° to 71°C)
Green (GR)	<b>High-Temperature Urethane</b> For exposure to intermittent temperatures up to 350°F (177°C).	Clinker	-40° to 300°F (-40° to 149°C)
Clear (CL)	<b>Low-Rigidity Urethane</b> For dry products such as sand and gravel.	Gravel, Dry Sand	-20° to 160°F (-29° to 71°C)
Navy Blue (NB)	<b>Low-Adhesion Urethane</b> For sticky or tacky materials.	Cement, Glass, Wood Chips	-20° to 160°F (-29° to 71°C)

*Urethane shelf life***IMPORTANT**

Urethane put in service after exceeding its shelf life may wear differently and deteriorate quicker than normal urethane.

**NOTE**

Code Date is written near bottom of blade as mm/dd/yy-x. In addition to or in place of this date, you may see an imprinted date medallion similar to the example shown. In this example, “14” stands for the year 2014. The small circles represent the quarter of the year. If three circles are “punched” the blade was produced in the first quarter. If none of the circles are “punched” the blade was produced in the fourth quarter. If code date on your blade(s) is not legible or is missing, contact Martin Engineering or a representative.

Table II. Urethane Shelf Life

Blade Color	Shelf Life
Blue	1 Year from Code Date
Brown	2 Years from Code Date
Clear	1 Year from Code Date
Green	2 Years from Code Date
Orange	1 Year from Code Date

*Safety*

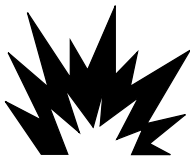
All safety rules defined in the above documents and all owner/employer safety rules must be strictly followed when working on the belt cleaner.

**⚠ DANGER**

Do not touch or go near the conveyor belt or conveyor accessories when the belt is running. Your body or clothing can get caught and you can be pulled into the conveyor, resulting in severe injury or death.

**⚠ DANGER**

Before installing, servicing, or adjusting the belt cleaner, turn off and lock out/tag out all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.



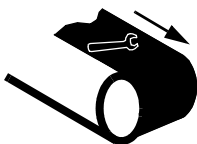
### **⚠ DANGER**

If this equipment will be installed in an enclosed area, test the gas level or dust content before using a cutting torch or welding. Using a torch or welding in an area with gas or dust may cause an explosion resulting in serious injury or death.



### **⚠ WARNING**

Before using a cutting torch or welding the chute wall, cover the conveyor belt with a fire retardant cover. Failure to do so can allow the belt to catch fire.



### **⚠ WARNING**

Remove all tools from the installation area and conveyor belt before turning on the conveyor. Failure to do so can cause serious injury to personnel or damage to the belt and conveyor.



### **⚠ WARNING**

Mainframe with blade can be heavy and may require two people to lift. Attempting to lift the belt cleaner without assistance could result in injury.



### **⚠ WARNING**

Moving spring can pinch and crush. Keep hands away from spring.

### **⚠ CAUTION**

Center the belt cleaner blades to clean an area narrower than the conveyor belt width. This allows for side-to-side movement of the belt and prevents damage to the belt edge.

Use only Martin® ZHD Cleaner mainframe and tensioners with Martin® ZHD Cleaner Blades. Other mainframes and tensioners may not be strong enough and could break, causing damage to the conveyor belt and conveyor system.

## Before Installing Belt Cleaner and Tensioner

### IMPORTANT

The delivery service is responsible for damage occurring in transit. Martin Engineering CANNOT enter claims for damages. Contact your transportation agent for more information.

1. Inspect shipping containers for damage. Report damage to delivery service immediately and fill out delivery service's claim form. Keep any damaged goods subject to examination.
2. Remove Martin® ZHD Cleaner and tensioner from shipping containers. Equipment in containers should include the following:
  - Martin® ZHD Cleaner mainframe and blades.
  - Martin® Spring Link Tensioner Assembly.
  - Fasteners (see "Part Numbers").
  - Two Conveyor Products Warning Labels, P/N 23395.
3. If anything is missing, contact Martin Engineering or a representative.



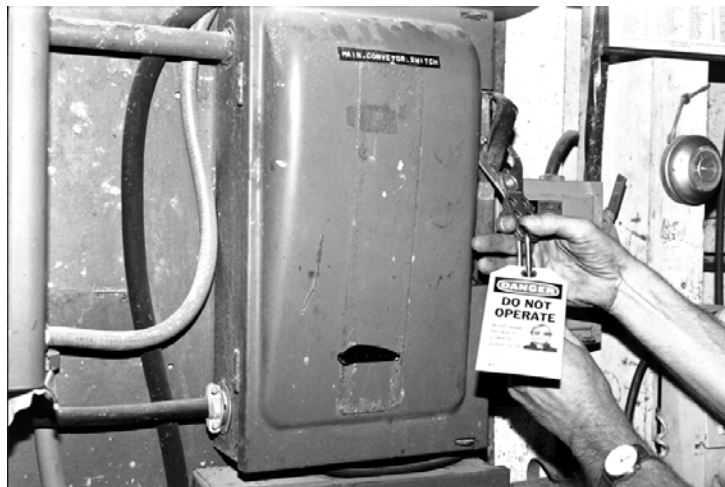
### WARNING

Before installing equipment, turn off and lock out/tag out energy source to conveyor and conveyor accessories.

4. Turn off and lock out/tag out energy source according to ANSI standards (see "References").

### IMPORTANT

Read and understand the safety information in the previous section.



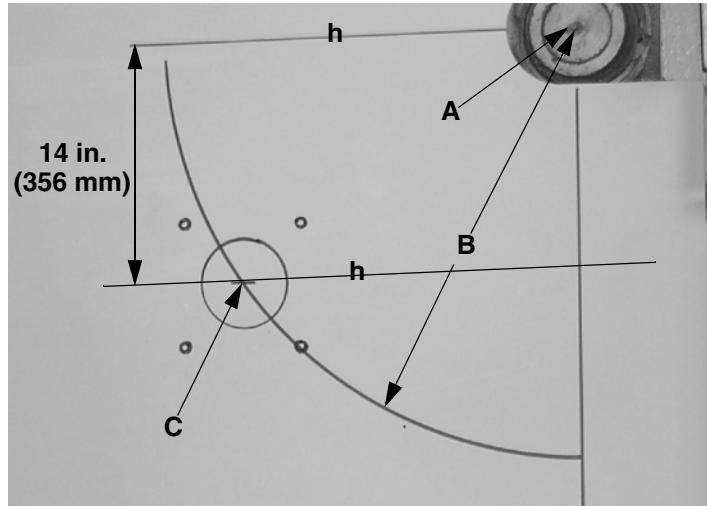


# Installing Belt Cleaner and Spring Tensioner

## Locating and Cutting Mounting Holes

- A. Center point of pulley.
- B. Radius of pulley, lagging and belt + 5".
- C. Center point of belt cleaner mainframe.

