



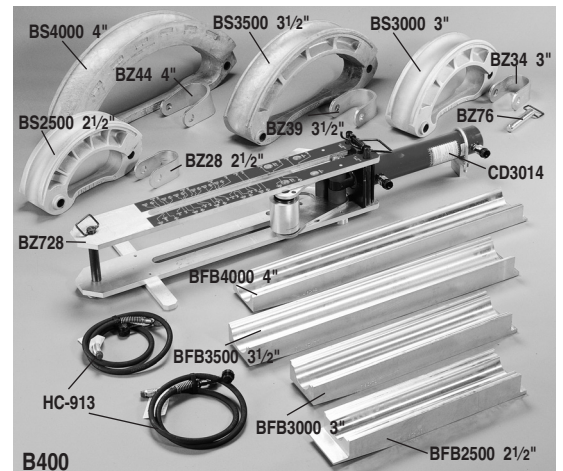
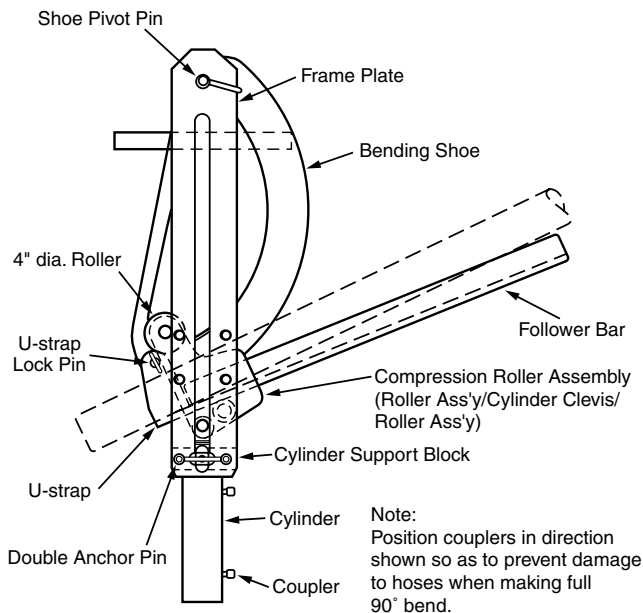
# Instruction Sheet

Model B400, B400D, B400L & B400DL  
Egor® Hydraulic Benders

**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

GARDNER BENDER CANNOT BE HELD RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, MAINTENANCE OR APPLICATION OF ITS PRODUCTS. Please contact Gardner Bender's technical service department for assistance if you are in doubt as to the proper safety precautions essential to designing and setting up your particular application.



Egor® Benders are shipped in metal storage cases.



P408S Electric Hydraulic Pump

## Egor® & Ultra Egor™ Bender Component Chart

Order Egor® Set Model Number	Size Set	Pump and Hoses	Bender Frame	Adjustable Compression Roller Assembly	Pins	Cylinder	Bending Shoes	Follow Bar	U-strap
Deluxe Egor® ULTRA Egor™	<b>B400LP408S</b>	2-1/2", 3", 3-1/2", 4" sets	P408S Pump (2) HC913 Hoses	BZ70 includes cylinder block, top and bottom frame plates and frame pivot assembly with clevis eye	BZ72 includes all rollers, top roller plate assembly, and bottom plate assembly	BZ74 double anchor frame pin	BS4000 BS3500 BS3000 BS2500	BFB4000 BFB3500 BFB3000 BFB2500	BZ44 (4") BZ39 (3-1/2") BZ34 (3") BZ28 (2-1/2")
Standard Egor® Bender Set	<b>B400DLP408S</b>	2-1/2", 3", 4" sets	P408S Pump (2) HC913 Hoses		BZ76 U-strap pin	CD3028	BS4000 BS3000 BS2500	BFB4000 BFB3000 BFB2500	BZ44 (4") BZ34 (3") BZ28 (2-1/2")
Standard Egor® ULTRA Egor™	<b>B400DL</b>		Pump and Hose Not Included		BZ78 bend shoe pin				
Standard Egor® ULTRA Egor™ Bender Set	<b>B400DLP408S</b>		P408S Pump (2) HC913 Hoses						

## Unpacking

Remove all bender shoes, follow bars, U-straps and pins. Inspect for damage and compare these components to the complete set shown on page one for possible missing parts. Depending on which set you purchased - the basic difference in component content will be whether you purchased a set having the 3<sup>1</sup>/<sub>2</sub>" size shoe, follow bar and U-strap included.

## Maintenance of your Eegor® Bender

Aside from conventional care of the hydraulic components, very little maintenance of the Eegor® bender is required. Removing sand or dirt from grooves and moving parts will extend bender life and facilitate ease of operation.

**Lubricate rollers, when needed, with molybdenum disulfide paste only (such as Dow Corning's Molykote #G-n paste, or equivalent). For heavy use, lubricate rollers weekly. Note: Graphite formulations are not equivalent lubrication.**

## Bender Frame Assembly - Removal, Transporting & Storage

To remove or carry the bender frame assembly—do so by placing hand on the **bottom** frame plate. You should have assistance so that the lifting points are at the front end and back end of the bottom plate.

**CAUTION** Avoid pinched fingers by keeping hands away from the BZ72 roller assembly, which pivots freely on a pin through the cylinder rod eye and may swing suddenly aside during handling.

The hydraulic cylinder, cylinder mounting block and compression roller assembly slide back and forth between the two frame plates.

This sliding action is a function of the bender design for locating the cylinder to meet the need of your particular conduit size; up to a full 90° without the need of another set-up or reposition of the conduit.

The slide action permits the bender assembly to be collapsed to a shorter length for handling and storage. When storing, be sure to remove the hydraulic hoses from the cylinder and install dust caps on the coupler ports. See the back page for details of storing the B400DL and B400L models.

## Safety Alert Symbol

The symbol above is used in conjunction with a danger, warning or caution statement. It alerts operators, supervisors and all personnel that safety precautions are required during specific operations and specific conditions. Failure to comply with safety data could result in serious injury or death.

