

Bender Set-Up

A. Ratchet Handle

1. The bender frame has two mounting holes for the ratchet handle and a locating pin in the area between the two holes, figure 1.

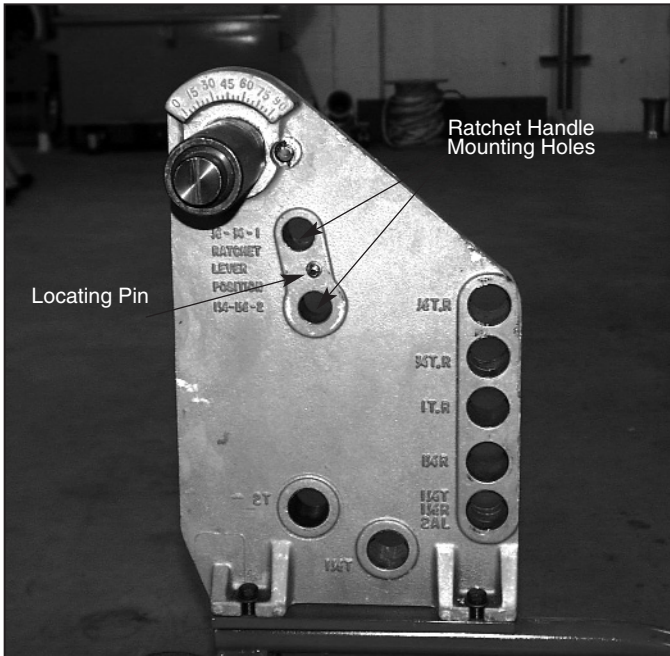


Fig. 1

2. The upper hole is used when bending $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1" conduit. The lower hole is used when bending $1\frac{1}{4}$ ", $1\frac{1}{2}$ " and 2" conduit. Check the markings on the frame.
3. Two of the three holes in the back of the ratchet handle are for the locating pin on the frame. When bending $\frac{1}{2}$ ", $\frac{3}{4}$ " or 1" conduit, the lower left hole is used. When bending $1\frac{1}{4}$ ", 1" or 2" conduit, the top center hole is used, figure 2. The third hole is not used.

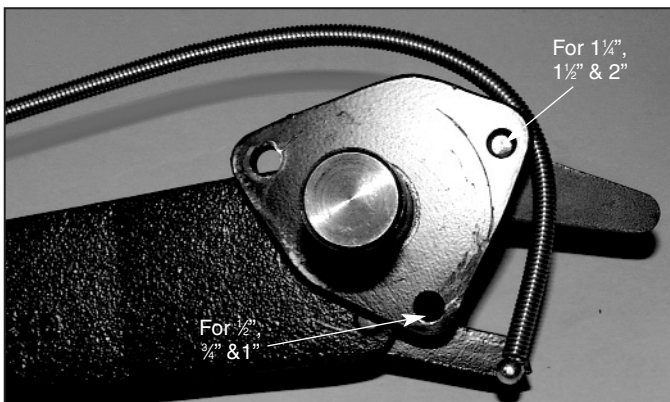


Fig. 2

4. Insert the ratchet handle shaft into the frame hole which is marked for the size conduit to be bent. Guide the locating pin into the correct hole and press the ratchet against the frame. Secure the ratchet with the nut, tighten finger tight.

NOTE: The mounting nut must be completely threaded on the shaft and the ratchet must be against the frame. Do not use a wrench to tighten the nut.

B. Shoe Installation

1. Select the shoe which is marked for the size and type conduit to be bent. The diameter and material it is designed for is marked on the flat end of each shoe.

