

INSTRUCTION MANUAL



855 Smart Bender[®] and 38650 Optional Deluxe Pendant

Serial No. ZW0001 - ZW1999



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

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Description

The 855 Smart Bender® is designed to bend 1/2" through 2" EMT, IMC and Rigid electrical conduit in bends of 0 through 90 degrees. The Smart Bender® operates similar to other Greenlee electric benders with the bending action accomplished through a rotating shoe with a hook and stationary roller conduit supports.

Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This 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 following Greenlee tool:

855 Smart Bender®

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge.

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

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 V, 20 A receptacle on a ground fault-protected circuit only. Refer to "Grounding Instructions."
- Do not modify the power cord or plug.
- Inspect the power cord before use. Repair or replace the cord if damaged.
- Disconnect the unit from power before servicing.

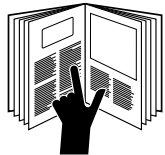
Failure to observe these warnings can result in severe injury or death.



⚠ WARNING

- Do not expose to rain.
- Do not use in wet or damp locations.
- Do not immerse the pendant switch in water or any other liquid.

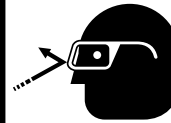
Failure to observe these warnings can result in severe injury or death.



⚠ 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 can result in severe injury or death.



⚠ WARNING

Wear eye protection when operating or servicing this tool.

Failure to wear eye protection can 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 can result in severe injury or death.

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


IMPORTANT SAFETY INFORMATION

	<p>⚠ WARNING</p>
	<p>Extension cords:</p> <ul style="list-style-type: none"> • Use only three-wire, 12 AWG 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 can result in severe injury or death.</p>

	<p>⚠ 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 can result in severe injury or death.</p>


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

<p>⚠ 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 can result in severe injury or death.</p>

	<p>⚠ CAUTION</p>
	<p>Do not use tool as a step or ladder.</p>

<p>⚠ CAUTION</p>
<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. • 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. • Set the switches to the appropriate conduit size and type before bending. • Select the appropriate shoe groove and support roller for the type and size of conduit before bending. • Do not bend conduit over 93 degrees. Overbending could result in the other shoe hook colliding with the conduit. • Some bender parts and accessories are heavy and may require more than one person to lift and assemble. • Ensure that all bystanders are away from the work area when operating the bender. • Ensure that the work area is clean, dry, uncluttered, and well lit. • 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 can result in injury or property damage.</p>

Grounding Instructions

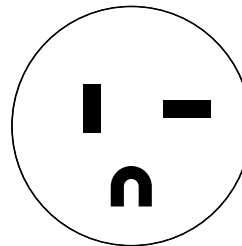
	⚠ WARNING
	<p>Electric shock hazard:</p> <ul style="list-style-type: none">• Do not modify the plug provided with the tool.• Connect this tool to a grounded receptacle on a 20 A GFCI-protected circuit. <p>Failure to observe these warnings can result in severe injury or death.</p>

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.

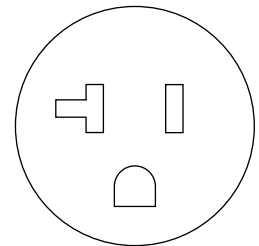
This tool's electric cord has a grounding conductor and a grounding plug as shown. Do not modify the plug. Connect the plug to a corresponding GFCI-protected receptacle that is properly installed and grounded in accordance with all national and local codes and ordinances.

Do not use an adapter.

NEMA 5-20



Plug



Receptacle

Specifications



Bending head shown locked in the vertical bending position.



Balanced bending head pivots easily as it is changed from the vertical bending position to the horizontal bending table position.

Choice of two bending positions



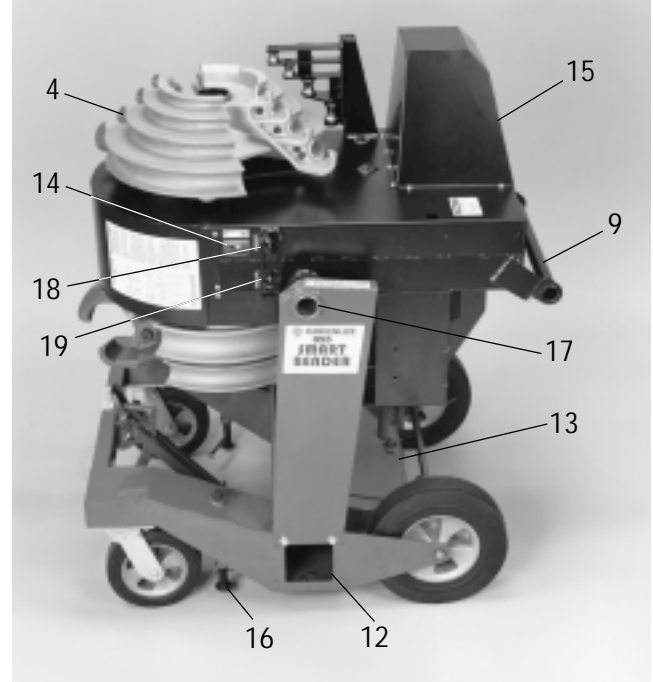
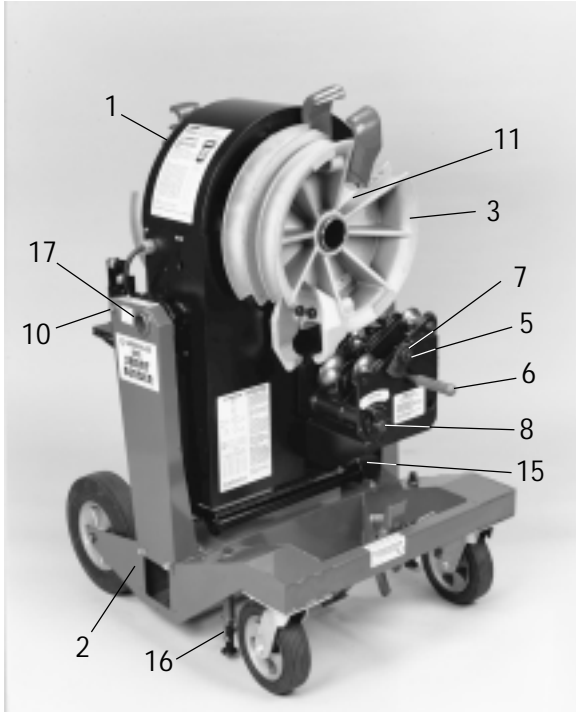
Bending head locked in the horizontal bending table position.

855 Bender Specifications

- Height - 47"
- Width - 28-1/2"
- Depth - 35-1/2"
- Weight - 510 pounds
- Power - 120 vac (80 vac minimum), 18 amps -20 amp GFCI-protected receptacle required
- Power Output - 2.5 hp
- Operating Temperature Range - 32 - 100 degrees F.
- Operating Humidity Range - 0 - 98%
- Capacity - 1/2" thru 2" EMT, IMC, Rigid Steel and Rigid Aluminum Conduit

Conduit Centerline Bending Radius						
SIZE	1/2	3/4	1	1-1/4	1-1/2	2
EMT	4-5/16"	5-1/2"	7"	8-13/16"	8-3/8"	9-1/4"
IMC & Rigid	4-1/4"	5-7/16"	6-15/16"	8-3/4"	8-1/4"	9"

Specifications



Key Description

- 1 Bender power head
- 2 Trunnion support frame
- 3 1-1/2" - 2" bending shoe
- 4 1/2" - 1-1/4" bending shoe
- 5 1-1/2" - 2" support roller system
- 6 Support roller engagement handle
- 7 Support roller locking cam
- 8 Support roller squeeze adjustment
- 9 Transport handle
- 10 Bender head pivot lock knob
- 11 Shoe retaining lock ring
- 12 Open storage area
- 13 Lockable storage area
- 14 Power switch/circuit breaker
- 15 Pendant control receptacle
- 16 Leveling jack screws
- 17 Lifting eyes
- 18 Conduit size selector switch
- 19 Conduit type selector switch

Features

- The 855 is a bender designed to make high quality bends of up to 90 degrees in 1/2" thru 2" EMT, IMC and Rigid steel conduit and 1/2" thru 2" rigid aluminum conduit. It incorporates a number of features to make bending easier and faster.
- Four large wheels allow easy transportability.
- Powerful motor and efficient gearbox can bend 2" rigid in 11 seconds.
- Working height at waist level reduces need for the operator to bend over.

- All conduit bending can be done without changing shoes or rollers.
- Conduit bending can be done in a vertical plane while keeping the conduit level or in a horizontal plane to allow making kicks and offsets.
- Simple roller system automatically adjusts to EMT or IMC conduit sizes.
- The zero position for bending is automatically set by selecting the size and type of conduit to be bent prior to bending.
- Bender automatically compensates for conduit springback so you simply bend to the desired angle without using charts.
- Programmable memory will allow you to preselect a desired angle and automatically bend to that angle for one or more bends.
- Digital display gives accurate readout of actual or programmed angle.
- Eccentric roller system squeeze adjustment allows easy adjustment for variations in conduit.
- Removable pendant control prevents unauthorized use of the bender.
- A lockable storage area is provided for the instructions, pendant control etc.
- Lifting eyes are provided for easy hoisting.
- Stubs, offsets and saddles can be easily made. An optional deluxe hand terminal will tell you where to make the conduit marks for any type of common bend and bend to the proper angle.
- Standard bender is fully upgradable with the optional hand terminal.

Transportation and Setup

Transporting

The only proper way to lift this bender is by attaching nylon or polyester slings or chain and hooks to the lifting eyes. The bender head must be in the table top position as shown below with the 1-1/2", 2" shoe up. Rotate the eyes up so the slings or hooks can be hooked to or looped through the eyes. Make sure that each side of



the sling or chain is at least 3' long to prevent it from rubbing against the bender. Make sure all components used to lift this bender are properly rated for the 510 lb (232 kg) weight. Use a ramp to load and unload from a truck or other vehicle that is not equipped with a lift gate. To transport around the jobsite, first assure that the jackscrews are retracted enough to clear the terrain. Pull out on the bender head pivot lock knob. If the pivot lock knob cannot be pulled out far enough for the detent pin to clear the frame, turn the knob clockwise until the detent pin clears the frame. Rotate the bender head so that the 1-1/2" - 2" shoe is up, and make sure that the detent pin locks into position. Turn the pivot lock knob counterclockwise until resistance is felt to lock the pin in position.

To prevent the bender from rolling on its own, the kickstand can be lowered. It is located between the two swivel wheels. To set the kickstand, apply foot pressure to the lever above the stand until it contacts the ground and then push the bender away from you until it rolls up onto the stand. To take the bender off the stand, push down on the lever below the crossbar and pull the bender towards you until it rolls off the stand.



Setup

When you reach your destination, lower at least two jackscrews to prevent the unit from rolling. If desired, all four jackscrews can be used to level the unit. Rotate the bender head to the position you desire to bend in. To rotate the bender head, pull out the round pivot lock knob while pivoting the head in the desired direction.



If the knob is difficult to pull out, turn the knob clockwise until it pushes against the frame to break it free. When the bender is in the desired position, make sure the detent pin fully engages in the hole. To reduce the amount of free play in the bender head, turn the knob counterclockwise until some resistance is felt. Remove the pendant control from its storage area and plug it into one of the 2 pin receptacles on the lower right faces of the bender. **This must be plugged in before the**



bender is turned on or it will not operate. Plug the power cord into a 120 vac, 20 amp GFCI-protected receptacle and turn the power switch ON. Wait until the display comes on before pressing any keys or the bender will not operate.

Operating - Standard Pendant



NOTE! Before pressing **BEND**, **JOG** or **UNLOAD**, make sure that the conduit size selector switch is set to the size you are going to be using. Failure to do so may result in the shoes rotating the opposite direction than expected. Pressing a second key while another is already depressed will do nothing further. The first key pressed has priority.