### DANGER

Indicates a high probability of death or severe injury or major property damage could result.

### WARNING

Indicates serious but less probability of death, severe bodily injury or major property damage could result.

### CAUTION

A less serious alert, but still demands attention to detail. It indicates a hazardous condition that may cause minor injuries or property damage.

## Introduction

Gardner Bender™ produces twelve versions of the Eegor® hydraulic conduit bender. Each version uses a hydraulic cylinder and electrically operated pump to produce the force necessary to bend conduit sizes 2<sup>1</sup>/<sub>2</sub>" to 4". Differences between model numbers are based on the accessories included with each model and the length of the cylinder used to bend the conduit. Since the process of bending is the same for all models, the instructions and safety precautions apply to all application and uses of Gardner Bender™ hydraulic conduit benders.

Bending conduit encounters a wide range of situations and a variety of conduit materials. Because of the multiple job specifications, it is not possible to provide instructions covering every situation. Principal bending formulas apply to use of the model B400 series benders. Assembly instructions are specific. Follow them precisely to ensure safe, reliable and effective conduit bending.

All instructions are important, but safety alert symbols are located throughout this manual, and a separate section is included to address specific safety concepts.

Before operating Gardner Bender™ conduit benders, read and understand this entire manual. If any subjects are not understood, contact Gardner Bender at 414-352-4160; ask for technical services.

**IMPORTANT—USER SAFETY AND PROTECTION:** In setting up systems, take care to select the proper components and design to ensure appropriate integration with your existing operations and equipment. Observe all safety measures to avoid the risk of personal injury and damage to property and equipment through improper usage.

**CAUTION**

The Egor® bender develops 30 tons of force at 9,250 psi. Greater forces will be generated between the rollers, follow bars and bending shoe. Operators must follow instructions for assembly and bending conduit to avoid pinch points and applying forces to incorrect bender components.

**CAUTION**

Do not use damaged parts to assemble the Egor® bender. Items that are damaged or broken due to extensive wear must be replaced to avoid potential hazards to the operator.

**WARNING**

Keep hands and loose clothing away from all moving parts. Frames and rollers move under high pressure. Do not place hands on conduit or between conduit and follow bar during operation. Severe injuries could result.

**CAUTION**

Do not connect or disconnect hydraulic hose fittings with pressure in the system. A rigid hose indicates the presence of internal pressure. Prior to electrical or hydraulic repairs, retract the hydraulic cylinder and turn off the hydraulic pump.

### Bender Assembly

#### A. Frame Assembly

1. Remove the frame assembly and hydraulic cylinder from the metal case. Place the assembly on a flat surface. Figure 1.

**CAUTION**

The cylinder slides within the frame assembly. When lifting or moving, keep the frames as level as possible to prevent injury from moving parts.



Figure 1: Frame Assembly

2. A pivoting lock holds the top frame in place. Figure 2.



Figure 2: Lock-on Frame

3. Turn the pivot lock to align it with the slot in the frame. Lift the top frame off the roller assembly. Figure 3.

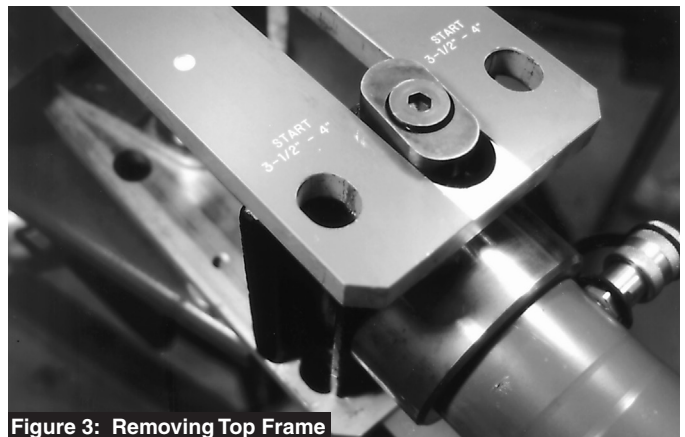


Figure 3: Removing Top Frame

4. Place your foot on the lower frame, grasp the end of the hydraulic cylinder and pull it toward you. Align the slots of the cylinder mounting block with holes in the lower frame that correspond with conduit size being bent. Figure 4.

**NOTE:** For model B400L and B400DL align the cylinder block with the holes for 3½" & 4" conduit size (last holes in frame). **The cylinder will remain in this position for all bending sizes and angles to 90°.**



Figure 4: Moving Cylinder Frame

5. Install the two hydraulic hoses. Apply one wrap of teflon tape to the threads on the end of the hose. Remove the pipe plugs from the pump valve, one port is marked “ADV” the other is marked “RET”. Install a hose in each port. Figure 5.

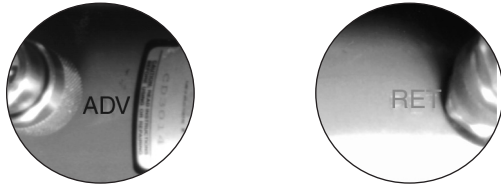


Figure 5: Hose Installation

6. Connect the hose from the “ADV” port to the hydraulic cylinder coupler located near the base of the cylinder. Make sure there is no dirt or debris in either half prior to assembly. Push the hose coupler firmly into the cylinder coupler, then tighten coupler collar. Connect the hose from the “RET” port to the remaining cylinder coupler. Figure 6A & 6B.

**IMPORTANT:** The hose coupler must be firmly seated in the cylinder coupler and held tightly while turning the coupler collar. Hand tighten the collar. **Do not use tools to tighten.** Failure to properly assemble couplers will inhibit oil flow.

