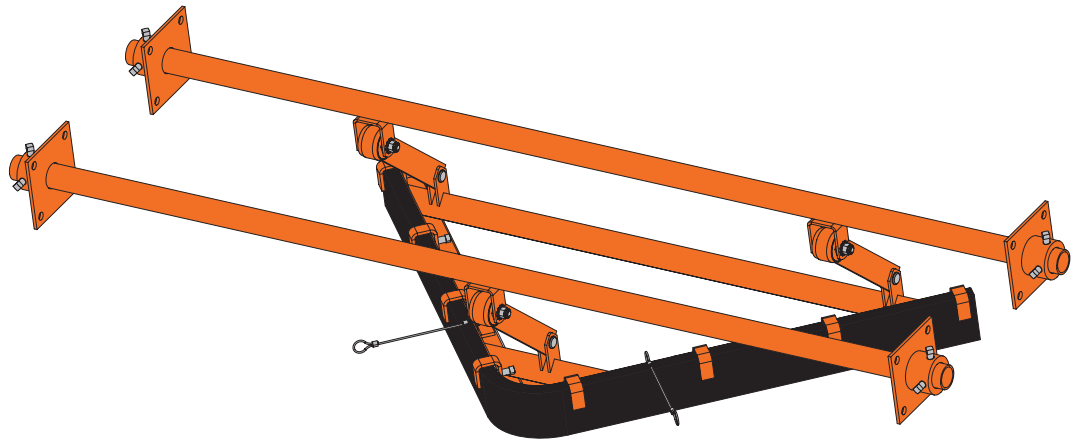


***martin***®

***Martin***® ***Torsion***  
***V-Plow***



***Operator's Manual***  
***M3177***

# 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

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## General

The Martin<sup>®</sup> Torsion V-Plow floats on the inside surface of a conveyor belt to effectively remove stray material. Mounted over the belt with Martin<sup>®</sup> Torsion Arm Suspension, the v-plow rides over the belt, rising and falling with changes in belt tension and travel. The self-adjusting design provides effective cleaning in all states of blade wear.

The Martin<sup>®</sup> Torsion V-Plow fits belts from 18 to 96 in. (400 to 2400 mm) wide. Specifications are shown in Table I.

**Table I. Martin<sup>®</sup> Torsion V-Plow Specifications**

<b>Cleaning Edge Material</b>	60-Durometer Rubber
	90-Durometer Urethane
<b>Blade Dimensions</b>	1 x 4 in. (25 x 102 mm)
<b>Operating Temperature</b>	-20 to 160°F (-29 to 71°C)

## 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 and Health Administration (OSHA), 32nd Floor, Room 3244, 230 South Dearborn Street, Chicago, IL 60604.

## Safety

All safety rules defined in the above documents and all owner/employer safety rules must be strictly followed when working on the Martin<sup>®</sup> Torsion V-Plow.

## Materials required

Only standard hand tools are needed to install this equipment.

## Before Installing V-Plow

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### 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 container 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® Torsion V-Plow from shipping container. Equipment in container should include the following:
  - Martin® Torsion V-Plow Assembly.
  - Two Conveyor Products Warning Labels, P/N 23395.
3. If anything is missing, contact Martin Engineering or representative.



### ⚠ WARNING

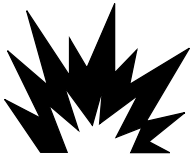
Before installing equipment, turn off and lock out/tag out energy source to conveyor and conveyor accessories.

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

### ⚠ WARNING

If equipment will be installed in an enclosed area, gas level or dust content must be tested before using a cutting torch or welding. Using a cutting torch or welding in an area with gas or dust may cause an explosion.

5. If using a cutting torch or welding, test atmosphere for gas level or dust content. Cover conveyor belt with a fire-retardant cover.