Stub Up and Offset Bending Chart to determine bending marks when using standard pendant.

Standard Pendant Control

Bend Key: will run the shoe in the direction to bend the conduit according to which conduit size has been selected by the rotary size selector switch. The **BEND** key will function only while it is pressed. If an angle is stored in memory it will cease to function once that angle has been reached.

Jog Key: will run the shoe in the direction to bend the conduit according to which conduit size has been selected by the rotary size selector switch in 1/2 degree increments. The **JOG** key will function anytime it is pressed.

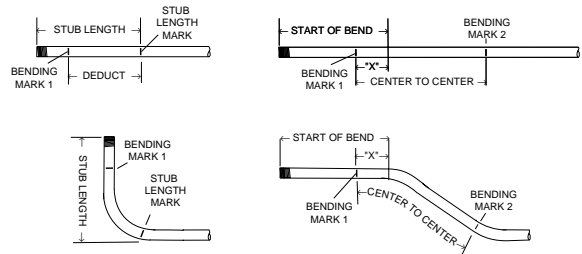
Unload Key: will run the shoe backwards according to which conduit size has been selected by the rotary size selector switch. The **UNLOAD** key will function when it is pressed unless the roller support locking cam is locked in position.

Angle Select ▲ : is used to set the desired bend angle into memory. Pressing it for a moment will increase the present angle in memory 1 degree at a time. Holding it down will rapidly advance the memory angle.

Angle Select ▼ : functions the same as the **ANGLE SELECT UP** key except it will decrease the angle.

Clear Key: will set the display to 00 and eliminate any angle from memory. It will not reset the actual present bend angle to zero.

Display: Upon power-up, the display will show **00**. Once a bend is started, the display will show the actual bend angle. It will not start counting until the conduit actually starts to bend. If an angle is stored in memory the display will show that angle at all times except while the **BEND**, **JOG** or **UNLOAD** keys are depressed and for about 2 seconds after they are released. The display will not show angles greater than **99** or less than **0**.



	CONDUIT SIZE	1/2	3/4	1	1-1/4	1-1/2	2
EMT	DEDUCT	7-1/2	9	11	13-5/8	14-7/8	16-3/8
	MINIMUM STUB	9-1/2	11	13	15-5/8	16-7/8	18-3/8
IMC/RIGID	DEDUCT	7-1/2	9	11	13-5/8	14-7/8	16-1/8
	MINIMUM STUB	9-1/2	11	13	15-5/8	16-7/8	18-1/8
	OFFSET -"X"	2-1/2	3-1/16	3-1/16	4	4-3/4	4-3/4

Finished Angle						
OFFSET	15°		30°		45°	
	MAX CONDUIT SIZE	CENTER TO CENTER	MAX CONDUIT SIZE	CENTER TO CENTER	MAX CONDUIT SIZE	CENTER TO CENTER
2	3/4	7-3/4				
4	1-1/2	15-7/16	3/4	7-15/16		
6	2	23-3/16	1	11-15/16	1/2	8-5/16
8	2	30-7/8	1-1/2	15-15/16	1	11-1/16
10	2	38-5/8	2	19-15/16	1-1/4	13-13/16
12	2	46-3/8	2	23-15/16	1-1/2	16-5/8
14	2	54-1/16	2	27-15/16	2	19-7/16
16	2	61-13/16	2	31-15/16	2	22-1/4
18	2	69-9/16	2	35-15/16	2	25-1/16
20	2	77-1/4	2	39-15/16	2	27-15/16
22	2	85	2	43-15/16	2	30-3/4

Operating - Deluxe Pendant

Optional Deluxe Pendant Switch

Enter all dimensions in inches converting any fractions to decimals using the DECIMAL CONVERSION Chart below.



DECIMAL CONVERSION

1/16	.06
1/8	.12
3/16	.18
1/4	.25
5/16	.31
3/8	.37
7/16	.43
1/2	.50
9/16	.56
5/8	.62
11/16	.68
3/4	.75
13/16	.81
7/8	.87
15/16	.93

1. Upon power up, the **SELECT CONDUIT SIZE** prompt will be displayed alone.
2. The sequence of prompts or displays is:
 - a) SELECT CONDUIT SIZE
 - b) SELECT CONDUIT TYPE
 - c) SELECT BEND TYPE
 - d) SELECT ANGLE
 - e) SELECT HEIGHT
 - f) SELECT LENGTH (This prompt is skipped when the bend type is a stub)
 - g) MARK 1= ENTER TO GO ON
 - h) SET FRONT OF HOOK AT MARK 1....
 - i) 0-99 (bend angle is displayed as soon as BEND is pressed)
 - j) SET FRONT OF HOOK AT MARK 2.... (This display is skipped for stubs)
 - k) 0-99
 - l) SET FRONT OF HOOK AT MARK 3.... (This display is skipped for stubs and offsets)
 - m) 0-99
 - n) return to SELECT LENGTH or SELECT HEIGHT if the bend is a stub
3. Pressing any of the six conduit size keys at any point will set that size into memory and display the SELECT CONDUIT TYPE screen.
4. Pressing the conduit type key at any point will show the last conduit type entered and set it in memory and display the SELECT BEND TYPE screen. Pressing the key again will cycle through the conduit types in the order of EMT, IMC, RIG, EMT, IMC, ... etc.
5. Pressing any of the three bend type keys (STUB, OFFSET or SADDLE) at any time will set that bend type in memory and display the SELECT ANGLE screen.
6. Pressing the ANGLE key at any point will display the SELECT ANGLE screen and allow changing of the angle with the numerical keys then press ENTER. The ANGLE key does not need to be pressed if SELECT ANGLE is already displayed.
7. Pressing the HEIGHT key at any point will display the SELECT HEIGHT screen and allow changing of the height with the numerical keys and pressing ENTER. The HEIGHT key does not need to be pressed if SELECT HEIGHT is already displayed.
8. Pressing the LENGTH key at any point will display the SELECT LENGTH screen and allow changing of the length with the numerical keys and pressing ENTER unless the bend type is a stub in which case the LENGTH key will do nothing. The LENGTH key does not need to be pressed if SELECT LENGTH is already displayed.
9. Pressing ENTER:
 - a) **is required to store any numerical value into memory.**
 - b) when on SELECT CONDUIT SIZE screen will proceed to the next screen without changing the size.
 - c) when on SELECT CONDUIT TYPE screen will proceed to the next screen without changing the type.
 - d) when on SELECT BEND TYPE screen will proceed to the next screen without changing the bend type.
 - e) when on SELECT ANGLE screen will proceed to the next screen without changing the angle.
 - f) when on SELECT HEIGHT screen will proceed to the next screen without changing the height. If the bend type is a stub, then pressing ENTER will proceed to the MARK 1= ... ENTER TO GO ON screen.
 - g) when on SELECT LENGTH screen will proceed to the next screen without changing the LENGTH.
 - h) when on MARK 1= ... ENTER TO GO ON screen will proceed to next screen.
 - i) when on any of the three SET FRONT OF HOOK AT.... screens will do nothing.

Operating - Deluxe Pendant (cont'd)

10. Pressing any of the eleven numeric keys and ENTER when the display is prompting SELECT ANGLE will display and store the numbers as they are pressed. Angles will only be displayed in whole numbers. Pressing any of the numeric keys and ENTER when the SELECT HEIGHT and SELECT LENGTH" prompts are displayed will display and store the numbers immediately after a HEIGHT =" or LENGTH =" display as soon as the numbers are pressed. At any other point, pressing the numeric keys will do nothing. All numeric displays will be limited to two decimal places except as noted above.
11. Pressing BEND:
 - a) if the conduit size and type have not been selected will display the SELECT CONDUIT SIZE screen but will not start the bender.
 - b) with the conduit size, type and an angle of 0 in memory or no angle in memory will run the bender. The display will be blank except for showing the actual bend angle. Operation will stop and the prior screen will return when the BEND key is released.
 - c) with the conduit size, type and an angle other than 0 in memory will run the bender. The display will be blank except for showing the actual bend angle. Operation will stop when the BEND key is released or when the actual bend angle equals or exceeds the angle set in memory. Releasing the BEND key will not change the display. The prior screen will return when the bend angle equals the angle in memory.
12. Pressing UNLOAD will run the bender backwards so the conduit can be removed. Releasing the UNLOAD key will stop operation. If the conduit size and type have not been selected, then the SELECT CONDUIT SIZE" screen will be displayed and the bender will not start. If the roller support locking cam is activated, the UNLOAD key will not function.
13. Pressing JOG will run the bender forward 1/2 degree every time it is pressed. If the conduit size and type have not been selected, then the SELECT CONDUIT SIZE screen will be displayed and the bender will not start.
14. Pressing RESET returns the display to the SELECT CONDUIT SIZE screen, clears all other settings from memory and clears the screen except for the prompt.
15. Pressing CLEAR NUMBER will eliminate any numerical value you are in the process of entering. If you are not being prompted to enter a number value the CLEAR NUMBER will have no effect.
16. Pressing a second key while a first key is already depressed will do nothing further. The first key pressed has priority.

Installing and Bending Conduit

Note: Variations for deluxe terminal operation are included within brackets [...].

Select the size and type of conduit to be bent with the two rotary selector switches on the side of the bender.



[On the deluxe terminal, select the size and type of conduit with the six conduit size keys and the one conduit type key. Each press of conduit type key will choose the next type. The rotary selector switches have no effect when the deluxe terminal is used]. Initialize home position on the bender before installing conduit. Press UNLOAD until the shoe hook for selected size and type of conduit is at the bottom (6 o'clock position). Press BEND until the pendant display starts counting. Then press UNLOAD until the shoe rotates backwards and stops. This is the proper load position for the selected size and type of conduit and home position is now set. (After you have started bending, the bender will automatically stop at this position when unloaded.) If you wish to side load the conduit, position the hook at around the 5 o'clock position instead. The shoe grooves for IMC and Rigid use green hooks; the shoe grooves for EMT use silver hooks. Insert the conduit into the proper shoe groove and hook. Align with bend location marks with the front of the hook.

Operating (cont'd)

Manual Bending

Make sure that no angle is set in memory. The memory is clear if the pendant display shows 00 when BEND, UNLOAD or JOG are not depressed. If 00 is not displayed, press CLEAR. [The memory is clear if no angle is shown in the top row of the terminal display and is prompting for a bend type]. If an angle of 93 degrees is reached at any time while pressing BEND, the bender will stop to prevent accidentally running a hook into the conduit. To proceed, release the BEND key and press it again.

1/2" thru 1-1/4" Conduit



Press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. The angle displayed has already compensated for springback. When you reach your desired angle release the BEND key. It might be beneficial to stop slightly before the angle to account for reaction time and motor braking time and then use the JOG key to advance the bend in 1/2 degree increments to prevent overbending.

1-1/2" & 2" Rigid Conduit



Make sure that the rollers are in the fully retracted position to the right. Press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. The angle displayed has already compensated for springback. When you reach your desired angle release the BEND key. It might be beneficial to stop slightly before the angle to account reaction time and motor braking time and then use the JOG key to advance the bend in 1/2 degree increments to prevent overbending.

Note: For aluminum rigid conduit, bend as you would IMC conduit with the squeeze backed off 2 positions.

1-1/2" & 2" EMT & IMC Conduit

Press or jog the BEND key while engaging the roller system using the support roller engagement handle.



Apply sufficient force on the handle so that the roller system reaches its position against the stops before the conduit starts to bend. Supporting the tail end of a long conduit may ease engagement when bending vertically. Continue to press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend, the digital display will start to count from zero and show the angle to which the conduit has been bent. The angle displayed has already compensated for springback. When you reach your desired angle release the BEND key. It might be beneficial to stop slightly before the angle to account for reaction time and motor braking time and then use the JOG key to advance the bend in 1/2 degree increments to prevent overbending.