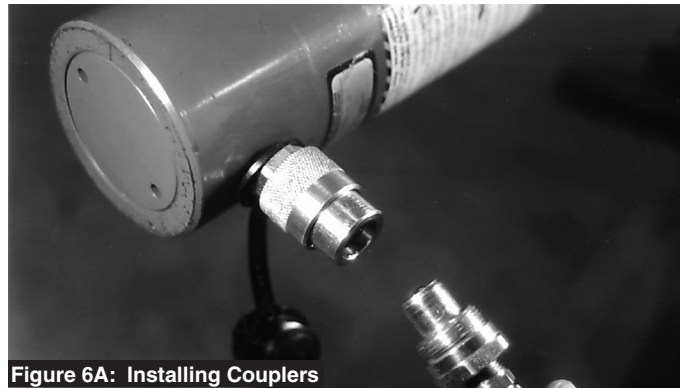


Figure 6A: Installing Couplers

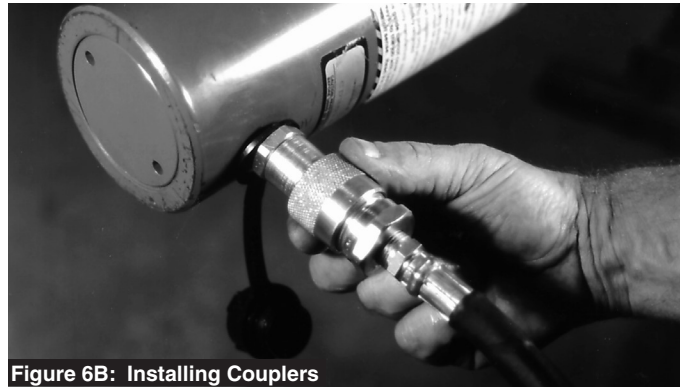


Figure 6B: Installing Couplers

7. Remove the upper roller and plate assembly by pulling straight up. The upper plate and large aluminum roller are a single assembly. Figure 7.

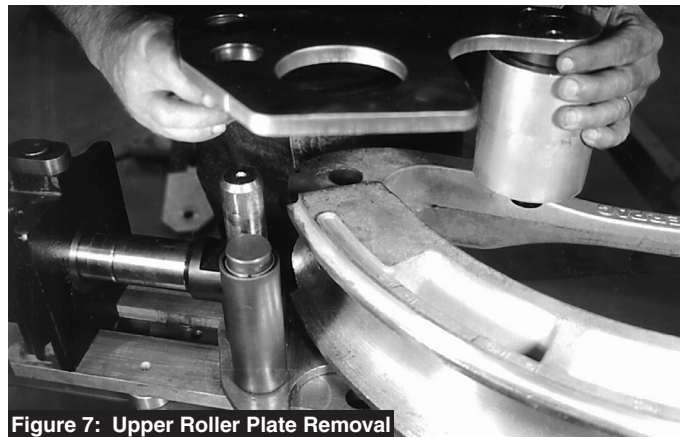


Figure 7: Upper Roller Plate Removal

8. The lower plate and roller assembly remain in position during normal shoe and follow bar installation.

### Bending Shoe and Follow Bar Installation

A. Model B400L and Model B400DL Ultra Eegor™

1. The B400L and B400DL use a 28" hydraulic cylinder. As a result, the upper and lower plate assemblies use the 3½"-4" frame holes for mounting all sizes of conduit bending shoes. See figure 8. For smaller sizes of conduit, the cylinder plunger must be advanced to position the roller assembly against the follow bar.

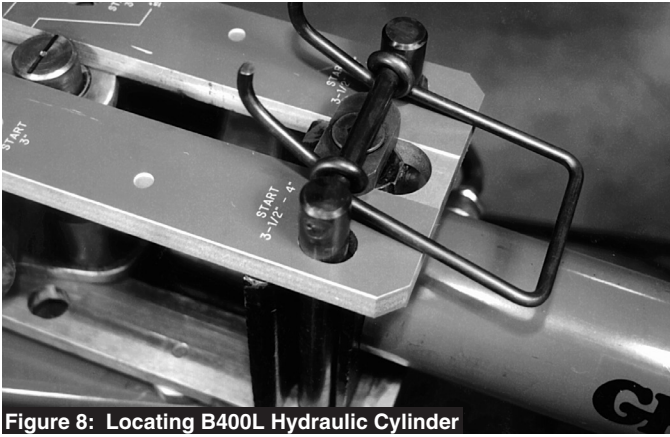


Figure 8: Locating B400L Hydraulic Cylinder

2. Position the desired size shoe on top of the lower roller and plate assembly. Be sure the bend angle numbers are facing up. Figure 9.



Figure 9: Positioning Bend Shoes on B400L

3. The top plate and roller assembly is installed over the shoe. Prior to installation, move the indicator knob to the "C" position for rigid or IMC conduit; the "T" position for EMT (thinwall). Figure 10.

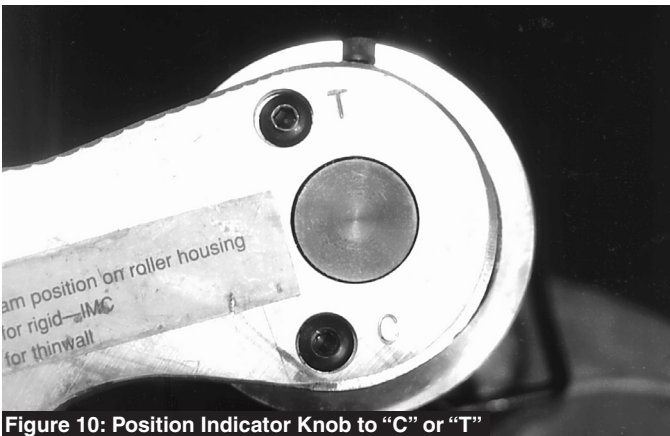


Figure 10: Position Indicator Knob to "C" or "T"

4. The large roller axle has two flats which engage the retaining collar on the lower plate. Press the upper plate down until the lower roller axles are flush with the top plate holes and the flats of the upper roller shaft are firmly seated in the retaining collar.



Figure 11: Top Plate Installation

- NOTE:** The roller assembly axle may not engage the collar initially. To ensure proper engagement, move the indicator knob slightly until the axle seats properly. Figure 12.

