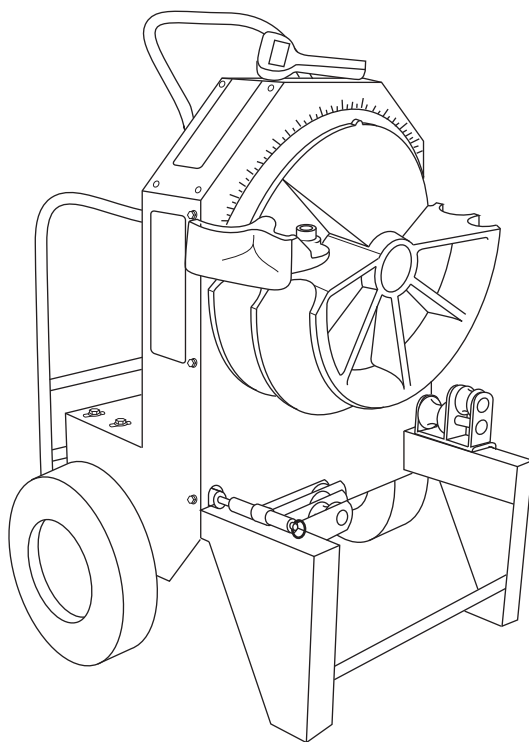


INSTRUCTION MANUAL



GREENLEE®

A Textron Company



555® **Electric Bender**



Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

Register this product at www.greenlee.com

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Description

The Greenlee 555® Electric Bender is intended to bend 1/2" to 2" conduit and pipe.

Bending shoe groups are available to accommodate the following types: Electrical Metallic Tubing, Intermediate Metallic Conduit, Rigid Conduit, PVC-Coated Rigid Conduit, and Schedule 40 Pipe. The shoe groups are shown in the “Bending Attachment Groups” section of this manual.

In addition to the 555, this manual also applies to the following models:

- 555E (includes accessories for bending Electrical Metallic Tubing)
- 555I (includes accessories for bending Intermediate Metallic Conduit)
- 555R (includes accessories for bending Rigid Conduit and Schedule 40 Pipe)

Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This instruction manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

Purpose of this Manual

This manual is intended to familiarize all personnel with the safe operation and maintenance procedures for the Greenlee 555® Electric Bender, with Serial Code AAJ.

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge at www.greenlee.com.



Do not discard this product or throw away!

For recycling information, go to www.greenlee.com.

All specifications are nominal and may change as design improvements occur. Greenlee Textron Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

555 is a registered trademark of Greenlee Textron Inc.

Mobil is a registered trademark of Mobil Oil Corporation.

KEEP THIS MANUAL

IMPORTANT SAFETY INFORMATION



SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

⚠ DANGER

Immediate hazards which, if not avoided, **WILL** result in severe injury or death.

⚠ WARNING

Hazards which, if not avoided, **COULD** result in severe injury or death.

⚠ CAUTION

Hazards or unsafe practices which, if not avoided, **MAY** result in injury or property damage.



⚠ WARNING

Electric shock hazard:

- Connect the power cord to a 120 volt, 20 amp receptacle on a ground fault protected circuit only. See Grounding Instructions.
- Do not modify the power cord or plug.
- Inspect the power cord before use. Repair or replace the cord if damaged.
- Disconnect from power before servicing.

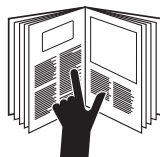
Failure to observe this warning could result in severe injury or death.



⚠ WARNING

- Do not expose to rain.
- Do not use in wet or damp locations.

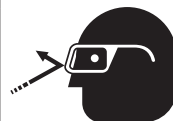
Failure to observe these warnings could result in severe injury or death.



⚠ DANGER

Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

Failure to observe this warning will result in severe injury or death.



⚠ WARNING

Wear eye protection when operating or servicing this tool.

Failure to wear eye protection could result in serious eye injury from flying debris.



⚠ DANGER

Do not use this tool in a hazardous environment. Hazards include flammable liquids, gases, or other materials. Using this tool in a hazardous environment can result in a fire or explosion.

Failure to observe this warning will result in severe injury or death.




⚠ WARNING


Do not remove guards.

Failure to observe this warning could result in severe injury or death.

IMPORTANT SAFETY INFORMATION

	⚠ WARNING
	<p>Extension cords:</p> <ul style="list-style-type: none"> Use only three-wire, 12-gauge extension cords that have three-prong grounding-type plugs and three-hole receptacles that accept the tool's plug. Do not use extension cords that are longer than 30 m (100'). Repair or replace damaged extension cords. <p>Failure to observe these warnings could result in severe injury or death.</p>

⚠ WARNING
<p>Make sure that the handle is properly installed and secured with the safety spring clips and snap pins before lifting or moving the bender. An improperly installed handle could allow the bender to fall, injuring nearby personnel.</p> <p>Failure to observe this warning could result in severe injury or death.</p>


	⚠ WARNING
	<p>Pinch points:</p> <p>Keep hands away from bending shoe, rollers and conduit when bender is in use.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

⚠ WARNING
<p>Unplug the bender before changing accessories. Accidental start-up could result in serious injury.</p>

⚠ CAUTION
<ul style="list-style-type: none"> Conduit moves rapidly as it is bent. The path of the conduit must be clear of obstructions. Be sure clearance is adequate before starting the bend. Do not operate the bender while wearing loose clothing. Loose clothing can get caught in moving parts. Inspect the bender before use. Replace worn, damaged or missing parts with Greenlee replacement parts. A damaged or improperly assembled component could break and strike nearby personnel. Some bender parts and accessories are heavy and may require more than one person to lift and assemble. Use this tool for the manufacturer's intended purpose only. Use other than that which is instructed in this manual can result in injury or property damage. <p>Failure to observe these precautions may result in injury or property damage.</p>

Note: Keep all decals clean and legible, and replace when necessary.

Grounding Instructions

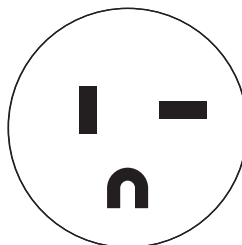
	<p>⚠ WARNING</p>
	<p>Electric shock hazard:</p> <ul style="list-style-type: none"> • Do not modify the plug provided with the tool. • Connect this tool to a grounded receptacle on a 20 amp ground fault protected circuit. <p>Failure to observe these warning could result in severe injury or death.</p>

This tool must be grounded. In the event of a malfunction or breakdown, an electrical ground provides a path of least resistance for the electric current. This path of least resistance is intended to reduce the risk of electric shock.

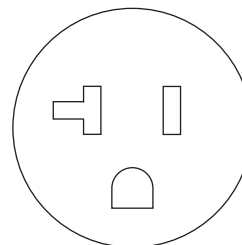
This tool's electric cord has a grounding conductor and a grounding plug as shown. Do not modify the plug. Connect the plug to a corresponding GFCI-protected receptacle that is properly installed and grounded in accordance with all national and local codes and ordinances.

Do not use an adapter.

NEMA 5-20

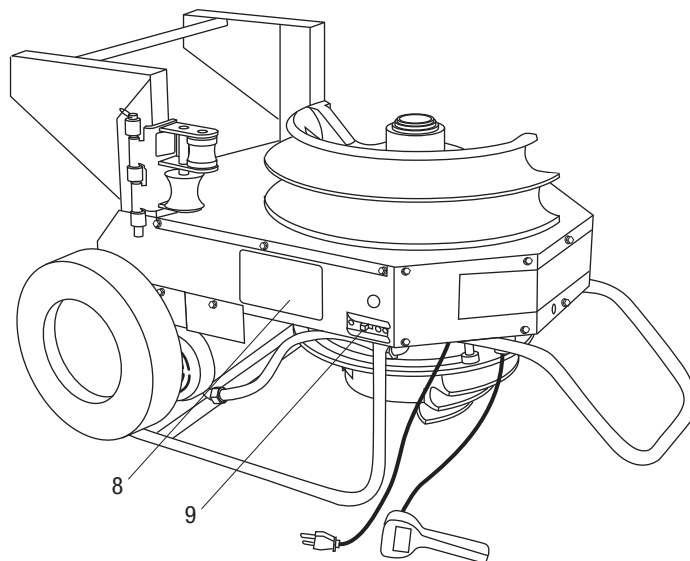
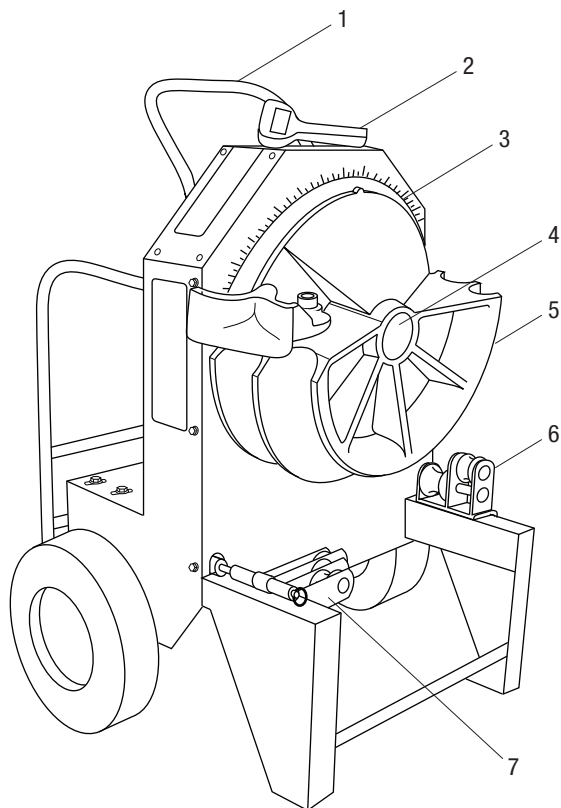


Plug



Receptacle

Identification



555R Electric Bender (shown)

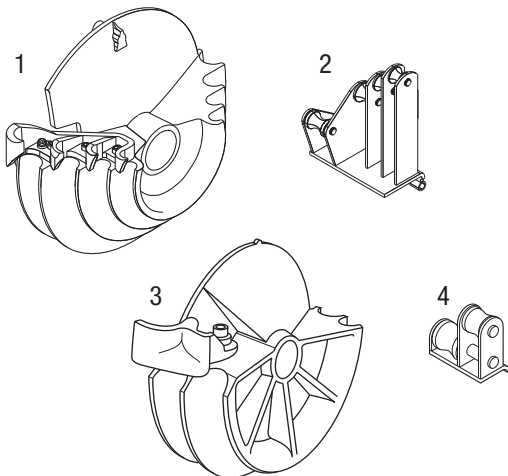
- | | |
|-----------------|--|
| 1. Handle | 6. 1-1/2" to 2" Roller Support |
| 2. Pendant | 7. 1/2" to 1-1/4" Roller Support (in storage position) |
| 3. Protractor | 8. Bending Instructions Decal |
| 4. Main Shaft | 9. Circuit Breaker (ON/OFF switch) |
| 5. Bending Shoe | |

Specifications

Height	1118 mm (44")
Width	724 mm (28.5")
Depth	521 mm (20.5")
Mass/Weight (bender without shoes or roller supports).....	126 kg (278 lb)
Power Supply	120 VAC, 20 amp GFCI-protected receptacle
Operating Conditions	
Temperature	-20 °C to 49 °C (-5 °F to 120 °F)
Relative Humidity	0% to 98%
Capacity	1/2" to 2" conduit, schedule 40 pipe

Bending Attachment Groups

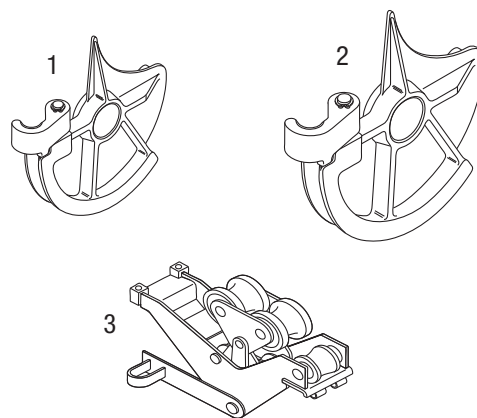
RIGID



28007: 1/2" to 1-1/4" IMC
1/2" to 2" Rigid Steel
1/2" to 2" Schedule 40 Pipe

Key	UPC No. 78-3310-	Description
1	00571	Bending Shoe for 1/2" to 1-1/4"
2	00936	Roller Support Unit for 1/2" to 1-1/4"
3	17937	Bending Shoe for 1-1/2" to 2"
4	17984	Roller Support Unit for 1-1/2" to 2"

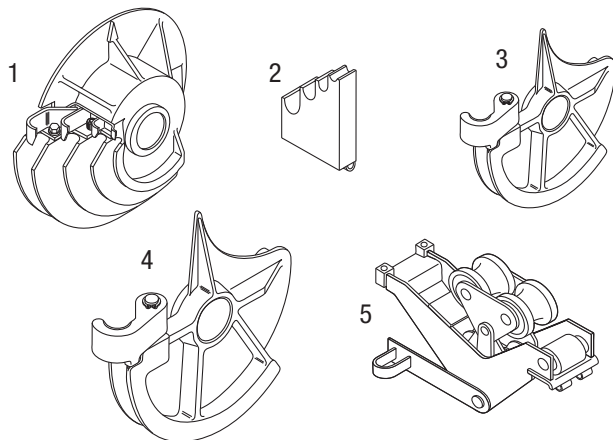
IMC



26330: 1-1/2" to 2" IMC

Key	UPC No. 78-3310-	Description
1	25263	Bending Shoe for 1-1/2"
2	25268	Bending Shoe for 2"
3	25273	Roller Support Unit for 1-1/2" to 2"
	23818	Storage Box

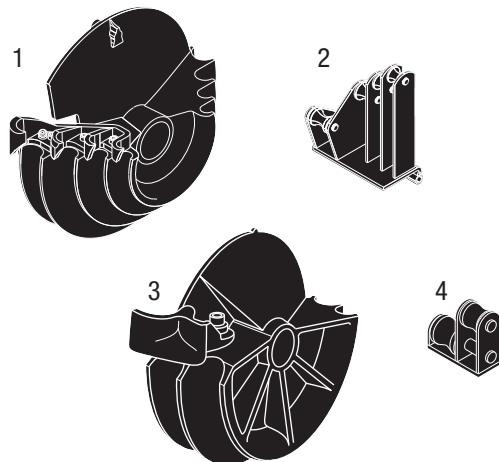
EMT



23802: 1/2" to 2" EMT

Key	UPC No. 78-3310-	Description
1	17944	Bending Shoe for 1/2" to 1-1/4"
2	17986	Roller Support Unit for 1/2" to 1-1/4"
3	23499	Bending Shoe for 1-1/2"
4	23505	Bending Shoe for 2"
5	23541	Roller Support Unit for 1-1/2" to 2"
	23818	Storage Box

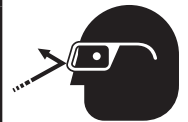
PVC-COATED RIGID



37279: 1-1/2" to 2" 40 Mil PVC-Coated Rigid

Key	UPC No. 78-3310-	Description
1	00573	Bending Shoe for 1/2" to 1-1/4"
2	00946	Roller Support Unit for 1/2" to 1-1/4"
3	37281	Bending Shoe for 1-1/2" to 2"
4	37282	Roller Support Unit for 1-1/2" to 2"
	23818	Storage Box

Setup

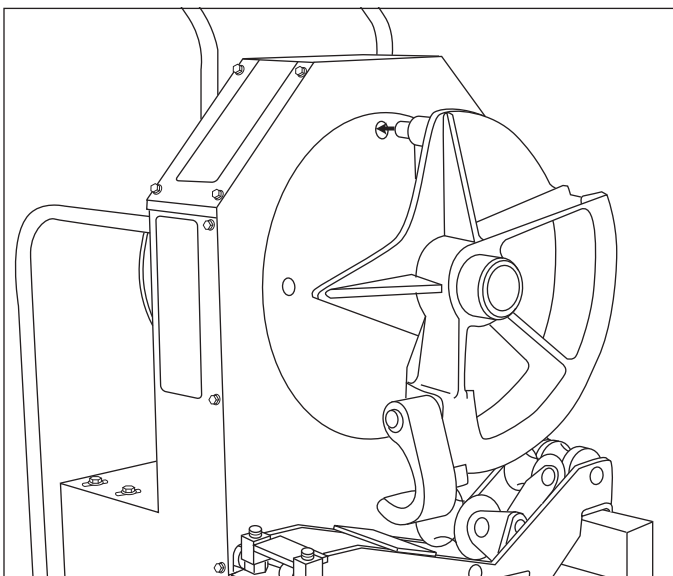
	<p align="center">⚠ WARNING</p> <p>Wear eye protection when operating or servicing this tool.</p> <p>Failure to wear eye protection could result in serious eye injury from flying debris.</p>
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<p align="center">⚠ WARNING</p> <p>Unplug the bender before changing accessories. Accidental start-up could result in serious injury.</p>
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1. Slide the appropriate bending shoe onto the shaft of the main sprocket, as shown. Align the four drive studs on the back of the shoe with the four holes in the main sprocket.

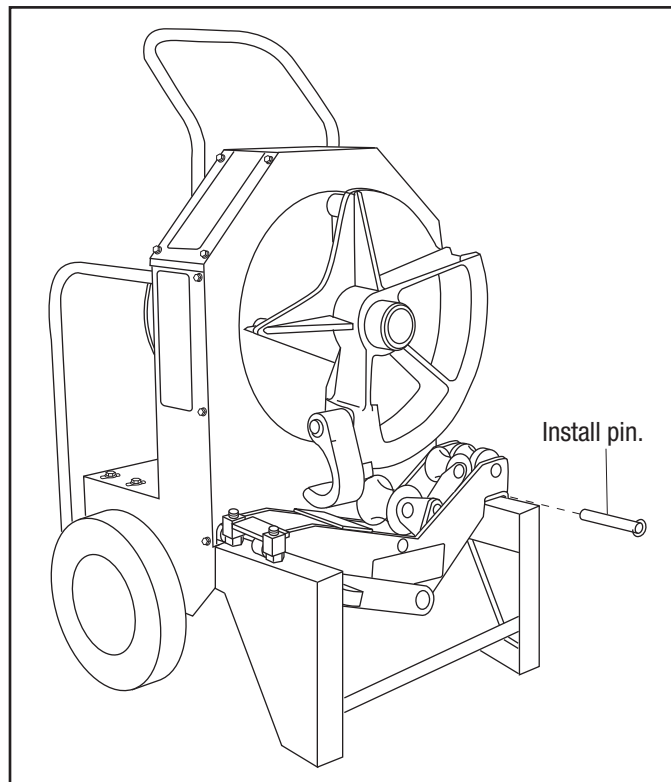
Note: 1-1/2" and 2" EMT and IMC bending shoes have only three drive studs.

Installing a Bending Shoe



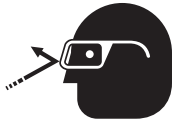
2. Mount the appropriate support unit onto the leg of the bender and install the hinge pin, as shown.