A roller support lock has been provided to free up one hand. Once the roller support engagement handle is brought up into position, a locking cam will hold the handle in place and bending can proceed from this point without further operator action on the handle. Lifting up on the tail of the conduit will make roller engagement

Operating (cont'd)

easier. For 1-1/2" EMT, it may be easy to go past the cam; if this happens, raise the cam by hand and rest the handle against it. If you wish to change the position of the conduit and it is held too tightly to move, rotate the handle counterclockwise to disengage the cam. Reposition the conduit and relock in place. The UNLOAD key will not function while the locking cam is engaged.

Note: If unable to raise the handle enough to engage the locking cam even after lifting up on the tail of the conduit or pushing down on the nose, the squeeze is probably set too high. If the handle easily passes by the cam on 2", the squeeze is probably set too low.

Programmed Bending

Press the ANGLE SELECT UP key to place an angle into memory. Pressing it momentarily will advance the stored angle 1 degree at a time. Holding it down will rapidly advance the angle. Release it when the desired angle is obtained. Use the ANGLE SELECT DOWN key to reduce the angle in memory. It operates the same as the ANGLE SELECT UP key does. The ANGLE SELECT DOWN key can also be used to initiate putting an angle in memory. For large angles, this would be faster. Press the CLEAR key to remove any angle from memory and set the display to 00. If an angle is stored in memory, it will be displayed whenever the BEND, JOG or UNLOAD keys are not depressed. [Press the ANGLE key on the deluxe terminal and enter an angle using the ten numerical keys. The decimal is not used for angles. Press ENTER to set the angle in memory]. If an angle of 93 degrees is reached at any time while pressing BEND, the bender will stop to prevent accidentally running a hook into the conduit. To proceed, release the BEND key and press it again.

1/2" thru 1-1/4" Conduit

Press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. The angle displayed has already compensated for springback. As the conduit approaches the programmed angle the bender will slow and then stop at the programmed angle. Releasing the BEND key at any time during the bend will stop the bender. The bend can then be resumed from the point it was stopped. After stopping at the programmed angle the BEND key will function if released and pressed again. The JOG key can be used to bend beyond the programmed angle in 1/2 degree increments.

1-1/2" & 2" Rigid Conduit

Make sure that the rollers are in the fully retracted position to the right. Press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. The angle displayed has already compensated for springback. As the conduit approaches the programmed angle the bender will slow and then stop at the programmed angle. Releasing the BEND key at any time during the bend will stop the bender. The bend can then be resumed from the point it was stopped. After stopping at the programmed angle the BEND key will function if released and pressed again. The JOG key can be used to bend beyond the programmed angle in 1/2 degree increments.

Note: For aluminum rigid conduit, bend as you would IMC conduit with the squeeze backed off 2 positions.

1-1/2" & 2" EMT & IMC Conduit



Press or jog the BEND key while engaging the roller system using the support roller engagement handle. Apply sufficient force on the handle so that the roller system reaches its position against the stops before the conduit starts to bend. Supporting the tail end of a long conduit may ease engagement when bending vertically. Continue to press the BEND key while maintaining conduit alignment until slack is taken up.

When the conduit starts to bend, the digital display will start to count from zero and show the angle to which the conduit has been bent. The angle displayed has already compensated for springback. As the conduit approaches the programmed angle the bender will slow and then stop at the programmed angle. Releasing the BEND key at any time during the bend will stop the bender. The bend can then be resumed from the point it was stopped. After stopping at the programmed angle the BEND key will function if released and pressed again.

Operating (cont'd)

The JOG key can be used to bend beyond the programmed angle in 1/2 degree increments. A roller support lock has been provided to free up one hand. Once the roller support engagement handle is brought up into position, a locking cam will hold the handle in place and bending can proceed from this point without further operator action on the handle. Lifting up on the tail of the conduit will make roller engagement easier. For 1-1/2" EMT, it may be easy to go past the cam; if this happens, raise the cam by hand and rest the handle against it. If you wish to change the position of the conduit and it is held too tightly to move, lift up on the cam while supporting the handle and allow the handle to retract slightly. Reposition the conduit and relock in place. The UNLOAD key will not function while the locking cam is engaged.

Note: If unable to raise the handle enough to engage the locking cam even after lifting up on the tail of the conduit or pushing down on the nose, the squeeze is probably set too high. If the handle easily passes by the cam on 2", the squeeze is probably set too low.

Unloading

When the conduit is bent to the desired angle, press the UNLOAD key until the shoe has rotated back about 10 or more degrees. Twist the conduit to free it from the hook and remove it from the shoe. Continue to press UNLOAD and the bender will automatically stop at the best position for end loading the next conduit. If you want to side load the conduit (or use the opposite side of the shoe), you need to unload beyond this point. To do so, simply release the UNLOAD key and press it again. The bender will proceed to unload. Release the UNLOAD key when the shoe has rotated to the desired position.

Making Another Bend

To make another manual bend proceed as you did with the first one. To make another programmed bend of the same size, type and angle, load and bend the conduit just as you did the previous one. You may change the programmed angle and make a bend to the new angle without any additional changes. You can also change the size and/or type of conduit and bend to the previous angle; however, if your change requires using the opposite side of a shoe, you will need to use the UNLOAD key to index the shoe, do not use the BEND key to index the shoe. Using the BEND key will cause the bender to stop at the programmed angle. Pressing CLEAR will eliminate this but you will need to reprogram the bend.

Making a Fully Programmed Bend on Deluxe Pendant

Select the size and type of conduit to be bent as previously instructed. Select the type of bend you wish to make using one of the three bend type keys (STUB, OFFSET or SADDLE). Enter the angle to be bent to using the numerical keys (0 thru 9). Press ENTER. The decimal key is not used for angles. Enter the height of the stub, offset or saddle using any of the 11 numerical keys. Press ENTER. The height is from the bottom of the conduit to the center of the end of the conduit for stubs and from the bottom of the conduit to the bottom of the second bend for offsets and saddles. If you are to make an offset or saddle, enter the length of it using the 11 numerical keys. Press ENTER. The length is from the end of the conduit to beginning of the first bend for offsets and from the end of the conduit to the middle of the saddle for saddles. The display screen will show where to make your alignment marks. Place mark 1 on the conduit the distance shown from the end of the conduit. For offsets and saddles, place mark 2 the distance shown from mark 1. For saddles, place mark 3 the distance shown from mark 2. Insert the conduit into the proper shoe groove and hook and align mark 1 with the front edge of the hook.

1/2" thru 1-1/4" Conduit

Press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. Releasing the BEND key at any time during the bend will stop the bender. The bend can then be resumed from the point it was stopped. As the conduit approaches the programmed angle the bender will slow and then stop at the programmed angle. After stopping at the programmed angle the BEND key will function if released and pressed again. The JOG key can be used to bend beyond the programmed angle in 1/2 degree increments. Press UNLOAD until the shoe has rotated back about 10 or more degrees and twist the conduit to loosen it from the hook. If the bend is complete, remove the conduit from the shoe. For offsets and saddles, press UNLOAD until the shoe returns and stops at the load position, move conduit to align mark 2 with the hook, rotate conduit 180 degrees, and make the next bend(s) as before.

1-1/2" & 2" Rigid Conduit

Make sure that the rollers are in the fully retracted position to the right. Press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. Releasing the BEND key at any time during the bend will stop the bender. The bend can then be resumed from the point it was stopped. As the conduit approaches the programmed angle the bender will slow and then stop at the programmed angle. After stopping

Operating (cont'd)

at the programmed angle the BEND key will function if released and pressed again. The JOG key can be used to bend beyond the programmed angle in 1/2 degree increments. Press UNLOAD key until the shoe has rotated back about 10 or more degrees and twist the conduit to loosen it from the hook. If the bend is complete, remove the conduit from the shoe. For offsets and saddles, press UNLOAD until the shoe returns and stops at the LOAD position, move conduit to align mark 2 with the hook, rotate conduit 180 degrees, and make the next bend(s) as before.

Note: For aluminum Rigid conduit, bend as you would for IMC conduit with the squeeze backed off two positions.

1-1/2" & 2" EMT & IMC Conduit

Press or jog the BEND key while engaging the roller system using the support roller engagement handle. Apply sufficient force on the handle so that the roller system reaches its position against the stops before the conduit starts to bend. Supporting the tail end of a long conduit may ease engagement when bending vertically. Continue to press the BEND key while maintaining conduit alignment until slack is taken up. When the conduit starts to bend the digital display will start to count from zero and show the angle to which the conduit has been bent. Releasing the BEND key at any time during the bend will stop the bender. The bend can then be resumed from the point it was stopped. As the conduit approaches the programmed angle the bender will slow and then stop at the programmed angle. After reaching the programmed angle the BEND key will become non-functional. For EMT conduit, a roller support lock has been provided to free up one hand. Once the roller support engagement handle is brought up into position, a locking cam will hold the handle in place and bending can proceed from this point without further operator action on the handle. Lifting up on the tail of the conduit will make roller engagement easier. For 1-1/2" EMT, it may be easy to go past the cam; if this happens, raise the cam by hand and rest the handle against it. If you wish to change the position of the conduit and it is held too tightly to move, lift up on the cam while supporting the handle and allow the handle to retract slightly. Reposition the conduit and relock in place. The UNLOAD key will not function while the locking cam is engaged.

Note: If unable to raise the handle enough to engage the locking cam even after lifting up on the tail of the conduit or pushing down on the nose, the squeeze is probably set too high. If the handle easily passes by the cam on 2", the squeeze is probably set too low.

Press UNLOAD key until the shoe has rotated back about 10 or more degrees and twist the conduit to loosen it from the hook. If the bend is complete, remove the conduit from the shoe. For offsets and saddles, press UNLOAD until the shoe returns and stops at the LOAD position, move conduit to align mark 2 with the hook, rotate conduit 180 degrees, and make the next bend(s) as before.

Variations of Types of Bends: Offsets Located by the Second Bend

If you wish to make an offset where the location of the end of the second bend is desired rather than the start of the first bend, then treat the bend as a saddle to make your alignment marks and then bend it as an offset. First enter the conduit size & type, bend type (saddle), angle, height and length (from the end of the conduit to the desired end of the second bend) in the normal fashion. Dimensions will be displayed for three marks. Layout the first two marks on the conduit and ignore the third. Press the OFFSET key and then press ENTER several times until the display prompts you to set the conduit at mark 1. Continue to make your offset as previously instructed.

"U" Bends

To make a two bend "U", treat it as a 90° stub and offset. Enter the conduit size, conduit type, type of bend (STUB), angle (90), and length (distance from end of conduit to bottom of "U"). The screen will display MARK 1=.... PRESS ENTER TO GO ON. Record mark 1. Next, press OFFSET and ENTER. Then enter the height (centerline distance between the two legs) and press ENTER. The display will prompt SELECT LENGTH. Press any numerical key and ENTER. The screen will display MARK 1=...., MARK 2=.... PRESS ENTER TO GO ON. Ignore mark 1 displayed and record mark 2. Use mark 1 from the stub bend and mark 2 from the offset bend and lay out marks onto the conduit as a normal offset. Proceed to bend the conduit as a normal offset except **do not rotate** the conduit between bends.