### NOTE

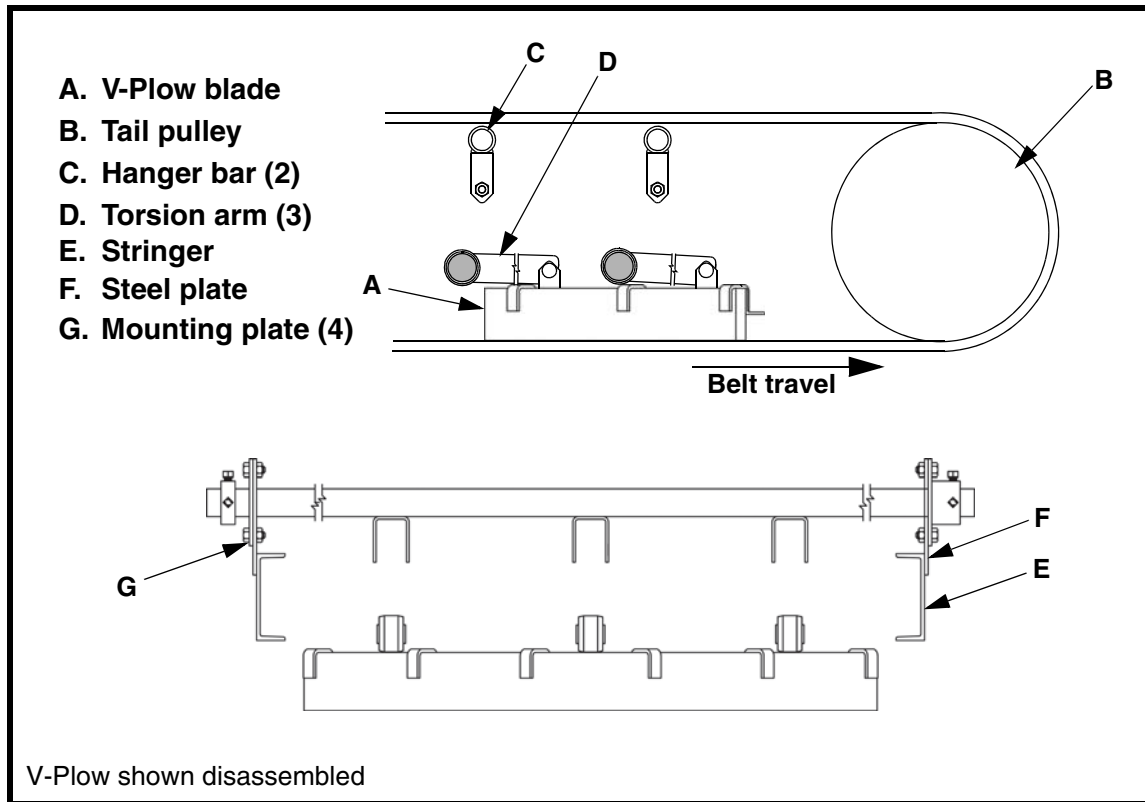
The side of the conveyor belt that the hub mount tensioner will be located on is referred to as the "operator side." The other side of the belt is referred to as the "far side."

6. Determine which side of conveyor belt is easiest to access. Locate tensioner on the most accessible side of the belt.

## IMPORTANT

Read entire section before beginning work.

1. Place v-plow blade (A, Figure 1) on return side of belt before tail pulley (B), with the “V” pointing away from the tail pulley.