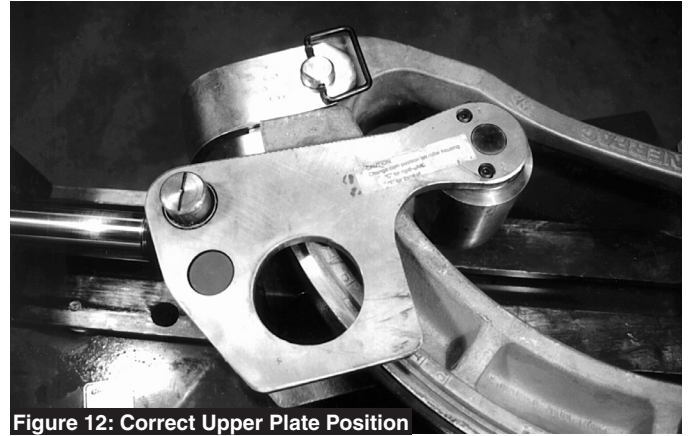


Figure 12: Correct Upper Plate Position

5. Move the bend shoe to align the pivot hole with the hole in the bottom frame. If the shoe is too far away, start the hydraulic pump. Advance the cylinder until the pivot hole is located under the frame hole. Install the pivot pin (BZ78). Figure 13.

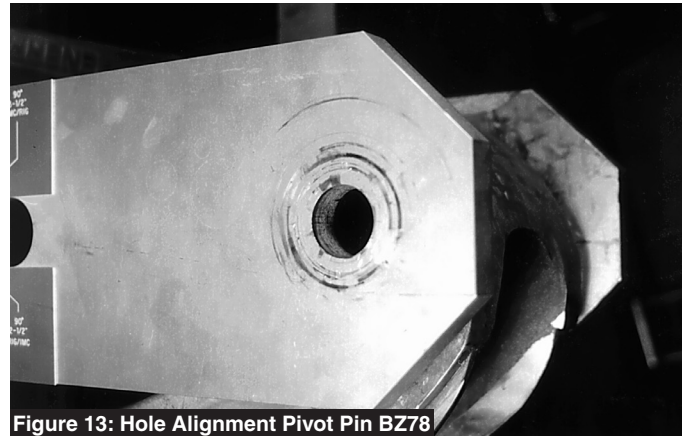


Figure 13: Hole Alignment Pivot Pin BZ78

6. Install the "U" strap. Be sure the U-strap size matches the bend shoe size. The stamped numbers must face up. Position the "U" strap and secure with pin BZ76. Figure 14.



Figure 14: Installing "U" Strap & Pin

B. Model B400 and B400D

1. The B400 and B400D use a hydraulic cylinder with a 14" stroke. As a result, the cylinder mounting block must be moved to the holes in the frame that match the size conduit being bent. Figure 15.

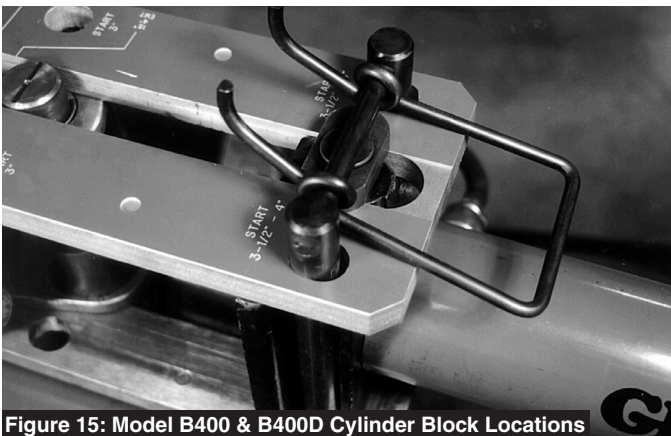


Figure 15: Model B400 & B400D Cylinder Block Locations

2. Slide the cylinder along the bottom frame until the cylinder mounting block grooves are aligned with the desired holes in the lower frame.
3. Position the bend shoe on top of the lower roller plate. Be sure the bend angle numbers are facing up. Figure 16.



Figure 16: Installing Bend Shoe

4. The top plate and roller assembly are installed over the bend shoe. Prior to installation, be sure to move the indicator knob to either "C" for Rigid/IMC or "T" for EMT (thinwall) conduit. Figure 17.



Figure 17: Position of Indicator Knob

5. The axle for the large roller (upper plate assembly) has two flats which engage the retainer of the lower plate assembly. Press the upper roller down until the lower roller axles are flush with the top plate. The flats on the upper roller axle must fully seat into the retainer collar. Figure 18.

**NOTE:** The roller assembly may not fully seat on the first attempt. To ensure proper engagement, move the indicator knob (slightly) until the axles of the lower rollers are through the top plate and flush with the top of it.



Figure 18: Top Plate Installation

6. Move the bend shoe to align the pivot hole with the hole at the end of the lower frame. Figure 19.

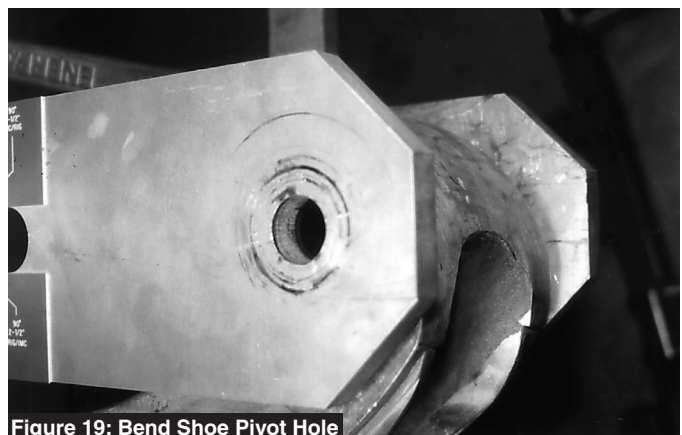


Figure 19: Bend Shoe Pivot Hole

bend shoe. Install the retaining pin (BZ78) through the upper frame, bend shoe, and lower frame. Secure with hairpin cotter. Figure 20.