Roller Support Unit Installed



3. Mark the conduit. See the decals on the bender or the Additional Bending Instructions section of this manual.
4. Place the bender in either the vertical or horizontal bending position.

Operation

	<p align="center">⚠ WARNING</p> <p>Wear eye protection when operating or servicing this tool.</p> <p>Failure to wear eye protection could result in serious eye injury from flying debris.</p>
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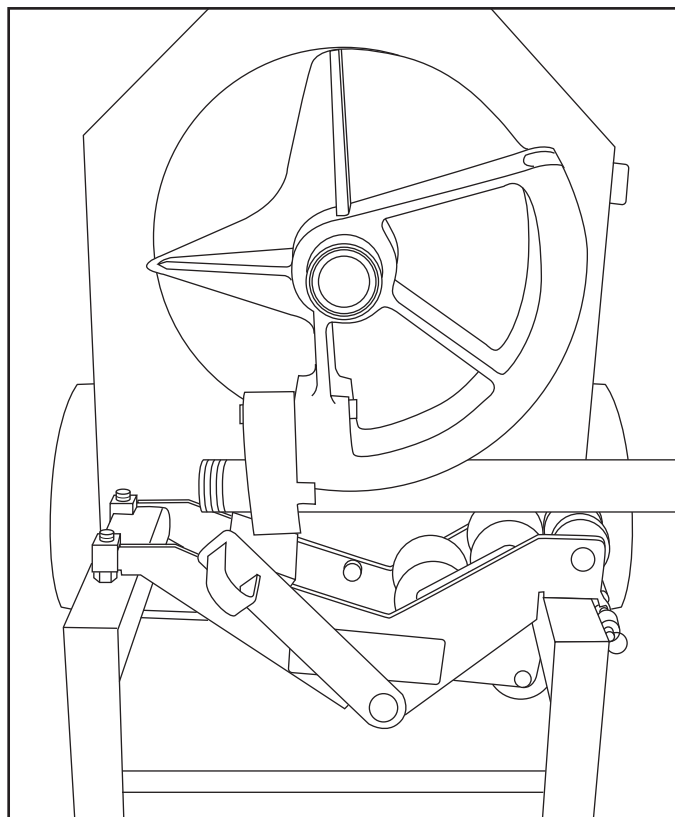
	<p align="center">⚠ WARNING</p> <p>Pinch points:</p> <p>Keep hands away from bending shoe, rollers and conduit when bender is in use.</p> <p>Failure to observe this warning could result in severe injury or death.</p>
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<p align="center">⚠ WARNING</p> <p>Do not operate the bender while wearing loose clothing. Loose clothing can get caught in moving parts.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

BENDING CONDUIT

1. Plug the cord into an appropriate receptacle. See Grounding Instructions.
2. Press BEND or UNLOAD until the shoe is 5° to 10° before the 0° starting point.
3. Load the conduit so that the bending mark is aligned with the front edge of the shoe hook, as illustrated.

Loading the Conduit



4. See the instruction decal for the appropriate bend angle.

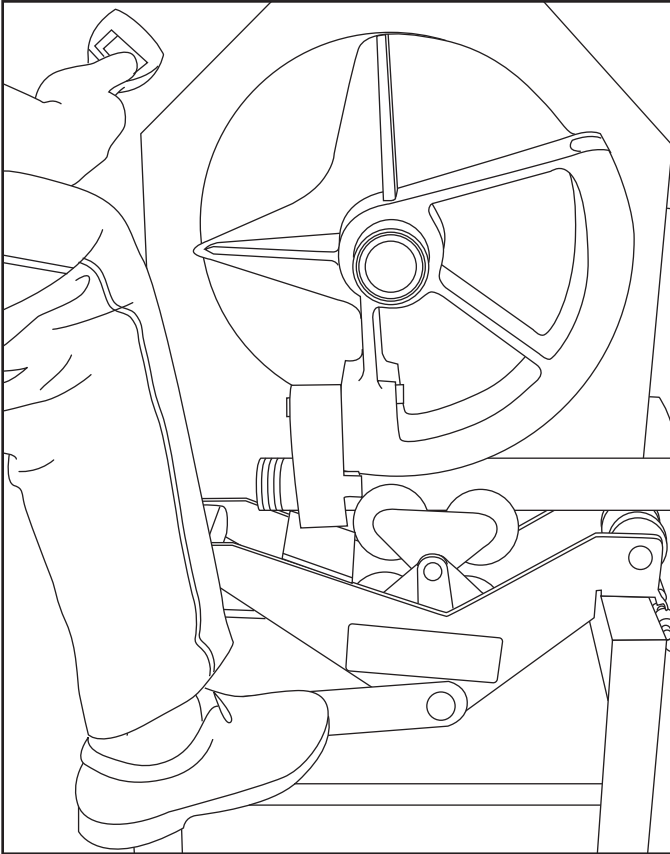
Operation (cont'd)

5. Bend the conduit:

If bending 1-1/2" to 2" EMT or IMC:

- a. Place one foot on the loading pedal, as shown.

**Engaging the Loading Pedal
(for 1-1/2" to 2" EMT or IMC Only)**



- b. Press and hold BEND. The bender will pull up the roller support. When the roller support contacts the stop, remove your foot from the loading pedal.
- c. Release the switch as you approach the desired angle of bend.
- d. Press BEND momentarily until the bend is complete.

If bending any other size or type of conduit:

- a. Press and hold BEND.
- b. Release the switch as you approach the desired angle of bend.
- c. Press BEND momentarily until the bend is complete.
6. Press UNLOAD. The shoe will rotate backward.
- Note: If bending EMT or IMC, the roller support unit will drop to its original position.*
7. Twist the conduit to release it from the hook. Remove the conduit.
8. Press and hold UNLOAD until the shoe has rotated back to 0°.

Operation (cont'd)

ADJUSTING THE SQUEEZE

When bending 1-1/2" to 2" EMT or IMC, the roller support must be engaged so that it contacts the conduit; the pressure against the conduit is the "squeeze."

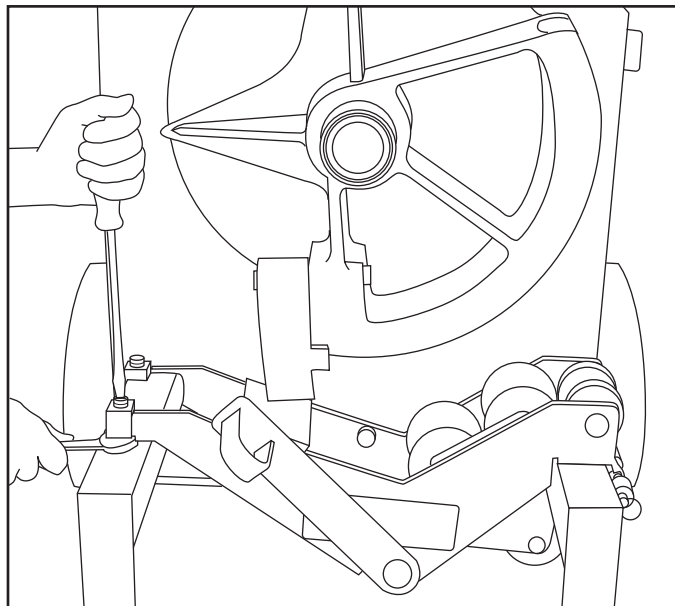
Due to variations in conduit, the standard adjustment may provide too much or too little squeeze. If the conduit develops excessive side marking when bent, the squeeze is set too high. If the conduit becomes excessively oval or wrinkled, the squeeze is set too low.

1. Use a screwdriver to loosen the set screws.
2. Use a wrench to rotate both adjusting bolts 1/2 turn clockwise to INCREASE squeeze or 1/2 turn counterclockwise to DECREASE squeeze.

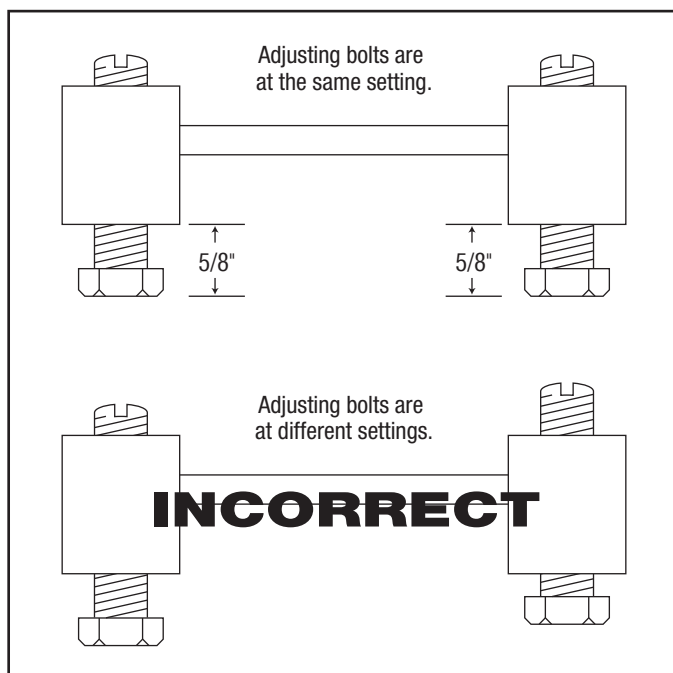
Note: In order to distribute the load evenly, adjust both bolts to the same setting. See the illustration.

3. Tighten the set screws.

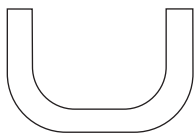
Adjusting the Squeeze



Standard Squeeze Setting

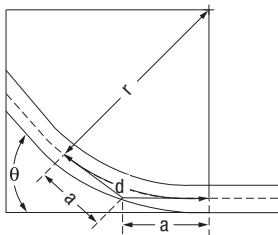


Illustrated Bending Glossary



back-to-back bend — any U-shaped bend formed by two parallel 90° bends with a straight section of conduit or pipe between the bends.

center-to-center distance — the distance between the successive bends that make up an offset or a three-bend saddle.

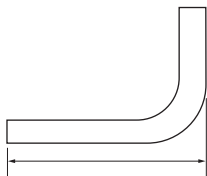


developed length — the actual length of pipe that will be bent; see distance “d” in the illustration at left.

gain — the difference between the straight-line distance ($a + a$) and the shorter radial distance, (d) where:

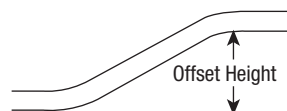
θ = angle of bend

r = the centerline bending radius of the bending shoe



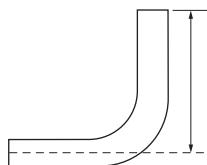
kick — single bend of less than 90°

leg length — the distance from the end of a straight section of conduit or pipe to the bend; measured from the end to the outside edge of the conduit or pipe.



offset bend — two opposite bends with the same degree of bend; used to avoid an obstruction.

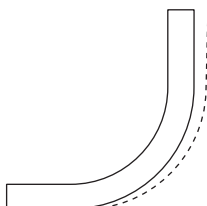
offset height — the distance between the two legs of an offset bend, measured perpendicular to the two legs; also called amount of offset and depth of offset.



rise — the distance from the end of a straight section of conduit or pipe to the bend; measured from the end to the center line of the conduit or pipe. Also called stub or stub-up.

saddle — a three-bend or four-bend combination; used to avoid an obstruction.

shrink — the amount of conduit “lost” when laying out an offset bend working toward an obstruction; see the explanation under Offset Bending in this manual.



springback — the amount, measured in degrees, that a conduit or pipe tends to straighten after being bent.

Bending Instructions

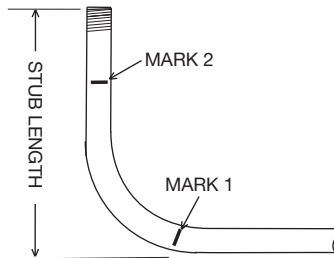
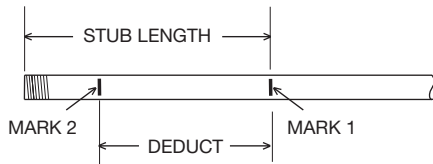
90° STUBS

1. Measure the length of the required stub.
2. See the Minimum Stub Length formula on the Deduct Table. The required stub must be equal to or longer than the Minimum Stub Length.
3. Measure and mark the stub length on the conduit. This is Mark 1. Subtract the Deduct from this mark and make a new mark. This is Mark 2.
4. Align Mark 2 with the front edge of the hook and bend the conduit.

Notes:

When the operator presses "UNLOAD", the conduit may spring back a few degrees. Compensate by overbending as shown in the Scale Reading Table.

The rigid shoe can make a 180° bend in one shot. All other shoes bend to 90° maximum.



Deduct Table

SIZE		1/2	3/4	1	1-1/4	1-1/2	2
DEDUCT	RIGID/PVC	7-1/2	9	11	14	14-1/4	16-1/8
	EMT	7	8-7/8	10-3/4	13-1/8	13-7/8	15-3/8
	IMC	7-1/2	9	11	14	13-3/4	15-1/4
MINIMUM STUB LENGTH = DEDUCT PLUS 2 INCHES							

Figures are approximate

Scale Reading Table

SIZE	RIGID					EMT				
	15°	30°	45°	60°	90°	15°	30°	45°	60°	90°
1/2	18-3/4	35	50	66-1/4	96-1/4	16-1/4	32-1/2	47-1/2	63-3/4	95
3/4	17-1/2	32-1/2	47-1/2	63-3/4	95	17-1/2	33-3/4	48-3/4	63-3/4	95
1	17-1/2	33-3/4	48-3/4	65	95	17-1/2	32-1/2	48-3/4	65	95
1-1/4	18-3/4	33-3/4	48-3/4	63-3/4	95	17-1/2	33-3/4	48-3/4	65	95
1-1/2	18-3/4	33-3/4	48-3/4	65	95	16-1/4	31-1/4	46-1/4	61-1/4	92-1/2
2	20	35	48-3/4	63-3/4	96-1/4	17-1/2	33-3/4	48-3/4	63-3/4	95

SIZE	IMC					PVC-Coated				
	15°	30°	45°	60°	90°	15°	30°	45°	60°	90°
1/2	20	36-1/4	51-1/4	67-1/2	98-3/4	17-1/2	33-3/4	48-3/4	65	95
3/4	20	36-1/4	51-1/4	67-1/2	97-1/2	17-1/2	33-3/4	48-3/4	63-3/4	95
1	21-1/4	36-1/4	51-1/4	66-1/4	97-1/2	17-1/2	32-1/2	47-1/2	63-3/4	95
1-1/4	18-3/4	33-3/4	50	65	96-1/4	18-3/4	33-3/4	50	65	95
1-1/2	17-1/2	33-3/4	48-3/4	63-3/4	95	18-3/4	33-3/4	48-3/4	65	95
2	20	35	50	65	96-1/4	20	35	48-3/4	63-3/4	96-1/4

Figures are approximate

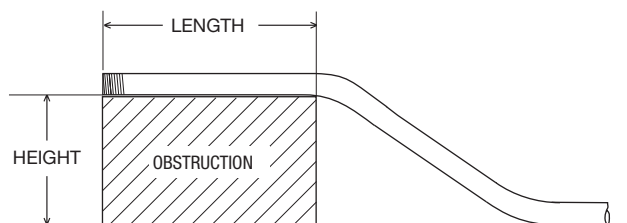
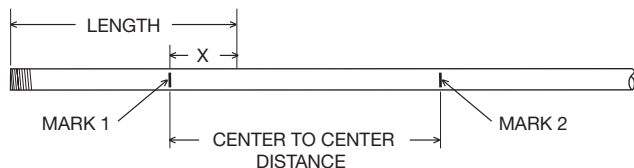
Bending Instructions (cont'd)

Offsets

1. Measure the height and length of the obstruction. Select the angle to be used.
2. See the Offset Table. The height of the obstruction must be equal to or greater than the minimum offset.
3. Refer to the X Table to find the X dimension. Refer to the Offset Table to find the center-to-center distance.

Note: If the center-to-center distance is not shown, calculate it by using the multipliers shown in the Offset Table.

4. Mark the conduit as shown.
5. Insert the conduit into the bender. Align Mark 1 with the front edge of the hook and bend the conduit.
6. Align Mark 2 with the front edge of the hook. Without removing the conduit from the bender, rotate the conduit 180°. Make the second bend.



Offset Table

OFFSET ▶		2	4	6	8	10
15°	Max. Conduit Size	3/4	1-1/2	2		
	Center-to-Center	7-3/4	15-7/16	23-3/16	30-15/16	38-5/8
30°	Max. Conduit Size		3/4	1	1-1/2	2
	Center-to-Center		8	12	16	20
45°	Max. Conduit Size			1/2	1	1-1/4
	Center-to-Center			8-1/2	11-5/16	14-1/8

OFFSET ▶		12	14	16	18	20	22
15°	Max. Conduit Size	2					
	Center-to-Center	46-3/8	54-1/16	61-13/16	69-9/16	77-1/4	85
30°	Max. Conduit Size	2					
	Center-to-Center	24	28	32	36	40	44
45°	Max. Conduit Size	1-1/2	2				
	Center-to-Center	16-15/16	19-13/16	22-5/8	25-7/16	28-1/4	31-1/8

CENTER-TO-CENTER DISTANCE = OFFSET HEIGHT x MULTIPLIER					
OFFSET ANGLE	10°	15°	22-1/2°	30°	45°
MULTIPLIER	5.8	3.9	2.6	2.0	1.4

Figures are approximate

X Table

CONDUIT SIZE	1/2	3/4	1	1-1/4	1-1/2	2
"X"	3-1/16	3-1/16	3-3/16	4	4-1/4	4-1/2

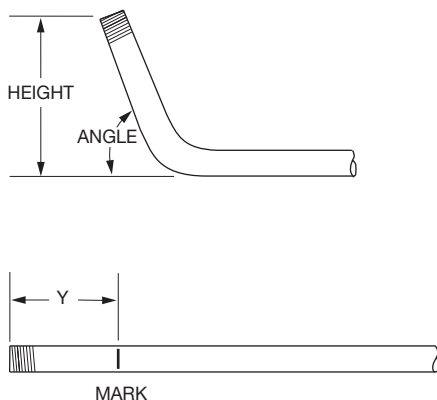
Figures are approximate

Additional Bending Instructions

The following drawings and bending tables are intended to provide the information necessary to accomplish the most common types of bends. The Bending Tables contain conduit marking information.

STUBS

1. Select the size and type of conduit. Determine the height of stub and the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled ANGLE, find the appropriate angle.
4. Find the row labeled Y. In the row at the top of the page, find the height (H) of the stub. The number shown at the intersection of row Y and column H is the distance Y. Place the bending mark Y inches from the end of the conduit.
5. Bend the conduit.