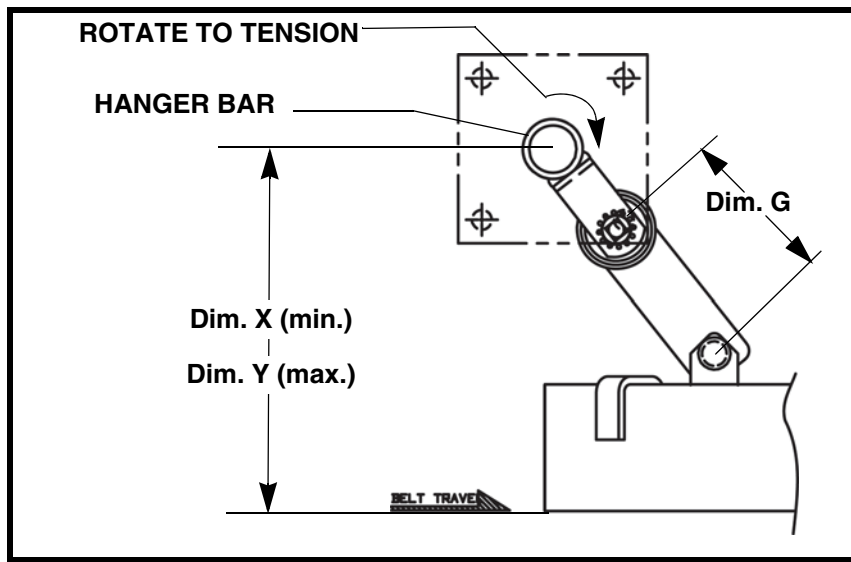


**Figure 1. Locating V-Plow on Belt**

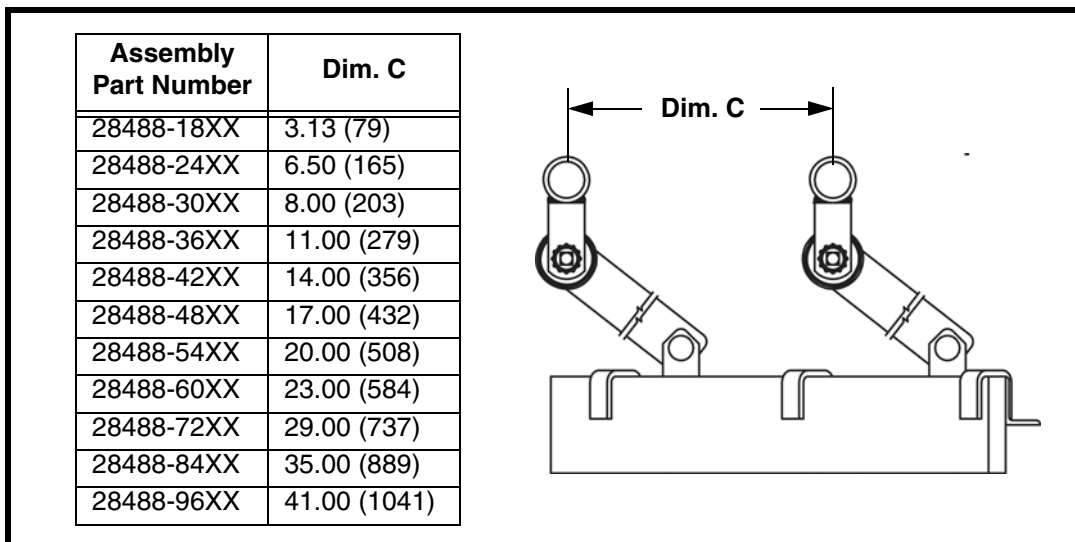
2. Locate hanger bars (C) according to Table II and Figures 2 and 3. For example, if using torsion arm (D) P/N 28495-05, arm length (A) is 6.50 in. (165 mm) so mount hanger bars between 13.12 in. (333 mm) (B) and 14.37 in. (365 mm) above belt.
3. After determining how far above belt to locate hanger bars, measure distance between hanger bars according to the chart in Figure 3. Mark location of hanger bars on stringers.
4. Determine how to mount hanger bars:
  - a. If stringers (E) are too low to accommodate hanger bars in proper position, bolt or weld four 1/2-in. (13-mm) thick steel plates (F) to the tops of the stringers.
  - b. If stringers are high enough to accommodate hanger bars in proper position, fasten mounting plates (G) for hanger bars directly onto stringers.

**Table II. Martin® Torsion V-Plow Hanger Bar Locations—in. (mm)  
(Refer to Figure 2)**

Martin® Torsion V-Plow Assembly Part No.	Torsion Arm Part No.	For arm length G, locate hanger bar between X and Y		
		Dim. G	Dim. X Minimum	Dim. Y Maximum
28488-XXX	28495-01	10.25 (260)	16.87 (429)	18.12 (460)
28488-XXX1	28495-03	2.50 (64)	9.12 (232)	10.37 (263)
28488-XXX2	28495-02	6.00 (152)	12.62 (321)	13.87 (352)
28488-XXX3	28495-09	9.00 (228)	15.62 (397)	16.87 (429)
28488-XXX4	28495-04	5.00 (127)	11.62 (295)	12.87 (327)
28488-XXX5	28495-05	6.50 (165)	13.12 (333)	14.37 (365)
28488-XXX6	28495-06	8.00 (203)	14.62 (371)	15.87 (403)
28488-XXX7	28495-08	11.37 (289)	17.99 (457)	19.24 (489)



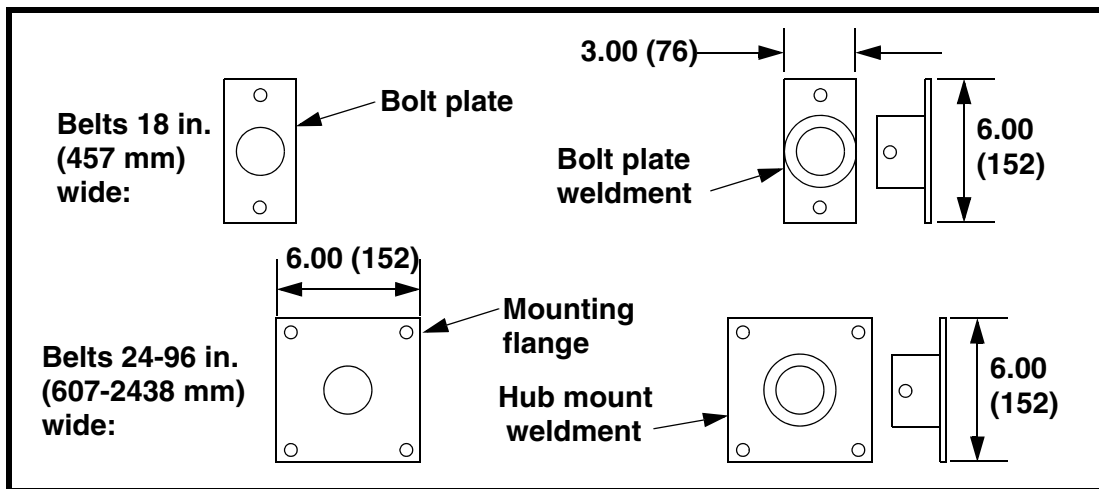
**Figure 2. Martin® Torsion V-Plow Hanger Bar Locations—  
Untensioned Detail (Refer to Table II)**



**Figure 3. Distance Between Hanger Bars**



5. See Figure 4. Mark location of mounting holes as follows:
  - a. For 18-in. (457-mm) wide belts, use a bolt plate weldment as a template and mark location of mounting holes on stringers or steel plates on both sides of belt for each hanger bar.
  - b. For 24 through 96-in. (607 through 2438-mm) wide belts, use a hub mount weldment as a template to mark the location of mounting holes on stringers or steel plates on both sides of the belt for each hanger bar.