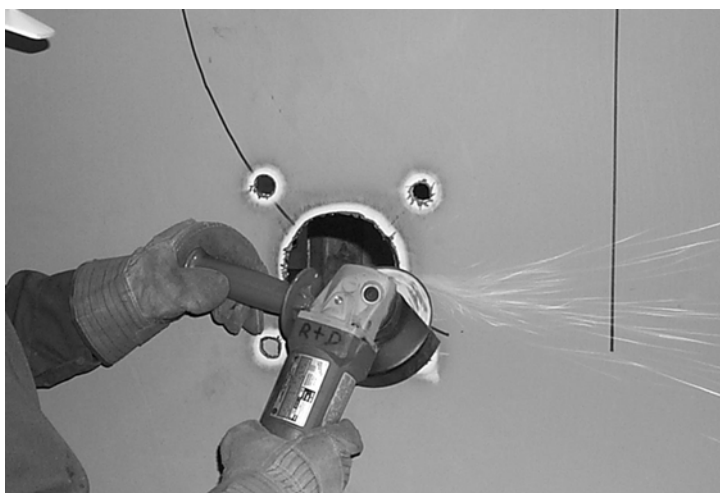
1. On operator side of chute wall, mark vertical and horizontal center line of head pulley and draw an arc as shown.



2. Locate center point of mainframe where the horizontal and vertical line intersects arc on chute wall.
3. Make sure mainframe and blades do not lie in the path of material unloading from conveyor belt. Make sure blade tip is at or below horizontal center line.

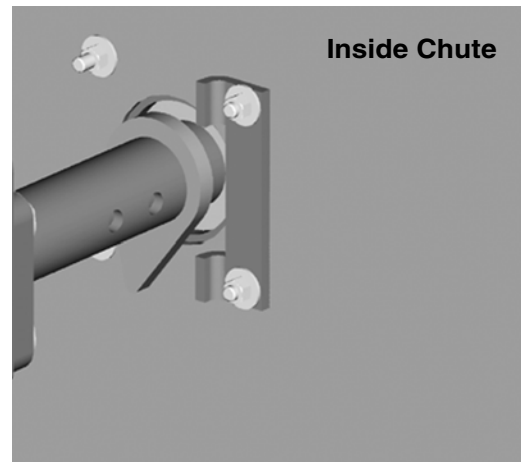
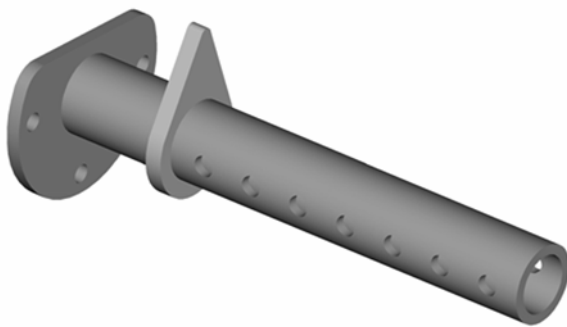
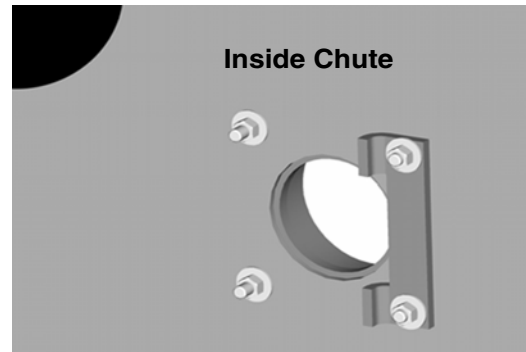


# Installation



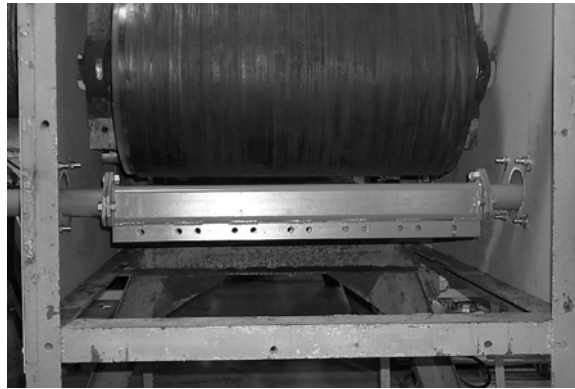
4. Cut holes in chute wall, and remove burrs and sharp edges.

## Installing Belt Cleaner Assembly

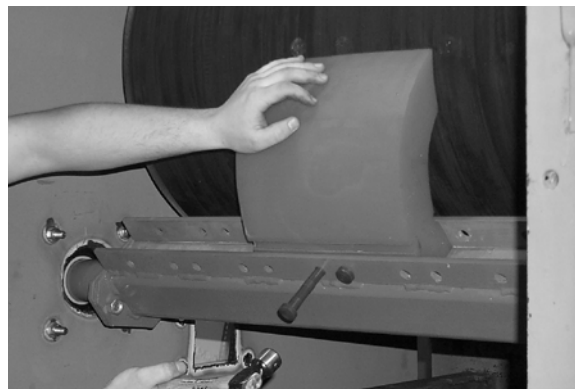


1. Install tensioner mount and stop onto chute wall.
2. Slide tensioner tab onto end weldment and insert end weldment into tensioner mount.
3. Repeat steps 1 and 2 on far side of chute without stop and tab.