7. Position the upper frame over the shoe assembly. Align the single pivot hole with the pivot hole in the

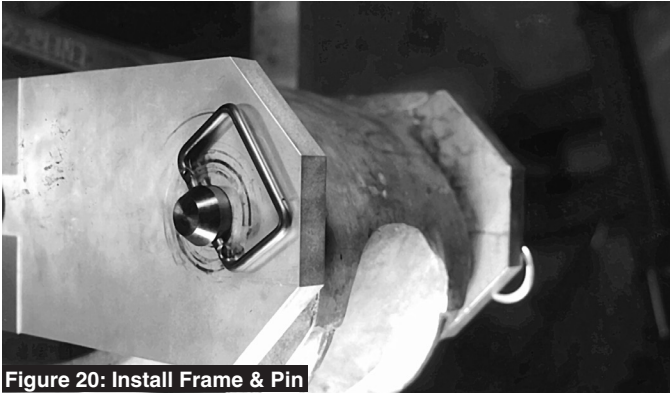


Figure 20: Install Frame & Pin

8. Turn locking pivot on cylinder block until it is positioned across the slot in the frame.
9. Place the “U” strap on the end of the bend shoe. Be sure the number, stamped in the strap, is facing up. Secure with “U” strap pin BZ76. Figure 21.

**CAUTION** The “U” strap pin (BZ76) must be through the top hole, bend shoe and bottom hole of “U” strap. If the bottom hole is not engaged, the “U” strap will be damaged during bending.



Figure 21: “U” Strap & Pin Installed

## Bending Conduit

### A. B400 and B400D

1. The cylinder mounting block has a groove along each side to accept the double anchor pin. Move the hydraulic cylinder until the grooves in the mounting block are aligned with holes in the frame. The numbers next to the holes must agree with the conduit size being bent. Figure 22.

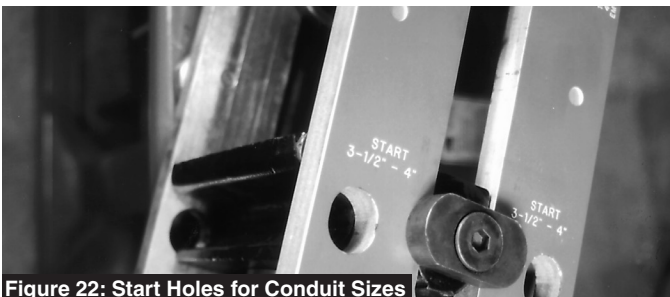


Figure 22: Start Holes for Conduit Sizes

2. Install the double anchor pin (BZ74) by inserting it in the holes of the upper frame, through the block grooves and through the holes of the lower frame. Figure 23.



Figure 23: Double Anchor Pin Installation

3. Slide conduit into the shoe groove and through the “U” strap. At least 2-3 inches of conduit must extend beyond the “U” strap to avoid deforming the end of the conduit. Figure 24.

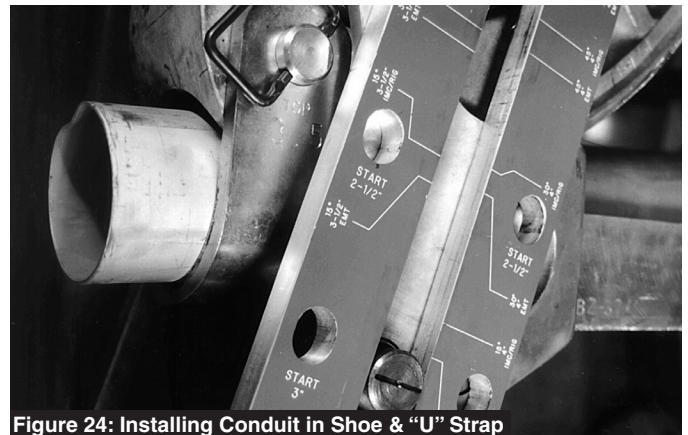


Figure 24: Installing Conduit in Shoe & “U” Strap

4. Insert the correct follow bar, tapered end first, between the rollers and conduit. The follow bar must be firmly seated against the “U” strap. A follow bar is used for all types of conduit. Figure 25.



Figure 25: Follow Bar Installed



To prevent damage to the follow bar, be sure the follow bar is inserted **tapered end first** and rests against the “U” strap. When installing the follow bar, the numbers engraved into the bar must face up.

- If the follow bar will not fit between the roller assembly and the conduit, the rollers will have to be moved. Turn the pump on. Press the “Retract” button momentarily to move the rollers back. Turn pump off. Push follow bar into position against the “U” strap.
- Prior to pressing the advance button, hold the end of the follow bar in place by pushing it forward.



Do not place fingers between follow bar and conduit. Severe injury will result.

- Press “Advance” button to begin bending. Once follow bar engages all rollers and bend begins, let go of the follow bar. Continue holding the “Advance” button until the bend is complete or the cylinder reaches maximum length.
- Large 3", 3½", and 4" conduit require two cycles of the hydraulic cylinder. When the first stage is complete the cylinder will stop and the pump motor will begin to stall. Release the “Advance” button. Press return (momentarily) to release pressure on the anchor pin. Do not remove the conduit shoe or follow bar from the bender.
- Lift and remove the anchor pin. Press “Retract” button until cylinder mounting block grooves are aligned with holes marked 2½". Replace the anchor pin through the top frame, cylinder block and lower frame. Figure 26.



Figure 26: Final Bend Angle Procedure



To avoid damaging the anchor pin, be sure both pin shafts protrude through the holes in the lower frame.

- Press “Advance” button until bend is complete.

## Reading Bend Angles

- Bend angles are printed on the upper frame decal. Locations exist for Rigid, IMC and EMT conduit. Locate the mark indicating the type of conduit and the angle desired. Figure 27.