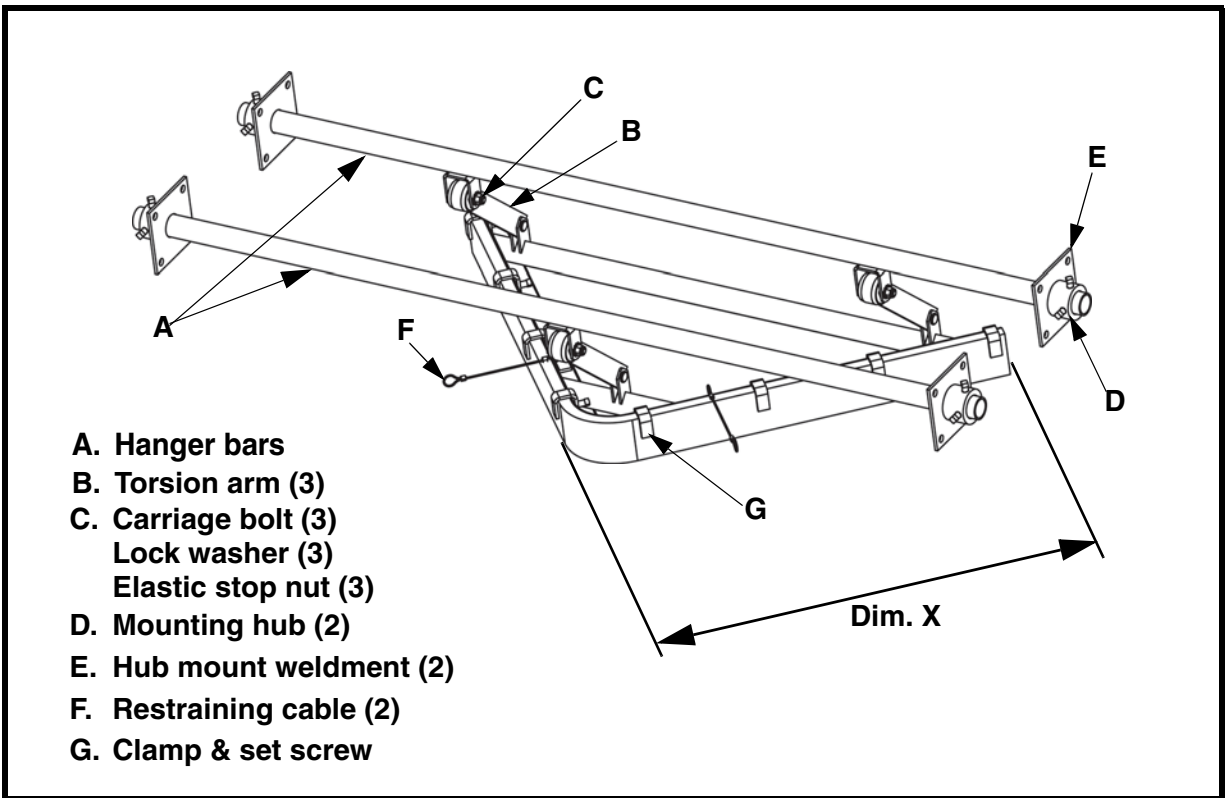


**Figure 4. Martin® Torsion V-Plow Mounting Plates**

**NOTE**

**For easier maintenance, Martin Engineering recommends bolting rather than welding mounting plates to stringers or steel plates.**

6. Bolt or weld mounting plates to stringers or steel plates as follows:
  - a. If bolting mounting plates to stringers or steel plates, do the following:
    - (1) Drill or cut four 2-1/2-in. (64-mm) holes for the two hanger bars.
    - (2) Drill or cut 9/16-in. (14-mm) holes for mounting screws for each mounting plate.
    - (3) Remove burrs and sharp edges.
    - (4) Install bolt plate weldments or hub mount weldments onto stringer or steel plates on operator side of belt with hex head cap screws, flat washers, compression washers, and hex nuts.
    - (5) Install bolt plate or mounting flange onto stringer or steel plates on far side of belt with hex head cap screws, flat washers, compression washers, and hex nuts.
  - b. If welding mounting plates to stringers or steel plates, do the following:
    - (1) Drill or cut four 2-1/2-in. (64-mm) holes for the two hanger bars.
    - (2) Position bolt plate weldments or hub mount weldments onto the stringer or steel plates on operator side of belt.
    - (3) Position bolt plate or mounting flange onto stringer or steel plates on far side of the belt.
    - (4) Weld mounting plates onto stringers or steel plates. Make a continuous weld around entire mounting plate.