Four Bend Saddles

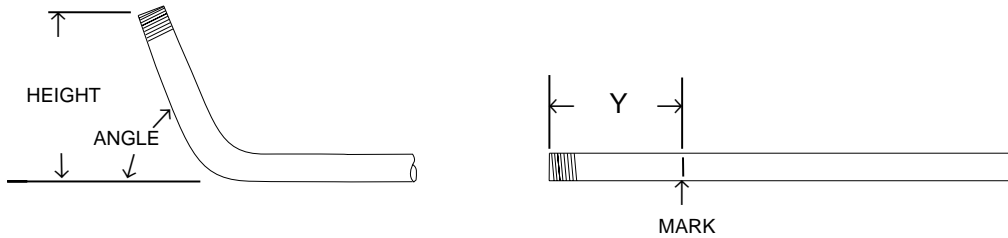
To make a four bend saddle, program it as a saddle and bend it as two offsets. Enter the conduit size and type, bend type (saddle), angle, height and length (from the end of the conduit to the end of the second bend). The dimensions will be displayed for three marks. Layout marks one and two in normal fashion. Place a third mark the distance shown for mark three from mark one (not mark two as usual). Place a fourth mark the distance of the desired straight section from the third mark. Place a fifth mark the distance shown for mark two from the fourth mark. Press the OFFSET key and then press ENTER several times until the display prompts you to set the conduit at mark one. Make your first bend here. Rotate the conduit 180 degrees and make your second bend starting at the second mark. Maintain alignment and make your first bend of the second offset starting at your fourth mark. Rotate the conduit 180 degrees and make the second bend of the second offset starting at your fifth mark.

Special Bending Information

Setting Up Your Bends

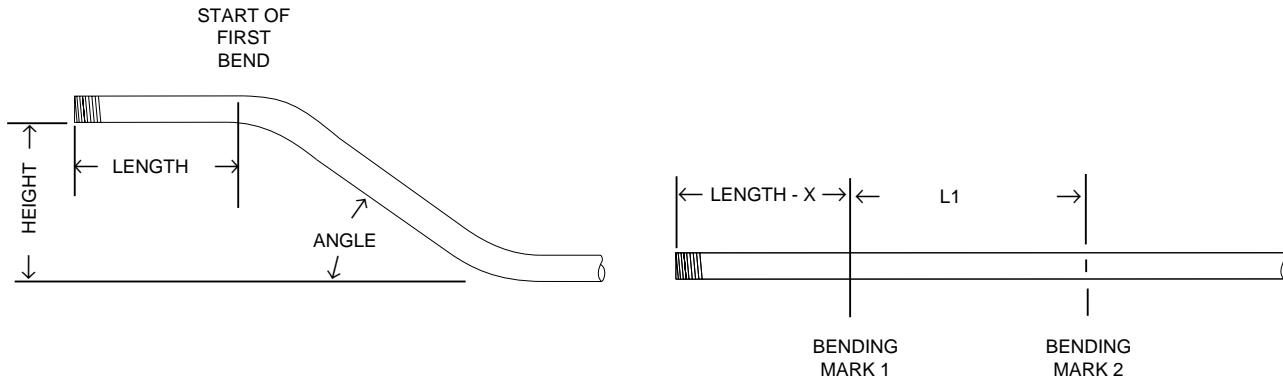
The following describes a means for laying out the starting points for various types of bends. It will give very accurate measurements for heights and bend angles commonly used.

Stubs:



1. Go to the following chart which is for the size and type of conduit you are to bend.
2. Look down to the ANGLE column until you come to the angle you want to bend to.
3. Look at the numbers in the row preceded by Y and pick the one that is directly under the height (H) you want.
4. Place a mark this distance from the end of the conduit.
5. Make your bend after positioning the front edge of the hook on your mark.

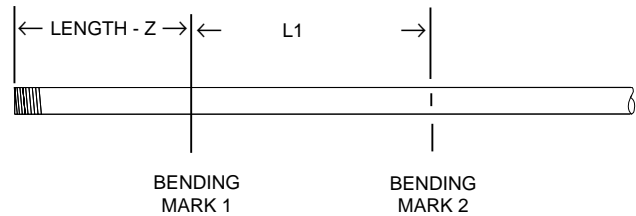
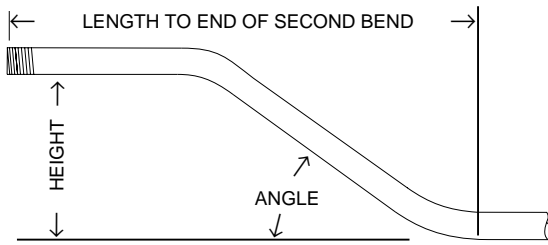
Offsets: (Controlling the start of the first bend)



1. Subtract the X dimension for the size of conduit to be bent from the desired length.
2. Place your first mark this distance from the end of the conduit.
3. Go the following chart which is for the size and type of conduit you are to bend.
4. Look down to the ANGLE column until you come to the angles you want to bend to.
5. Look at the numbers in the row preceded by L1 and pick the one that is directly under the height (H) you want.
6. Place a second mark this distance from your first mark.
7. Make your first bend after placing the front edge of the hook on the first mark and your second bend after placing the front edge of the hook under the second mark.

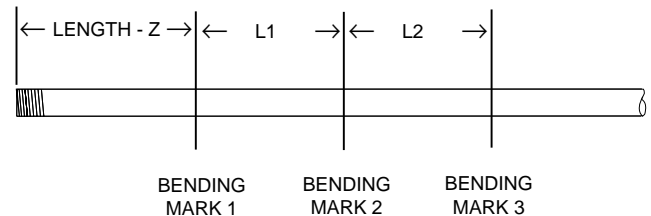
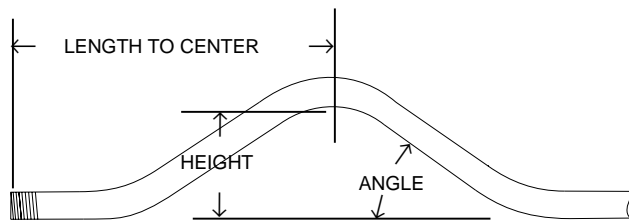
Special Bending Information (cont'd)

Offsets: (Controlling the end of the second bend)



1. Go to the following chart which is for the size and type of conduit you are to bend.
2. Look down the ANGLE column until you come to the angle you want to bend to.
3. Look at the numbers in the row preceded by Z and pick the one that is directly under the height (H) you want.
4. Subtract this Z dimension from the desired length.
5. Place your first mark this distance from the end of the conduit.
6. Look at the numbers in the row preceded by L1 and pick the one that is directly under the height (H) you want.
7. Place a second mark this distance from your first mark.
8. Make your first bend after placing the front edge of the hook on the first mark and your second bend after placing the front edge of the hook on the second mark.

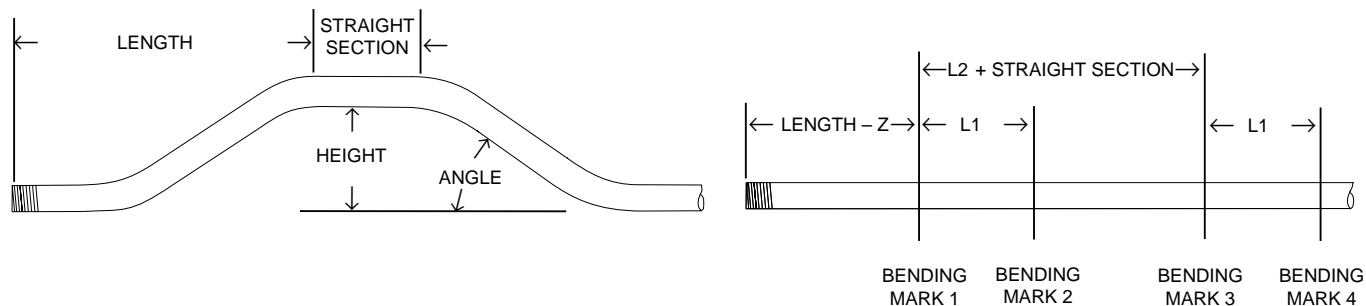
3 Bend Saddles



1. Go to the following chart which is for the size and type of conduit you are to bend.
2. Look down the ANGLE column until you come to the angle you want to bend to.
3. Look at the numbers in the row preceded by Z and pick the one that is directly under the height (H) you want.
4. Subtract this Z dimension from the desired length.
5. Place your first mark this distance from the end of the conduit.
6. Look at the numbers in the row preceded by L1 and pick the one that is directly under the height (H) you want.
7. Place a second mark this distance from your first mark.
8. Look at the numbers in the row preceded by L2 and pick the one that is directly under the height (H) you want.
9. Place a third mark this distance from your second mark.
10. Make your first bend after placing the front edge of the hook on the first mark and your second bend after placing the front edge of the hook on the second mark. Remember to make the second bend double the first bend. Make your third bend after placing the front edge of the hook on the third mark.

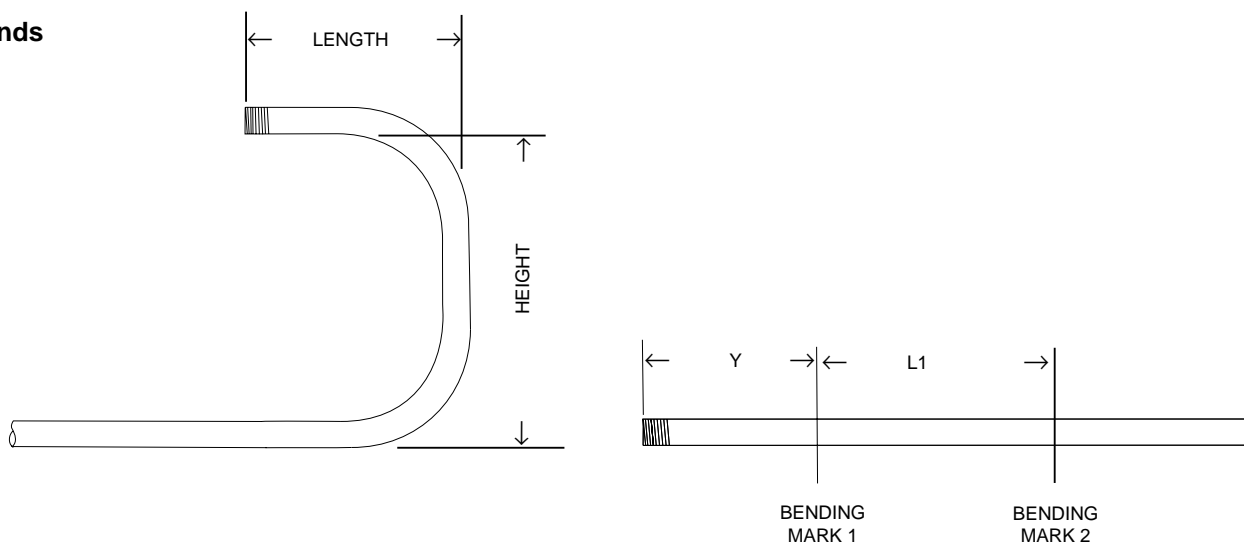
Special Bending Information (cont'd)

4 Bend Saddles with Straight



1. Go to the following chart which is for the size and type of conduit you are to bend.
2. Look down the ANGLE column until you come to the angle you want to bend to.
3. Look at the numbers in the row preceded by Z and pick the one that is directly under the height (H) you want.
4. Subtract this Z dimension from the desired length.
5. Place your first mark this distance from the end of the conduit.
6. Look at the numbers in the row preceded by L1 and pick the one that is directly under the height (H) you want.
7. Place a second mark this distance from your first mark.
8. Look at the numbers in the row preceded by L2 and pick the one that is directly under the height (H) you want.
9. Add this L2 value to the desired length of your straight section.
10. Place a third mark this distance from your first mark.
11. Look up the L1 dimension used above again.
12. Place a fourth mark this distance from your third mark.
13. Make your four bends by placing the front edge of the hook on the respective marks for each bend.

U-Bends



1. Go to the following chart which is for the size and type of conduit you are to bend.
2. Look down the ANGLE column until you come to 90 degrees.
3. Look at the numbers in the row preceded by Y and pick the one that is directly under the height (H) you want the length to be.
4. Look at the numbers in the row preceded by L1 and pick the one that is directly under the height (H) you want.
5. Place a second mark this distance from your first mark.
6. Make your first bend after placing the front edge of the hook on the first mark and your second bend after placing the front edge of the hook on the second mark.