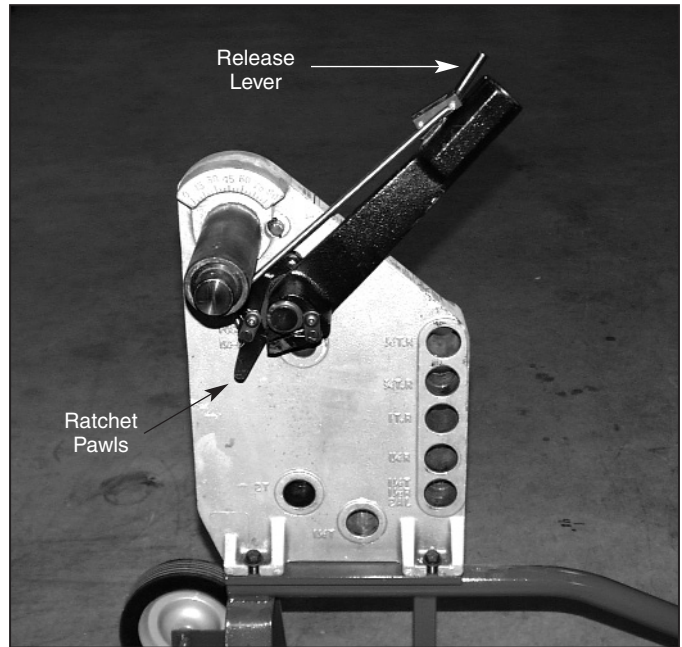


Fig. 3

2. To mount the shoe, pull the ratchet release lever back against the handle, figure 3.
3. Raise the ratchet handle approximately 60° , then lower it back to the rest position. The ratchet pawls will move upward to permit shoe installation.
4. Remove the hairpin cotter and washer from the pivot shaft, figure 4. Position the shoe on the shaft with the ratchet teeth facing the frame.

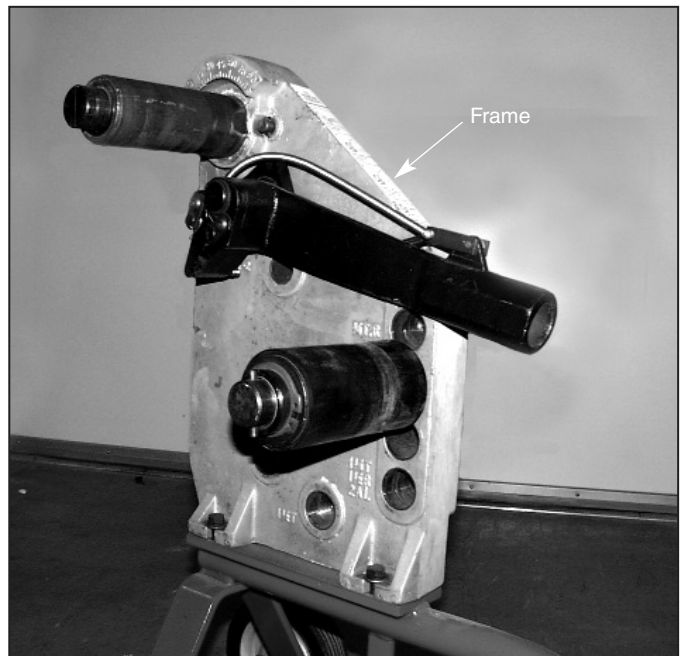


Fig. 4

- Slide the shoe on the shaft and secure it with the large washer and hairpin cotter, figure 5.

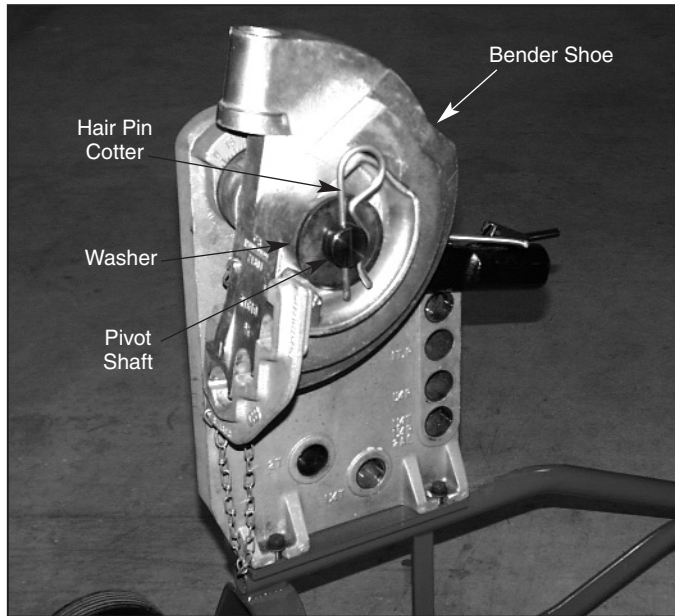


Fig. 5

C. 2" EMT Shoe Only (BT2000)

- The shoe is placed on the pivot shaft in the same way as other shoes. The washer is not used to secure the shoe. Instead a shaft and strap assembly is used. See figure 6.