**Figure 5. Installing Martin® Torsion V-Plow**

7. Insert hanger bars (A, Figure 5) through mounting holes. Attach each torsion arm (B) to the hanger bars with three carriage bolts, lock washers, and elastic stop nuts (C) loosely tightened.
8. Center blade on belt. Slide a mounting hub (D) onto the far side of each hanger bar, and up against bolt plate. Tighten the two set screws in each mounting hub.
9. See Figure 6. Push blade away from tail pulley until hanger bar tabs and torsion arm form a straight line as shown. Tighten elastic stop nuts to  $95 \pm 5$  ft-lb ( $13 \pm .7$  kgm)
10. Using a pipe wrench, rotate hanger bars in direction shown in Figure 6 until hanger bar tabs are at a  $90^\circ$  angle to the belt, and the blade is tight against belt but is not changing belt line. Make sure blade contacts belt evenly at all three corners.
11. Lock hanger bars in position by tightening the two set screws in each hub mount weldment (E, Figure 5).

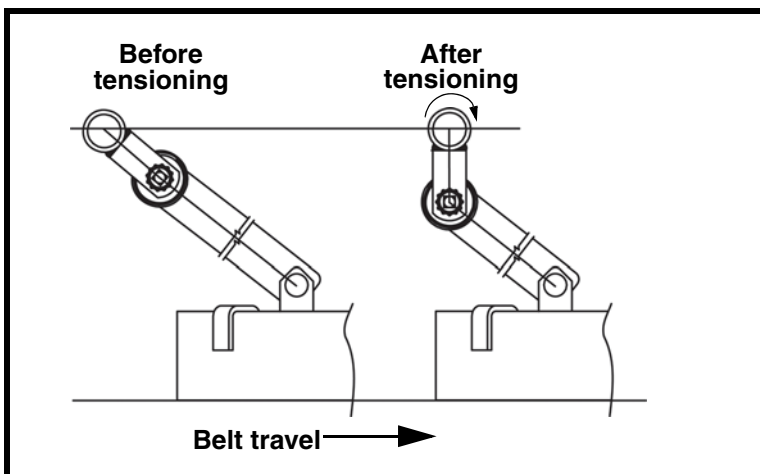


Figure 6. Tensioning Martin® Torsion V-Plow

**⚠ CAUTION**

Restraining cables must be installed to prevent plow from being carried into pulley if mount brackets should fail. Failure to do so could severely damage plow, pulley, and belt. Do not install restraining cables on stringers that are between the plow and tail pulley.

12. Attach two restraining cables (F, Figure 5) to the conveyor stringers or steel plates as shown in Table III. Leave no more than 2 in. (51 mm) of slack in cables.

**Table III. Restraining Cables Minimum Mounting Distance From Face of Tail Pulley**

Assembly Part No.	Figure 5 Dim. X in. (mm)	Distance From Tail Pulley in. (mm)
28488-18XX	13.00 (330)	31.00 (787)
28488-24XX	20.50 (521)	38.50 (978)
28488-30XX	24.25 (616)	42.25 (1073)
28488-36XX	28.50 (724)	46.50 (1181)
28488-42XX	32.75 (832)	50.75 (1289)
28488-48XX	37.00 (940)	55.00 (1397)
28488-54XX	41.13 (1070)	59.13 (1502)
28488-60XX	45.25 (1149)	63.25 (1607)
28488-72XX	54.00 (1372)	72.00 (1829)
28488-84XX	62.50 (1588)	80.50 (2045)
28488-96XX	71.00 (1803)	89.00 (2261)

## After Installing V-Plow

### IMPORTANT

Read entire section before beginning work.

1. Thoroughly wipe chute walls clean above Martin® Torsion V-Plow on both sides of chute. Place a Conveyor Products Warning Label (P/N 23395) on each chute wall visible to belt 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.

2. Remove all tools and fire-retardant cover from installation area and conveyor belt.

### DANGER

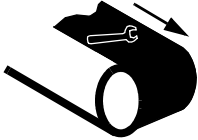
Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

3. Turn on conveyor belt for 1 hour.

### WARNING

Before adjusting belt cleaner, turn off and lock out/tag out energy source to conveyor belt and conveyor accessories.

4. After 1 hour of operation, turn off and lock out/tag out energy source according to ANSI standards (see “References”).
5. Make sure all fasteners are tight. Tighten if necessary.
6. Inspect v-plow for wear. (A small amount of “break-in” wear may be found. This will stop once blade wears to conveyor belt contour.)
7. Make sure plow is pushing material off edge of belt efficiently, leaving minimal material on belt.
8. If v-plow “chatters” on belt, adjust torsion arms or tension.
9. If excessive wear, material buildup, or some other problem exists, see “Troubleshooting/Installation Checklist.”