Special Bending Information Chart

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1/2 EMT												
	Y	15	3.28	11.01	18.73	26.45	34.18	41.91	53.50	65.09	88.27	134.64
	L1	15	7.72	15.45	23.18	30.90	38.63	46.36	57.95	69.54	92.72	139.09
	L2	15	8.88	16.61	24.34	32.07	39.79	47.52	59.11	70.70	93.88	140.25
	Z	15	11.13	18.60	26.06	33.53	40.99	48.45	59.65	70.85	93.24	138.02
MINIMUM H = 0.95												
	Y	22.5	.92	6.14	11.37	16.59	21.82	27.05	34.89	42.73	58.40	89.76
	L1	22.5	5.20	10.43	15.66	20.88	26.11	31.33	39.17	47.01	62.69	94.05
	L2	22.5	6.95	12.17	17.40	22.63	27.85	33.08	40.92	48.76	64.44	95.79
	Z	22.5	9.09	13.92	18.75	23.58	28.41	33.24	40.48	47.72	62.21	91.18
MINIMUM H = 1.63												
	Y	30		3.60	7.60	11.60	15.60	19.60	25.60	31.60	43.60	67.60
	L1	30		7.95	11.95	15.95	19.95	23.95	29.95	35.95	47.95	71.95
	L2	30		10.27	14.27	18.27	22.27	26.27	32.27	38.27	50.27	74.27
	Z	30		11.81	15.27	18.74	22.20	25.66	30.86	36.06	46.45	67.23
MINIMUM H = 2.44												
	Y	45			3.65	6.47	9.30	12.13	16.37	20.61	29.10	46.07
	L1	45			8.29	11.12	13.95	16.78	21.02	25.26	33.75	50.72
	L2	45			11.78	14.61	17.44	20.27	24.51	28.75	37.24	54.21
	Z	45			12.18	14.18	16.18	18.18	21.18	24.18	30.18	42.18
MINIMUM H = 4.37												
	Y	60				3.77	6.08	8.38	11.85	15.31	22.24	36.10
	L1	60				8.76	11.07	13.38	16.84	20.31	27.24	41.09
	L2	60				13.41	15.72	18.03	21.49	24.96	31.89	45.74
	Z	60				12.25	13.40	14.56	16.29	18.02	21.48	28.41
MINIMUM H = 6.61												
	Y	90						4.71	7.71	10.71	16.71	28.71
	L1	90						10.09	13.09	16.09	22.09	34.09
	L2	90						17.07	20.07	23.07	29.07	41.07
	Z	90						11.38	11.38	11.38	11.38	11.38
MINIMUM H = 11.38												
3/4 EMT												
	Y	15	2.07	9.80	17.53	25.26	32.98	40.71	52.30	63.89	87.08	133.44
	L1	15	7.72	15.45	23.17	30.90	38.63	46.36	57.95	69.54	92.72	139.08
	L2	15	9.20	16.93	24.66	32.39	40.11	47.84	59.43	71.02	94.20	140.57
	Z	15	12.08	19.55	27.01	34.47	41.94	49.40	60.60	71.79	94.19	138.97
MINIMUM H = 1.20												
	Y	22.5		5.00	10.22	15.45	20.67	25.90	33.74	41.58	57.26	88.62
	L1	22.5		10.42	15.65	20.88	26.10	31.33	39.17	47.01	62.69	94.04
	L2	22.5		12.65	17.88	23.10	28.33	33.56	41.39	49.23	64.91	96.27
	Z	22.5		15.04	19.87	24.69	29.52	34.35	41.59	48.84	63.32	92.29
MINIMUM H = 2.06												
	Y	30			6.43	10.43	14.43	18.43	24.43	30.43	42.43	66.43
	L1	30		7.93	11.93	15.93	19.93	23.93	29.93	35.93	47.93	71.93
	L2	30		10.90	14.90	18.90	22.90	26.90	32.90	38.90	50.90	74.90
	Z	30		13.09	16.56	20.02	23.48	26.95	32.14	37.37	47.73	68.52
MINIMUM H = 3.08												
	Y	45			2.36	5.19	8.02	10.85	15.09	19.33	27.82	44.79
	L1	45			8.24	11.07	13.90	16.73	20.97	25.21	33.70	50.67
	L2	45			12.69	15.52	18.35	21.18	25.42	29.67	38.15	55.12
	Z	45			13.82	15.82	17.82	19.82	22.82	25.82	31.82	43.82
MINIMUM H = 5.53												
	Y	60					4.62	6.93	10.39	13.85	20.78	34.64
	L1	60					10.94	13.25	16.71	20.18	27.10	40.96
	L2	60					16.88	19.18	22.65	26.11	33.04	46.90
	Z	60					15.45	16.60	18.33	20.06	23.53	30.46
MINIMUM H = 8.38												
	Y	90							5.74	8.74	14.74	26.74
	L1	90							12.57	15.57	21.57	33.57
	L2	90							21.47	24.47	30.47	42.47
	Z	90							14.47	14.47	14.47	14.47
MINIMUM H = 14.47												

Special Bending Information Chart (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	51.58	63.17	86.35	132.71
	L1	15	7.72	15.44	23.17	30.90	38.63	46.35	57.94	69.54	92.72	139.08
	L2	15	9.60	17.33	25.06	32.79	40.51	48.24	59.83	71.42	94.61	140.97
	Z	15	12.55	20.02	27.48	34.94	42.41	49.87	61.07	72.27	94.66	139.44
MINIMUM H = 1.32												
	Y	22.5		4.31	9.54	14.77	19.99	25.22	33.06	40.90	56.58	87.93
	L1	22.5		10.42	15.64	20.87	26.09	31.32	39.16	47.00	62.68	94.04
	L2	22.5		13.25	18.47	23.70	28.93	34.15	41.99	49.83	65.51	96.87
	Z	22.5		15.72	20.54	25.37	30.20	35.03	42.27	49.51	64.00	92.97
MINIMUM H = 2.32												
	Y	30		1.72	5.72	9.72	13.72	17.72	23.72	29.72	41.72	65.72
	L1	30		7.91	11.91	15.91	19.91	23.91	29.91	35.91	47.91	71.91
	L2	30		11.69	15.69	19.69	23.69	27.69	33.69	39.69	51.69	75.69
	Z	30		13.98	17.45	20.91	24.37	27.84	33.03	38.23	48.62	69.41
MINIMUM H = 3.53												
	Y	45				4.32	7.15	9.97	14.22	18.46	26.94	43.91
	L1	45				11.00	13.83	16.66	20.90	25.15	33.63	50.60
	L2	45				16.67	19.49	22.32	26.57	30.81	39.29	56.26
	Z	45				17.16	19.16	21.16	24.16	27.16	33.16	45.16
MINIMUM H = 6.48												
	Y	60					3.52	5.83	9.30	12.76	19.69	33.55
	L1	60					10.77	13.08	16.55	20.01	26.94	40.79
	L2	60					18.32	20.63	24.10	27.56	34.49	48.34
	Z	60					17.29	18.44	20.18	21.91	25.37	32.30
MINIMUM H = 9.97												
	Y	90								7.02	13.02	25.02
	L1	90								14.91	20.91	32.91
	L2	90								26.23	32.23	44.23
	Z	90								17.61	17.61	17.61
MINIMUM H = 17.61												
1-1/4 EMT												
	Y	15		7.41	15.13	22.86	30.59	38.31	49.91	61.50	84.68	130.04
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	10.09	17.82	25.55	33.27	41.00	48.73	60.32	71.91	95.09	141.46
	Z	15	13.79	21.26	28.72	36.18	43.65	51.11	62.31	73.50	95.90	140.68
MINIMUM H = 1.65												
	Y	22.5		2.74	7.96	13.19	18.42	23.64	31.48	39.32	55.00	86.36
	L1	22.5		10.41	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.97	19.20	24.42	29.65	34.88	42.72	50.56	66.23	97.59
	Z	22.5		17.21	22.03	26.86	31.69	36.52	43.76	51.01	65.49	94.46
MINIMUM H = 2.89												
	Y	30		4.12	8.12	12.12	16.12	22.12	28.12	40.12	64.12	
	L1	30		11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89	
	L2	30		16.64	20.64	24.64	28.64	34.64	40.64	52.64	76.64	
	Z	30		19.20	22.66	26.12	29.59	34.78	39.98	50.37	71.16	
MINIMUM H = 4.40												
	Y	45				2.55	5.38	8.20	12.45	16.69	25.18	42.15
	L1	45					13.75	16.58	20.82	25.07	33.55	50.52
	L2	45					20.88	23.71	27.95	32.20	40.68	57.65
	Z	45					21.46	23.46	26.46	29.46	35.46	47.46
MINIMUM H = 8.10												
	Y	60					1.50	3.81	7.27	10.73	17.66	31.52
	L1	60							16.34	19.81	26.74	40.59
	L2	60							25.85	29.32	36.25	50.10
	Z	60							23.08	24.81	28.28	35.21
MINIMUM H = 12.49												
	Y	90							1.23	4.23	10.23	22.23
	L1	90									20.10	32.10
	L2	90									34.37	46.37
	Z	90									22.10	22.10
MINIMUM H = 22.10												

Special Bending Information Chart (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
1-1/2 EMT												
	Y	15		5.56	13.29	21.01	28.74	36.47	48.06	59.65	82.83	129.20
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	10.02	17.75	25.48	33.20	40.93	48.66	60.25	71.84	95.02	141.39
	Z	15	15.16	22.62	30.09	37.55	45.02	52.48	63.68	74.87	97.26	142.05
MINIMUM H = 1.99												
	Y	22.5		1.05	6.28	11.50	16.73	21.96	29.80	37.64	53.31	84.67
	L1	22.5		10.41	15.63	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2	22.5		13.87	19.09	24.32	29.55	34.77	42.61	50.95	66.13	97.49
	Z	22.5		18.54	23.37	28.19	33.02	37.85	45.09	52.34	66.82	95.79
MINIMUM H = 3.40												
	Y	30			2.52	6.52	10.52	14.52	20.52	26.52	38.52	62.52
	L1	30			11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2	30			16.50	20.50	24.50	28.50	34.50	40.50	52.50	76.50
	Z	30			20.49	23.95	27.42	30.88	36.08	41.27	51.67	72.45
MINIMUM H = 5.05												
	Y	45				1.06	3.89	6.72	10.96	15.20	23.69	40.66
	L1	45					13.77	16.60	20.84	25.08	33.57	50.54
	L2	45					20.68	23.51	27.75	32.00	40.48	57.45
	Z	45					22.67	24.67	27.67	30.67	36.67	48.67
MINIMUM H = 8.96												
	Y	60						2.39	5.85	9.32	16.25	30.10
	L1	60							16.39	19.86	26.79	40.64
	L2	60							25.60	28.06	35.89	49.85
	Z	60							24.21	25.94	29.40	36.33
MINIMUM H = 13.46												
	Y	90								2.95	8.95	20.95
	L1	90									20.22	32.22
	L2	90									34.06	46.06
	Z	90									23.00	23.00
MINIMUM H = 23.00												
2 EMT												
	Y	15		4.42	12.15	19.88	27.61	35.33	46.92	58.51	81.70	128.06
	L1	15		15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.71	139.08
	L2	15		18.00	25.73	33.46	41.18	48.91	60.50	72.09	95.27	141.64
	Z	15		23.00	30.47	37.93	45.40	52.86	64.06	75.25	97.64	142.43
MINIMUM H = 2.09												
	Y	22.5		.14	5.36	10.59	15.82	21.04	28.88	36.72	52.40	83.76
	L1	22.5		10.40	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.02
	L2	22.5		14.24	19.47	24.70	29.92	35.15	42.99	50.83	66.51	97.86
	Z	22.5		19.05	23.88	28.70	33.53	38.36	45.60	52.85	67.33	96.30
MINIMUM H = 3.59												
	Y	30			1.68	5.68	9.68	13.68	19.68	25.68	37.68	61.68
	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			21.13	24.60	28.06	31.53	36.72	41.92	52.31	73.09
MINIMUM H = 5.37												
	Y	45				.21	3.04	5.87	10.11	14.35	22.84	39.81
	L1	45					13.73	16.56	20.80	25.05	33.53	50.50
	L2	45					21.40	24.23	28.47	32.72	41.20	58.17
	Z	45					23.60	25.60	28.60	31.60	37.60	49.60
MINIMUM H = 9.61												
	Y	60						1.44	4.91	8.37	15.30	29.15
	L1	60							16.27	19.73	26.66	40.52
	L2	60							26.51	29.96	36.80	50.76
	Z	60							25.45	27.19	30.65	37.58
MINIMUM H = 14.54												