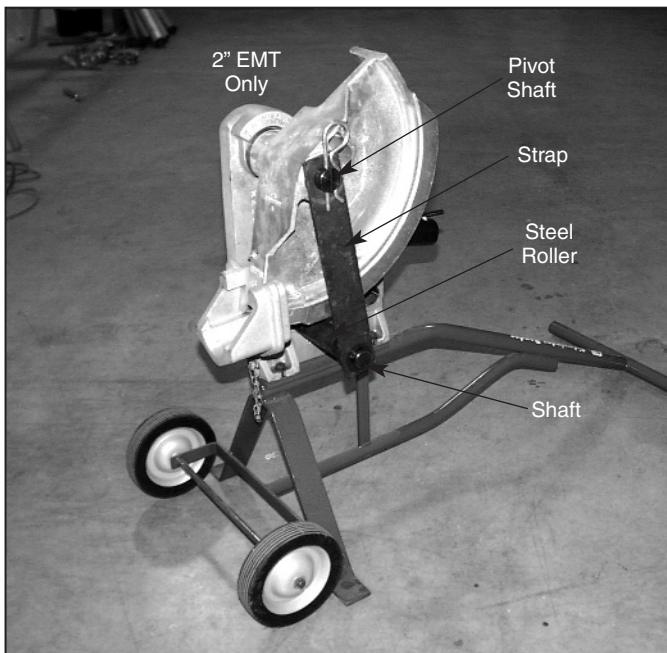


Fig. 6

- Assemble the shaft by placing the strap on the small shaft, then sliding the steel roller over the small shaft.
- Insert the shaft and strap assembly into the frame opening marked 2T. Place the strap over the pivot shaft and insert the hairpin cotter in the pivot shaft, figure 6.
- Soft roller assembly is not used when bending 2" EMT.

D. Bending Conduit

- Press the shoe lock pin, figure 7, rotate the shoe until the lock pin seats in the shoe notch and holds the shoe in place.

NOTE: Before starting a bend, be sure lock pin has released from shoe.

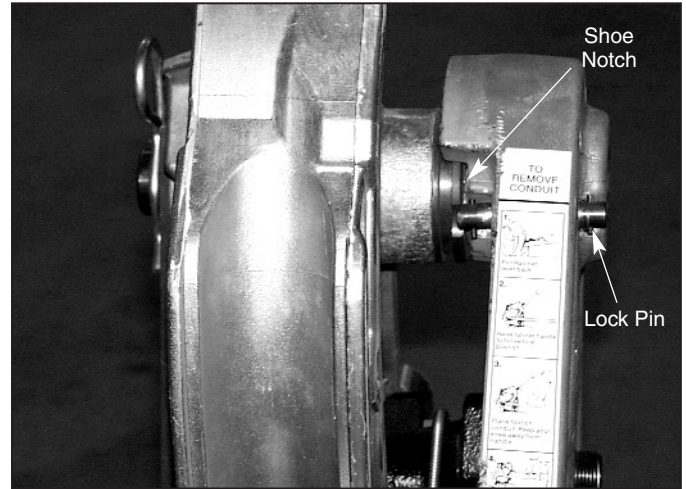


Fig. 7

- Place the conduit under the shoe and in the groove. The other end of the conduit must rest on the black roller assembly. Check the charts on the last page for exact conduit positions for various type bends.
- When the conduit is properly positioned, install the shoe jaw on the shoe until it rests against the stops, figure 8.