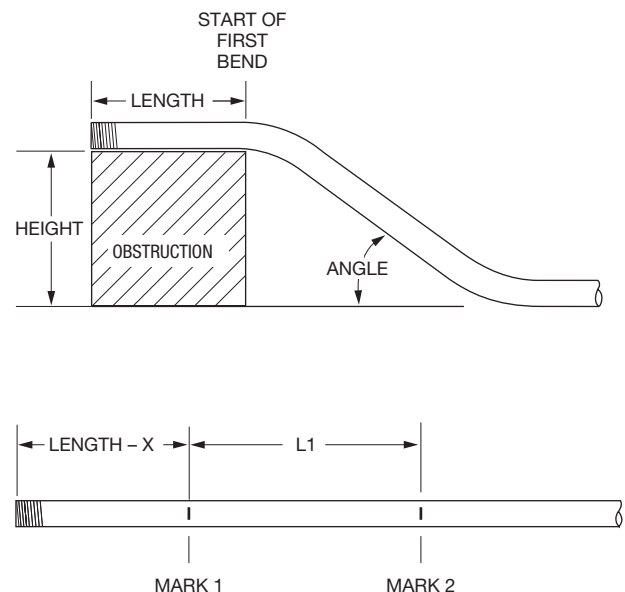
OFFSETS

An offset is used to route the conduit around an obstruction. To make an offset, two equal bends are required. The distance between the two bends is the center-to-center distance.

When working past an obstruction, it is necessary to determine the location of the first bend. The center-to-center distance is then used to determine the location of the second bend. When working toward an obstruction, it is necessary to determine the location of the second bend. The center-to-center distance is then used to determine the location of the first bend.

Working Past an Obstruction

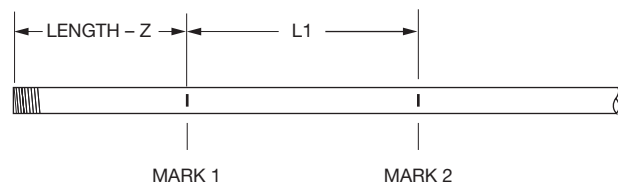
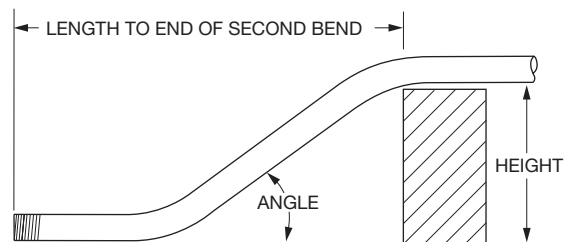
1. Select the size and type of conduit. Measure the height of the obstruction and the distance labeled LENGTH. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. To the right of the size and type of conduit, find the dimension labeled X. Subtract X from LENGTH. Place the first bending mark this distance from the end of the conduit.
4. Under the column labeled ANGLE, find the appropriate angle. Find the row labeled L1. In the row at the top of the page, find the height (H) of the offset. The number shown at the intersection of row L1 and column H is L1. Place the second bending mark L1 inches from the first bending mark.
5. Bend the conduit.



Additional Bending Instructions (cont'd)

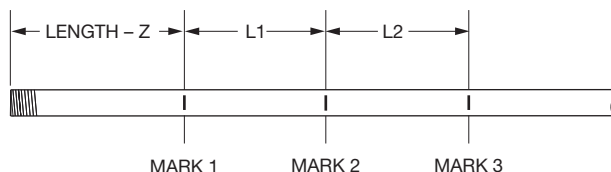
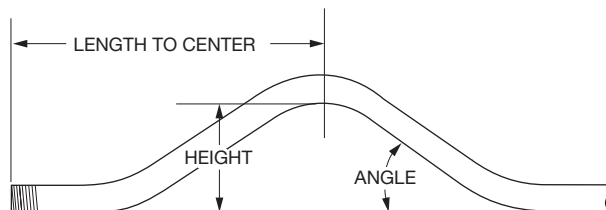
Working Toward an Obstruction

1. Select the size and type of conduit. Measure the height of the obstruction and the distance labeled **LENGTH TO END OF SECOND BEND**. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled **ANGLE**, find the appropriate angle. Find the row labeled **Z**. In the row at the top of the page, find the height (**H**) of the offset. The number shown at the intersection of the **Z** row and the **H** column is **Z**. Subtract **Z** from **LENGTH TO THE END OF SECOND BEND**. Place the first bending mark this distance from the end of the conduit.
4. In the same column, find the row labeled **L1**. Place the second bending mark **L1** inches from the first bending mark.
5. Bend the conduit.



THREE-BEND SADDLE

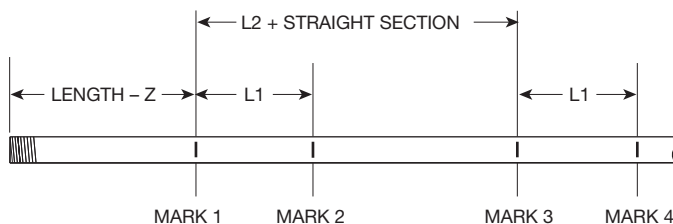
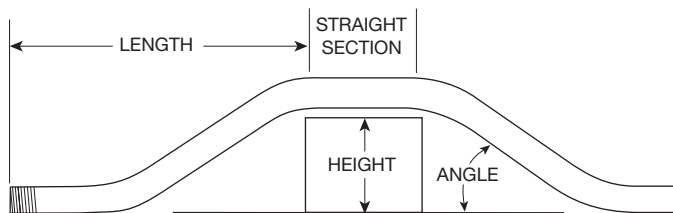
1. Select the size and type of conduit. Measure the height of the obstruction and the distance from the end of the conduit to the center (**LENGTH TO CENTER**) of the bend. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled **ANGLE**, find the appropriate angle. Find the row labeled **Z**. In the row at the top of the page, find the height (**H**) of the offset. The number shown at the intersection of the **Z** row and the appropriate **H** column is **Z**. Subtract **Z** from the **LENGTH TO CENTER**. Place the first bending mark this distance from the end of the conduit.
4. In the same column, find the row labeled **L1**. Place the second bending mark **L1** inches from the first bending mark.
5. In the same column, find the row labeled **L2**. Place the third bending mark **L2** inches from the second bending mark.
6. Bend the conduit.



Additional Bending Instructions (cont'd)

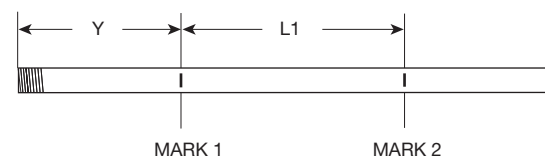
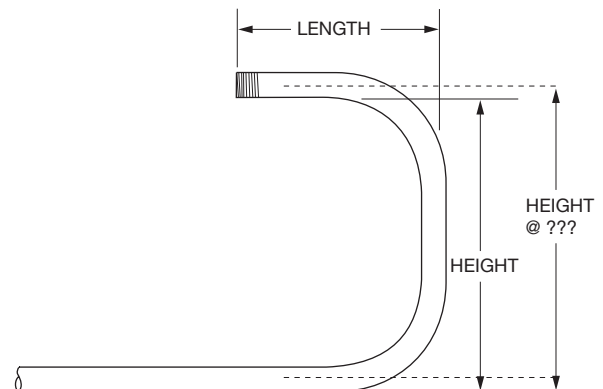
FOUR-BEND SADDLE

1. Select the size and type of conduit. Measure the height of the obstruction, the distance labeled **LENGTH**, and the distance labeled **STRAIGHT SECTION**. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled **ANGLE**, find the appropriate angle. Find the row labeled **Z**. In the row at the top of the page, find the height (**H**) of the offset. The number shown at the intersection of the **Z** row and the appropriate **H** column is **Z**. Subtract **Z** from the **LENGTH**. Place the first bending mark this distance from the end of the conduit.
4. In the same column, find the row labeled **L1**. Place the second bending mark **L1** inches from the first bending mark.
5. In the same column, find the row labeled **L2**. Add **L2** to the **STRAIGHT SECTION**. Place the third bending mark this distance from the first bending mark.
6. Make the final bending mark **L1** inches from the third bending mark.
7. Bend the conduit.



U-BENDS

1. Select the size and type of conduit. Determine the **LENGTH** and the **HEIGHT**.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled **ANGLE**, find **90°**.
4. Find the row labeled **Y**. In the row at the top of the page, find the height (**H**) that corresponds to the **LENGTH**. The number shown at the intersection of the **Y** row and the appropriate **H** column is the distance **Y**. Place the bending mark **Y** inches from the end of the conduit.
5. Find the row labeled **L1**, and go to the right to find the height (**H**) that corresponds to the **HEIGHT**.
6. The number shown at the intersection of the **L1** row and the appropriate **H** column is **L1**. Place the second bending mark **L1** inches from the first mark.
7. Bend the conduit.



Additional Bending Tables

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1/2" EMT												
	Y	15	3.74	11.47	19.20	26.92	34.65	42.38	53.97	65.56	88.74	135.11
	L1	15	7.72	15.45	23.18	30.90	38.63	46.36	57.95	69.54	92.72	139.09
	L2	15	8.94	16.66	24.39	32.12	39.84	47.57	59.16	70.75	93.94	140.30
	Z	15	10.70	18.16	25.62	33.09	40.55	48.02	59.21	70.41	92.80	137.59
MINIMUM H = 0.84												
	Y	22.5	1.37	6.60	11.82	17.05	22.28	27.50	35.34	43.18	58.86	90.22
	L1	22.5	5.20	10.43	15.65	20.88	26.11	31.33	39.17	47.01	62.69	94.05
	L2	22.5	7.02	12.25	17.48	22.70	27.93	33.16	41.00	48.83	64.51	95.87
	Z	22.5	8.68	13.51	18.34	23.17	28.00	32.83	40.07	47.31	61.80	90.77
MINIMUM H = 1.48												
	Y	30	0.04	4.04	8.04	12.04	16.04	20.04	26.04	32.04	44.04	68.04
	L1	30		7.94	11.94	15.94	19.94	23.94	29.94	35.94	47.94	71.94
	L2	30		10.37	14.37	18.37	22.37	26.37	32.37	38.37	50.37	74.37
	Z	30		11.42	14.89	18.35	21.82	25.28	30.48	35.67	46.07	66.85
MINIMUM H = 2.25												
	Y	45		1.23	4.05	6.88	9.71	12.54	16.78	21.02	29.51	46.48
	L1	45			8.29	11.11	13.94	16.77	21.01	25.26	33.74	50.71
	L2	45			11.93	14.76	17.59	20.42	24.66	28.90	37.39	54.36
	Z	45			11.85	13.85	15.85	17.85	20.85	23.85	29.85	41.85
MINIMUM H = 4.14												
	Y	60			1.83	4.14	6.45	8.76	12.22	15.69	22.62	36.47
	L1	60				8.74	11.05	13.36	16.82	20.29	27.21	41.07
	L2	60				13.60	15.91	18.22	21.68	25.14	32.07	45.93
	Z	60				11.99	13.14	14.30	16.03	17.76	21.22	28.15
MINIMUM H = 6.38												
	Y	90				1.00	3.00	5.00	8.00	11.00	17.00	29.00
	L1	90						10.01	13.01	16.01	22.01	34.01
	L2	90						17.30	20.30	23.30	29.30	41.30
	Z	90						11.29	11.29	11.29	11.29	11.29
MINIMUM H = 11.29												
3/4" EMT												
	Y	15	2.35	10.07	17.80	25.53	33.26	40.98	52.58	64.17	87.35	133.71
	L1	15	7.72	15.45	23.17	30.90	38.63	46.36	57.95	69.54	92.72	139.08
	L2	15	9.17	16.90	24.62	32.35	40.08	47.81	59.40	70.99	94.17	140.54
	Z	15	11.79	19.26	26.72	34.19	41.65	49.11	60.31	71.51	93.90	138.68
MINIMUM H = 1.12												
	Y	22.5	0.05	5.28	10.50	15.73	20.95	26.18	34.02	41.86	57.54	88.90
	L1	22.5	5.20	10.42	15.65	20.88	26.10	31.33	39.17	47.01	62.69	94.04
	L2	22.5	7.37	12.60	17.83	23.05	28.28	33.50	41.34	49.18	64.86	96.22
	Z	22.5	9.90	14.73	19.56	24.39	29.22	34.04	41.29	48.53	63.02	91.99
MINIMUM H = 1.94												
	Y	30		2.72	6.72	10.72	14.72	18.72	24.72	30.72	42.72	66.72
	L1	30		7.93	11.93	15.93	19.93	23.93	29.93	35.93	47.93	71.93
	L2	30		10.83	14.83	18.83	22.83	26.83	32.83	38.83	50.83	74.83
	Z	30		12.77	16.23	19.70	23.16	26.62	31.82	37.02	47.41	68.19
MINIMUM H = 2.92												
	Y	45			2.67	5.50	8.33	11.15	15.40	19.64	28.12	45.09
	L1	45			8.25	11.08	13.90	16.73	20.97	25.22	33.70	50.67
	L2	45			12.60	15.43	18.25	21.08	25.33	29.57	38.05	55.02
	Z	45			13.46	15.46	17.46	19.46	22.46	25.46	31.46	43.46
MINIMUM H = 5.27												
	Y	60			0.33	2.64	4.95	7.26	10.72	14.18	21.11	34.97
	L1	60					10.95	13.26	16.72	20.19	27.12	40.97
	L2	60					16.75	19.06	22.53	25.99	32.92	46.78
	Z	60					15.04	16.20	17.93	19.66	23.12	30.05
MINIMUM H = 8.03												
	Y	90					1.13	3.13	6.13	9.13	15.13	27.13
	L1	90							12.62	15.62	21.62	33.62
	L2	90							21.32	24.32	30.32	42.32
	Z	90							13.95	13.95	13.95	13.95
MINIMUM H = 13.95												

Additional Bending Tables (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1" EMT												
	Y	15	1.35	9.07	16.80	24.53	32.26	39.98	51.57	63.16	86.35	132.71
	L1	15	7.72	15.44	23.17	30.90	38.63	46.35	57.95	69.54	92.72	139.08
	L2	15	9.54	17.26	24.99	32.72	40.45	48.17	59.76	71.36	94.54	140.90
	Z	15	12.51	19.98	27.44	34.91	42.37	49.83	61.03	72.23	94.62	139.40
MINIMUM H = 1.31												
	Y	22.5		4.33	9.56	14.78	20.01	25.24	33.07	40.91	56.59	87.95
	L1	22.5		10.42	15.64	20.87	26.10	31.32	39.16	47.00	62.68	94.04
	L2	22.5		13.15	18.37	23.60	28.82	34.05	41.89	49.73	65.41	96.77
	Z	22.5		15.64	20.47	25.30	30.13	34.96	42.20	49.44	63.93	92.90
MINIMUM H = 2.29												
	Y	30		1.75	5.75	9.75	13.75	17.75	23.75	29.75	41.75	65.75
	L	30		7.91	11.91	15.91	19.91	23.91	29.91	35.91	47.91	71.91
	L2	30		11.55	15.55	19.55	23.55	27.55	33.55	39.55	51.55	75.55
	Z	30		13.87	17.34	20.80	24.27	27.73	32.92	28.12	48.51	69.30
MINIMUM H = 3.47												
	Y	45			1.56	4.39	7.22	10.05	14.29	18.53	27.02	43.99
	L1	45				11.01	13.84	16.67	20.91	25.16	33.64	50.61
	L2	45				16.47	19.30	22.13	26.37	30.62	39.10	56.07
	Z	45				16.98	18.98	20.98	23.98	26.98	32.98	44.98
MINIMUM H = 6.35												
	Y	60				1.33	3.64	5.95	9.42	12.88	19.81	33.67
	L1	60					10.80	13.11	16.57	20.04	26.97	40.82
	L2	60					18.08	20.39	23.85	27.32	34.24	48.10
	Z	60					17.02	18.17	19.91	21.64	25.10	32.03
MINIMUM H = 9.74												
	Y	90						1.25	4.25	7.25	13.25	25.25
	L1	90								15.02	21.02	33.02
	L2	90								25.93	31.93	43.93
	Z	90								17.12	17.12	17.12
MINIMUM H = 17.12												
1-1/4" EMT												
	Y	15	0.26	7.99	15.72	23.45	31.17	38.90	50.49	62.08	85.27	131.63
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	10.07	17.80	25.52	33.25	40.98	48.71	60.30	71.89	95.07	141.44
	Z	15	13.20	20.66	28.12	35.59	43.05	50.52	61.71	72.91	95.30	140.09
MINIMUM H = 1.48												
	Y	22.5		3.33	8.55	13.78	19.01	24.23	32.07	39.91	55.59	86.95
	L1	22.5		10.41	15.63	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.94	19.17	24.40	29.62	34.85	42.69	50.53	66.21	97.56
	Z	22.5		16.60	21.43	26.26	31.09	35.91	43.16	50.40	64.89	93.86
MINIMUM H = 2.66												
	Y	30		0.72	4.72	8.72	12.72	16.72	22.72	28.72	40.72	64.72
	L1	30			11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2	30			16.61	20.61	24.61	28.61	34.61	40.61	52.61	76.61
	Z	30			18.58	22.04	25.51	28.97	34.17	39.37	49.76	70.54
MINIMUM H = 4.09												
	Y	45			0.33	3.15	5.98	8.81	13.05	17.30	25.78	42.75
	L1	45				10.93	13.75	16.58	20.83	25.07	33.55	50.52
	L2	45				18.00	20.83	23.66	27.90	32.14	40.63	57.60
	Z	45				18.82	20.82	22.82	25.82	28.82	34.82	46.82
MINIMUM H = 7.65												
	Y	60					2.11	4.42	7.89	11.35	18.28	32.14
	L1	60						12.89	16.35	19.82	26.74	40.60
	L2	60						22.32	25.79	29.25	36.18	50.04
	Z	60						20.69	22.42	24.16	27.62	34.55
MINIMUM H = 11.92												
	Y	90							1.88	4.88	10.88	22.88
	L1	90									20.13	32.13
	L2	90									34.29	46.29
	Z	90									21.38	21.38
MINIMUM H = 21.38												