Special Bending Information Chart (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
	Y	90								1.62	7.62	19.62
	L1	90										31.80
	L2	90										47.16
	Z	90										25.06

MINIMUM H = 25.06

1/2 IMC/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

	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

Special Bending Information Chart (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
	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

1 IMC/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

	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

Special Bending Information Chart (cont'd)

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
	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 = 12.42												
	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												

1-1/2 IMC/RIGID

	Y	15		5.30	13.03	20.75	28.48	36.21	47.80	59.39	82.57	128.94
	L1	15	7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2	15	9.94	17.67	25.39	33.12	40.85	48.58	60.17	71.76	94.94	141.31
	Z	15	15.09	22.56	30.02	37.49	44.95	52.41	63.61	74.81	97.20	141.98
MINIMUM H = 1.97												

	Y	22.5		.90	6.13	11.36	16.58	21.81	29.65	37.49	53.17	84.52
	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		18.44	23.27	28.09	32.92	37.75	44.89	52.24	66.72	95.69
MINIMUM H = 3.36												

	Y	30			2.44	6.44	10.44	14.44	20.44	26.44	38.44	62.44
	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			20.35	23.82	27.28	30.75	35.94	41.14	51.53	72.32
MINIMUM H = 4.98												

	Y	45				1.06	3.88	6.71	10.96	15.20	23.68	40.65
	L1	45					13.78	16.60	20.85	25.09	33.58	50.55
	L2	45					20.50	23.33	27.57	31.81	40.30	57.27
	Z	45					22.47	24.47	27.47	30.47	36.47	48.47
MINIMUM H = 8.82												

	Y	60						2.45	5.91	9.38	16.30	30.16
	L1	60							16.41	19.87	26.80	40.66
	L2	60							25.36	28.83	35.76	49.61
	Z	60							23.92	25.65	29.12	36.04
MINIMUM H = 13.21												

	Y	90								3.12	9.12	21.12
	L1	90									20.33	32.33
	L2	90									33.77	45.77
	Z	90									22.50	22.50
MINIMUM H = 22.50												

2 IMC/RIGID

	Y	15		4.15	11.87	19.60	27.33	35.06	46.65	58.24	81.42	127.78
	L1	15		15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.71	139.08
	L2	15		17.80	25.62	33.35	41.08	48.80	60.40	71.99	95.17	141.53
	Z	15		22.90	30.36	37.82	45.29	52.75	63.95	75.15	97.54	142.32
MINIMUM H = 2.06												

	Y	22.5			5.22	10.45	15.67	20.90	28.74	36.58	52.26	83.61
	L1	22.5		10.40	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.02
	L2	22.5		14.09	19.31	24.54	29.76	35.00	42.83	50.67	66.35	97.71
	Z	22.5		18.89	23.71	28.54	33.37	38.20	45.44	52.69	67.17	96.14
MINIMUM H = 3.53												

Special Bending Information Chart (cont'd)

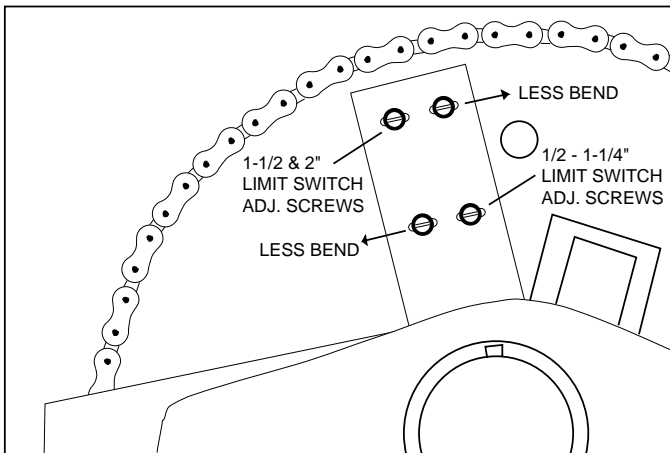
	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
	Y	30			1.62	5.62	9.62	13.62	19.62	25.62	37.62	61.62
	L1	30			11.88	15.88	19.88	23.88	29.88	35.88	47.88	71.88
	L2	30			16.79	20.79	24.79	28.79	34.79	40.79	52.79	76.79
	Z	30			20.92	24.38	27.84	31.31	36.50	41.70	52.09	72.88
MINIMUM H = 5.26												
	Y	45				.26	3.08	5.91	10.16	14.40	22.88	39.85
	L1	45					13.74	16.56	20.81	25.05	33.53	50.50
	L2	45					21.10	23.93	28.17	32.42	40.80	57.87
	Z	45					23.27	25.27	28.27	31.27	37.27	49.27
MINIMUM H = 9.38												
	Y	60						1.58	5.04	8.50	15.43	29.29
	L1	60							16.30	19.77	26.70	40.55
	L2	60							26.13	29.59	36.52	50.38
	Z	60							24.99	26.72	30.18	37.11
MINIMUM H = 14.14												
	Y	90								1.94	7.94	19.94
	L1	90										31.98
	L2	90										46.70
	Z	90										24.25
MINIMUM H = 24.25												

Maintenance and Adjustments

Adjustments

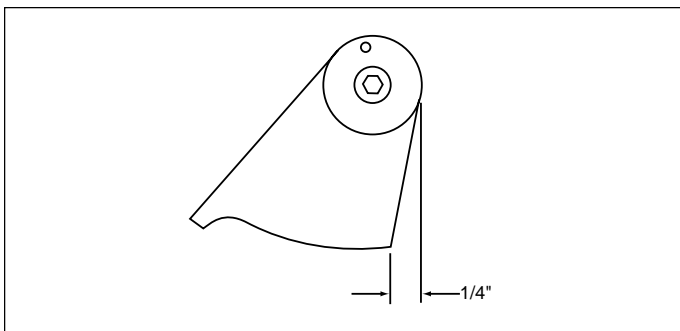
Squeeze: Proper squeeze adjustment on the 1-1/2" - 2" roller system is achieved when the tail roller shaft is 1/4" above the support frame with IMC conduit installed but not under load and the leading roller is not contacting the hook. Proper squeeze adjustment for EMT is set when the tail roller shaft does not contact the support frame while bending. If the conduit wrinkles or excessive ovalness is experienced, the squeeze should be increased in one step (hole) increments. To increase squeeze, rotate the shaft counterclockwise. To decrease squeeze, rotate the shaft clockwise.

Accuracy: If the accuracy of all sizes of conduit on one shoe is off in the same direction, the limit switch needs to be adjusted. To do so first unplug the bender. Remove the four screws that secure the top round guard and remove the guard to expose the two limit switches. The top switch controls the 1-1/2" - 2" shoe. Loosen the



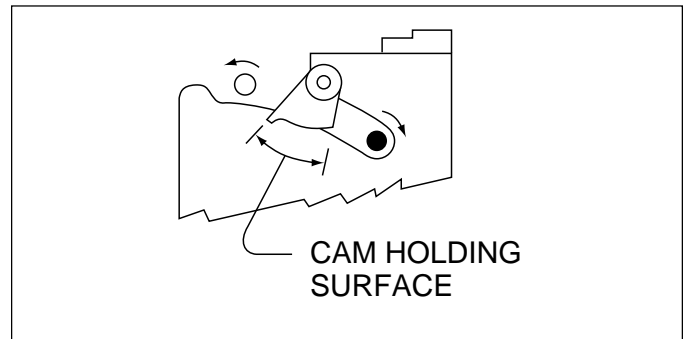
two screws and move it to the right side of the bender as shown above to prevent overbending. The bottom switch controls the 1/2" - 1-1/4" shoe. Loosen the two screws and move it to the left side of the bender as shown above to prevent overbending. Move either switch the opposite direction if the bender is underbending. Every 1/8" of switch movement approximates 1 degree of change. Tighten the screws and replace the guard.

Retention Cam: Loosen the screws securing the

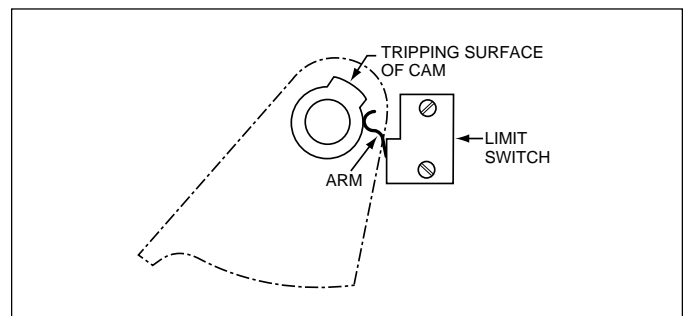


retention cam. With the bender oriented in the vertical position, rotate the round plate until the right side edge of the cam is pointed straight down or within 1/4" left of being straight down. Make sure both ends of the spring are engaged in the holes of the cam and round plate. Tighten the screws while holding the round plate in position with pliers to prevent it from rotating.

Check to make sure the roller support handle will fully engage and retract without catching on the cam holding surface. This should be done in both the vertical and horizontal bending positions. It should also be done with the cam positioned as far left and as far right as friction will allow it to stay.



Once everything is tightened down in the proper position, push in the limit switch trip arm. You should hear the switch click on. If not, loosen the two screws and nuts and slide the switch to the right and retighten. Push the cam toward the switch to make sure any free play will not trip the switch.



Rotate the cam until the switch trip arm rides up on top of the tripping surface of the cam. You should hear the switch click on. If not, move the switch to the left to a point where it does. You should hear the switch click off when the cam is released. If you cannot move the switch enough to get it to trip properly, use needlenose pliers to slightly bend the arm.

Maintenance and Adjustments (cont'd)

Maintenance


Chain Lubrication: Lubrication of the drive chain is recommended every 6 months (more often if used in dusty or corrosive environments).

1. Disconnect power to unit.
2. Remove the 1-1/2" - 2" shoe.
3. Remove the lower front guard.
4. Spray a motorcycle chain lubricant on the inside of the chain between the sprockets while pressing UNLOAD until the entire length of chain has been covered (do not spray on the encoder beneath the drive sprocket).
5. Replace the guard and shoe. Make sure the hooks for both shoes line up with each other. If one shoe is off 90°, the bender will not work properly, and damage to the bender may occur.

Adjustment: Check the free play in the chain every time the chain is lubed. If the total play half way between the sprockets is more than 1", adjust the chain.

1. Disconnect power to unit.
2. Remove the 1-1/2" - 2" shoe.
3. Remove the front lower guard and the motor cover.
4. Loosen the 2 motor mounting bolts on the front of the bender and the 2 mounting bolts and 1 nut on the back.
5. Turn the lower bolt on the front clockwise until all chain slack is removed. While maintaining tension, tighten the nut and 2 front bolts.
6. Tighten the 2 rear bolts.
7. Replace the motor cover, guard and shoe. Make sure the hooks for both shoes line up with each other. If one shoe is off 90°, the bender will not work properly, and damage to the bender may occur.