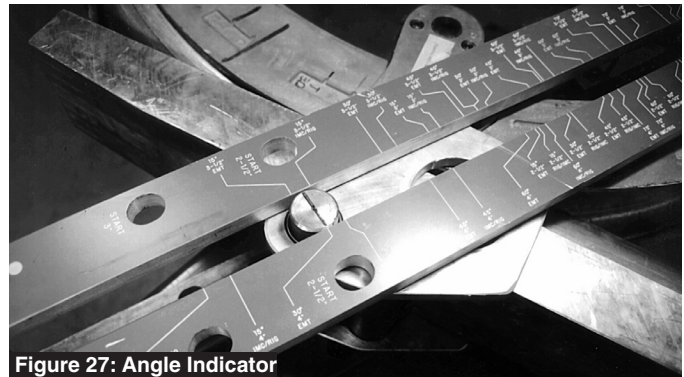


Figure 27: Angle Indicator

- During the bend the bronze roller shaft travels through the slot in the upper frame. A line is scribed on the shaft. When the line on the shaft reaches the bend angle you have selected, the bend is complete.

### B. B400L and B400DL

- The cylinder mounting block must be positioned at the 3½"-4" holes of the upper frame. Figure 28.



Figure 28: Cylinder Position B400L & B400DL

- Position the bending shoe (numbers facing up) on the lower roller plate. Install the upper roller plate assembly. Be sure the lower roller axles are flush with the top of the upper roller plate.
- Place the upper frame on the cylinder block so the lock tab and the roller axle are located in the center groove of the frame. Position the hole (in the far end) over the pin hole in the bending shoe.
- Insert the bend shoe pin (BZ78) through the upper frame, bend shoe and lower frame. Insert the retaining pin into the hole at the bottom of the bend shoe pin. Figure 29.



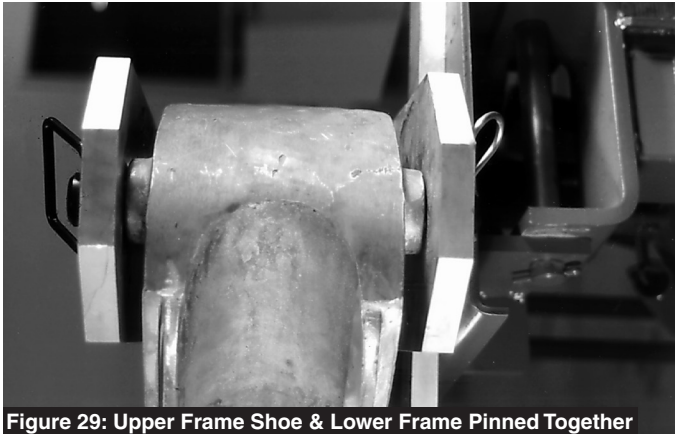


Figure 29: Upper Frame Shoe & Lower Frame Pinned Together

5. Install the double anchor pin (BZ74) through the two holes marked "Start" 3 1/2"–4". Both legs of the pin must extend through the top frame, the cylinder block and through the lower frame. Figure 30.



Figure 30: BZ74 Installation

6. The "U" strap attaches to the bending shoe by first placing the strap over the shoe, then inserting the strap retaining pin (BZ76). Be sure the conduit size number is facing up and the retaining pin is protruding through the bottom of the "U" strap. Figure 31.



Figure 31: "U" Strap & Pin Installation

7. Slide conduit into the shoe groove until it enters the "U" strap and protrudes a minimum of 2" beyond the "U" strap. The mark placed on the conduit must be visible at the outer edge of the "U" strap. Slide the follow bar (tapered end first) between the conduit and roller assembly.

**CAUTION**

To avoid damaging the follow bar, rest it against the "U" strap. Do not attempt to bend conduit if a gap exists between the follow bar and "U" strap.



Figure 32: Follow Bar Installation

8. Turn pump on. Press the pendant button to "Advance". Push on the rear of the follow bar until the conduit and follow bar begin traveling through the rollers. Figure 33.

**NOTE:** Consult older instructions for Egor® models without bend angle decal on frame.



Figure 33: Begin Bending

9. To determine bend angles, watch the scribed marks on the roller shaft as it travels past the white numbers on the red decal. The decal is marked for all angles and for IMC, Rigid, and EMT conduit. Locate your specific angle and conduit type on the decal. When the roller shaft reaches the angle you desire, release the pendant button.

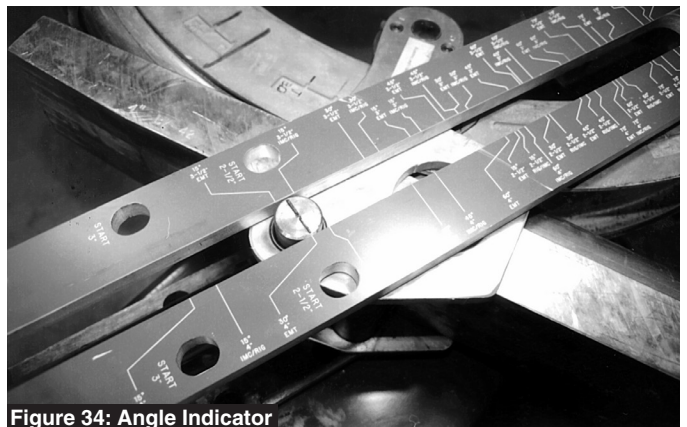


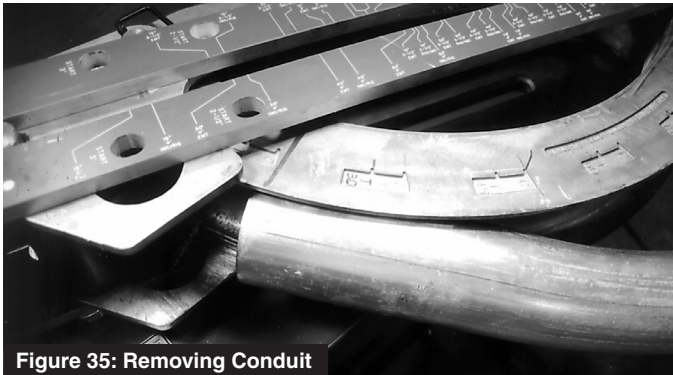
Figure 34: Angle Indicator

10. To remove bent conduit, press the “Retract” button and hold it until the conduit returns to the starting position.



When the conduit returns to the starting position, the conduit and follow bar become loose enough to fall out of the bender. Grab the follow bar to prevent it from falling out of the roller assembly.