Additional Bending Tables (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1-1/2" EMT												
	Y	15		6.26	13.99	21.72	29.44	37.17	48.76	60.35	83.53	129.90
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	9.95	17.68	25.40	33.13	40.86	48.58	60.18	71.77	94.95	141.31
	Z	15	14.42	21.88	29.35	36.81	44.28	51.74	62.94	74.13	96.53	141.31
MINIMUM H = 1.81												
	Y	22.5		1.77	7.00	12.22	17.45	22.68	30.52	38.36	54.03	85.39
	L1	22.5		10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.76	18.98	24.21	29.44	34.66	42.50	50.34	66.02	97.38
	Z	22.5		17.76	22.59	27.42	32.25	37.07	44.32	51.56	66.04	95.02
MINIMUM H = 3.11												
	Y	30			3.26	7.26	11.26	15.26	21.26	27.26	39.26	63.26
	L1	30			11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2	30			16.36	20.36	24.36	28.36	34.36	40.36	52.36	76.36
	Z	30			19.67	23.14	26.60	30.07	35.26	40.46	50.85	71.64
MINIMUM H = 4.64												
	Y	45				1.84	4.67	7.50	11.74	15.98	24.47	41.44
	L1	45					13.78	16.60	20.85	25.09	33.57	50.54
	L2	45					20.47	23.30	27.55	31.79	40.27	57.24
	Z	45					21.78	23.78	26.78	29.78	35.78	47.78
MINIMUM H = 8.33												
	Y	60					0.91	3.22	6.68	10.15	17.07	30.93
	L1	60							16.40	19.87	26.80	40.65
	L2	60							25.34	28.80	35.73	49.58
	Z	60							23.22	24.95	28.42	35.34
MINIMUM H = 12.61												
	Y	90							0.89	3.89	9.89	21.89
	L1	90									20.34	32.34
	L2	90									33.74	45.74
	Z	90									21.77	21.77
MINIMUM H = 21.77												
2" EMT												
	Y	15		5.15	12.87	20.60	28.33	36.05	47.65	59.24	82.42	128.78
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.71	139.08
	L2	15	10.19	17.92	25.64	33.37	41.10	48.83	60.42	72.01	95.19	141.56
	Z	15	14.77	22.24	29.70	37.17	44.63	52.10	63.29	74.49	96.88	141.66
MINIMUM H = 1.89												
	Y	22.5		0.88	6.11	11.33	16.56	21.79	29.62	37.46	53.14	84.50
	L1	22.5		10.40	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.02
	L2	22.5		14.12	19.35	24.57	29.80	35.02	42.86	50.70	66.38	97.74
	Z	22.5		18.24	23.07	27.90	32.73	37.55	44.80	52.04	66.52	95.50
MINIMUM H = 3.28												
	Y	30			2.45	6.45	10.45	14.45	20.45	26.45	38.45	62.45
	L1	30			11.88	15.88	19.88	23.88	29.88	35.88	47.88	71.88
	L2	30			16.84	20.84	24.84	28.84	34.84	40.84	52.84	76.84
	Z	30			20.28	23.75	27.21	30.67	35.87	41.07	51.46	72.24
MINIMUM H = 4.94												
	Y	45				1.02	3.85	6.68	10.92	15.16	23.65	40.62
	L1	45					13.74	16.56	20.81	25.05	33.53	50.50
	L2	45					21.16	23.99	28.24	32.48	40.96	57.93
	Z	45					22.66	24.66	27.66	30.66	36.66	48.66
MINIMUM H = 8.95												
	Y	60					0.00	2.31	5.77	9.23	16.16	30.02
	L1	60							16.30	19.77	26.70	40.55
	L2	60							26.21	29.67	36.60	50.46
	Z	60							24.40	26.14	29.60	36.53
MINIMUM H = 13.63												
	Y	90								2.62	8.62	20.62
	L1	90									19.94	31.94
	L2	90									34.80	46.80
	Z	90									23.74	23.74
MINIMUM H = 23.74												

Additional Bending Tables (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1/2" IMC, Rigid, and 40 Mil PVC-Coated Rigid												
	Y	15	3.03	10.76	18.48	26.21	33.94	41.67	53.26	64.85	88.03	134.39
	L1	15	7.72	15.45	23.18	30.90	38.63	46.36	57.95	69.54	92.72	139.09
	L2	15	8.87	16.59	24.32	32.05	39.78	47.50	59.10	70.69	93.87	140.23
	Z	15	11.12	18.58	26.05	33.51	40.97	48.44	59.63	70.83	93.22	138.01
MINIMUM H = 0.95												
	Y	22.5	.77	5.98	11.21	16.44	21.66	26.89	34.73	42.57	58.25	89.60
	L1	22.5	5.20	10.43	15.66	20.88	26.11	31.34	39.17	47.01	62.69	94.05
	L2	22.5	6.92	12.15	17.38	22.60	27.83	33.06	40.89	48.73	64.41	95.77
	Z	22.5	9.07	13.90	18.73	23.56	28.38	33.21	40.46	47.70	62.18	91.15
MINIMUM H = 1.62												
	Y	30		3.49	7.49	11.49	15.49	19.49	25.49	31.49	43.49	67.49
	L1	30		7.95	11.95	15.95	19.95	23.95	29.95	35.95	47.95	71.95
	L2	30		10.24	14.24	18.24	22.24	26.24	32.24	38.24	50.24	74.24
	Z	30		11.78	15.24	18.70	22.17	25.63	30.83	36.02	46.42	67.20
MINIMUM H = 2.42												
	Y	45			3.59	6.41	9.23	12.06	16.30	20.55	29.03	46.00
	L1	45			8.30	11.13	13.95	16.78	21.02	25.27	33.75	50.72
	L2	45			11.74	14.57	17.39	20.22	24.46	28.71	37.19	54.16
	Z	45			12.13	14.13	16.13	18.13	21.13	24.13	30.13	42.13
MINIMUM H = 4.33												
	Y	60			1.42	3.73	6.04	8.34	11.81	15.27	22.20	36.06
	L1	60				8.77	11.08	13.39	16.85	20.31	27.24	41.10
	L2	60				13.35	15.66	17.97	21.44	24.90	31.83	45.69
	Z	60				12.18	13.33	14.49	16.22	17.95	21.41	28.34
MINIMUM H = 6.55												
	Y	90				.71	2.71	4.71	7.71	10.71	16.70	28.70
	L1	90						10.12	13.12	16.12	22.12	34.12
	L2	90						17.00	20.00	23.00	29.00	41.00
	Z	90						11.26	11.26	11.26	11.26	11.26
MINIMUM H = 11.26												
3/4" IMC, Rigid, and 40 Mil PVC-Coated Rigid												
	Y	15	1.86	9.58	17.31	25.04	32.77	40.49	52.08	63.68	86.86	133.22
	L1	15	7.72	15.45	23.17	30.90	38.63	46.36	57.95	69.54	92.72	139.08
	L2	15	9.19	16.91	24.64	32.37	40.09	47.82	59.41	71.00	94.19	140.55
	Z	15	12.06	19.53	26.89	34.46	41.92	49.38	60.58	71.78	94.17	138.95
MINIMUM H = 1.19												
	Y	22.5		4.85	10.08	15.31	20.53	25.76	33.60	41.44	57.12	88.47
	L1	22.5		10.42	15.65	20.88	26.10	31.33	39.17	47.01	62.69	94.04
	L2	22.5		12.62	17.85	23.08	28.30	33.53	41.37	49.21	64.89	96.24
	Z	22.5		15.01	19.84	24.67	29.49	34.32	41.57	48.81	63.29	92.26
MINIMUM H = 2.05												
	Y	30		2.33	6.33	10.33	14.33	18.33	24.33	30.33	42.33	66.33
	L1	30		7.93	11.93	15.93	19.93	23.93	29.93	35.93	47.93	71.93
	L2	30		10.86	14.86	18.86	22.86	26.86	32.86	38.86	50.86	74.86
	Z	30		13.05	16.52	19.98	23.45	26.91	32.11	37.30	47.70	68.48
MINIMUM H = 3.06												
	Y	45			2.31	5.13	7.96	10.79	15.03	19.28	27.76	44.73
	L1	45			8.24	11.07	13.90	16.73	20.97	25.21	33.70	50.67
	L2	45			12.64	15.47	18.30	21.13	25.37	29.61	38.10	55.07
	Z	45			13.76	15.76	17.76	19.76	22.76	25.76	31.76	43.76
MINIMUM H = 5.49												
	Y	60				2.28	4.59	6.90	10.36	13.83	20.75	34.61
	L1	60					10.94	13.25	16.72	20.18	27.11	40.97
	L2	60					16.81	19.12	22.58	26.05	32.98	46.83
	Z	60					15.36	16.52	18.25	19.88	23.45	30.38
MINIMUM H = 8.31												
	Y	90					.76	2.76	5.76	8.76	14.76	26.76
	L1	90							12.60	15.60	21.60	33.60
	L2	90							21.39	24.39	30.39	42.39
	Z	90							14.33	14.33	14.33	14.33
MINIMUM H = 14.33												

Additional Bending Tables (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1" IMC, Rigid, and 40 Mil PVC-Coated Rigid												
	Y	15	1.08	8.81	16.52	24.25	31.97	39.70	51.29	62.88	86.07	132.43
	L1	15	7.72	15.44	23.17	30.90	38.63	46.35	57.94	69.54	92.72	139.08
	L2	15	9.59	17.32	25.04	32.77	40.50	48.23	59.82	71.41	94.59	140.95
	Z	15	12.53	20.00	27.46	34.93	42.39	49.86	61.05	72.25	94.64	139.43
MINIMUM H = 1.31												
	Y	22.5		4.13	9.35	14.58	19.81	25.03	32.87	40.71	56.39	87.75
	L1	22.5		10.42	15.64	20.87	26.09	31.32	39.16	47.00	62.68	94.04
	L2	22.5		13.22	18.45	23.68	28.90	34.13	41.97	49.81	65.49	96.84
	Z	22.5		15.69	20.52	25.35	30.18	35.01	42.25	49.49	63.98	92.95
MINIMUM H = 2.31												
	Y	30		1.58	5.58	9.58	13.58	17.58	23.58	29.58	41.58	65.58
	L1	30		7.91	11.91	15.91	19.91	23.91	29.91	35.91	47.91	71.91
	L2	30		11.66	15.66	19.66	23.66	27.66	33.66	39.66	51.66	75.66
	Z	30		13.95	17.41	20.88	24.34	27.81	33.00	38.20	48.59	69.38
MINIMUM H = 3.51												
	Y	45			1.42	4.24	7.06	9.89	14.14	18.38	26.86	43.83
	L1	45				11.01	13.83	16.66	20.91	25.15	33.63	50.60
	L2	45				16.62	19.45	22.28	26.52	30.76	39.25	56.22
	Z	45				17.11	19.11	21.11	24.11	27.11	33.11	45.11
MINIMUM H = 6.44												
	Y	60				1.17	3.48	5.79	9.25	12.71	19.64	33.49
	L1	60					10.78	13.09	16.55	20.02	26.94	40.80
	L2	60					18.27	20.58	24.04	27.50	34.43	48.29
	Z	60					17.22	18.37	20.11	21.84	25.30	32.23
MINIMUM H = 9.91												
	Y	90						1.01	4.01	7.01	13.01	25.01
	L1	90								14.93	20.93	32.93
	L2	90								26.16	32.16	44.16
	Z	90								17.49	17.49	17.49
MINIMUM H = 17.49												
1-1/4" IMC, Rigid, and 40 Mil PVC-Coated Rigid												
	Y	15		7.15	14.87	22.60	30.33	38.06	49.65	61.24	84.42	130.78
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	10.07	17.80	25.53	33.25	40.98	48.71	60.30	71.89	95.07	141.44
	Z	15	13.77	21.24	28.70	36.17	43.63	51.09	62.29	73.49	95.88	140.66
MINIMUM H = 1.63												
	Y	22.5		2.57	7.80	13.02	18.25	23.47	31.31	39.15	54.83	86.19
	L1	22.5		10.41	15.63	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.94	19.17	24.40	29.62	34.85	42.69	50.53	66.21	97.56
	Z	22.5		17.18	22.01	26.84	31.66	36.49	43.73	50.98	65.46	94.43
MINIMUM H = 2.88												
	Y	30			4.00	8.00	12.00	16.00	22.00	28.00	40.00	64.00
	L1	30			11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2	30			16.61	20.61	24.61	28.61	34.61	40.61	52.61	76.61
	Z	30			19.16	22.62	26.09	29.55	34.75	39.94	50.33	71.12
MINIMUM H = 4.38												
	Y	45				2.48	5.31	8.14	12.38	16.62	25.11	42.08
	L1	45					13.75	16.58	20.83	25.07	33.55	50.52
	L2	45					20.83	23.66	27.90	32.14	40.63	57.60
	Z	45					21.40	23.40	26.40	29.40	35.40	47.40
MINIMUM H = 8.06												
	Y	60					1.46	3.77	7.23	10.69	17.62	31.48
	L1	60							16.35	19.82	26.74	40.60
	L2	60							25.79	29.25	36.18	50.04
	Z	60							23.00	24.73	28.20	35.13
MINIMUM H = 11.32												
	Y	90							1.23	4.23	10.23	22.23
	L1	90									20.13	32.13
	L2	90									34.29	46.29
	Z	90									21.96	21.96
MINIMUM H = 21.96												

Additional Bending Tables (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1-1/2" Rigid and 40 Mil PVC-Coated Rigid												
	Y	15		5.87	13.59	21.32	29.05	36.77	48.37	59.96	83.14	129.50
	L1	15	7.71	15.44	23.17	20.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	9.94	17.67	25.39	33.12	40.85	48.58	60.17	71.76	94.94	141.31
	Z	15	14.50	21.97	29.43	36.89	44.36	51.82	63.02	74.21	96.61	141.39
MINIMUM H = 1.82												
	Y	22.5		1.48	6.71	11.93	17.16	22.38	30.22	38.06	53.74	85.10
	L1	22.5		10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.75	18.97	24.20	29.43	34.65	42.49	50.33	66.01	97.37
	Z	22.5		17.84	22.67	27.50	32.32	37.15	44.39	51.64	66.12	95.09
MINIMUM H = 3.13												
	Y	30			3.02	7.02	11.02	15.02	21.02	27.02	39.02	63.02
	L1	30			11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2	30			16.35	20.35	24.35	28.35	34.35	40.35	52.35	76.35
	Z	30			19.75	23.21	26.68	30.14	35.34	40.53	50.92	71.71
MINIMUM H = 4.68												
	Y	45				1.65	4.48	7.31	11.55	15.79	24.28	41.25
	L1	45					13.78	16.60	20.85	25.09	33.58	50.55
	L2	45					20.45	23.28	27.52	31.77	40.25	57.22
	Z	45					21.84	23.84	26.84	29.84	35.84	47.84
MINIMUM H = 8.37												
	Y	60					0.74	3.05	6.52	9.98	16.91	30.76
	L1	60							16.41	19.87	26.80	40.66
	L2	60							25.31	28.77	35.70	49.56
	Z	60							23.28	25.01	28.47	35.40
MINIMUM H = 12.66												
	Y	90							0.75	3.75	9.75	21.75
	L1	90									20.35	32.35
	L2	90									33.70	45.70
	Z	90									21.80	21.80
MINIMUM H = 21.80												
2" Rigid and 40 Mil PVC-Coated Rigid												
	Y	15		4.42	12.15	19.87	27.60	35.33	46.92	58.51	81.69	128.06
	L1	15	7.71	15.44	23.17	30.89	38.62	46.35	57.94	69.53	92.71	139.08
	L2	15	10.27	18.00	25.73	33.46	41.18	48.91	60.50	72.09	95.27	141.64
	Z	15	15.20	22.66	30.13	37.59	45.06	52.52	63.72	74.91	97.30	142.09
MINIMUM H = 2.00												
	Y	22.5		0.24	5.47	10.70	15.92	21.15	28.99	36.83	52.51	83.86
	L1	22.5		10.40	15.63	20.85	26.08	31.31	39.15	46.99	62.66	94.02
	L2	22.5		14.24	19.47	24.70	29.92	35.15	42.99	50.83	66.51	97.86
	Z	22.5		18.71	23.54	28.36	33.19	38.02	45.26	52.51	66.99	95.96
MINIMUM H = 3.47												
	Y	30			1.84	5.84	9.84	13.84	19.84	25.84	37.84	61.84
	L1	30			11.88	15.88	19.88	23.88	29.88	35.88	47.88	71.88
	L2	30			17.00	21.00	25.00	29.00	35.00	41.00	53.00	77.00
	Z	30			20.79	24.26	27.72	31.19	36.38	41.58	51.97	71.75
MINIMUM H = 5.20												
	Y	45				0.42	3.25	6.08	10.32	14.57	23.05	40.02
	L1	45					13.72	16.55	20.79	25.04	33.52	50.49
	L2	45					21.40	24.23	28.47	32.72	41.20	58.17
	Z	45					23.26	25.26	28.26	31.26	37.26	49.26
MINIMUM H = 9.38												
	Y	60						1.68	5.14	8.61	15.54	29.39
	L1	60							16.27	19.73	26.66	40.52
	L2	60							26.51	29.97	36.90	50.76
	Z	60							25.11	26.85	30.31	37.24
MINIMUM H = 14.25												
	Y	90								1.87	7.87	19.87
	L1	90										31.80
	L2	90										47.16
	Z	90										24.72
MINIMUM H = 24.72												

Additional Bending Tables (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1-1/2" IMC												
	Y	15		6.41	14.14	21.87	29.60	37.32	48.91	60.51	83.69	130.05
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.00
	L2	15	9.95	17.68	25.40	33.13	40.86	48.58	60.18	71.77	94.94	141.31
	Z	15	13.99	21.45	28.92	36.38	43.85	51.31	62.51	73.70	96.10	140.88
MINIMUM H = 1.69												
	Y	22.5		2.02	7.24	12.47	17.69	22.92	30.76	38.60	54.28	85.64
	L1	22.5		10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.76	18.98	24.21	29.44	34.66	42.50	50.34	66.02	97.38
	Z	22.5		17.33	22.16	26.99	31.82	36.64	43.89	51.13	65.61	94.59
MINIMUM H = 2.94												
	Y	30			3.55	7.55	11.55	15.55	21.55	27.55	39.55	63.55
	L1	30			11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2	30			16.36	20.36	24.36	28.36	34.36	40.36	52.36	76.36
	Z	30			19.24	22.71	26.17	29.64	34.83	40.03	50.42	71.21
MINIMUM H = 4.43												
	Y	45				2.17	5.00	7.83	12.07	16.31	24.80	41.77
	L1	45					13.78	16.60	20.85	25.09	33.57	50.54
	L2	45					20.47	23.30	27.55	31.79	40.27	57.24
	Z	45					21.35	23.35	26.35	29.35	35.35	47.35
MINIMUM H = 8.02												
	Y	60					1.26	3.56	7.03	10.49	17.42	31.28
	L1	60							16.40	19.87	26.80	40.65
	L2	60							25.34	28.80	35.73	49.58
	Z	60							22.79	24.52	27.99	34.91
MINIMUM H = 12.24												
	Y	90							1.25	4.25	10.25	22.25
	L1	90									20.34	32.34
	L2	90									33.74	45.74
	Z	90									21.34	21.34
MINIMUM H = 21.34												
2" IMC												
	Y	15		5.04	12.77	20.50	28.22	35.95	47.54	59.13	82.31	128.68
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.71	139.00
	L2	15	10.19	17.92	25.64	33.37	41.10	48.83	60.42	72.01	95.19	141.56
	Z	15	14.56	22.03	29.49	36.96	44.42	51.89	63.00	74.28	96.67	141.45
MINIMUM H = 1.84												
	Y	22.5		0.88	6.10	11.33	16.56	21.78	29.62	37.46	53.14	84.50
	L1	22.5		10.40	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.02
	L2	22.5		14.12	19.35	24.57	29.80	35.02	42.86	50.70	66.38	97.74
	Z	22.5		18.03	22.86	27.69	32.52	37.34	44.59	51.83	66.31	95.29
MINIMUM H = 3.20												
	Y	30			2.50	6.50	10.50	14.50	20.50	26.50	38.50	62.50
	L1	30			11.88	15.88	19.88	23.88	29.88	35.88	47.88	71.88
	L2	30			16.84	20.84	24.84	28.84	34.84	40.84	52.84	76.84
	Z	30			20.07	23.54	27.00	30.46	35.66	40.86	51.25	72.03
MINIMUM H = 4.84												
	Y	45				1.12	3.94	6.77	11.02	15.26	23.74	40.71
	L1	45					13.74	16.56	20.81	25.05	33.53	50.50
	L2	45					21.16	23.99	28.24	32.48	40.96	57.93
	Z	45					22.45	24.45	27.45	30.45	36.45	48.45
MINIMUM H = 8.80												
	Y	60					0.11	2.42	5.89	9.35	16.28	20.13
	L1	60							16.30	19.77	26.70	20.55
	L2	60							26.21	29.67	36.60	50.46
	Z	60							24.19	25.93	29.39	26.32
MINIMUM H = 13.45												
	Y	90								2.75	8.75	20.75
	L1	90									19.94	31.94
	L2	90									34.80	46.80
	Z	90									23.53	23.53
MINIMUM H = 23.53												

Handle Removal and Replacement (Serial Number AAJ7300 and above)

The handle of the 555 is designed to be removable. This feature is convenient when performing complex bending, and makes it easy to replace a damaged handle.