Brake: Under normal circumstances the brake should not require adjustment. However, if the brake can be heard dragging while bending or if the braking performance deteriorates, brake adjustment may be necessary.

	⚠ WARNING
	Do not touch the brake if the bender has been recently used. It will be hot. Wait an hour for it to cool off before adjusting.

1. Disconnect power to unit.
2. Remove the motor cover.
3. Loosen the 2 set screws on the brake rotor hub (the part that turns).
4. Slide it to a position .002" - .015" away from the mating face (about 1 to 3 page thicknesses of this manual).
5. Tighten the set screws to 35 in-lb.
6. Replace the motor cover.

Support rollers:

Front rollers: The front rollers (1-1/2" - 2") should be cleaned and lubricated every 6 months (more often if used in dusty environments).

1. Disconnect power to unit.
2. Remove the 1-1/2" - 2" shoe.
3. Detach the 2 springs from under the roller supports.
4. Remove the squeeze adjustment arm bolt and arm.
5. Remove the 3 bolts securing the pivot bushing and remove the bushing.

⚠ WARNING

Use both hands to grab all 4 lead and tail rollers to prevent the assemblies from pivoting and pinching fingers.

6. Pull out the pivot shaft.
7. Lift the roller assembly to the left and up to remove.
8. Loosen the 1-1/2" bushing set screw and pull out the handle.
9. Loosen the 2" bushing set screw and press out the pivot pin.
10. Remove the bolt and 1 retaining ring from the 2" roller assembly and pull off the side plate.
11. Remove the tail roller, center roller, shim (if used), O-ring, pivot ball, split roller, spacer, split roller, pivot ball and O-ring.
12. Clean all the grease and dirt off.
13. Lubricate all working surfaces with molybdenum disulfide grease.
14. Slip one O-ring over each side plate. Replace with a new one if cut, shaved or cracked.
15. Replace the pivot ball, split roller, spacer, split roller, pivot ball, shim (if used), center roller and tail roller.
16. Fit on the side plate.

Maintenance and Adjustments (cont'd)

17. Reattach the retaining ring and bolt (use a high strength retaining compound on the bolt).
18. Slip the O-rings onto the pivot balls.
19. Repeat above with the 1-1/2" roller assembly noting the following exceptions:
 - a) there is no center roller.
 - b) remove and replace the spring anchor.
 - c) 2 spring washers are used in place of the center spacer.
20. Replace the 1-1/2" - 2" shoe. Make sure the hooks for both shoes line up with each other. If one shoe is off 90°, the bender will not work properly, and damage to the bender may occur.

Rear rollers: The rear rollers should be lubricated every 6 months (more often if used in a dusty environment).

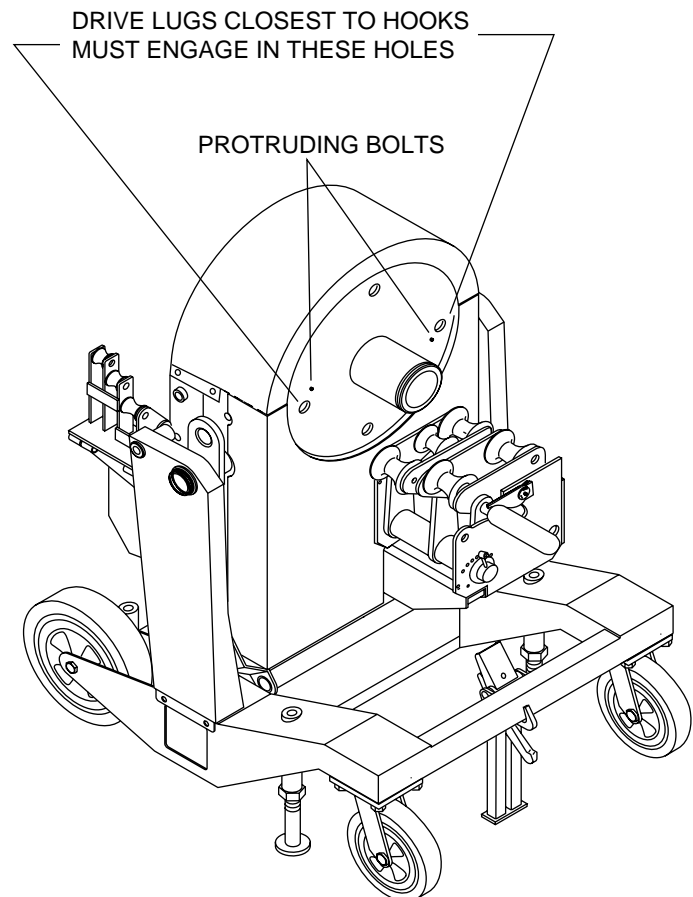
1. Spray a motorcycle chain lubricant in-between each side of the roller while rotating the roller.
2. Repeat for each roller.
3. Wipe excess lube away.

Motor: The motor commutator brushes should last for about 1000 hours of normal use but will eventually need to be replaced.

1. Disconnect power to unit.
2. Remove the motor cover.
3. Remove the power cord strain relief.
4. Remove the 2 nuts securing the shroud to the tail of the motor and remove the shroud.
5. Push in the commutator brush retainer and move it towards the brush to release it. Unplug the brush and remove it. Replace if the length is less than 1/4".
6. Reassemble in reverse order.

Removing and installing shoes

1. Disconnect power to unit.
2. Remove the retaining ring securing the shoe to be removed with retaining ring pliers.
3. Use both hands to hold onto both sides of the shoe and pull it off the spindle.
4. Assemble in reverse order, noting the following:
On the 1-1/2" - 2" shoe, the two drive lugs closest to the hooks must engage in the two (of four) holes nearest the bolts protruding from the sprocket. On the 1/2" - 1-1/4" shoe, the two drive lugs closest to the hooks must engage in the two drive plate holes.



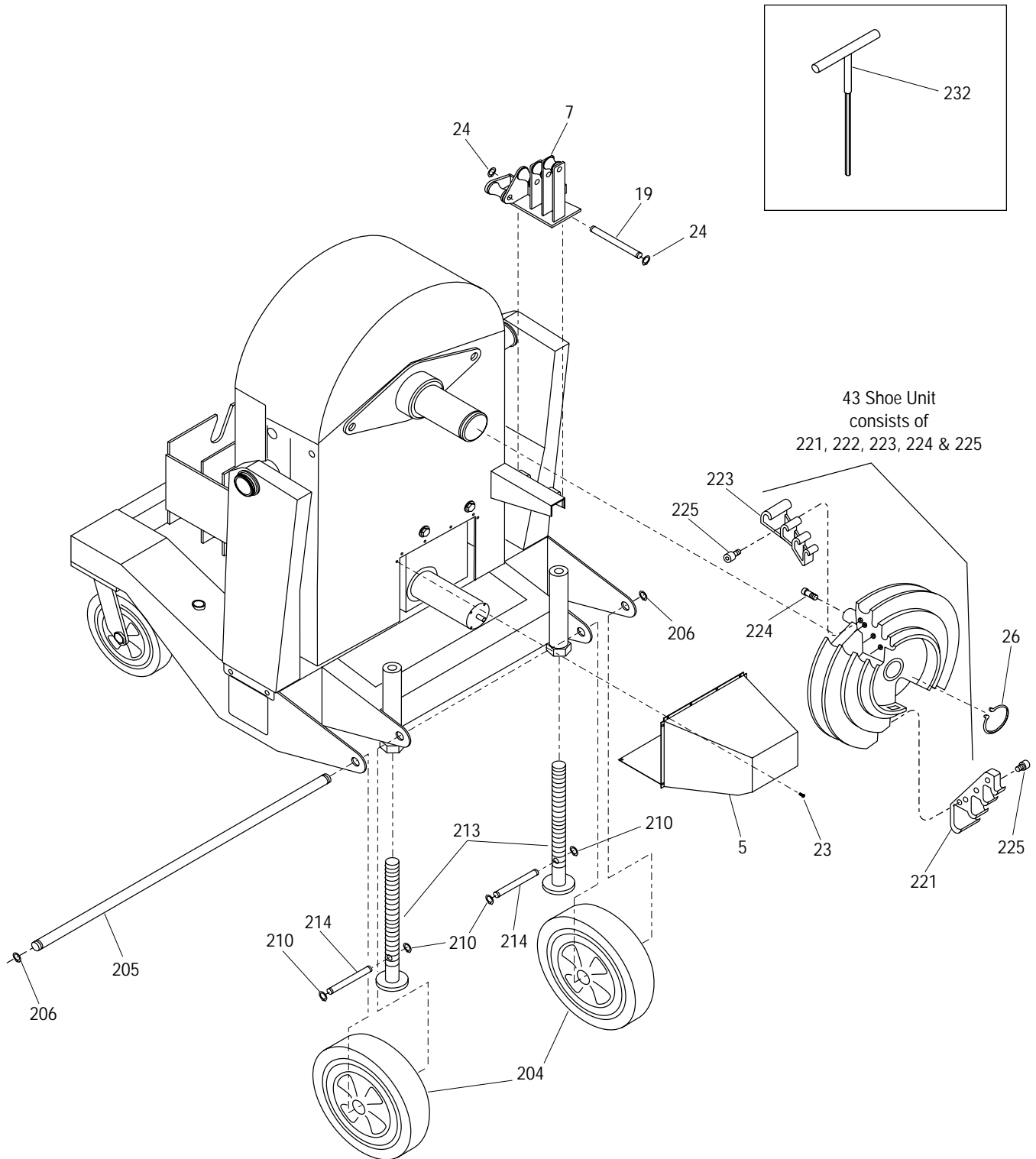
Troubleshooting

Problem	Probable Cause	Probable Remedy
Bender will not operate.	No voltage.	<p>Check supply voltage circuit operation.</p> <p>Check that switch is ON.</p> <p>Pendant not fully plugged in.</p>
Bender operates, but display is blank.	<p>Insufficient voltage.</p> <p>Pendant was plugged in while bender was on.</p>	<p>Use shorter or larger gauge extension cord.</p> <p>Check supply voltage (80 vac min.).</p> <p>Turn bender switch OFF and ON.</p>
Display comes on - bender won't bend.	<p>Bend angle already exceeds angle in memory.</p> <p>Bender was advanced 93 degrees.</p>	<p>CLEAR memory. BEND until display counts. UNLOAD to desired position.</p> <p>Release and repress BEND.</p>
Display comes on - will not count during bend.	<p>Shoe installed in wrong position.</p> <p>Bender turned on while conduit was fully loaded.</p>	<p>Insert shoe drive lugs in holes 90 degrees from the present position. Hooks must align with hooks on 1/2" - 1/4" shoe.</p> <p>Remove conduit, and initialize home position per instructions (see page 10).</p>
Bender operates in wrong direction.	Wrong conduit size and/or type selected.	Set selector switches properly.
Bends are overbent a few degrees.	<p>Wrong conduit size and/or type selected.</p> <p>Shoe was not rotated far enough to unload direction before start of bend.</p> <p>Too much squeeze on 1-1/2" or 2" EMT or IMC conduit.</p> <p>Unusual conduit characteristics.</p>	<p>Set selector switches properly.</p> <p>Initialize home position per instructions (see page 10).</p> <p>Back squeeze off per adjustment instructions.</p> <p>Bend to a smaller angle to compensate.</p>

Troubleshooting (cont'd)