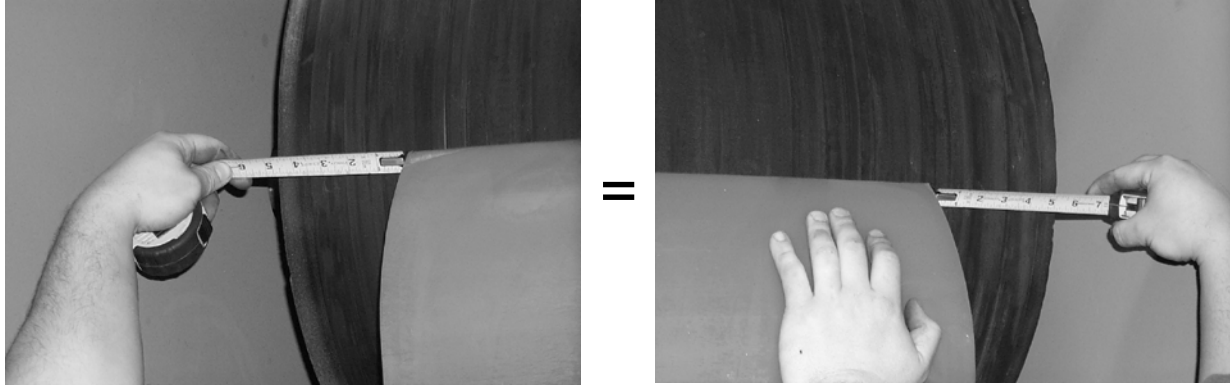
# Installation



4. Position mainframe and install cap screws, washers, and nuts.

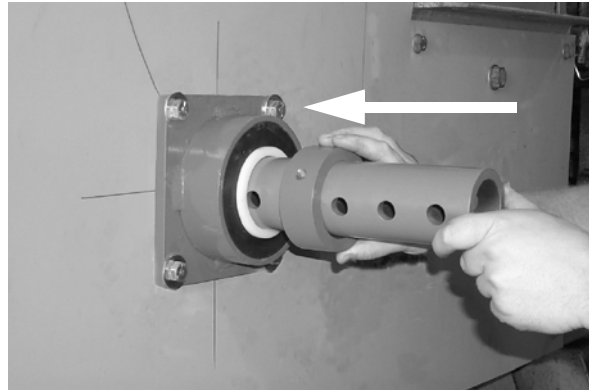
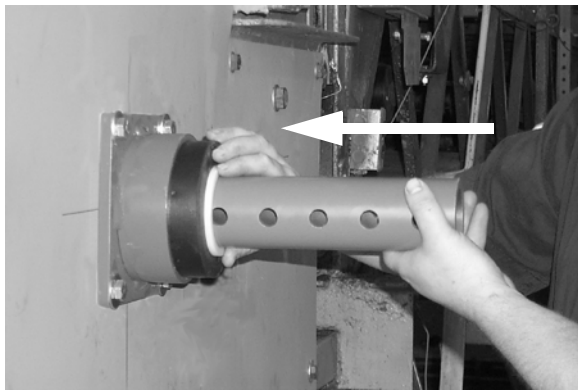


5. Insert blades and secure with pins.

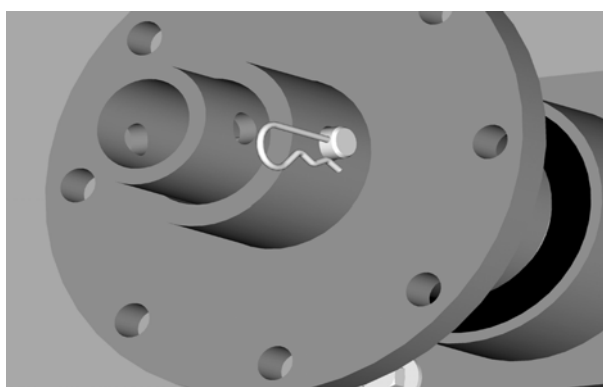
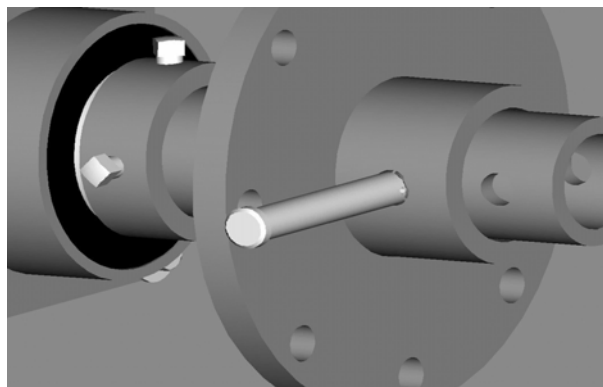
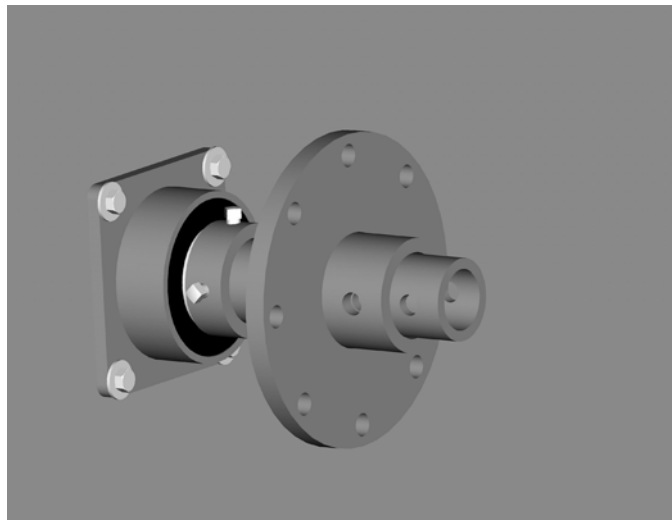


6. Center cleaner on belt.

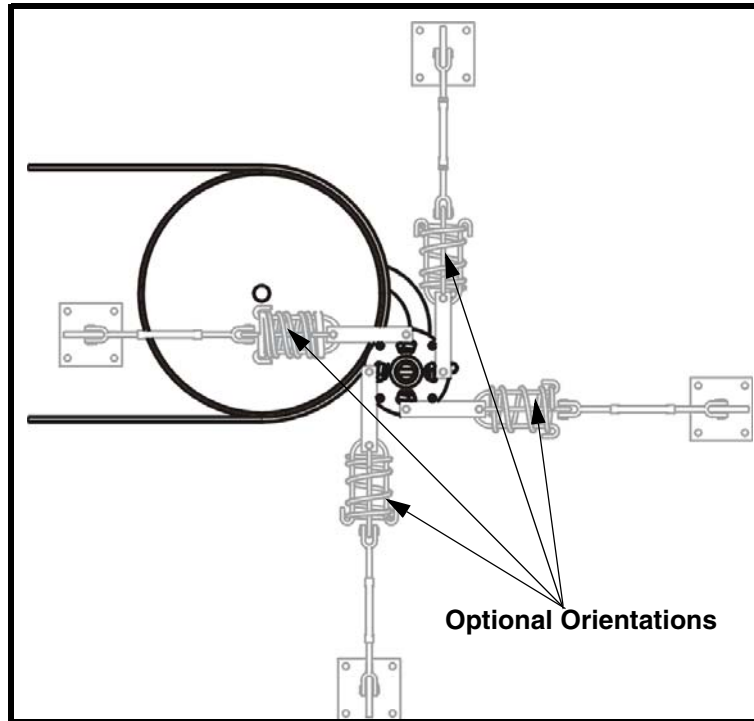
***Installing  
Tensioner***



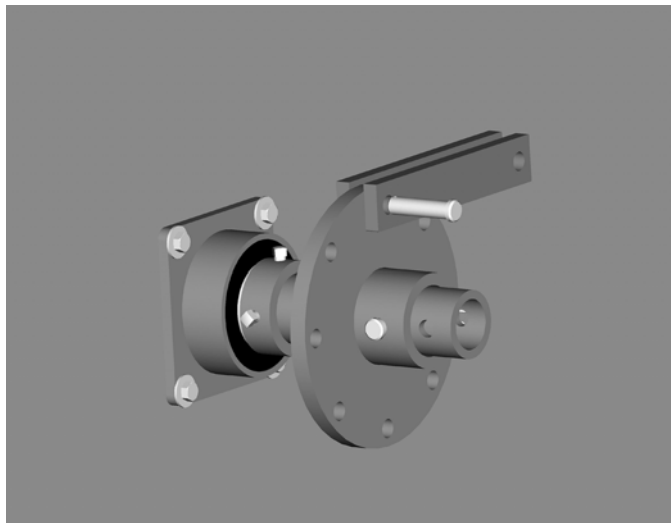
1. Insert rubber bearing and nylon bushing over end weldment and into flange.
2. Slide locking collar over each end weldment and secure with set screws.
3. Repeat steps 1 and 2 on opposite side.