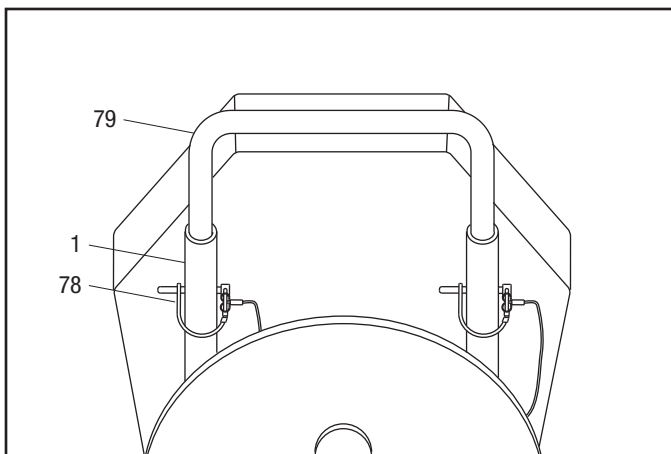
Removal

1. Place the bender in the upright position.
2. Release the spring clip on the safety snap pin (78).
3. Remove the pin from the handle (79) and the sleeve of the frame (1).
4. Repeat Steps 1 through 3 for the other end of the handle.
5. Lift the handle to remove.

Replacement

1. Insert the handle (79) into the sleeves of the frame (1).
2. Align the holes in the handle with the holes in the sleeves.
3. Insert the safety snap pin (78). Ensure that the pin goes through the handle and the sleeve on the frame (1).
4. Engage the safety spring clip over the end of the pin. Ensure that the loop on the clip is completely around the pin.
5. Repeat Steps 2 through 4 for the other end of the handle.

Removing or Replacing Handle



Transportation

⚠ WARNING

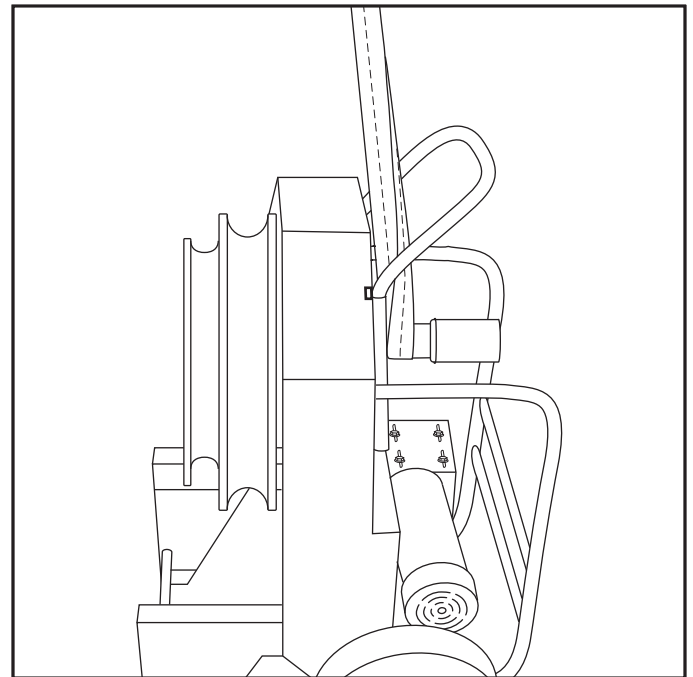
Make sure that the handle is properly installed and secured with the safety spring clips and snap pins before lifting or moving the bender. An improperly installed handle could allow the bender to fall, injuring nearby personnel.

Failure to observe this warning could result in severe injury or death.

The only proper way to lift this bender is by attaching a nylon or polyester sling around the storage spindle. The sling should extend between the handle and main frame of the bender so that the handle acts as a guide for the sling, as shown.

Make sure that all components used to lift this bender are properly rated for the 167 kg (368 lb) weight. Use a ramp to load and unload from a truck or other vehicle that is not equipped with a lift gate.

Transporting Bender




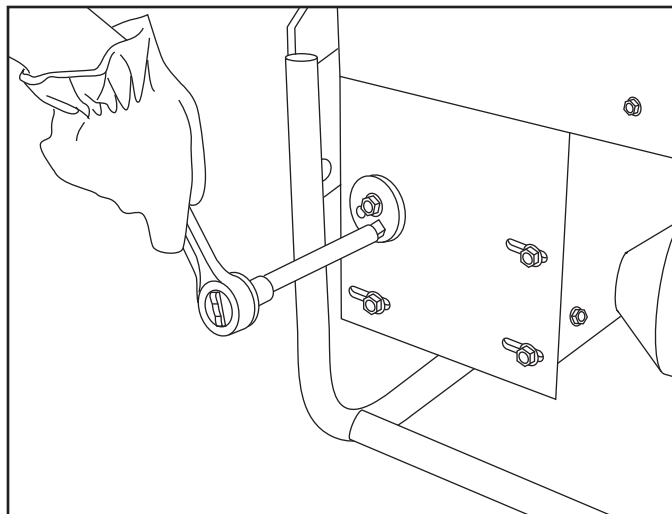
Maintenance

There is no need for periodic flushing and replacing of lube in the bender gear box since it is sealed and locked tight. However, if the box is opened for repair and the lube is lost or contaminated by dirt, then the box and parts should be flushed out and filled with 26 fluid ounces of Mobil® 634 synthetic oil.

Flushing should be accomplished with kerosene, which is a petroleum hydrocarbon that does not affect seals.

Note: Aromatic hydrocarbons such as benzene, chlorinated solvents such as carbon-tetrachloride, and ketones such as acetone should never be used for flushing as they are solvents for rubber. They are also harmful to the environment.

	⚠ WARNING
	<p>Disconnect this tool when not in use, before servicing or adjusting, and when changing shoes or conduit rollers and supports.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

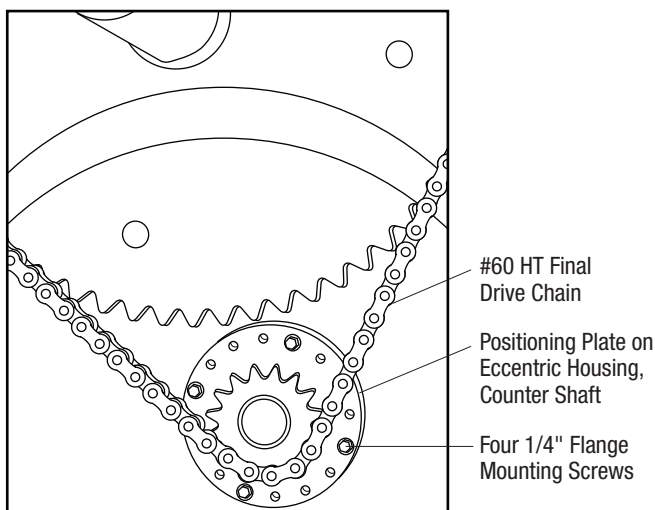
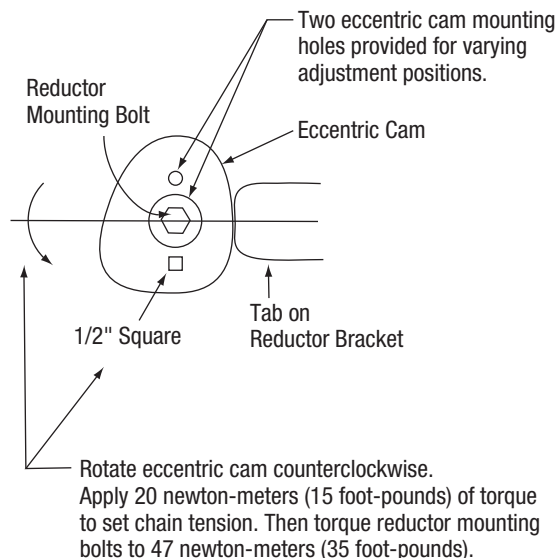


With the eight reductor mounting bolts (22, 24) loose, rotate the eccentric cam with a 1/2" square drive to tension the chain. Torque the eight reductor mounting bolts to 47 newton-meters (35 foot-pounds).

Chain Adjustment

Both chains have to be adjusted if the final drive #60 chain is to be reset. Refer to the Illustration and Parts List.

1. Remove the front cover (38) and upper rear guard (37).
2. Loosen the eight mounting bolts for the reductor (19). Remove the eccentric cam and move the reductor to create chain slack.
3. Remove the four retaining screws for eccentric adjustment. Rotate to remove slack from the chain and align with one of the two sets of holes in the frame. Remount the eccentric with the four bolts.
4. Slide the reductor in slotted mounting holes to the retention chain. Set tension with the eccentric cam.



Maintenance (cont'd)

Electrical Control Unit Removal



⚠ WARNING

Disconnect power supply before servicing bender. Servicing to be done only by trained service technician.

Failure to observe this warning could result in severe injury or death.

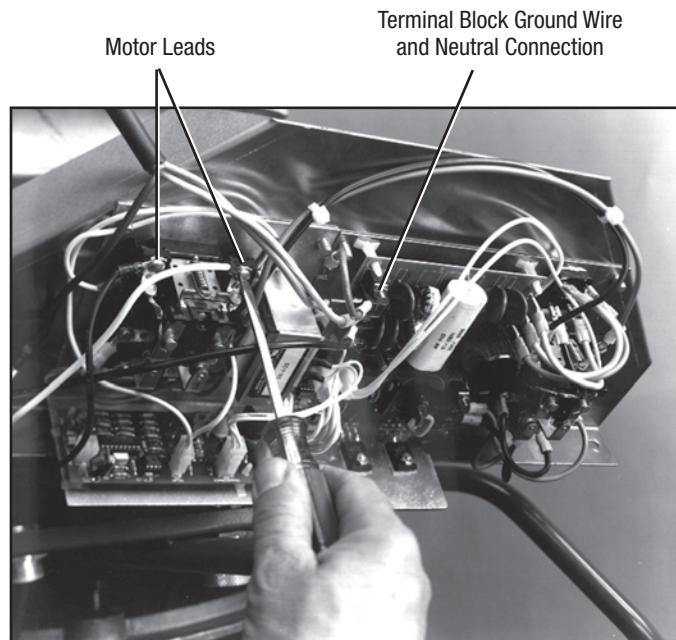
1. Remove the cover retained by ten 5/16 hex screws.
2. Disconnect the pendant switch plug from the circuit board and remove through the cord grip.
3. Remove two hex mounting screws, one on each side.



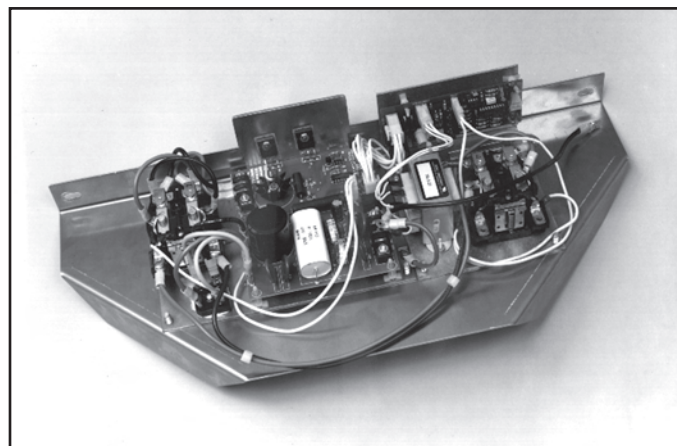
3/8" Hex
Mounting Screw

Line Connection
at Circuit Breaker

4. Remove the motor leads, power cord ground wire, and neutral wire before the control unit can be totally removed from the bender.



Electrical control removed from bender.




Troubleshooting

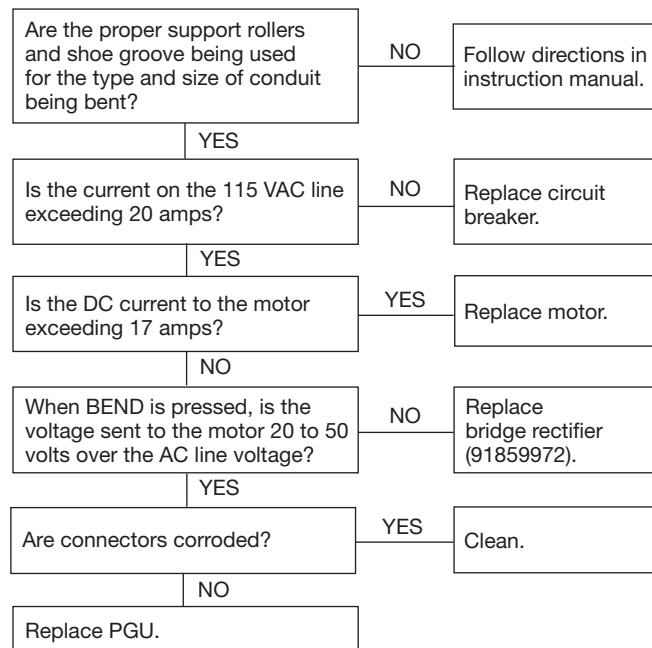
Problem	Probable Cause	Possible Remedy
Bender will not operate.	No voltage.	Check supply voltage circuit operation.
		Check that switch is on.
Bends are overbent a few degrees.	Too much squeeze on 1-1/2" or 2" EMT or IMC conduit.	Back squeeze off per adjustment instructions.
	Unusual conduit characteristics.	Bend smaller angle to compensate.
Bends are underbent a few degrees.	Too little squeeze on 1-1/2" or 2" EMT or IMC conduit.	Increase squeeze per adjustment instructions.
	Unusual conduit characteristics.	Bend larger angle to compensate.

Troubleshooting (cont'd)

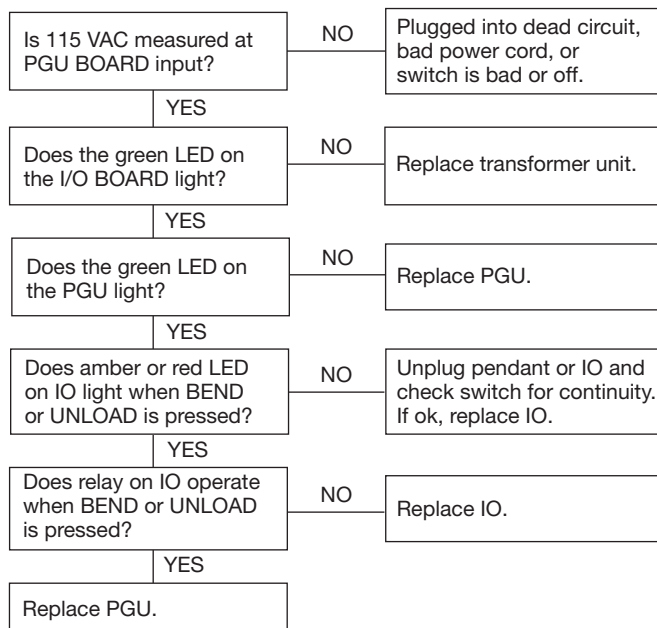
The following flow charts show the suggested troubleshooting procedures for some bender problems. They by no means encompass all possible problems or solutions.