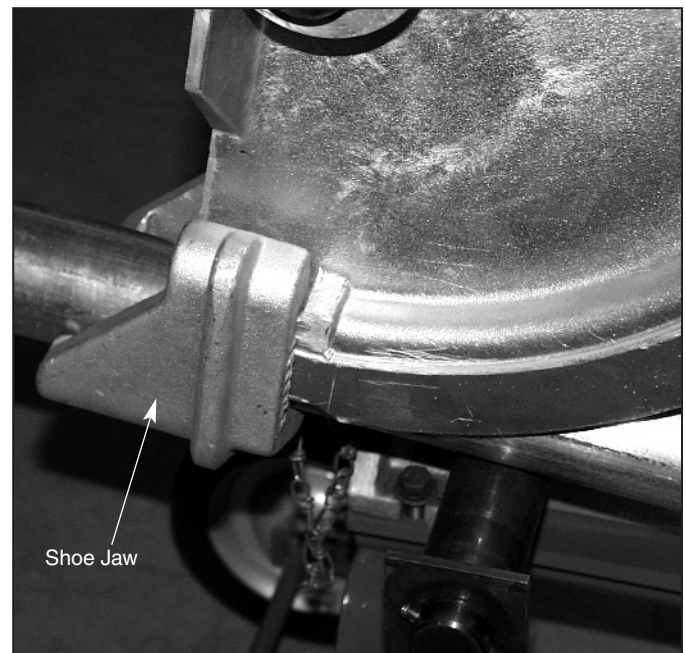


Fig. 8

NOTE: 2" EMT Conduit Only: When the conduit is positioned and the jaw in place, install the follow bar. The tapered end (marked Start) slides under the conduit and against the jaw. The follow bar must rest on the roller assembly, figure 9.

- To use the bender, a 5-foot length of 1-inch standard pipe, schedule 40 or 80, is needed for bending $\frac{1}{2}$ " through 2" conduit. The 1" pipe is placed into the ratchet handle and used as an extension handle to make bending easier.

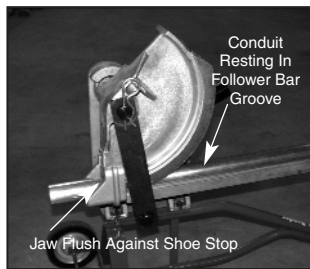


Fig. 9

NOTE: When bending $1\frac{1}{2}$ " thru 2" conduit, a heavy duty piece of 1" pipe must be used, due to greater bending forces required. A $\frac{3}{4}$ " pipe can be inserted in the 1" standard pipe for added strength.

- Insert the 1" pipe into the ratchet handle, figure 10. Push the release lever forward to set the ratchet pawls. Raise the ratchet handle until the pawls engage the shoe teeth, figure 11.

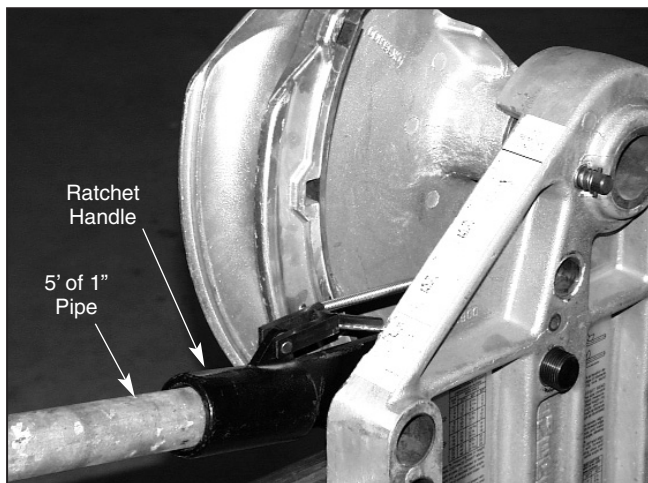


Fig. 10

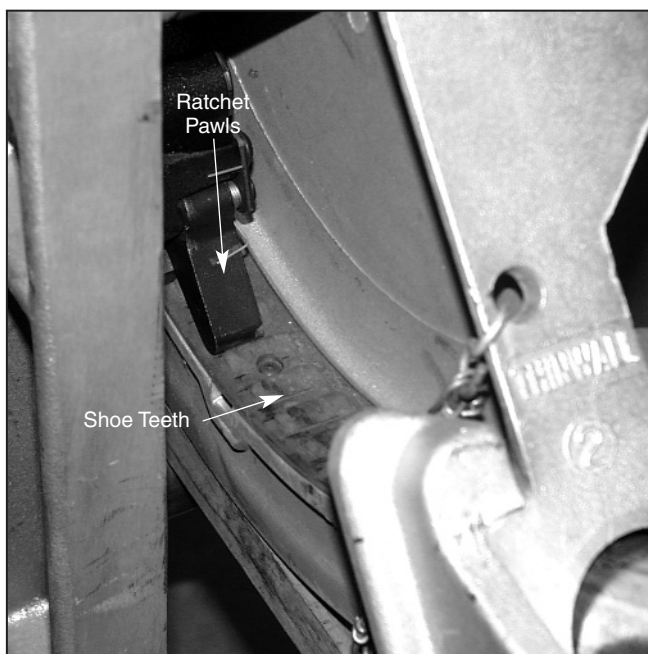


Fig. 11

- Using the 1" pipe, pull the ratchet down to begin bending, check the angle indicator (on the frame) and the pointer on the shoe to determine what degree of bend has been accomplished, figure 12. Repeat raising and lowering the ratchet as often as needed to make the desired bend.