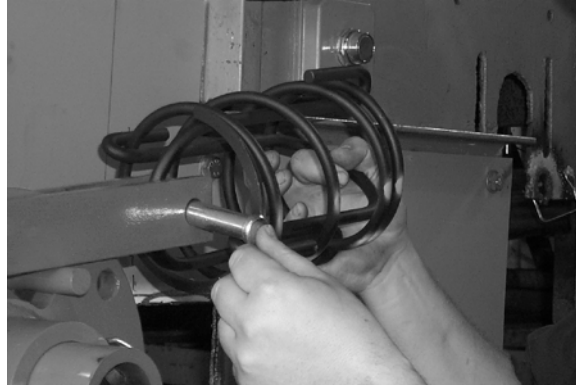
4. Slide wheel weldment into place.
5. Insert clevis pin and secure with hair pin.



6. Tensioner can be assembled in any direction. Make sure blade is tensioned into the belt.



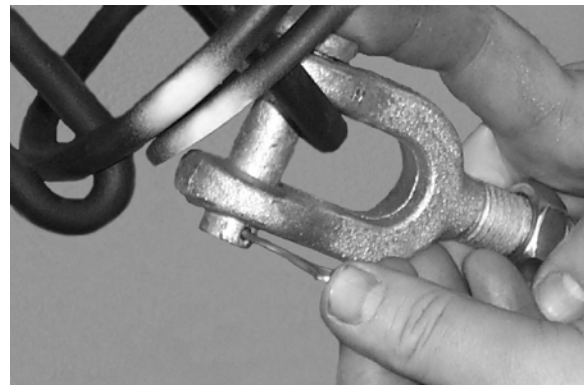
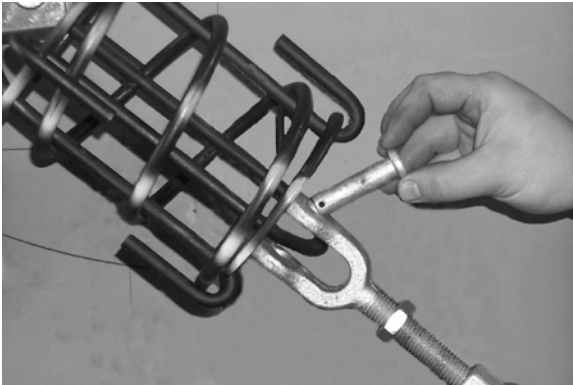
7. Assemble links to wheel weldment with clevis pin and hair pin.



8. Assemble spring to links with clevis pin and hair pin.

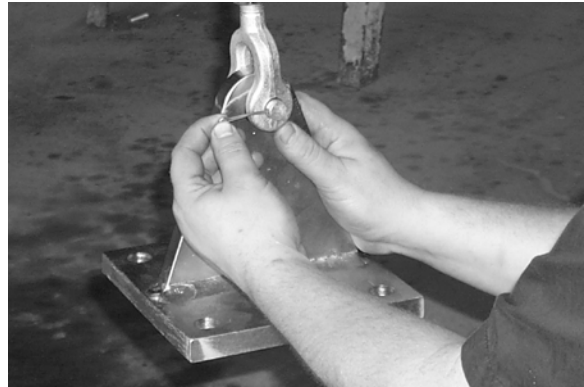


9. Fully extend turnbuckle.

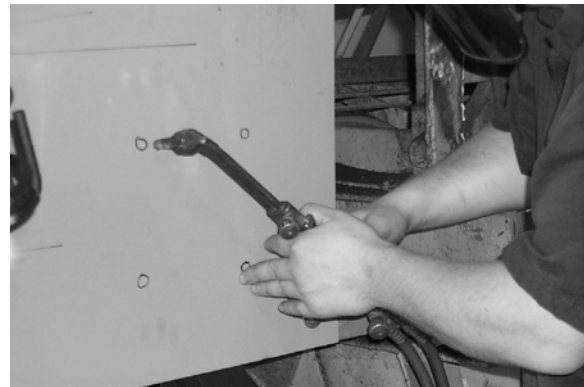


10. Assemble turnbuckle to spring.



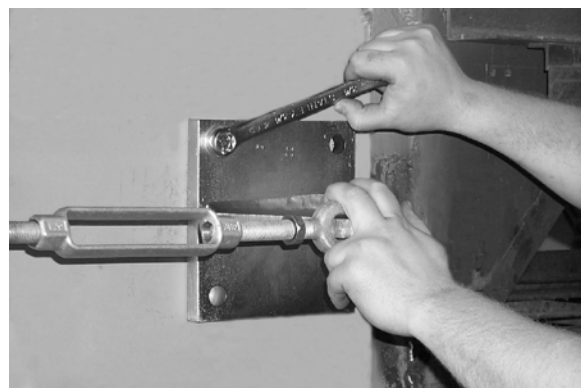


11. Assemble top mount weldment to turnbuckle.



12. Extend spring link assembly to final position and mark holes while pressing blades against belt.

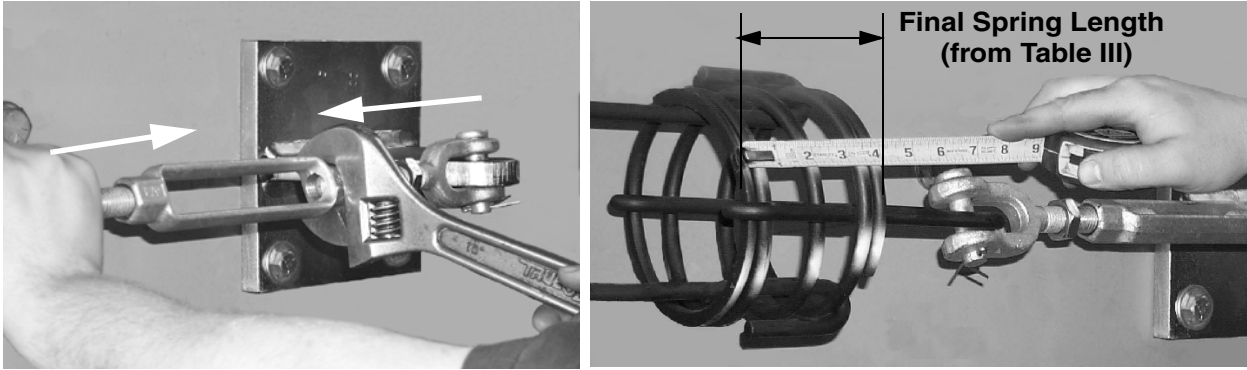
13. Cut holes in chute wall.