	⚠ WARNING
	<p>Electric shock hazard:</p> <ul style="list-style-type: none"> • Contact with live circuits can result in severe injury or death. • Some troubleshooting steps require power to the bender. This type of troubleshooting step should only be performed at authorized Greenlee service centers by personnel who are familiar with safe troubleshooting procedures. <p>Failure to observe these warnings could result in severe injury or death.</p>

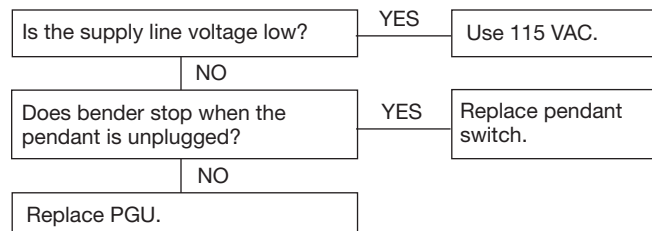
Trips circuit breaker



Won't bend



Won't stop



Bender only runs in one direction

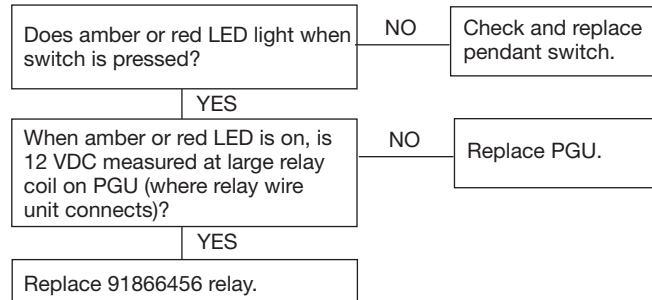
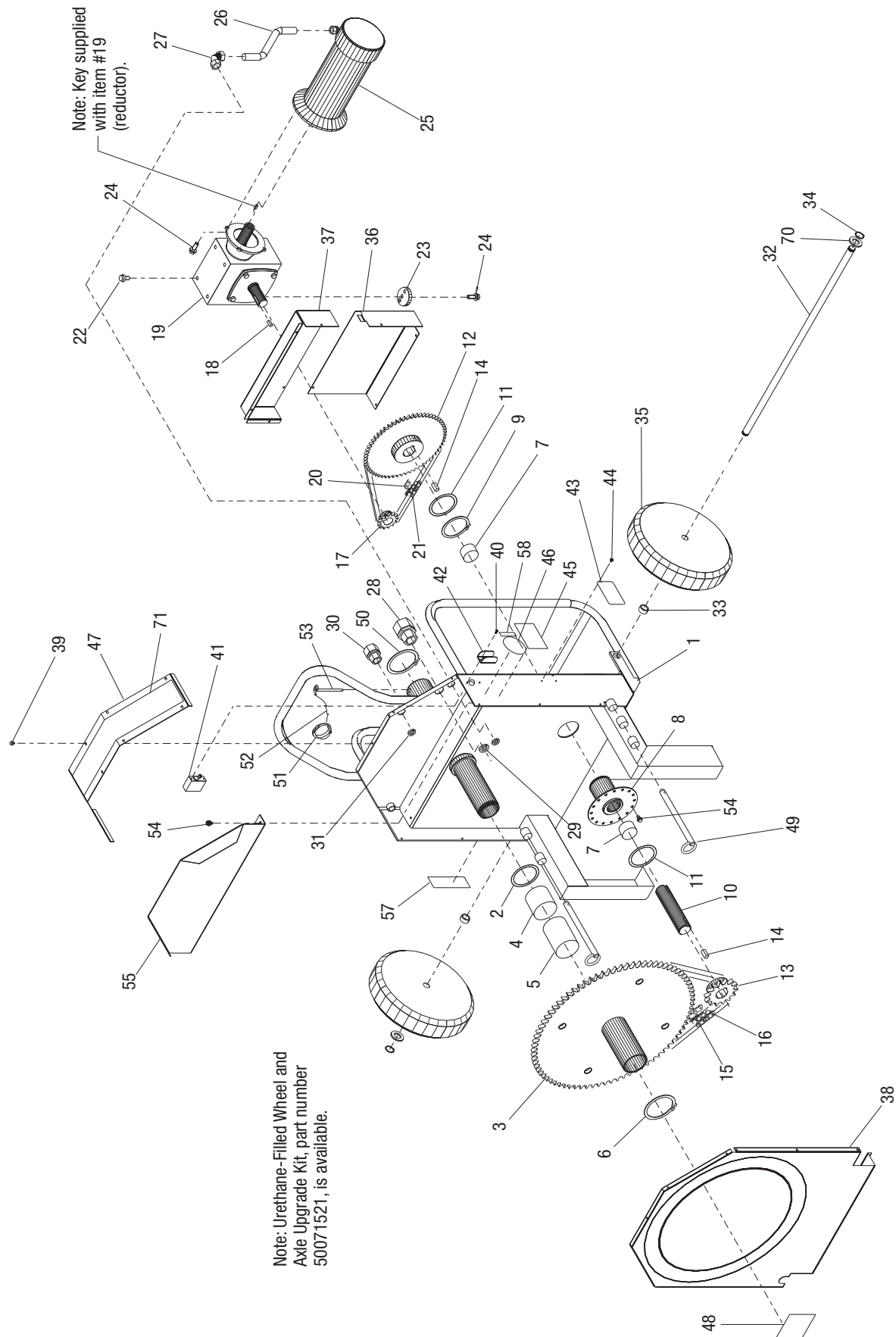
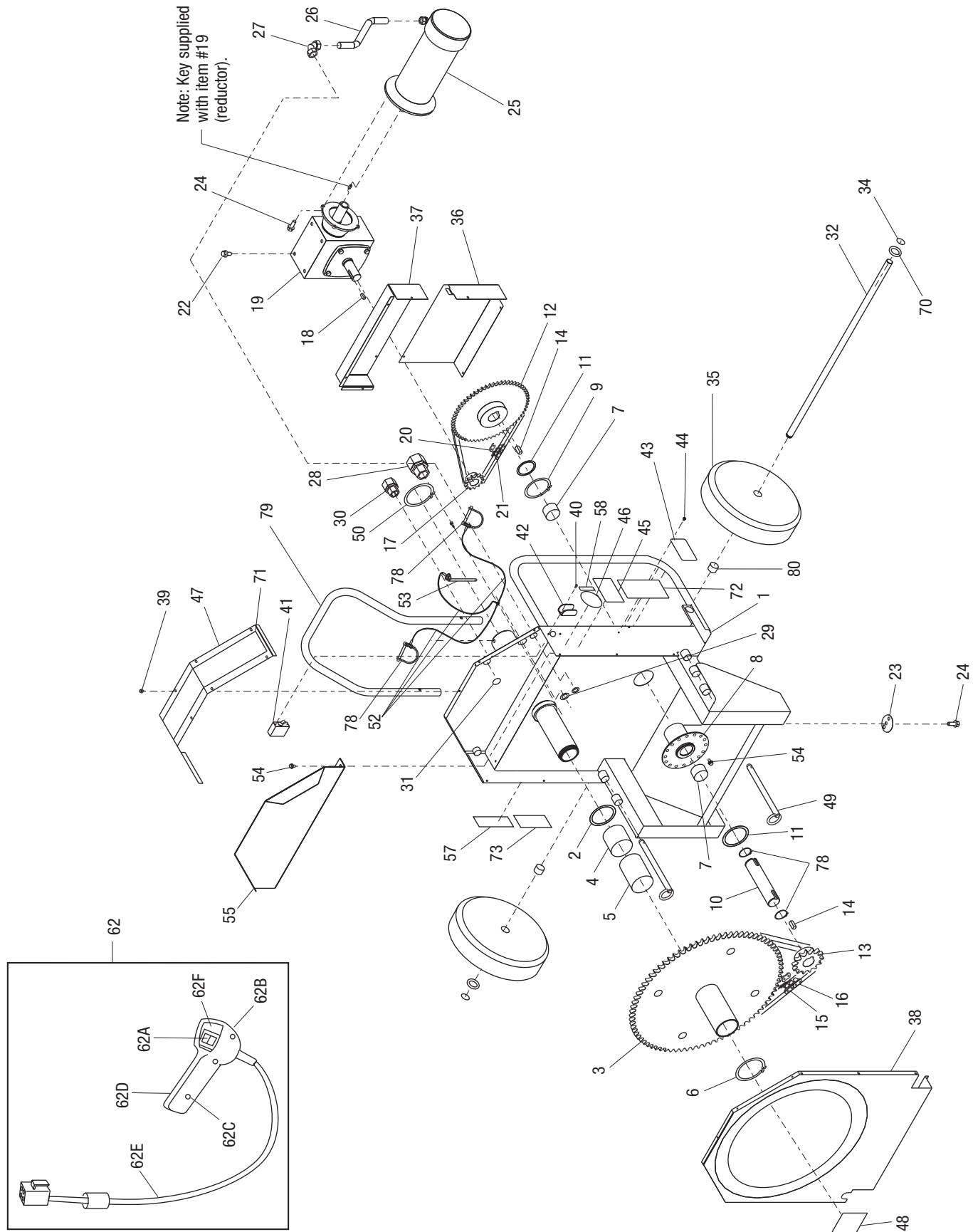


Illustration — 555® Electric Bender



Parts List — 555® Electric Bender

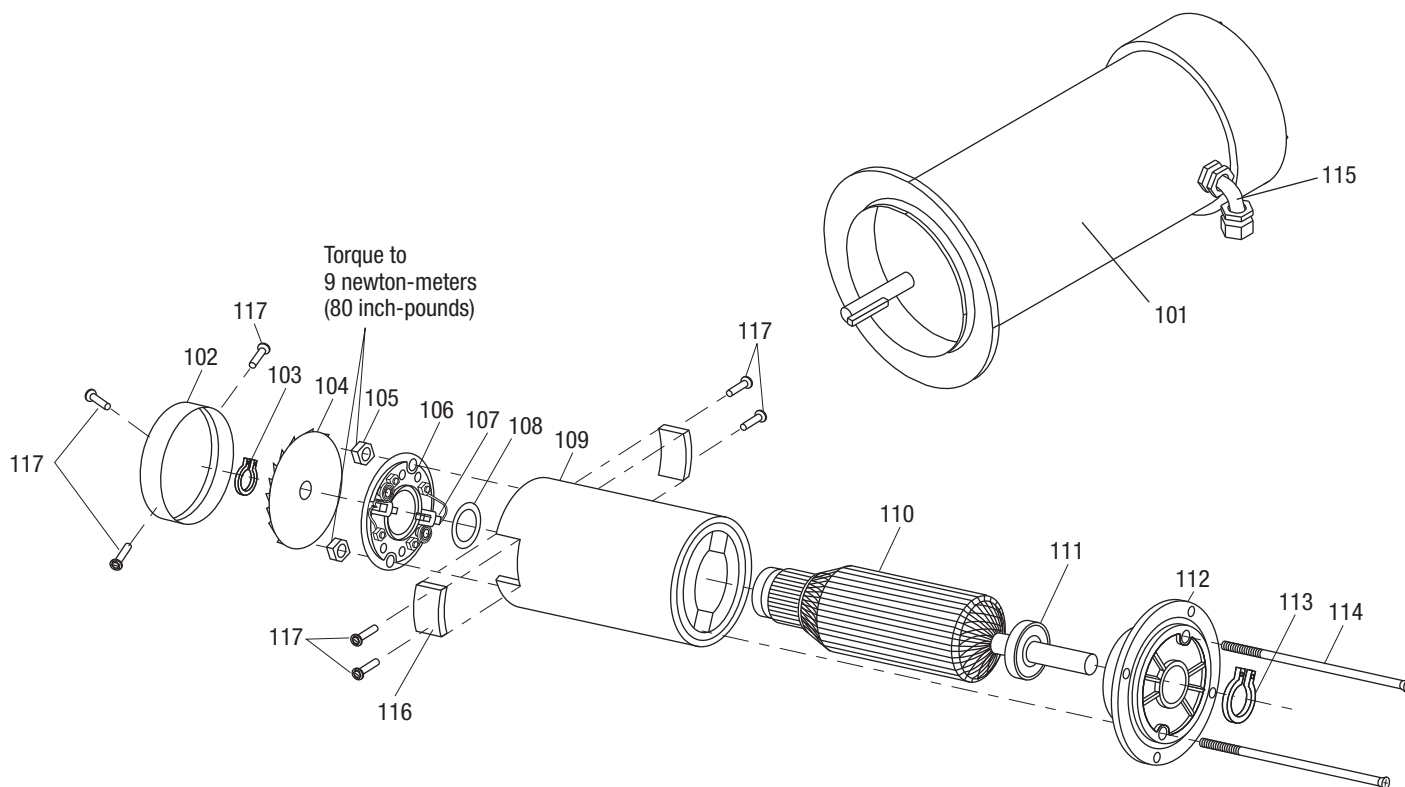
Key	Part No.	Description	Qty	Key	Part No.	Description	Qty
1	50397427	Weldment, Main Frame.....	1	30	91867673	Strain Relief, Pendant Switch	1
2	50234528	Washer, Fiber	1	31	91862639	Nut, 1/2 Conduit Lock	1
3	50328964	Weldment, Sprocket Unit.....	1	32	50397575	Axle	1
4	90524098	Bearing, Fiberglide ø2.625 x 2.5 long	1	33	50397672	Bushing, Spacer	2
5	90524101	Bearing, Fiberglide ø2.625 x 3.75 long	1	34	90515285	Ring, Retaining #5160-75	2
6	90524144	Ring, Retaining #5100-237	1	35	90533909	Wheel	2
7	90524128	Bearing, Fiberglide ø1.625 x 1.00 long	2	36	50397680	Guard, Rear Lower.....	1
8	50397630	Weldment, Countershaft	1	37	50397699	Guard, Rear Upper.....	1
9	90540239	Ring, Retaining #5100-250	1	38	50397605	Cover, Front	1
10	50397648	Shaft, Counter.....	1	39	90516559	Screw, #10-16 x .50 Hex Head	30
11	90524136	Bearing, Thrust Fiberglide.....	2	40	90504305	Screw, #6-32 x .375 Phillips	2
12	90545486	Sprocket, #40 60T	1	41	91863856	Switch, Air Pax.....	1
13	52047256	Sprocket, #60 12T	1	42	50297082	Guard, Switch	1
14	52047257	Key, Countershaft	2	43	50259288	Nameplate.....	1
15	90545460	Chain, #60 87P	1	44	90530012	Rivet, pop 1/8 x 1/8 Drive	4
16	90542517	Masterlink, #60	1	45	50190539	Decal, Voltage.....	1
17	90545478	Sprocket, #40 13T	1	46	50303929	Decal, Damp Warning	1
18	50398253	Key, Reductor Sprocket.....	1	47	50397591	Cover, Top	1
19	90523881	Reductor, Worm Gear	1	48	50351915	Decal, Safety.....	1
20	90527879	Masterlink, #40	1	49	90533895	Pin, Hitch	2
21	90545516	Chain, #40 87P	1	50	90525019	Ring, Retaining #5100-287	1
22	90545680	Bolt, 3/8-16 UNC x .75.....	7	51	90542797	Tie, Wrap.....	4
23	50397583	Eccentric	1	52	90545524	Lanyard	1
24	90542371	Bolt, 3/8-16 UNC x 1.00.....	5	53	90545451	Pin, Hitch	1
25	91864178	Motor	1	54	90543351	Screw, 1/4 x .37 Thread Forming.....	6
26	90545494	Conduit, Sealtight	1	55	50398229	Bracket, Mounting, Electrical.....	1
27	91852145	Elbow, Sealtight	1	57	50339370	Decal, Squeeze Adjust.....	1
28	91866839	Strain Relief.....	1	58	50389742	Decal, Circuit Breaker	1
29	90511700	Nut, 3/4 Conduit Lock	1	68	90543351	1/4-14 Hex, Screw.....	8
				70	90517407	Washer, Flat	2
				71	50024973	Decal, Instruction.....	1

Illustration — 555® Electric Bender (Serial Number AAJ7300 and above)


Parts List — 555® Electric Bender (Serial Number AAJ7300 and above)

Key	Part No.	Description	Qty	Key	Part No.	Description	Qty
1	50397427	Weldment, Main Frame.....	1	37	50397699	Guard, Rear Upper.....	1
2	50234528	Washer, Fiber	1	38	50397605	Cover, Front	1
3	50328964	Weldment, Sprocket Unit.....	1	39	90516559	Screw, #10–16 x .50 Hex Head	31
4	90524098	Bearing, Fiberglide ø2.625 x 2.5 long	1	40	90504305	Screw, #6–32 x .375 Phillips	2
5	90524101	Bearing, Fiberglide ø2.625 x 3.75 long	1	41	91863856	Switch, Air Pax.....	1
6	90524144	Ring, Retaining #5100-237	1	42	50297082	Guard, Switch	1
7	90524128	Bearing, Fiberglide ø1.625 x 1.00 long	2	43	50069055	Nameplate.....	1
8	50397630	Weldment, Countershaft	1	44	90530012	Rivet, pop 1/8 x 1/8 Drive	4
9	90540239	Ring, Retaining #5100-250	1	45	50190539	Decal, Voltage.....	1
10	50397648	Shaft, Counter.....	1	46	50303929	Decal, Damp Warning.....	1
11	90524136	Bearing, Thrust Fiberglide.....	2	47	50397591	Cover, Top.....	1
12	90545486	Sprocket, #40 60T	1	48	50351915	Decal, Safety.....	1
13	90542533	Sprocket, #60 14T	1	49	90533895	Pin, Hitch	2
14	50397656	Key, Countershaft	2	50	90525019	Ring, Retaining #5100-287	1
15	90545460	Chain, #60 87P	1	52	90545524	Lanyard	3
16	90542517	Masterlink, #60	1	53	90545451	Pin, Hitch	1
17	90545478	Sprocket, #40 13T	1	54	90543351	Screw, 1/4 x .37 Thread Forming.....	14
18	50398253	Key, Reductor Sprocket.....	1	55	50398229	Bracket, Mounting, Electrical.....	1
19	90523881	Reductor, Worm Gear	1	57	50339370	Decal, Squeeze Adjust.....	1
20	90527879	Masterlink, #40	1	58	50389742	Decal, Circuit Breaker	1
21	90545516	Chain, #40 87P	1	62	50398393	Switch, Pendant.....	1
22	90545680	Bolt, 3/8–16 UNC x .75.....	7	62A	91864496	Switch, Center Off	1
23	50397583	Eccentric	1	62B	50319027	Handle, Right Half.....	1
24	90542371	Bolt, 3/8–16 UNC x 1.00.....	5	62C	90534417	Screw, #6–20 x .625 Pan Head, Self-Tapping.....	3
25	91864178	Motor	1	62D	50319019	Handle, Left Half	1
26	90545494	Conduit, Sealtight	1	62E	50398377	Cord	1
27	91852145	Elbow, Sealtight	1	62F	50354876	Decal, Face Plate.....	1
28	91866839	Strain Relief.....	1	70	90517407	Washer, Flat	2
29	90511700	Nut, 3/4 Conduit Lock	1	71	50024973	Decal, Instruction.....	1
30	91867673	Strain Relief, Pendant Switch	1	77	90510518	Ring, Retaining #5100-150	2
31	91862639	Nut, 1/2 Conduit Lock	1	78	90552687	Pin, Safety Snap	2
32	50397575	Axle.....	1	79	50397486	Handle, Upper.....	1
34	90515285	Ring, Retaining #5160-75	2	80	50069195	Sleeve, Axle	2
35	90552679	Wheel, Urethane Filled.....	2				
36	50397680	Guard, Rear Lower.....	1				