11. Remove the follow bar, then remove the bent conduit from the roller assembly. Turn pump off.



### Follow Bar Synchronization - Removal

Occasionally your follow bar may become out of synchronization with the movement of the bend shoe on the return cycle.

If this happens, care should be taken by visual inspection as you are retracting the cylinder. Figure 36 illustrates what to look for in an out-of-phase condition. You will note the follow bar slipped forward over the strap, rather than the front end of follow bar remaining behind the strap.



### Procedure for Removal

1. After completing desired bend, retract the bend shoe until the strap is **close** to the follow bar as shown in figure 36. Do not retract further or make contact with the U-strap against the follow bar or breakage could occur.

2. Once close to the follow bar, remove the U-strap by pulling the pin. Figure 37.
3. Assist follow bar out by retracting the bend shoe further while pulling out the follow bar with your free hand. Figure 38.
4. For standard Eegor® models, the double pin will always end in the same frame holes it started in.



### 90° Stub-up and Kick Bend Instructions

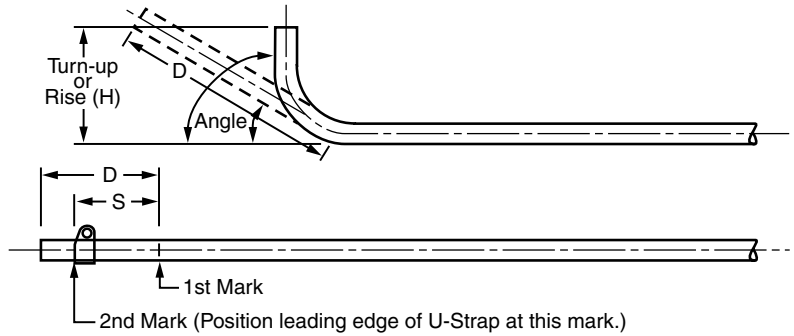
Rise (H)	Diagonal Distance (D) Chart				
	Bend Angle				
	15°	30°	45°	60°	90°
2	7 <sup>3</sup> / <sub>4</sub>	4	2 <sup>13</sup> / <sub>16</sub>	2 <sup>5</sup> / <sub>16</sub>	2
4	15 <sup>7</sup> / <sub>16</sub>	8	5 <sup>1</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	4
6	23 <sup>9</sup> / <sub>16</sub>	12	8 <sup>1</sup> / <sub>2</sub>	6 <sup>15</sup> / <sub>16</sub>	6
8	30 <sup>15</sup> / <sub>16</sub>	16	11 <sup>9</sup> / <sub>16</sub>	9 <sup>1</sup> / <sub>4</sub>	8
10	38 <sup>5</sup> / <sub>8</sub>	20	14 <sup>1</sup> / <sub>8</sub>	11 <sup>9</sup> / <sub>16</sub>	10
12	46 <sup>3</sup> / <sub>8</sub>	24	17	13 <sup>7</sup> / <sub>8</sub>	12
14	54 <sup>1</sup> / <sub>16</sub>	28	19 <sup>9</sup> / <sub>16</sub>	16 <sup>3</sup> / <sub>16</sub>	14
16	61 <sup>13</sup> / <sub>16</sub>	32	22 <sup>5</sup> / <sub>8</sub>	18 <sup>1</sup> / <sub>2</sub>	16
18	69 <sup>9</sup> / <sub>16</sub>	36	25 <sup>7</sup> / <sub>16</sub>	20 <sup>13</sup> / <sub>16</sub>	18
20	77 <sup>1</sup> / <sub>4</sub>	40	28 <sup>9</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>8</sub>	20
22	85	44	31 <sup>1</sup> / <sub>8</sub>	25 <sup>3</sup> / <sub>8</sub>	22
24	92 <sup>3</sup> / <sub>4</sub>	48	33 <sup>15</sup> / <sub>16</sub>	27 <sup>1</sup> / <sub>16</sub>	24
26	100 <sup>7</sup> / <sub>16</sub>	52	36 <sup>3</sup> / <sub>4</sub>	30	26
28	108 <sup>9</sup> / <sub>16</sub>	56	39 <sup>5</sup> / <sub>8</sub>	32 <sup>5</sup> / <sub>16</sub>	28
30	115 <sup>15</sup> / <sub>16</sub>	60	42 <sup>7</sup> / <sub>16</sub>	34 <sup>5</sup> / <sub>8</sub>	30

### Set-back Chart

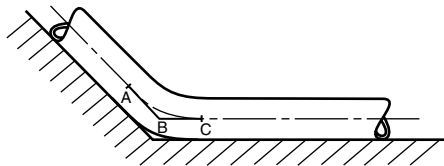
Nominal Conduit Size	Stub-ups	"S" Set-back Dimension (inches)			
		Kick Bends			
		90°	60°	45°	30°
2 <sup>1</sup> / <sub>2</sub>	15 <sup>5</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>8</sub>	6	3 <sup>3</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>
3	18 <sup>3</sup> / <sub>4</sub>	11	7 <sup>1</sup> / <sub>8</sub>	4	1 <sup>3</sup> / <sub>4</sub>
3 <sup>1</sup> / <sub>2</sub>	24	13 <sup>3</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>
4	28	16 <sup>1</sup> / <sub>4</sub>	10 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	1 <sup>7</sup> / <sub>8</sub>

## To Make a Stub-up or Kick Bend

1. Determine “H” dimension by measuring rise or height needed. From “Diagonal Distance Chart” at right, determine straight length of pipe (D) needed to reach to desired turn-up height (H) at desired bend angle.
2. Lay off this distance (D) from end of conduit and make first mark.
3. From “Set-back Chart”, select proper set-back dimension (S) corresponding to conduit size and bend angle desired.
4. Measure distance (S) back from the first mark and make second mark (see figure above).
5. Place conduit in bender with second mark aligned with leading edge of U-strap (see figure above) and bend conduit to desired angle.