## NOTE

Maintenance inspection should be performed no less than monthly. Your application may require more frequent maintenance inspections.

## IMPORTANT

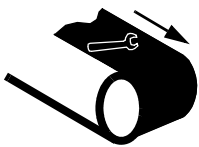
Read entire section before beginning work.



## ⚠ WARNING

Before servicing v-plow, turn off and lock out/tag out energy source to conveyor belt and conveyor accessories.

1. Turn off and lock out/tag out energy source according ANSI standards (see “References”).
2. Make sure all fasteners are tight. Tighten if necessary.
3. Make sure blade is still properly tensioned against belt. If blade is not cleaning effectively, adjust tension.
4. Check the cleaning edge for wear. If it is worn almost to the frame weldment, replace as follows:
  - a. Remove the square head set screws and C-clamps holding the cleaning edge against the frame weldment.
  - b. Remove the old cleaning edge.
  - c. Install a new cleaning edge and secure with C-clamps and square head set screws.
5. Check restraining cables for wear. Make sure cables are securely attached to stringers or steel plates.
6. Wipe all labels clean. If labels are not readable, contact Martin Engineering or representative for replacements.



## ⚠ WARNING

Failure to remove tools from maintenance 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/Installation Checklist

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**Troubleshooting** If you are experiencing problems with Martin® Torsion V-Plow, see below.

Symptom	Corrective Action
High blade wear rate	Tension set too high. Reduce tension.
Insufficient cleaning and carryback, or blade “chatter”	Tension set too low or too high. Increase or decrease tension. Check blade for excessive wear and replace if necessary.

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

Installation Checklist
✓ Hanger bars are located and positioned according to Table II.
✓ V-Plow is centered on belt.
✓ Carriage bolts on torsion arms are torqued to 95 ± 5 ft-lb (13 ± .7 kgm).
✓ Blade contacts belt evenly at all three corners.

# Part Numbers

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This section provides product names and corresponding part numbers for Martin® Torsion V-Plow and related equipment. Please reference part numbers when ordering parts.