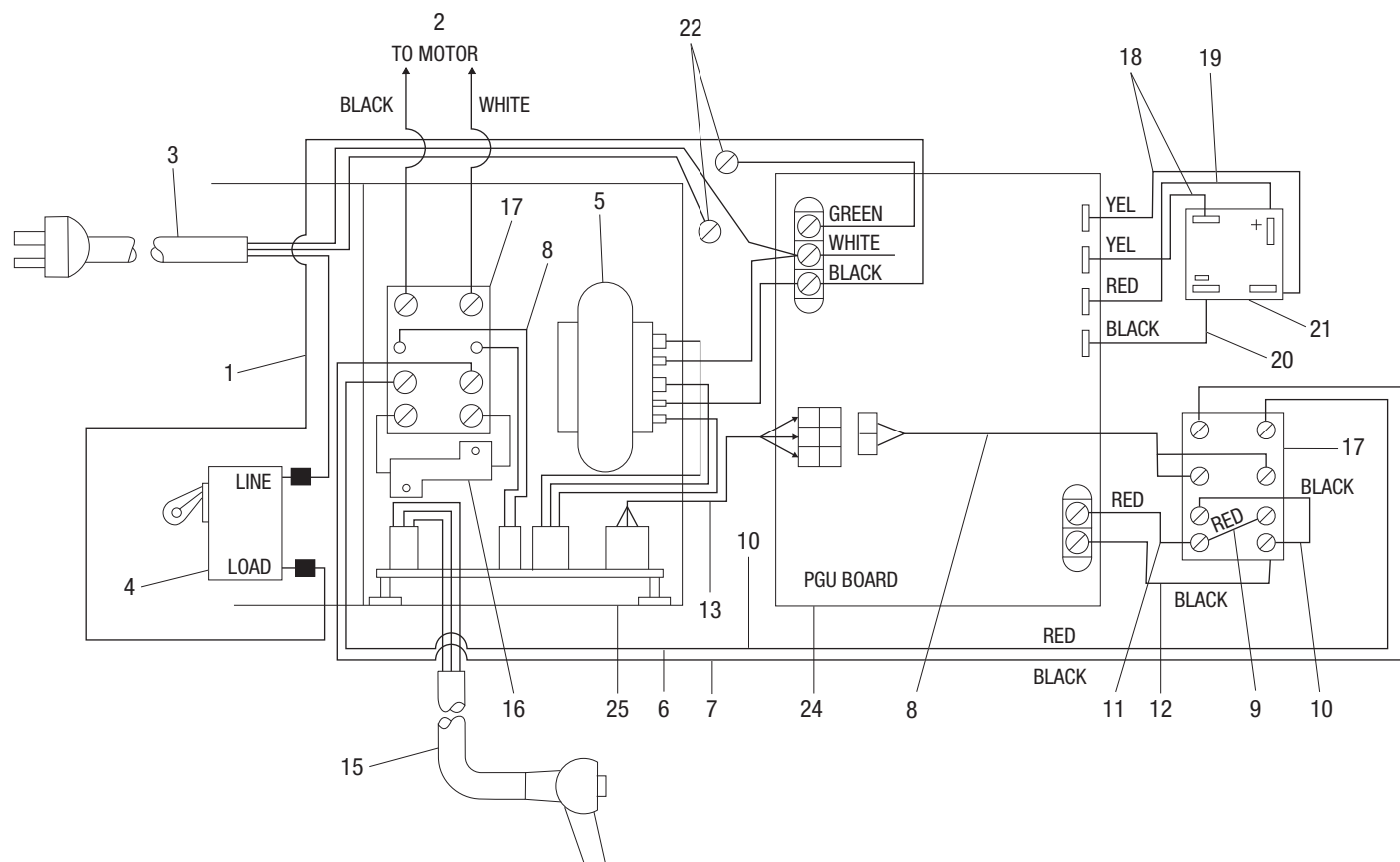
Illustration and Parts List — 115 Volt Motor



Pacific Scientific

Key	Part No.	Description	Qty
101	91864178	Motor, 115 Volt (standard).....	1
102	91864712	Fan Cover.....	1
103	90550714	Retaining Ring.....	1
104	91864321	Fan	1
105	91864283	End Bell Nut	2
106	91864194	Bell, Rear End	1
107	91864208	Brush.....	2
108	91864224	Thrust Washer	1
109	91864275	Shell and Magnet Assembly, 115V	1
110	91864259	Armature, 115V	1
111	91864216	Bearing Kit	2
112	91864186	Bell, Front End	1
113	91864240	Retaining Ring.....	1
114	91864267	Tie Bolt, 115V.....	2
115	91858763	90° Connector.....	1
116	91864305	Brush Cover	2
117	91864313	Cover Screw.....	7

Electrical Control System Layout



Key	Part No.	Description
1	50389416	PGU Power Wire
2	91864178	Motor
3	50386034	Power Cord
4	91863856	Switch Circuit Breaker
5	91867690	Transformer Unit
6	50398474	Wire Unit, Red
7	50398482	Wire Unit, Black
8	50386395	Relay Wire Unit
9	50386409	Red Relay Wire
10	50381750	Black Relay Wire
11	50389610	Red Relay, PGU Wire
12	50389602	Black Relay, PGU Wire

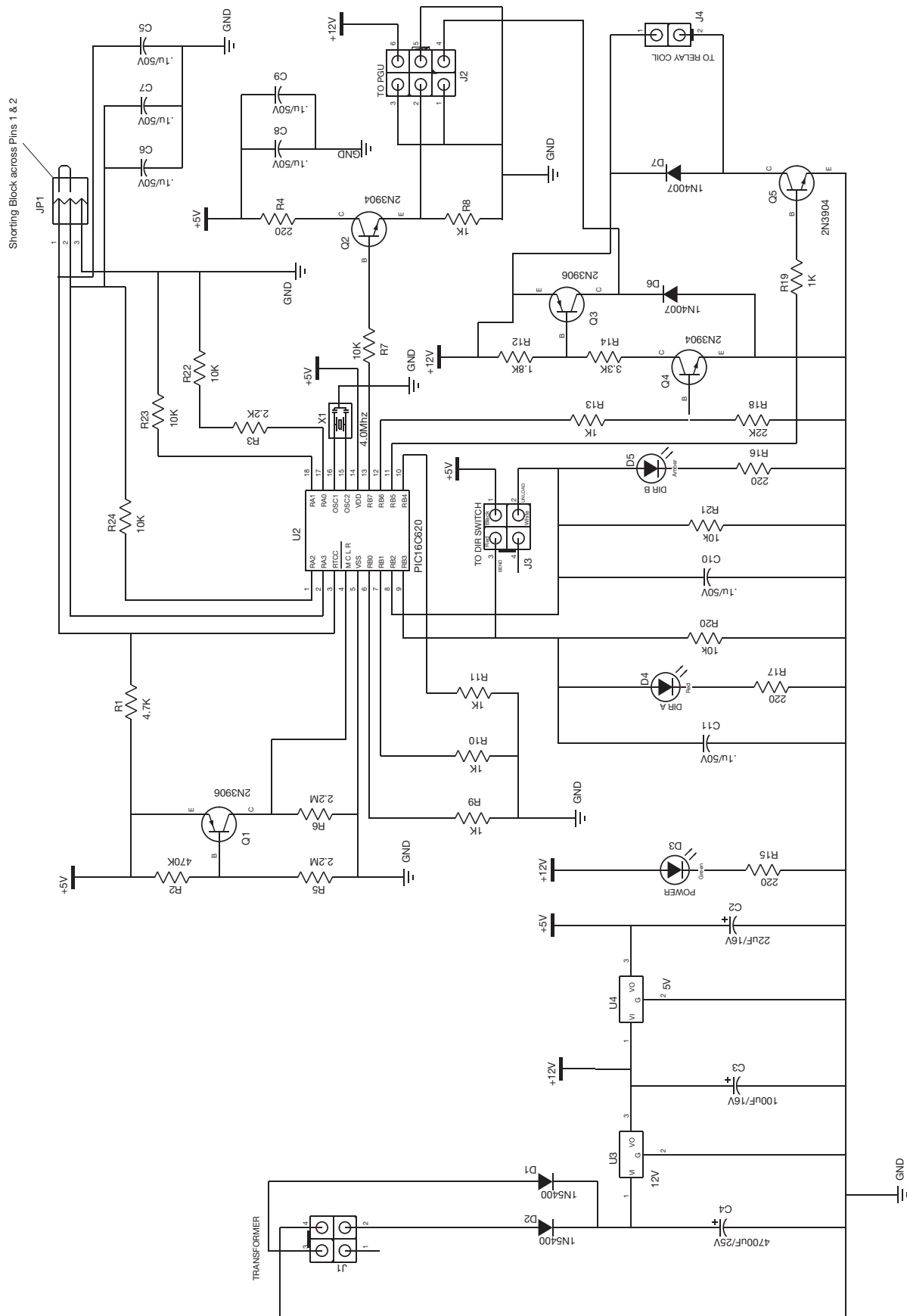
Key	Part No.	Description
13	50398466	IO-PGU Wire Unit
14	50389424	Ground Jump Wire
15	50398393	Switch Unit, Pendant
16	91867720	Resistor Unit
17	91866456	Contactor
18	50386433	Yellow Rectifier Wires
19	50386425	Red Rectifier Wire
20	50386417	Black Rectifier Wire
21	91859972	Rectifier
22	90543297	Ground Screw
24	50383132	Power Generation Board
25	50398458	Input-Output Brake Control Assembly

- Notes:
- Relay K2 mounted off-board.
 - Bridge rectifier mounted off-board.
 - All resistors 1/4W unless noted.

Parts List — Power Generation Unit

Greenlee No.	Location	Description	Value	Manufacturer	Part No.
—	R1-R2	Resistor	4.7 K Ω / 1/4 w / 5%	—	—
—	R3, R5, R6, R8, R11, R12	Resistor	10 K Ω / 1/4 w / 5%	—	—
—	R4	Resistor	22 Ω / 1/4 w / 5%	—	—
—	R7	Resistor	68 K Ω / 1/4 w / 5%	—	—
—	R9	Resistor	.04 Ω / 5 w / 1%	Dale	LVR-5 .04 Ω
—	R13	Resistor	320 / 1/4 w / 5%	—	—
—	R14	Resistor	4.7 K Ω / 10 w / 5%	Dale	CW-10 4.7K
—	R10	Resistor	680 Ω / 1/4 w / 5%	—	—
—	R19	Resistor	20k Ω / 2w / 1%	Dale	RS-2B-20K
—	R21	Resistor	680 / 1/4 w / 5%	—	—
91866871	D1	Diode	—	Semikron	SKR2F17
—	D2, D6	Zener Diode	IN4744-DO-41	Motorola	IN 4744
—	D3, D4	Diode	IN914	Motorola	IN 914
—	D7	Diode	IN 4007	Mototola	IN 4007
—	C1, C2	Capacitor	1mf / 50v	Philips	CY-30 C105M
—	C3	Capacitor	10mf / 250 VAC	American	10mf / 250VAC
—	C4	Capacitor	330mf / 25v	Nichicon	1E331MPA
91868629	C5	Capacitor	1000uF/250V	—	—
91868610	Q2	Mosfet	IXFH40N30	IXYS	IXFH40N30
91866880	K1	Relay	T81H5D312-05	P & B	T81H5D312-05
91866456	Off Board	Relay	PRD-11DY0-12	P & B	PRD-11DY0-12
—	L1, L2	Inductor	HL-8196	Hurricane	HL-8196
—	DSI	LED	LED T1-3/4 Green	HP	HLMP-3507
91866901	U1	IC	4049	Motorola	MC14049UBCP
91866910	U2	OPTO-Isolator	GN136N	HP	HCPL4502
91866928	U3, U4	IC	LM393	Motorola	LM393AN
91859972	Off Board	Rectifier	GBPC3504	GI	GBPC3504
—	D1	Heat Sink	—	Wakefield	695-1
50382705	Off Board	Heat Sink	—	Greenlee	—
—	J1	Connector	—	Beau	72503
—	J2	Connector	Mini-Fit Jr.	Molex	39-28-1063-P
—	J3, J7	Connector	Mini-Fit Jr.	Molex	39-28-1023-P
—	J4	Connector	—	Beau	72502
91866936	T1	Transistor	2N3904	Motorola	2N3904

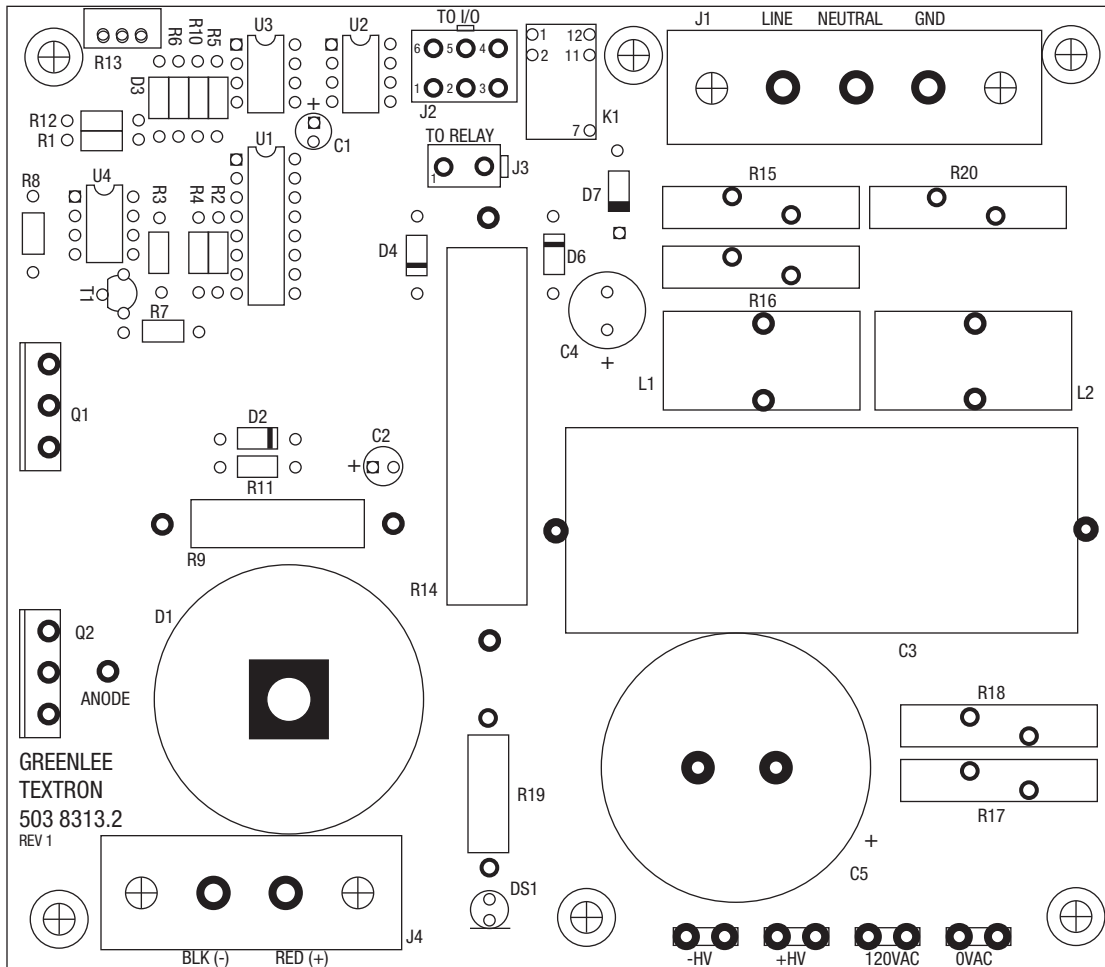
Schematic Diagram — IO Microprocessor



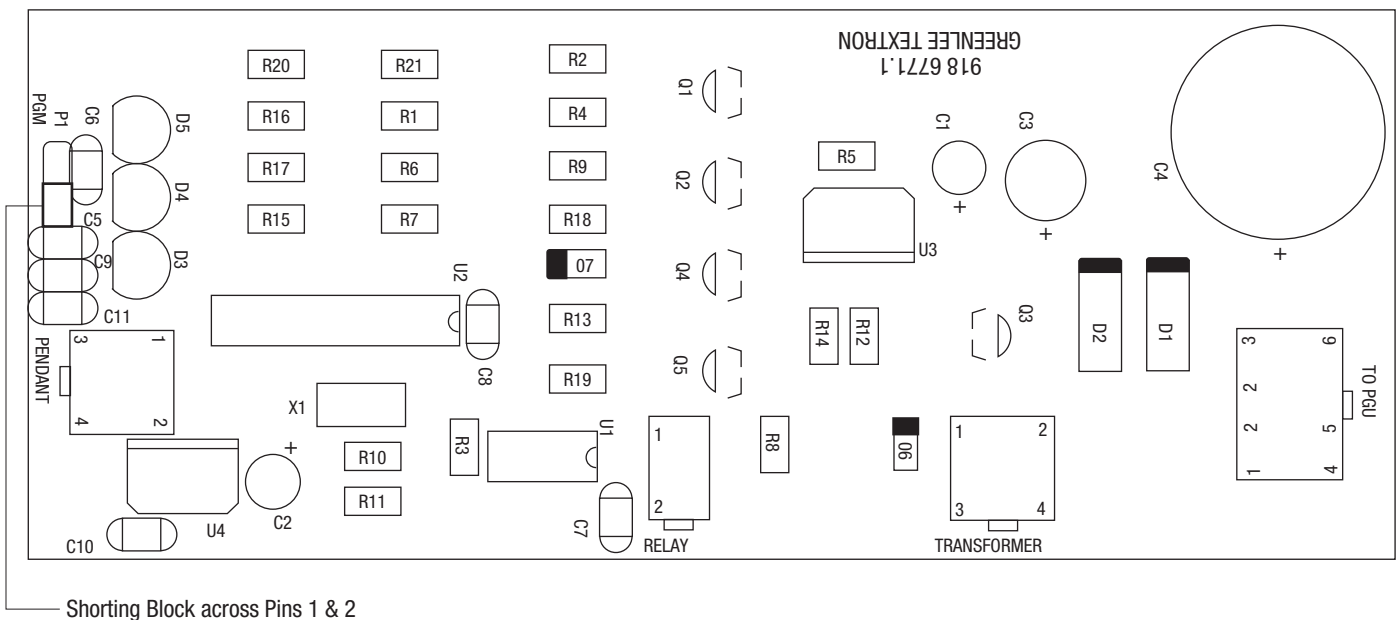
Parts List — IO Microprocessor

Quantity	Location	Description	Manufacturer	Part No.
2	D6, 7	IN4007	Motorola	IN4007
2	D1, 2	IN5400	Motorola	IN5400
3	Q2, 4, 5	2N3904	Motorola SGS Thomson	2N3904 2N3904
2	Q1, 3	2N3906	Motorola SGS Thomson	2N3906 2N3906
7	C5-11	.1U/50V	Philips	CY-20C104M
1	P1	1x3 Connector	Molex	22-03-2031
1	D3	Green LED	Panasonic	LN31GPHL
1	D4	Red LED	Panasonic	LN21RPHL
1	D5	Amber LED	Panasonic	LN41YPHL
1	U3	12V Reg	Motorola SGS Thomson	MC7812CT L7812CV
1	U4	5V Reg	Motorola SGS Thomson	MC7805CT L7805CV
1	J4	MF J2 Connector	Molex	3902801023
1	J1, 3	MF J4 Connector	Molex	39-28-1043
1	J2	MF J6 Connector	Molex	39028-1063
1	U2	Programmed PIC16C620	Greenlee Textron	91868696
1	C2	22UF/16V	Nichicon	UKB1C220KAA
1	C3	100UF/16V	Nichicon	UKB1C101KPA
1	C4	4700UF/25V	Panasonic	ECO-S1EP472AA
1	R1	4.7K/.25W/5%	Carbon Film (C.F.)	
6	R8-11, 13, 19	1K/.25W/5%	C.F.	
1	R12	1.8K/.25W/5%	C.F.	
1	R14	3.3K/.25W/5%	C.F.	
2	R3, 15	2.2K/.25W/5%	C.F.	
3	R4, 16, 17	220/.25W/5%	C.F.	
1	R18	22K/.25W/5%	C.F.	
1	R2	470K/.25W/5%	C.F.	
1	R7, 20, 21	10K/.25W/5%	C.F.	
2	R5, R6	2.2M/.25W/5%	C.F.	
1	X1	4 MHZ Resonator	Panasonic Murata	EFO-GC4004A4 CST - 4.00 MWG
1		PC Board	FR4, Double-Sided, 0.062"	
1	U2	18 pin .3 DIP Socket	Various	
1	P1	2 pin Shorting Block across Pins 1 & 2	Various	