14. Secure top mount weldment to chute wall.

15. For dual tensioners, repeat steps 4–14 on opposite side.

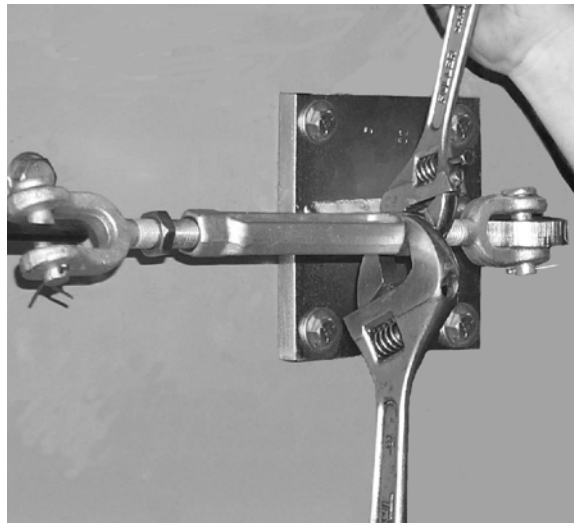
**Tensioning  
Belt Cleaner**



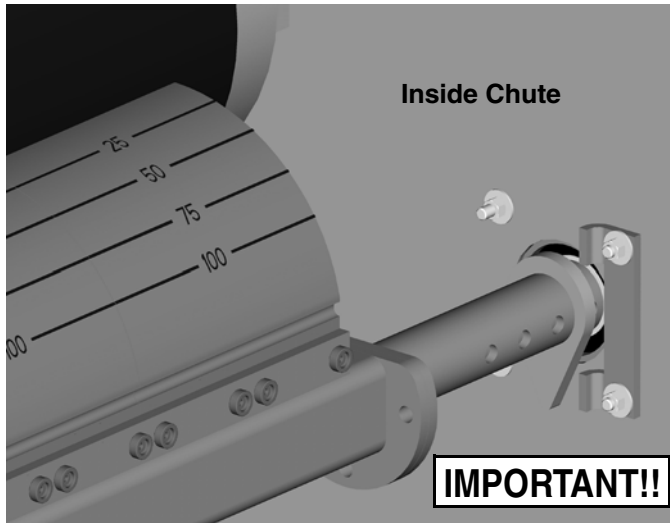
1. Tighten turnbuckle until spring is the length shown in Table III.

**Table III. Martin® ZHD Cleaner Tensioning Chart**

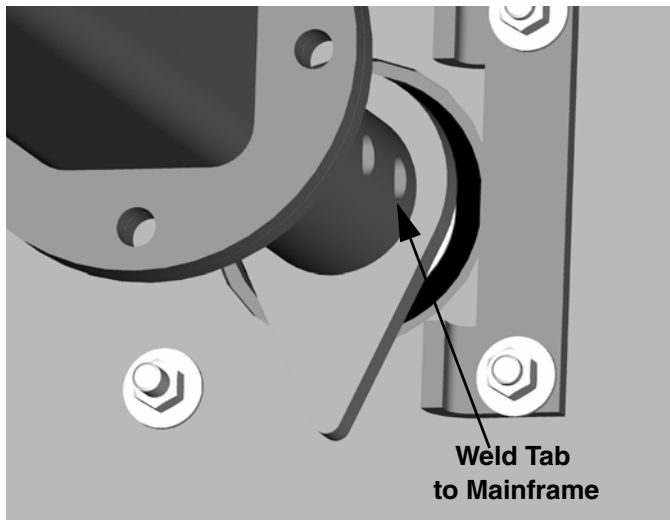
<b>ZHD-800 Assy, P/N 36366-XXXX</b>	
<b>Belt Width in.(mm)</b>	<b>Final Spring length in. (mm)</b>
24 (400-599)	3.00 (76.20)
30 (600-799)	2.25 (57.15)
36 (800-999)	4.00 (101.6)
42 (1000-1199)	3.50 (88.90)
48 (1200-1399)	3.00 (76.20)
54 (1400-1599)	2.75 (69.85)
60 (1600-1799)	2.00 (50.80)
72 (1800-1999)	3.75 (95.25)
84 (2000-2199)	3.25 (82.55)
96 (2200-2400)	2.75 (69.85)



2. Secure turnbuckle with jam nut.
3. Repeat on opposite side for dual tensioner.



4. Position tab to allow mainframe to rotate into stop when blades wear.

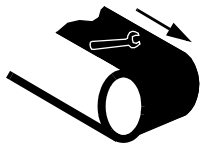


5. Weld tab to mainframe so that tab is 2.875 in. (73 mm) from stop.

## After Installing Belt Cleaner



1. Thoroughly wipe chute wall clean above tensioner.
2. Place Conveyor Products Warning Label (P/N 23395) on outside chute wall visible to belt cleaner operator.



### **⚠ WARNING**

Failure to remove tools from installation area and conveyor belt before turning on energy source can cause serious injury to personnel and damage to belt.



### **⚠ DANGER**

Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

3. Turn on conveyor belt for 1 hour, then turn off.



### **⚠ DANGER**

Before installing, servicing, or adjusting the belt cleaner/tensioner, turn off and lock out/tag out all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.

4. Make sure all fasteners are tight. Tighten if necessary.
5. Inspect belt cleaner for the following:
  - Wear. (A small amount of “break-in” wear may be found. This will stop once blades wear to conveyor belt contour.)
  - Material buildup. (No material between blades and return side of conveyor belt should be found.)
6. If wear, material buildup, or some other problem exists, see “Troubleshooting.”

## IMPORTANT

Read entire section before beginning work.

## NOTE

Maintenance inspection should be performed no less than weekly. Some applications may require more frequent maintenance inspections.



## ⚠ DANGER

Before installing, servicing, or adjusting the belt cleaner/tensioner, turn off and lock out/tag out all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.

1. Remove any material from belt cleaner.
2. Make sure all fasteners are tight. Tighten if necessary.
3. Check tension on cleaner. Re-tension if necessary.
4. Wipe all labels clean. If labels are not readable, contact Martin Engineering or a representative for replacements.
5. Check blades for excessive wear. Replace if necessary.
6. Remove equipment from service if there is any indication it is not functioning properly. Call Martin Engineering or a representative for assistance. Do NOT return equipment to operation until the cause of the problem has been identified and corrected.

## ⚠ WARNING

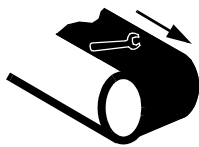
Failure to remove tools from installation area and conveyor belt before turning on energy source can cause serious injury to personnel and damage to belt.

7. Remove all tools from maintenance area.

## ⚠ DANGER

Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

8. Start conveyor belt.



# Troubleshooting

Symptom	Corrective Action
Insufficient cleaning and carryback.	<ul style="list-style-type: none"> <li>• Tension of cleaner on belt is set too low or too high. Increase or decrease tensioner setting.</li> <li>• Blades are worn. Check blades and replace if necessary.</li> </ul>
Noise or vibration.	Tension is not sufficient or is set too high. Correct tension as necessary. If this does not correct problem, blade urethane may not match application. Contact Martin Engineering or representative.
High blade wear rate.	Tension of cleaner on belt is set too high. Reduce tensioner setting.
Unusual wear or damage to blades.	Check belt splice(s) and repair as necessary.
Bent or broken mainframe or support frame due to blade slipping through.	If blades are worn to or past the wear line, replace blades. If blades are not worn, check mainframe location.
Corrosion or chemical degradation.	Blade urethane may not match application. Contact Martin Engineering or representative.