## ***Martin® Torsion V-Plow Assembly***

**Martin® Torsion V-Plow Assembly:** P/N 28488-XXXX. See Figure 7.

## ***Replacement blades***

**Replacement Rubber Blade:** P/N 100066.

**Replacement Urethane Blade:** P/N 31134-XXXU. XXX indicates belt width in inches.

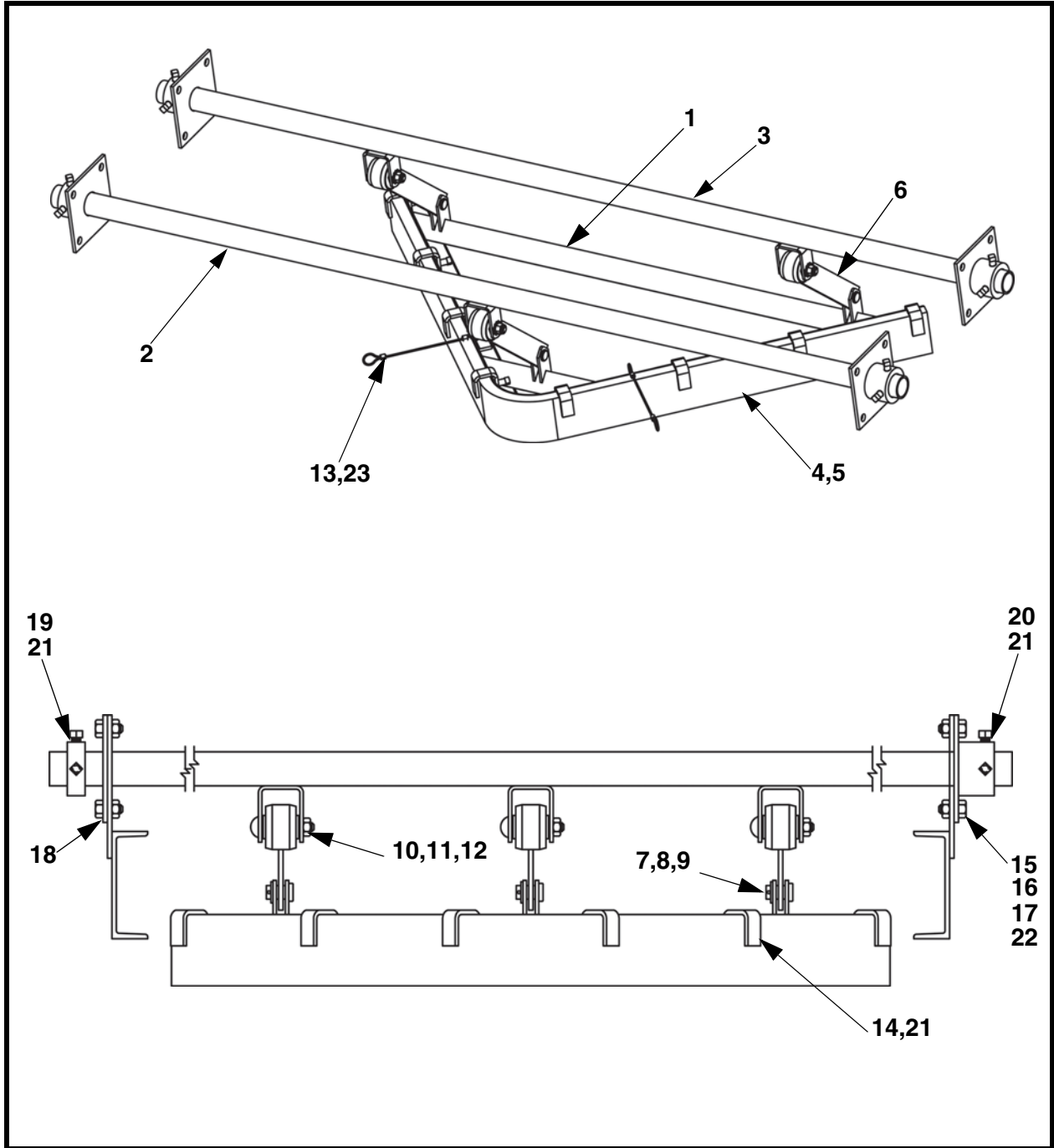


Figure 7. Martin® Torsion V-Plow Assembly, P/N 28488-XXXX\* (Sheet 1 of 2)



Item	Description	Part No.	Qty
1	Frame Weldment	Table IV	1
2	Hanger Front	Table IV	1
3	Hanger Rear	Table IV	1
4	Blade Urethane	31134-XXXU	1
5	Blade Rubber	100066	Table IV
6	Arm Torsion	Table VI	3
7	Clevis Pin	29066	3
8	Cotter Pin	16578	3
9	13/16" I.D. Flat Washer	16223	3
10	1/2"-13NC Elastic Lock Nut	24307	3
11	1/2" Lockwasher	21569	3
12	1/2"-13NC Carriage Bolt	21239	3
13	Clip Cable 1/8	23481	4
14	U-Clamp STD	31132	Table IV
15	1/2" Compression Washer	24310	Table IV
16	1/2"-13NC x 2" Lg. HHC Screw	24308	Table IV
17	1/2"-13NC Hex Nut	17151	Table IV
18	Flange Mounting Plate	Table V	2
19	Collar Locking	16845	2
20	Hub Mount Weldment	Table V	2
21	Screw SHS 1/2-13NC x 1	22763-03	Table IV
22	Washer Flat 5/8	23343	Table IV
23	Wire Rope 1/8 SS	100107	6
24 (NS)	Operator's Manual	M3177	1
25 (NS)	Martin® Product Label	32238	1
Fig. 8	Conveyor Products Warning Label	23395	2
Fig. 9	Flying Objects Warning Label	38227	2

**Figure 7. Martin® Torsion V-Plow Assembly, P/N 28488-XXXX\* (Sheet 2 of 2)**

\*First XX indicates belt width in inches; third X indicates blade material (R=Rubber; U=Urethane); last X indicates Martin® Torsion V-Plow Arm length (see Table V).

†XX equals belt width in inches.

NS = Not shown.