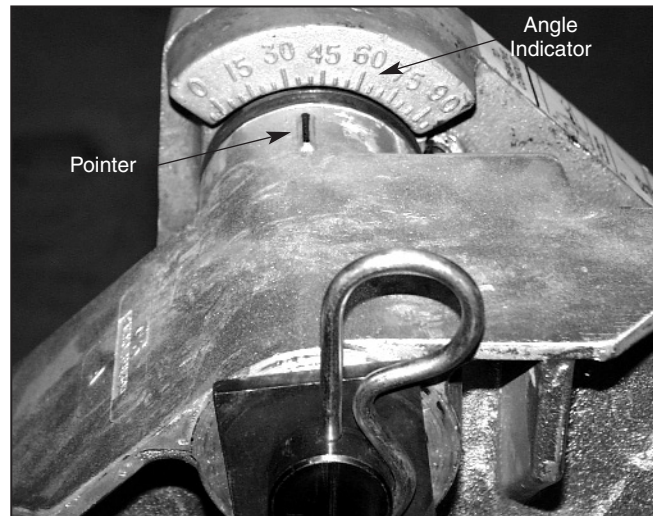


Fig. 12

- A small overbend is usually desirable to compensate for conduit spring-back. Various types and grades of conduit will spring-back in different amounts.

E. Removing Conduit

- After a bend is complete, pull the release lever back.
- Move the ratchet handle up until the pawls "click" together and release the shoe teeth, figure 13.
- Place foot on conduit. Keep your knee away from the handle.
- Pull down firmly on the ratchet handle. A sharp click will be heard when the pawls release.
- Remove the shoe jaw. Remove the conduit from the bending shoe.

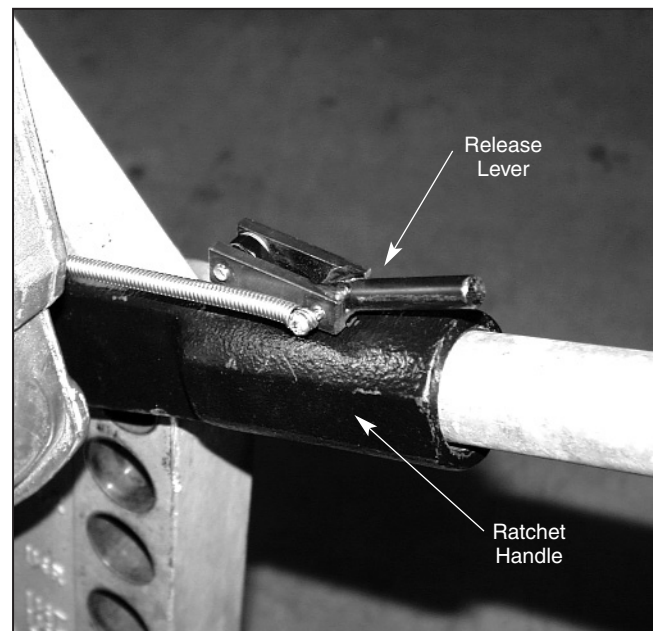


Fig. 13

- If the conduit will not slip out of the bending shoe, place the pipe handle in the bending shoe, figure 14.