## NOTE

Conveyor equipment such as conveyor belt cleaners are subject to a wide variety of bulk materials characteristics and often have to perform under extreme operating or environmental conditions. It is not possible to predict all circumstances that may require troubleshooting. Contact Martin Engineering or a representative if you are experiencing problems other than those listed in the “Troubleshooting” chart above. Do not return the equipment to operation until the problem has been identified and corrected.

### ***Installation checklist***

If after taking the corrective actions suggested under “Troubleshooting” you are still experiencing problems, check for the following:

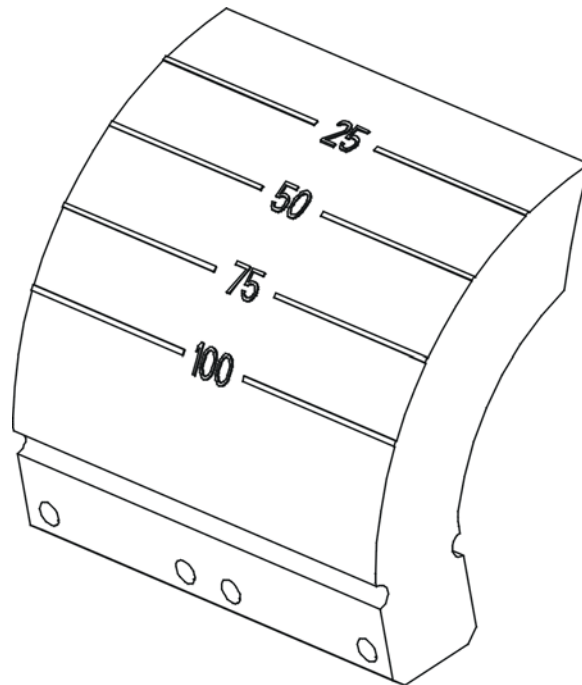
Installation Checklist
✓ Pre-Cleaner mainframe is proper distance from belt surface on both ends of mainframe.
✓ Pre-Cleaner blade tip is at or below horizontal center line of pulley and does not lie in path of material flow.

# Changing Blades

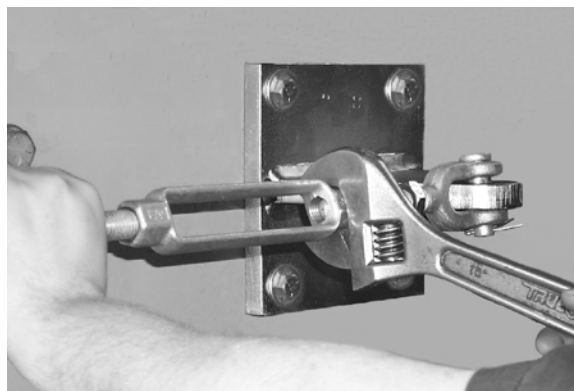


## **⚠ WARNING**

Before servicing or adjusting belt cleaner, turn off and lock out/tag out all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.

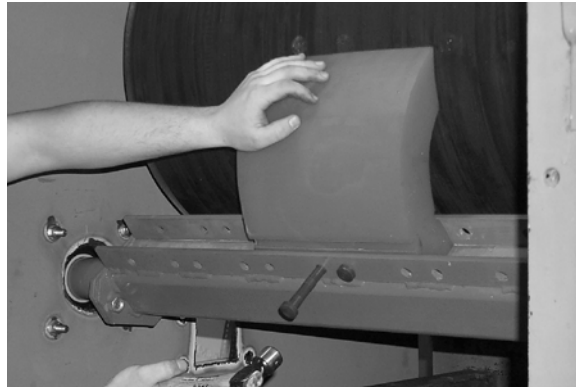
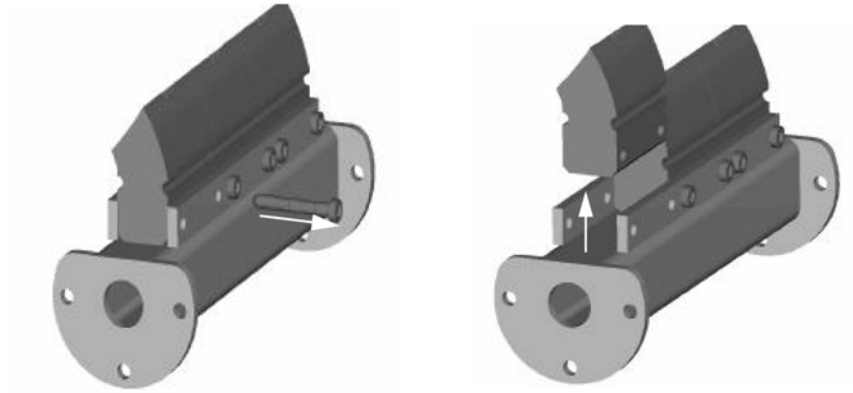


1. Before blades are worn to 100% wear line, replace blades. (You can replace blades without removing mainframe, or by removing mainframe from end weldments as shown.)



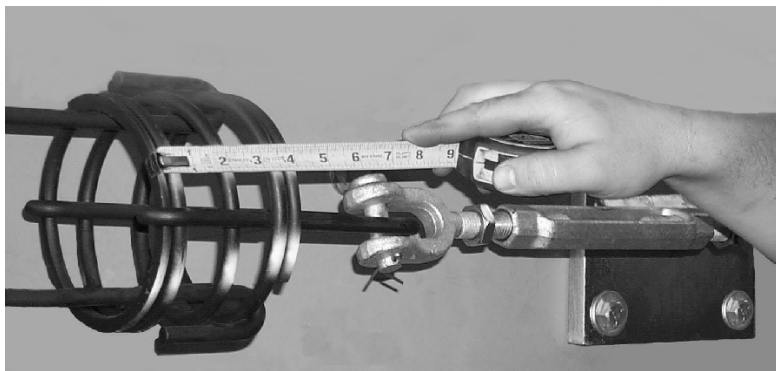
2. Extend turnbuckles.