Layout Diagram — Power Generation Board



Layout Diagram — IO and Microprocessor Board



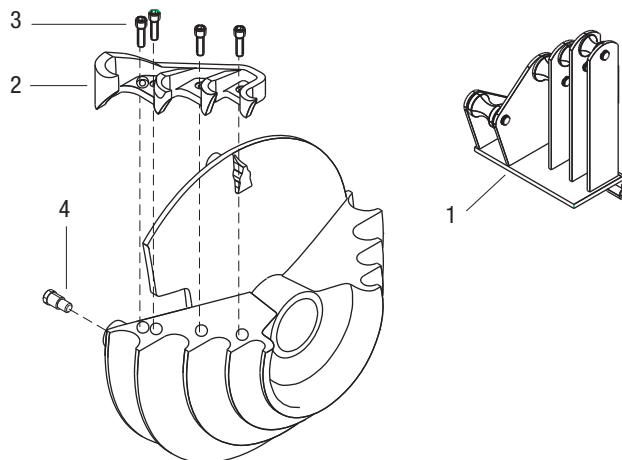
Shorting Block across Pins 1 & 2

Bending Shoes and Roller Supports

Bending Shoe and Roller Support 1/2" to 1-1/4" IMC and Rigid Conduit

Key	Part No.	Description	Qty
1	50009362	Roller Support, 1/2" to 1-1/4" IMC and Rigid.....	1
	50005715	Bending Shoe Assembly (includes items 2-4)	1
2	50005693	Hook	1
3	90510887	3/8-16 UNC x 1-1/4" Socket Head Cap Screw	4
4	50234226	Stud, Drive	3

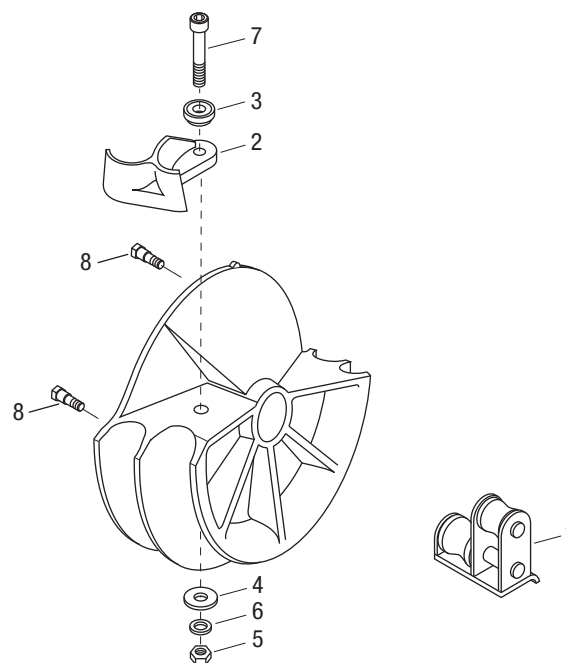
Shoe not available separately.



Bending Shoe and Roller Support 1-1/2" to 2" Rigid Conduit

Key	Part No.	Description	Qty
1	50179845	Roller Support, 1-1/2" to 2" Rigid Conduit.....	1
	50179373	Bending Shoe Assembly, 1-1/2" to 2" Rigid Conduit (includes items 2-8)	1
2	50179691	Pipe Hook	1
3	50179748	Pivot.....	1
4	90526759	5/8 Flat Washer.....	1
5	90515692	5/8-11 UNC Hex Nut	1
6	90509056	5/8 Split Lockwasher	1
7	90524268	5/8-11 UNC x 4" Socket Head Cap Screw	1
8	50234226	Stud, Drive	4

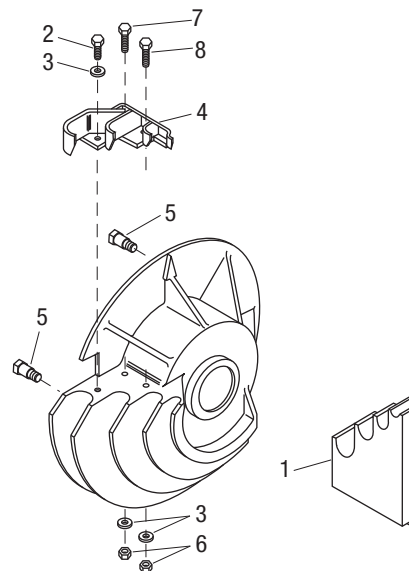
Shoe not available separately.



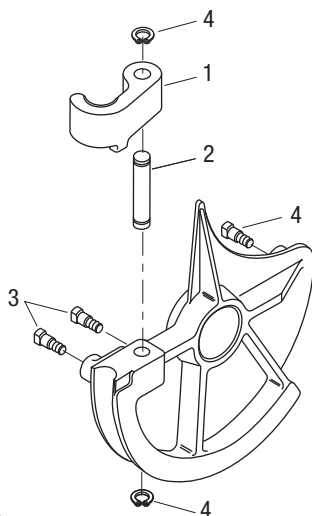
Bending Shoe and Pipe Rest 1/2" to 1-1/4" EMT Conduit

Key	Part No.	Description	Qty
1	50179861	Pipe Rest Assembly for 1/2" to 1-1/4" EMT Conduit.....	1
	50179446	Bending Shoe Assembly for 1/2" to 2-1/4" EMT Conduit (includes items 2-8)	1
2	90505972	3/8-16 UNC x Socket Head Cap Screw	1
3	90505069	3/8 Lockwasher (split).....	3
4	50245554	Pipe Hook	1
5	50234226	Stud, Drive	4
6	90506391	3/8-16 UNC Hex Nut, Cad. Plated	2
7	90505328	3/8-16 UNC x 1-1/4 SAE Grade 5 Socket Head Cap Screw	1
8	90510887	3/8-16 UNC x 1-1/4 Socket Head Screw	1

Shoe not available separately.

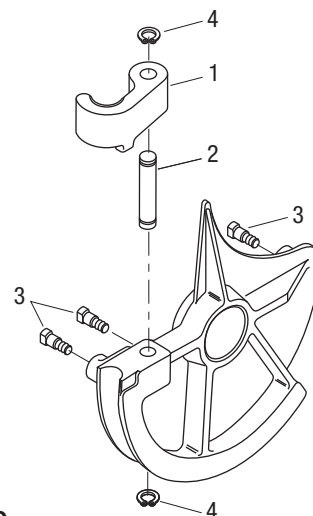


Bending Shoes and Roller Supports (cont'd)



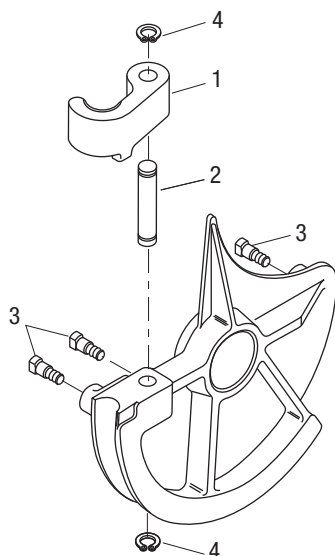
**Bending Shoe
1-1/2" EMT Conduit**

Key	Part No.	Description	Qty
	50234994	Shoe Unit, 1-1/2" EMT (includes items 1-4)	1
1	50188208	Hook, 1-1/2" EMT	1
2	50188410	Pin, 1-1/2" EMT Hook.....	1
3	50234226	Stud, Drive	3
4	90515293	Ring, Tru-Arc #5160-87 Retaining	2



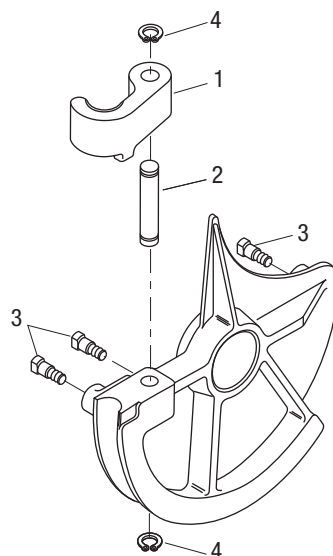
**Bending Shoe
1-1/2" IMC Conduit**

Key	Part No.	Description	Qty
	50253631	Shoe Unit, 1-1/2" IMC (includes items 1-4)	1
1	50188119	Hook, 1-1/2" IMC.....	1
2	50188372	Pin, 1-1/2" IMC	1
3	50234226	Stud, Drive	3
4	90515285	Ring, Tru-Arc Retaining.....	2



**Bending Shoe
2" EMT Conduit**

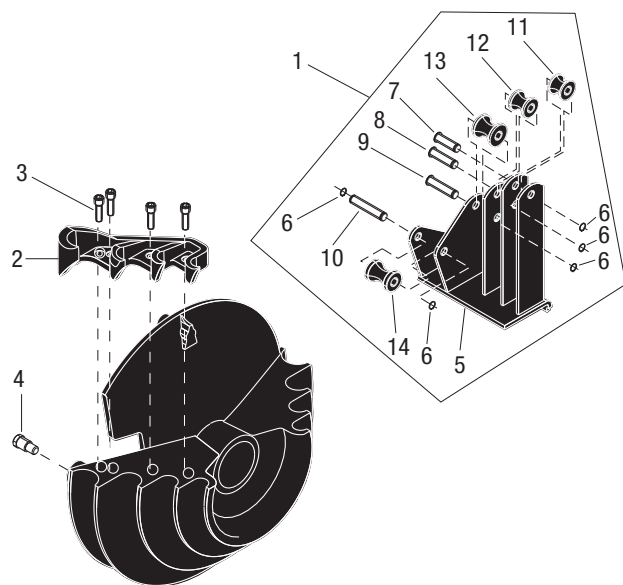
Key	Part No.	Description	Qty
	50235052	Shoe Unit, 2" EMT Conduit (includes items 1-4)	1
1	50188186	Hook, 2" EMT	1
2	50188429	Pin, 2" EMT Hook	1
3	50234226	Stud, Drive	3
4	90515293	Ring, Tru-Arc #5160-87 Retaining	2



**Bending Shoe
2" IMC Conduit**

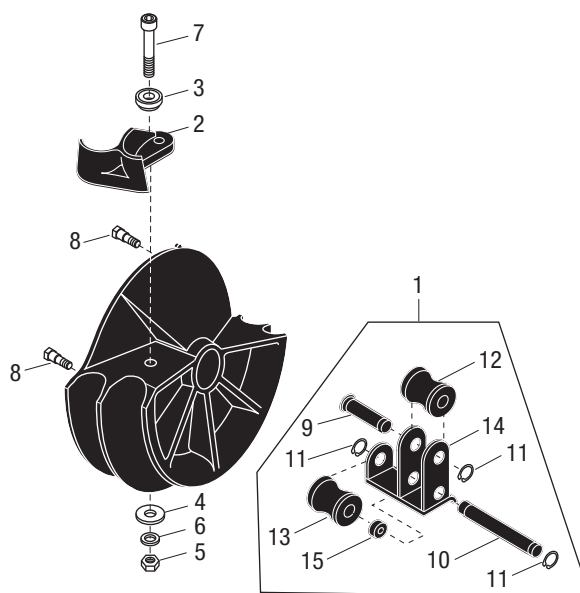
Key	Part No.	Description	Qty
	50252682	Shoe Unit, 2" IMC (includes items 1-4)	1
1	50001957	Hook, 2" IMC	1
2	50188429	Pin, 2" IMC.....	1
3	50234226	Stud, Drive	3
4	90515293	Ring, Tru-Arc Retaining.....	2

Bending Shoes and Roller Supports (cont'd)



Bending Shoe and Roller Support
1/2" to 1-1/4" 40 Mil PVC-Coated Rigid Conduit

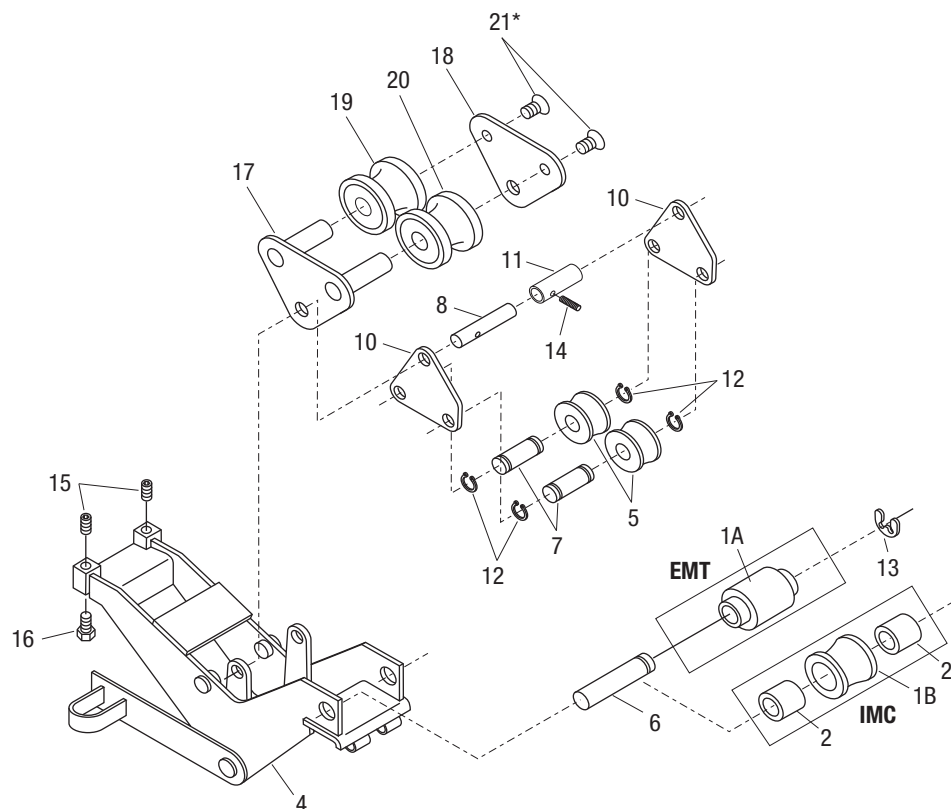
Key	Part No.	Description	Qty
1	50009460	Roller Support, 1/2" to 1-1/4" PVC-Coated Rigid (includes items 5–14)	1
	50005731	Bending Shoe Assembly, 1/2" to 1-1/4" PVC-Coated Rigid (includes items 2–4)	1
2	50005707	Hook	1
3	90510887	3/8–16 UNC x 1-1/4" Socket Head Cap Screw	4
4	50234226	Stud, Drive	3
5	50009451	Support Weldment, Roller.....	1
6	90513533	Retaining Ring.....	5
7	50009230	1/2" Roller Axle	1
8	50009249	3/4" Roller Axle	1
9	50009257	1" Roller Axle	1
10	50009265	1-1/4" Roller Axle.....	1
11	50009273	1/2" Roller	1
12	50009281	3/4" Roller	1
13	50009290	1" Roller	1
14	50009303	1-1/4" Roller.....	1



Bending Shoe and Roller Support
1-1/2" to 2" 40 Mil PVC-Coated Rigid Conduit

Key	Part No.	Description	Qty
1	50372823	Roller Support, 1-1/2" to 2" PVC-Coated Rigid (includes items 9–15)	1
	50372815	Bending Shoe Assembly, 1-1/2" to 2" PVC (includes items 2–8)	1
2	50024990	Hook	1
3	50179748	Pivot.....	1
4	90526759	5/8" Flat Washer	1
5	90515692	5/8–11 UNC Hex Nut	1
6	90509056	5/8" Lockwasher.....	1
7	90524268	5/8–11 UNC x 4" Socket Head Cap Screw	1
8	50234226	Stud, Drive	4
9	50376624	1-1/2" Shaft	1
10	50376616	2" Shaft.....	1
11	90515285	Retaining Ring.....	3
12	50372840	1-1/2" Roller.....	1
13	50372831	2" Roller	1
14	50376640	Support Weldment.....	1
15	50320254	Spacer.....	1

Bending Shoes and Roller Supports (cont'd)



EMT Roller Support Unit

Key	Part No.	Description	Qty
	50235419	Support Unit, 1-1/2" and 2" EMT Roller (includes all of the following).....	1
1A	50279831	Roller Unit, Cushioned.....	1
4	50235397	Frame Unit.....	1
5	50235109	Roller, 1-1/2" EMT.....	2
6	50235117	Pin, Roller Support.....	1
7	50239325	Pin, 1-1/2" EMT Roller.....	2
8	50235176	Pin, Roller Pivot.....	1
10	50235249	Plate, 1-1/2" EMT Pivot.....	2
11	50237934	Spacer.....	1
12	90515285	Ring, Retaining.....	4
13	90524640	Ring, Tru-Arc #X5133-98 External Series "E" Retaining.....	1
14	90514912	Rollpin, #59, -040-187-1250.....	1
15	90528484	Screw, 1/2-13 UNC x 3/4 Cup Pt. Skt. Set.....	2
16	90505425	Screw, 1/2-13 UNC x 1 Hex Head Cap.....	2
17	50349643	Support Weldment, 2" Roller.....	1
18	50349651	Plate, 2" Inner Roller Support.....	1
19	50235192	Roller, 2" EMT Front.....	1
20	50237926	Roller, 2" EMT Back.....	1
21*	90533941	Screw, 7/16-14 UNC x 1 Flat Head.....	2

IMC Roller Support Unit

Key	Part No.	Description	Qty
	50252739	Support Unit, 1-1/2" and 2" IMC Roller (includes items 1 and 2).....	1
1B	50283340	Roller.....	1
2	50283359	Spacer.....	2
4	50263250	Frame Unit.....	1
5	50252747	Roller, 1-1/2" IMC.....	2
6	50235117	Pin, Roller Support.....	1
7	50239325	Pin, 1-1/2" IMC Roller.....	2
8	50235176	Pin, Roller Pivot.....	1
10	50235249	Plate, 1-1/2" IMC Pivot.....	2
11	50237934	Spacer.....	1
12	90515285	Ring, Retaining.....	4
13	90524640	Ring, Tru-Arc #X5133-98 External Series "E" Retaining.....	1
14	90514912	Rollpin, #59, -040-187-1250.....	1
15	90528484	Screw, 1/2-13 UNC x 3/4 Cup Pt. Skt. Set.....	2
16	90505425	Screw, 1/2-13 UNC x 1 Hex Head Cap.....	2
17	50349643	Support Weldment, 2" Roller.....	1
18	50349651	Plate, 2" Inner Roller Support.....	1
19	50252798	Roller, 2" IMC.....	2
21*	90533941	Screw, 7/16-14 UNC x 1 Flat Head.....	2

*Key 21 must be torqued to 54 to 61 newton-meters (40 to 45 foot-pounds).



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