Table IV. Martin® Torsion V-Plow Item Part Numbers and Quantities

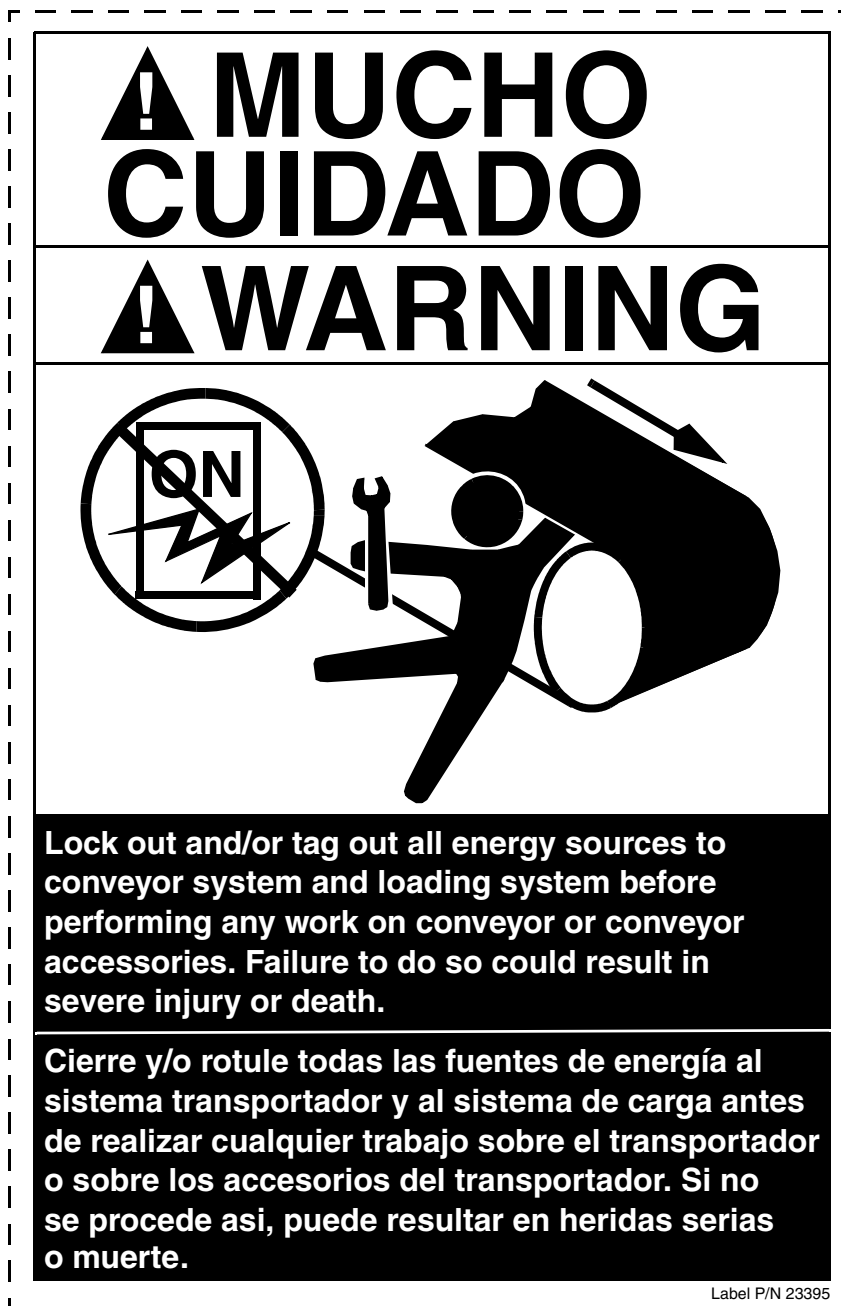
Assembly Part No.	Blade Length in. (mm)	Item 1 Part No.	Item 2 Part No.	Item 3 Part No.	Item 5 Qty	Item 14 Qty	Items 15,16, 17,22 Qty	Item 21 Qty
28488-18XX	27.00 (686)	25658-18	28493-24	28494-18	2' 1"	4	8	12
28488-24XX	38.00 (965)	25658-24	28493-24	28494-24	3' 2"	4	16	12
28488-30XX	45.50 (1156)	25658-30	28493-36	28494-30	3' 9"	6	16	14
28488-36XX	54.00 (1372)	25658-36	28493-36	28494-36	4' 6"	6	16	14
28488-42XX	63.00 (1600)	25658-42	28493-48	28494-42	5' 3"	8	16	16
28488-48XX	71.00 (1803)	25658-48	28493-48	28494-48	5' 11"	8	16	16
28488-54XX	79.50 (2019)	25658-54	28493-54	28494-54	6' 8"	10	16	18
28488-60XX	87.50 (2223)	25658-60	28493-60	28494-60	7' 4"	10	16	18
28488-66XX	96.50 (2451)	25658-66	28493-66	28494-66	8' 1"	12	16	20
28488-72XX	105.00 (2667)	25658-72	28493-72	28494-72	8' 9"	12	16	20
28488-78XX	114.00 (2896)	25658-78	28493-72	28494-72	9' 6"	14	16	22
28488-84XX	123.00 (3124)	25658-84	28493-84	28494-84	10' 3"	14	16	22
28488-96XX	141.00 (3581)	25658-96	28493-96	28494-96	11' 9"	16	16	24

Table V. Martin® Torsion V-Plow Mounting Plate Part Numbers

Belt Width in. (mm)	Item 18 Part No.	Item 20 Part No.
18.00 (400-500)	30208	30209
24.00-96.00 (500-2400)	16628	28623

Table VI. Martin® Torsion Arm Part Numbers and Lengths

Assembly Part No.	Arm Length in. (mm)	Torsion Arm Part No.
28488-XXX	10.25 (260)	28495-01
28488-XXX2	6.00 (152)	28495-02
28488-XXX1	2.50 (64)	28495-03
28488-XXX4	5.00 (127)	28495-04
28488-XXX5	6.50 (165)	28495-05
28488-XXX6	8.00 (203)	28495-06
28488-XXX7	11.37 (289)	28495-08
28488-XXX3	9.00 (228)	28495-09



**Figure 8. Conveyor Products Warning Label, P/N 23395**



Figure 9. Flying Objects Warning Label, P/N 38227