## Changing Blades



3. Knock out pins using hammer and punch.
4. Remove blades.
5. Insert new blades and secure with pins.





6. Re-tension belt cleaner. See Table III.

**Table III. Martin® ZHD Cleaner Tensioning Chart**

<b>ZHD-800 Assy, P/N 36366-XXXX</b>	
<b>Belt Width in.(mm)</b>	<b>Final Spring length in. (mm)</b>
24 (400-599)	3.00 (76.20)
30 (600-799)	2.25 (57.15)
36 (800-999)	4.00 (101.6)
42 (1000-1199)	3.50 (88.90)
48 (1200-1399)	3.00 (76.20)
54 (1400-1599)	2.75 (69.85)
60 (1600-1799)	2.00 (50.80)
72 (1800-1999)	3.75 (95.25)
84 (2000-2199)	3.25 (82.55)
96 (2200-2400)	2.75 (69.85)

## **Part Numbers**

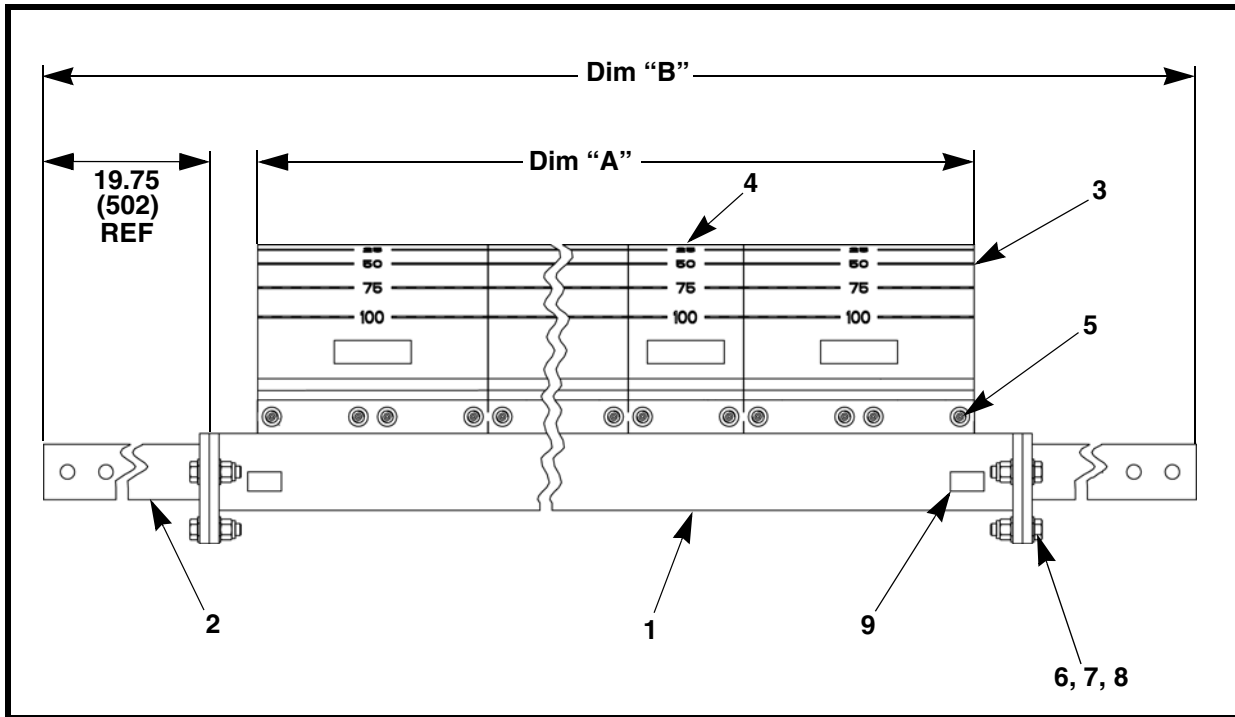
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***Martin® ZHD  
Cleaner Assembly***

**Martin® ZHD Cleaner Assembly:**  
P/N 36287-XXXXXXXXXX. See Figure 1.

***Martin® Spring  
Link Tensioner***

**Martin® Spring Link Tensioner Assembly:** P/N 35978. See Figure 2.



Item	Description	Part No.	Qty.
1	Mainframe Weldment	Table IV	1
2	Mainframe End Weldment	36286-R	2
3	Blade Assembly 12.00 Wide	Table V	Table IV
4	Blade Assembly 6.00 Wide	Table V	Table IV
5	Pin Nylon	36282	Table IV
6	Washer Flat 5/8 Narrow ZP	16814	12
7	Screw HHC 5/8-11NC X 2-1/4 ZP	34478	6
8	Nut Hex Elastic Lock 5/8-11NC ZP	22624	6
9	Label Martin Products	32238	4
10 (NS)	Martin® Link Tensioner Assembly	Table IV	1
11 (NS)	Martin® Spring Tensioner Assembly	Table IV	1
NS	Label Conveyor Products Warning	23395	2
NS	Operator's Manual	M3542	1

**Figure 1. Martin® ZHD Cleaner, P/N 36287-XXXXXXXX\***

NS = Not Shown

\*The first XX indicates belt width. The next X indicates blade type (Narrow & wide blades = Blank, or Narrow blades = V). The next XX indicates belt coverage (Standard belt width -6 in. = Blank, or 6 in. increments = XX). The next X indicates blade color (Orange = Blank, Brown = B, Green = G, Clear = C, Navy Blue = N). The next X indicates tensioner (No tensioner = Blank, Link tensioner = L, or Spring Tensioner = S). The last X indicates bearing type (Standard duty bearing = Blank, Heavy-duty bronze bearing = M).

**Table IV. Martin® ZHD Cleaner Part Numbers & Quantities**

Assembly Part No.	Dim. "A"	Dim. "B"	Part No. Item 1	Part No. Item 10	Part No. Item 11
36287-24XXXXXXXX	18.00 (457)	62.00 (1575)	36285-24	35978-S90XX	35392-ZHD
36287-30XXXXXXXX	24.00 (610)	68.00 (1727)	36285-30	35978-S90XX	35392-ZHD
36287-36XXXXXXXX	30.00 (762)	74.00 (1880)	36285-36	35978-S150XX	35392-ZHD
36287-42XXXXXXXX	36.00 (914)	80.00 (2032)	36285-42	35978-S150XX	35392-ZHD
36287-48XXXXXXXX	42.00 (1067)	86.00 (2184)	36285-48	35978-S150XX	35392-2ZHD
36287-54XXXXXXXX	48.00 (1219)	92.00 (2337)	36285-54	35978-S150XX	35392-2ZHD
36287-60XXXXXXXX	54.00 (1372)	98.00 (2489)	36285-60	35978-D90XX	35392-2ZHD
36287-72XXXXXXXX	66.00 (1676)	110.00 (2794)	36285-72	35978-D150XX	35392-2ZHD
36287-84XXXXXXXX	78.00 (1981)	122.00 (3099)	36285-84	35978-D150XX	35392-2ZHD
36287-96XXXXXXXX	90.00 (2286)	134.00 (3404)	36285-96	35978-D150XX	35392-2ZHD

Assembly Part No.	Qty Item 3	Qty Item 4	Qty Item 5
36287-24XXXXXXXX	1	1	6
36287-30XXXXXXXX	2	0	8
36287-36XXXXXXXX	2	1	10
36287-42XXXXXXXX	3	0	12
36287-48XXXXXXXX	3	1	14
36287-54XXXXXXXX	4	0	16
36287-60XXXXXXXX	4	1	18
36287-72XXXXXXXX	5	1	22
36287-84XXXXXXXX	6	1	26
36287-96XXXXXXXX	7	1	30