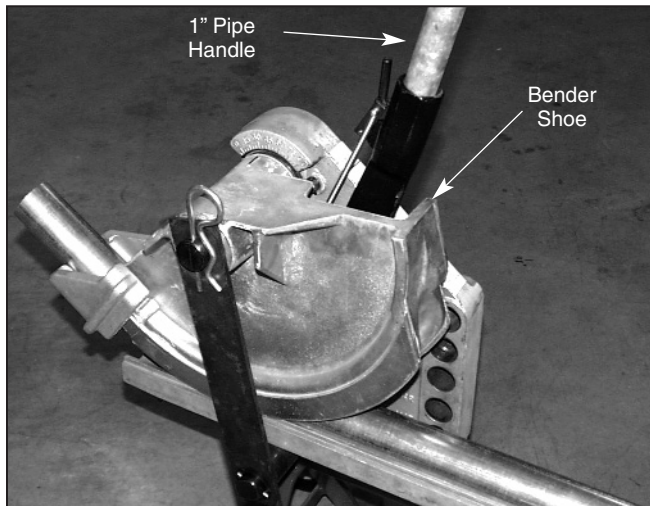


Fig. 14

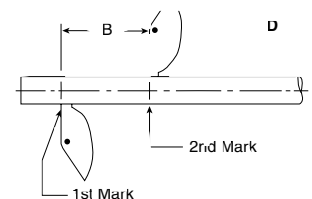
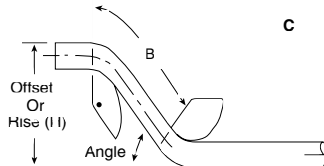
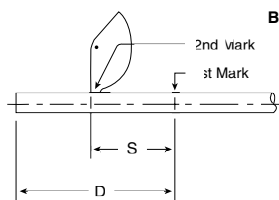
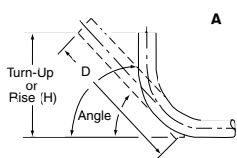
- Hold the conduit against the soft roller, at the same time push the pipe upward, moving the shoe counter-clockwise. The conduit will be forced out of the shoe.

Note: Removing 2" conduit requires removing the follow bar prior to removing the conduit.

Maintenance (Performed Monthly)

- Use heavy duty grease to coat the soft roller inner bearings and roller shaft.
- The roller mounting holes and ratchet mounting holes in the frame should be coated with a film of lightweight oil.
- Lightly coat the shoe pivot shaft (on the frame) with grease.
- Oil the wheel axles and the moving points of the ratchet handle.
- Do not lubricate threaded shafts or hardware pieces (cotter pins, nuts, etc.).

Charts & Instructions



Diagonal Distance Chart

Rise (H)	Bend Angle		
	30°	45°	90°
2	4	2 ¹³ / ₁₆	2
4	8	5 ¹ / ₁₆	4
6	12	8 ¹ / ₂	6
8	16	11 ⁵ / ₁₆	8
10	20	14 ¹ / ₈	10
12	24	17	12
14	28	19 ¹ / ₁₆	14
16	32	22 ⁵ / ₈	16
18	36	25 ⁷ / ₁₆	18
20	40	28 ⁹ / ₁₆	20
22	44	31 ¹ / ₈	22
24	48	33 ³ / ₁₆	24

Conduit Set-Back Dimension Chart

Type	Nominal Size	Stub-Ups			Kick Bends		
		90°		45°	30°		
		90°	45°	90°	45°	30°	
Rigid	1/2	5 1/4	1 1/2	1			
	3/4	8 3/8	2 5/16	1 1/2			
	1	9 1/2	2 15/16	1 7/8			
	1 1/4	11 3/4	3 1 1/16	2 3/8			
	1 1/2	14 1/4	4 3/8	2 7/8			
	2 (Alum.)	14 1/2	4 3/8	2 3/4			
EMT	1/2	5 5/8	1 1/2	1			
	3/4	7 1/2	2 3/16	1 1/2			
	1	9 3/4	2 15/16	1 7/8			
	1 1/4	13 1/4	4 3/8	2 7/8			
	1 1/2	15 3/4	5 1/8	3 1/4			
	2	12 3/4	4 9/16	3			

Offset Chart

Offset Desired (H)	Offset Bend Chart For Measurement (B) All Size (Dimensions In Inches)		
	15°		
	15°	30°	45°
2	7 3/4	4	2 1/2
4	15 7/16	8	5 3/8
6	23 3/16	12	8 3/16
8	30 7/8	16	11
10	38 5/8	20	13 13/16
12	46 3/8	24	16 1 1/16
14	54 1/8	28	19 1/2
16	61 13/16	32	22 25/16
18	69 1/16	36	25 1/8
20	77 1/4	40	28
22	85	44	31 13/16
24	92 3/4	48	33 3/8

90° Stub-Up And Kick Bend Instructions

- Determine (H) dimension by measuring rise or height needed. From "Diagonal Distance Chart", determine straight length of pipe (D) needed to reach desired turn-up height (H) at desired bend angle.
- Lay off distance (D) from end of conduit and make 1st mark.
- From "Set-Back Chart", select proper set-back dimension (S) corresponding to conduit size and bend angle desired.
- Measure distance (S) back from 1st mark, and make 2nd mark (see Figure B).
- Align forward edge of bending shoe with mark on conduit, and bend to desired angle, allowing for spring back.