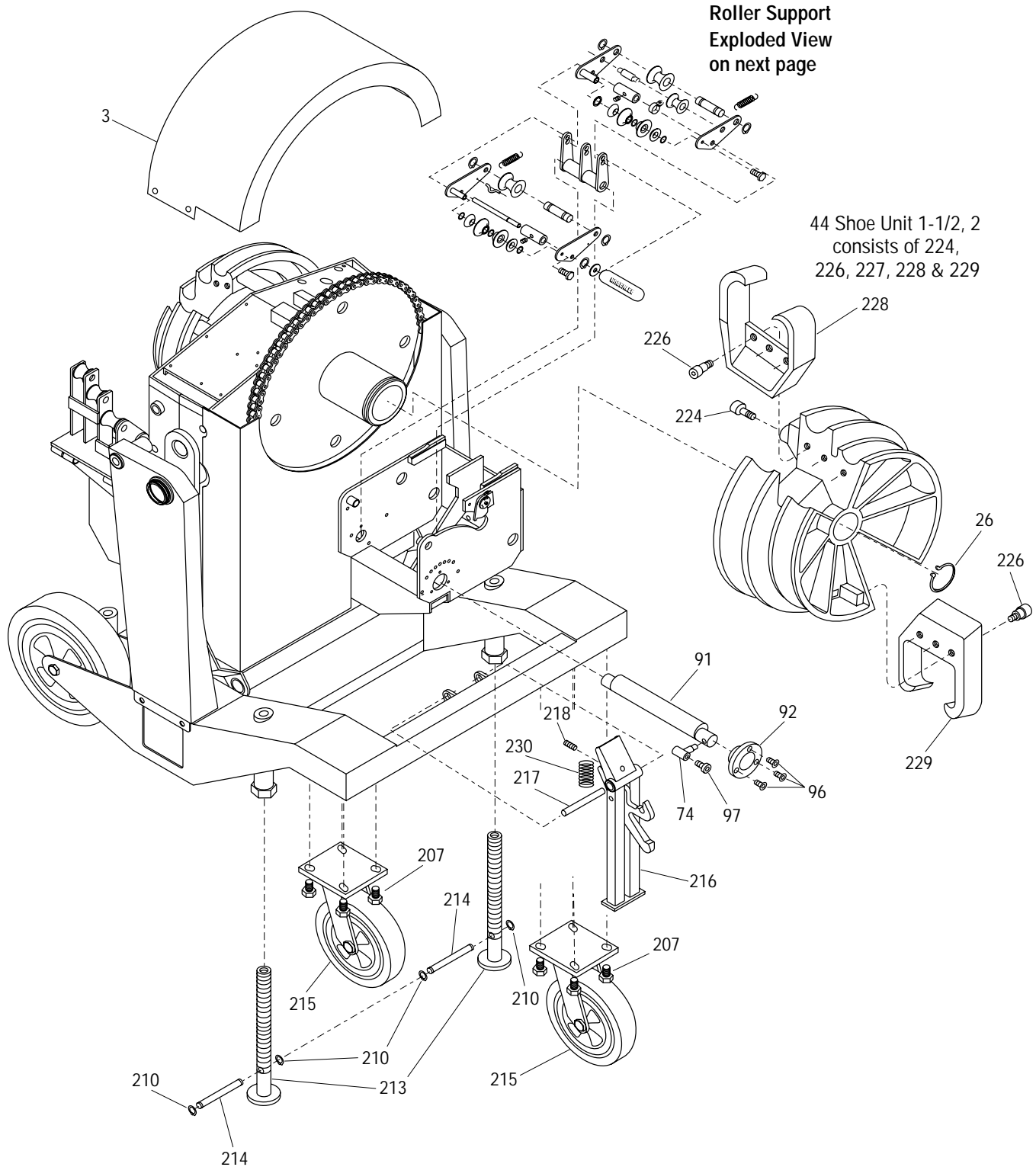
Problem	Probable Cause	Probable Remedy
Bends are underbent a few degrees.	Wrong conduit size and/or type selected.	Set selector switches properly.
	Too little squeeze on 1-1/2" or 2" EMT or IMC conduit.	Increase squeeze per adjustment instructions.
	Unusual conduit characteristics.	Bend to a larger angle to compensate.
UNLOAD key does not work.	Roller support locking cam is engaged.	Release the roller support or adjust retention cam.
	Unloaded to the starting position.	Release and repress UNLOAD.
Locking cam will not engage.	Too much squeeze on 1-1/2" or 2" EMT or IMC conduit.	Back squeeze off per adjustment instructions.
	Shoe rotated too far in unload direction.	Rotate shoe with BEND key until locking cam will engage.
Bend key does not work for 1/2 - 1-1/4" conduit.	Roller support locking cam is engaged.	Release the roller support or adjust retention cam.

Exploded View - 1/2" Thru 1-1/4" Side



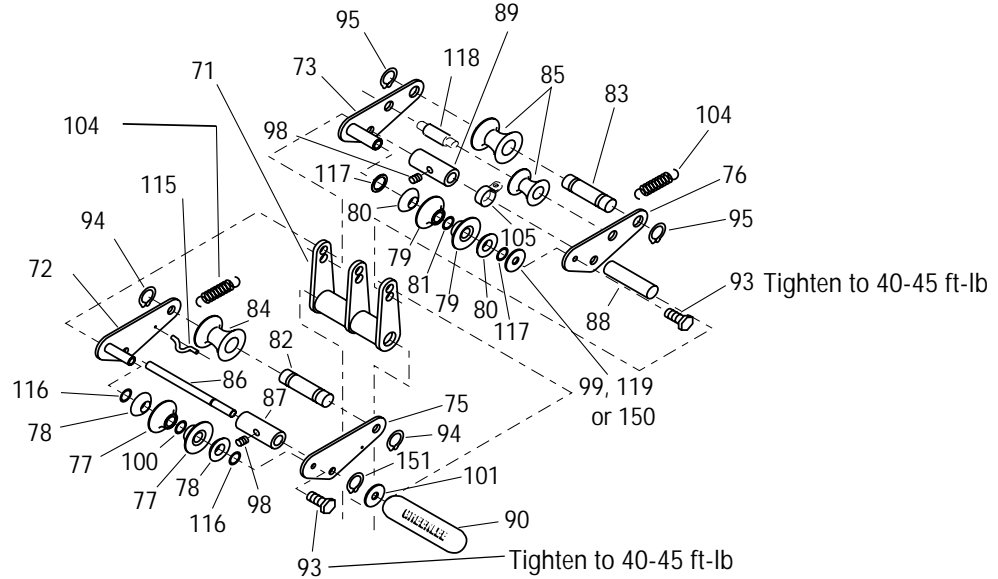
For parts not shown contact your nearest Authorized Greenlee Service Center or call 800-435-0786 for more information.

Exploded View - 1-1/2", 2" Side



For parts not shown contact your nearest Authorized Greenlee Service Center or call 800-435-0786 for more information.

Exploded View - 1-1/2", 2" Roller Support / Parts List



Key No.	UPC No.	Part No.	Description	Qty.	Key No.	UPC No.	Part No.	Description	Qty.
3	38217	503 8217.9	Guard weldment, top chain	1	98	50881	905 0881.5	Screw, 1/4-28 x .25 set	2
5	38232	503 8232.2	Guard weldment, motor	1	99	53018	905 3918.4	Washer, 1.00 x 1.37 x .03 shim	1
7	38199	503 8199.7	Spt wldt, 1/2 - 1-1/4" RLR	1	100	54248	905 4248.7	Washer, Belleville 1.362x.803	2
19	38465	503 8465.1	Pin, 1/2 - 1-1/4" sprt pvt	1	101	39440	503 9440.1	Washer, .62x2.00x.06 flat	1
23	51655	905 1655.9	Screw, #10-16 x.50 hex hd	29	104	54243	905 4243.6	Spring, extension .75 x 3.50	2
24	54228	905 4228.2	Ring, rtng Truarc #5160-42	2	105	54252	905 4252.5	Clamp, loop-type	1
26	52501	905 2501.9	Ring, rtng Truarc #5100-287	2	115	38592	503 8592.5	Guide, spring	1
43	38780	503 8780.4	Shoe unit, 1/2 - 1-1/4"	1	116	51130	905 1130.1	O-Ring, 1.50x1.62x.062	2
44	38148	503 8148.2	Shoe unit, 1-1/2 - 2"	1	117	51537	905 1537.4	O-Ring, 1.75x1.87x.062	2
71	38221	503 8221.7	Support weldment, roller	1	118	38657	503 8657.3	Shaft, 2 middle roller	1
72	38230	503 8230.6	Support weldment, 1-1/2"	1	119	52644	905 2644.9	Washer, 1/32 shim	1
73	38233	503 8233.0	Support weldment, 2"	1	150	52645	905 2645.7	Washer, 1/16 shim	1
74	38225	503 8225.0	Arm weldment, adjustment	1	151	53216	905 3216.3	Retaining ring #5100-62	1
75	38240	503 8240.3	Plate, 1-1/2 outer roller	1	204	53390	905 3390.9	Wheel	2
76	38242	503 8242.0	Plate, 2 outer roller	1	205	38166	503 8166.0	Axle, long	1
77	38254	503 8254.3	Split rollers, 1-1/2"	2	206	51528	905 1528.5	Ring, retaining #5160-75	2
78	38264	503 8264.0	Ball, 1-1/2"	2	207	54237	905 4237.1	Screw, flange 3/8-16x1.00 hex	16
79	38255	503 8255.1	Split rollers, 2"	2	210	54245	905 4245.2	Ring, retaining #5133-37 (early models only)	8
80	38263	503 8263.2	Ball, 2"	2	213	38464	503 8464.3	Pad weldment, jack bolt	4
81	38262	503 8262.4	Spacer, 2 roller	1	214	38266	503 8266.7	Pin, jack bolt (early models only)	4
82	38259	503 8259.4	Shaft, 1-1/2 rear	1	215	54276	905 4276.2	Caster, 8 swivel	2
83	38261	503 8261.6	Shaft, 2 rear roller	1	216	38743	503 8743.0	Stand, anti-movement	1
84	38252	503 8252.7	Roller, 1-1/2 IMC	1	217	31732	503 1732.6	Pin, pivot	1
85	38253	503 8253.5	Roller, 2 tail	2	218	50881	905 0881.5	Screw, 1/4" - 28 x .250 skt set	1
86	38260	503 8260.8	Shaft, 1-1/2 pivot roller	1	221	31710	503 1710.5	1/2 thru 1-1/4 IMC, rigid hook	1
87	32027	503 2027.0	Sleeve, 1-1/2"	1	223	31712	503 1712.1	1/2 thru 1-1/4 EMT hook	1
88	31728	503 1728.8	Shaft, 2 pivot	1	224	52479	905 2479.9	Drive bolt 1/2-13 x .62 socket head cap screw	6
89	38151	503 8151.2	Sleeve, 2"	1	225	51088	905 1088.7	1/2 thru 1-1/4 Hook Bolts, 3/8-16 x 1-1/4 socket head cap screw	8
90	23258	502 3258.4	Grip	1	226	53396	905 3396.8	1-1/2, 2 Hook shoulder bolts, 3/4 x 1-1/2	6
91	38256	503 8256.0	Shaft, eccentric	1	228	31716	503 1716.4	1-1/2, 2 EMT hook	1
92	38251	503 8251.9	Sleeve adapter	1	229	38779	503 8779.0	1-1/2, 2 IMC & rigid hook	1
93	50540	905 0540.9	Screw, 7/16-14 x 1.00 hex head	2	230	54297	905 4297.5	Spring	1
94	50283	905 0283.3	Retaining ring #5100-75	2	232	54880	905 4880.9	Wrench, 5/16" hex "T" - handle	1
95	50985	905 0985.4	Retaining ring #5100-100	2					
96	54242	905 4242.8	Screw, cap 1/4-20x.37 btn head	3					
97	50224	905 0224.8	Screw, 5/16-18 x 1.00 skt head	1					

OPTIONAL

38863	503 8863.0	Standard digital pendant control (not shown)
38650	503 8650.6	Deluxe pendant control (not shown)
38962	503 8962.9	Vinyl cover (not shown)