**Table V. Martin® ZHD Cleaner Blade**

Assembly Part No.	Part No. Item 3	Part No. Item 4	Blade Color
36287-XXXXXXXX	36281-12	36281-06	Orange
36287-XXXXXBXXX	36281-12BR	36281-06BR	Brown
36287-XXXXXGXXX	36281-12GR	36281-06GR	Green
36287-XXXXXNXXX	36281-12NB	36281-06NB	Navy Blue
36287-XXXXXCXXX	36281-12CL	36281-06CL	Clear

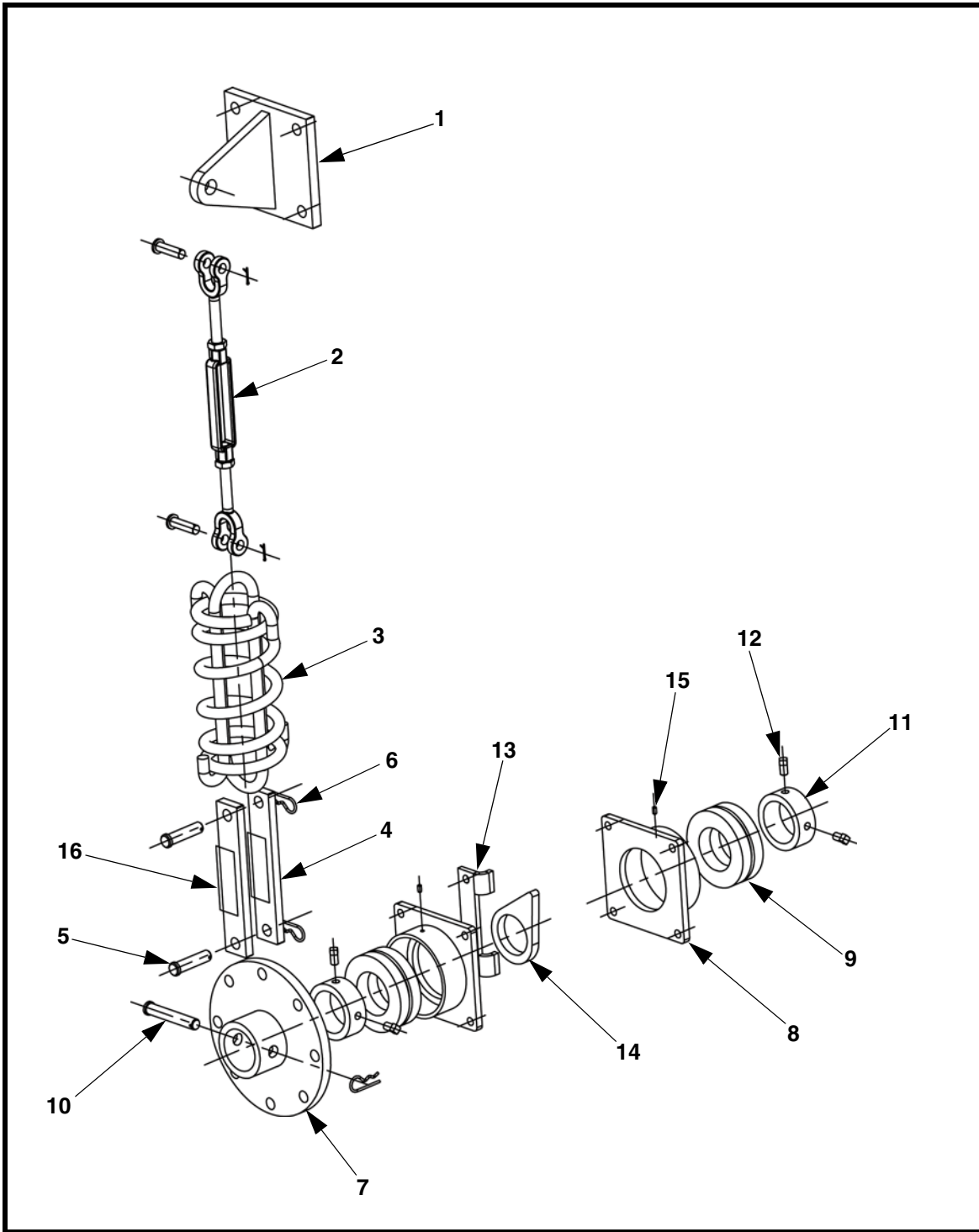


Figure 2. Martin® Spring Link Tensioner Assembly, P/N 35978-XXXXMX\* (Sheet 1 of 2)

Item	Description	Part No.	Qty Single Tensioner	Qty Dual Tensioners
1	Top Mount Weldment	35596	1	2
2	Turnbuckle Assembly	36022	1	2
3	Drawbar Extension Spring	Table VI or VII	1	2
4	Link	35956-L	2	4
5	Pin Clevis 3/4 x 3 ZP	32180-01	2	4
6	Hairpin Cotter .15 Dia. 2.69 ZP	32327	3	6
7	Wheel Weldment	35959	1	2
8	Mount Weldment with Tapped Hole	32342-H	2	2
9	Bearing Bronze	36983	2	2
10	Pin Clevis 3/4 x 4-1/2 ZP	32180-02	1	2
11	Locking Collar	32341	2	2
12	Screw SHS 1/2-13NC x 3/4 SS	22763-08	4	4
13	Link Tensioner Stop	37453	1	1
14	Link Tensioner Tab	37454	1	1
15	Screw Set HS SL Cup 1/4-20 x 1/2	36692	2	2
16	Tensioner Key (small 51mm)	35597-1	2	4

**Figure 2. Martin® Spring Link Tensioner Assembly, P/N 35978-XXXXMX\* (Sheet 2 of 2)**

The first X indicates (S) for single tensioner or (D) for dual tensioners. The next XXX indicates spring rate in lbs/in. The M indicates a heavy-duty bronze metal bearing. The last X indicates cable expander (no cable connection kit (0) or cable connection kit (C).)

**Table VI. Martin® Single Spring Link Tensioner Part Numbers**

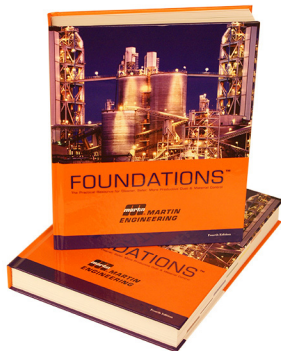
Assembly Part No.	Part No. Item 3	Item 3 Color Code
35978-S90MX	36422-1	Pink/White
35978-S150MX	36422-2	Blue/Yellow
35978-S500MX	36422-3	Green/White
35978-S750MX	36422-4	Red/Yellow

**Table VII. Martin® Dual Spring Link Tensioner Part Numbers**

Assembly Part No.	Part No. Item 3	Item 3 Color Code
35978-C-D090MX	36422-1	Pink/White
35978-C-D150MX	36422-2	Blue/Yellow
35978-C-D500MX	36422-3	Green/White
35978-C-D750MX	36422-4	Red/Yellow

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**Martin Engineering Australia Pty Ltd.**  
20 Ern Harley Dr - Burleigh Heads, QLD, 4220 - Australia  
1300 627 364  
[www.martin-eng.com.au](http://www.martin-eng.com.au)