Offset Bend Instructions

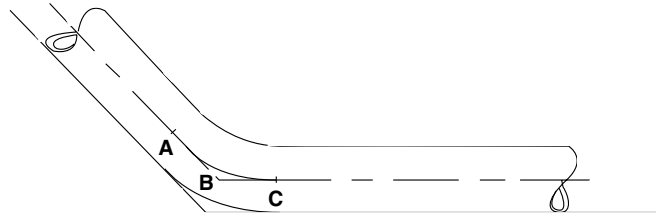
- Make first mark at location on determined by edge of obstacle or by following kick bend instructions.
- From the "Offset Bend Chart" for the size conduit to be bent, obtain measurement (B) for offset height (H) and bend angle desired.
- Make second mark at distance (B) beyond mark as illustrated by Figure D.
- Place conduit in bender aligning first mark with forward edge of bending shoe and make bend to desired angle, allowing for spring-back.
- Rotate conduit 180° and align second mark with forward edge of bending shoe and make bend to same angle as in step 4.

Developed Length Of Bend

Gain Of Bend

When conduit is bent, the length along the bend at the neutral axis (i.e., approximately the centerline of the pipe) is commonly called "developed length" of the bend.

The difference between the "squared off" distance (AB+BC) around a corner and the "developed length" (AC) along a bend is commonly called "gain" of the bend. (Measurements should be made at the pipe centerline.)



Size	Type	Pipe Bend Centerline Radii	Developed Length of Bends (inches)*				Gain of Bends (inches)*			
			15°	30°	45°	90°	15°	30°	45°	90°
1/2	EMT	3 5/16	7/8	1 1/4	2 9/16	5 3/16	0	1/16	1/8	1 3/8
3/4		5 1/16	1 5/16	2 11/16	4	8	0	1/16	3/16	2 3/16
1		6 7/16	1 11/16	3 3/8	5 1/16	10 3/16	0	1/16	1/4	2 3/4
1 1/4		9 15/16	2 5/8	5 3/16	7 13/16	15 9/16	0	1/8	7/16	4 1/4
1 1/2		11 3/8	3	5 15/16	8 15/16	17 7/8	0	1/8	1/2	4 7/8
2		9 7/16	2 1/2	4 15/16	7 3/8	14 13/16	0	1/8	3/8	4 1/16
1/2	Rigid	3 1/4	7/8	1 11/16	2 9/16	5 1/16	0	1/16	1/8	1 3/8
3/4		5	1 5/16	2 5/8	3 15/16	7 7/8	0	1/16	3/16	2 3/16
1		6 3/8	1 11/16	3 3/8	5	10 1/16	0	1/16	1/4	2 3/4
1 1/4		8 1/16	2 1/8	4 1/4	6 3/8	12 11/16	0	1/8	5/16	3 7/16
1 1/2		9 9/16	2 1/2	5	7 1/2	15	0	1/8	7/16	4 1/8
2(Alum.)		9 5/16	2 7/16	4 7/8	7 5/16	14 5/8	0	1/8	3/8	4

* At Pipe Centerline

REPAIR AND SERVICE INSTRUCTIONS: For repair service and parts contact your nearest GB ELECTRICAL Service Center. The Service Center will provide complete and prompt service on all GB ELECTRICAL products.

<p>PARTS AND SERVICE: For quality workmanship and genuine GB ELECTRICAL parts, select an Authorized GB Service Center for your repair needs. Only repairs performed by an Authorized Service Center displaying the official GB Authorized sign are backed with full factory warranty. Contact GB Electrical (414) 352-4160 for the name of the nearest GB Authorized Service Center.</p>	<p>WARRANTY: GB ELECTRICAL, INC. warrants its products against defects in workmanship and materials for 1 year from date of delivery to user. Chain is not warranted. Warranty does not cover ordinary wear and tear, abuse, misuse, overloading, altered products or use of improper fluid.</p>	<p>WARRANTY RETURN PROCEDURE: When question of warranty claim arises, send the unit to the nearest GB Authorized Service Center for inspection, transportation prepaid. Furnish evidence of purchase date. If the claim comes under the terms of our warranty the Authorized Service Center will REPAIR OR REPLACE PARTS AFFECTED and return the unit prepaid.</p>
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IMPORTANT: RECEIVING INSTRUCTIONS: Visually inspect all components for shipping damage. If any shipping damage is found, notify carrier at once. Shipping damage is NOT covered by warranty. The carrier is responsible for all repair or replacement costs resulting from damage in shipment.

SAFETY FIRST

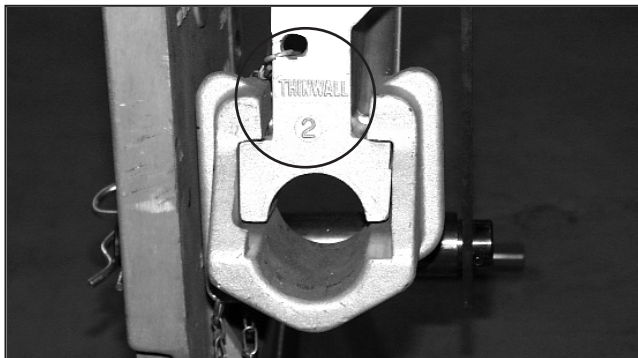
IMPORTANT — USER SAFETY AND PROTECTION: In setting up systems to fit your operations, care must be taken to select the proper components and design to insure appropriate integration with your operations and existing equipment and that all safety measures have been taken to avoid the risk of personal injury and property damage from your application or system.

GB ELECTRICAL CANNOT BE RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, MAINTENANCE OR APPLICATION OF ITS PRODUCTS. Please contact GB Electrical for guidance when you are in doubt as to the proper safety precautions to be taken in designing and setting up your particular application.

Preliminary Procedure: Read all instructions carefully before attempting to assemble or operate your mechanical conduit bender.

Bend Only Conduit Size and Type as Marked on Each Shoe:

Attempts to bend conduit size and type other than that marked on a shoe could result in breakage. (Do not attempt to bend 2" rigid or IMC steel conduit on this bender shoe).



When Bending 2" EMT Conduit:

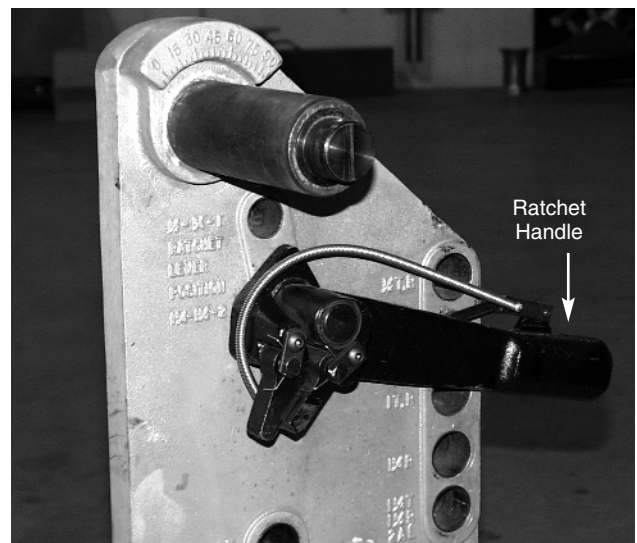
Always use the steel roller and strap provided. Failure to do so could result in breakage.



Important: The bender carriage must be on a solid, level surface during operation.

Roller Assembly Position:

Always place roller assembly and ratchet handle in proper frame hole according to the size and type of conduit being bent (as shown on Bender Frame).



Mounting of Bender Frame:

If bender frame is to be mounted on a bench or support other than the SAF-T-Bender Carriage, drill four (4) holes in the support, in-line with the mounting slots of the frame. Attach the frame to the support with four (4) 5/16" cap screws of proper length and secure with four (4) nuts. A plain washer should be used between the head of each cap screw and the bender frame.

CAUTION Keep hands clear of bending shoe and rollers during operation.