## Additional Bending Data for Egor® Benders



### Developed Length 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.

### Gain of 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.)

### “Developed Length” of Bends Chart

Nominal Conduit Size	“Developed Length” of Bends (inches)				
	90°	60°	45°	30°	15°
2½	16 <sup>3</sup> / <sub>8</sub>	10 <sup>15</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>4</sub>
3	20 <sup>1</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>2</sub>	10 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>8</sub>
3½	24 <sup>7</sup> / <sub>16</sub>	18 <sup>5</sup> / <sub>16</sub>	13 <sup>3</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>8</sub>	4 <sup>9</sup> / <sub>16</sub>
4	31 <sup>3</sup> / <sub>8</sub>	20 <sup>15</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>16</sub>	10 <sup>7</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>4</sub>

### “Gain” of Bends Chart

Nominal Conduit Size	“Gain” of Bends Measured at Centerline (inches)				
	90°	60°	45°	30°	15°
2½	5 <sup>3</sup> / <sub>16</sub>	1½	¾	5 <sup>1</sup> / <sub>16</sub>	1/8
3	6 <sup>3</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	7/8	3/8	1/8
3½	8 <sup>7</sup> / <sub>16</sub>	2 <sup>7</sup> / <sub>16</sub>	1½	½	1/8
4	9 <sup>1</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>9</sup> / <sub>16</sub>	9/16	3/16

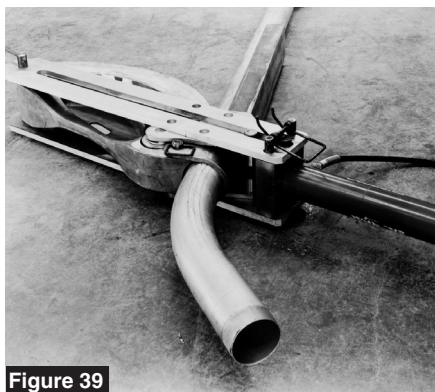


Figure 39

## Offset Bend Instructions for the Egor® Bender

### Bending Offsets

Offset bending is easy with the added benefit of bending good close offsets.

- A. To bend the offsets, proceed to bend in the normal manner covered above until the desired bend is reached. See Figure 39.



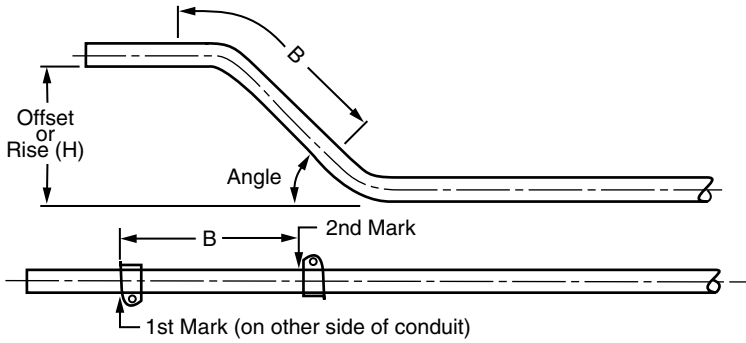
Figure 40

- B. Retract and strip out conduit. Rotate the conduit and locate as shown for the second bend. Complete the second bend, retract and strip out conduit for a good offset bend.

**When making offset bends, caution should be taken not to attempt too tight an offset. The follow bar will lift off the conduit when starting the second bend if it is too tight. Stop bending immediately or damage could occur to the bender. Correction is achieved by shifting the conduit so the U-strap engages the conduit more closely to the unbent portion of the conduit.**

### 2 1/2" Conduit Offset Chart

Desired Offset (H) (inches)	Measurement (B) (inches)			
	15°	30°	45°	60°
2	7 <sup>5</sup> / <sub>8</sub>	—	—	—
4	15 <sup>3</sup> / <sub>8</sub>	—	—	—
6	23 <sup>1</sup> / <sub>16</sub>	11 <sup>1</sup> / <sub>16</sub>	—	—
8	30 <sup>3</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>16</sub>	—	—
10	38 <sup>1</sup> / <sub>2</sub>	19 <sup>1</sup> / <sub>16</sub>	13 <sup>7</sup> / <sub>16</sub>	—
12	46 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	16 <sup>1</sup> / <sub>4</sub>	—
14	54	27 <sup>1</sup> / <sub>16</sub>	19 <sup>7</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>8</sub>
16	61 <sup>1</sup> / <sub>16</sub>	31 <sup>1</sup> / <sub>16</sub>	21 <sup>7</sup> / <sub>8</sub>	16 <sup>15</sup> / <sub>16</sub>
18	69 <sup>7</sup> / <sub>16</sub>	35 <sup>1</sup> / <sub>16</sub>	24 <sup>3</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>4</sub>
20	77 <sup>3</sup> / <sub>16</sub>	39 <sup>1</sup> / <sub>16</sub>	27 <sup>9</sup> / <sub>16</sub>	21 <sup>9</sup> / <sub>16</sub>
22	84 <sup>7</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	23 <sup>7</sup> / <sub>8</sub>
24	92 <sup>5</sup> / <sub>8</sub>	47 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>16</sub>	26 <sup>3</sup> / <sub>16</sub>
26	100 <sup>3</sup> / <sub>8</sub>	51 <sup>1</sup> / <sub>16</sub>	36 <sup>1</sup> / <sub>16</sub>	28 <sup>1</sup> / <sub>2</sub>
28	108 <sup>1</sup> / <sub>16</sub>	55 <sup>1</sup> / <sub>16</sub>	38 <sup>7</sup> / <sub>8</sub>	30 <sup>13</sup> / <sub>16</sub>
30	115 <sup>13</sup> / <sub>16</sub>	59 <sup>1</sup> / <sub>16</sub>	41 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>



### To Make an Offset Bend:

1. Make first mark at location determined either by edge of obstacle or by following “Kick Bend Instruction for Egor® Benders” (page 11).
2. From the “Offset Chart” for the size of conduit to be bent, obtain measurement (B) for offset height (H) and bend angle desired.
3. Make second mark at distance (B) beyond first mark and on opposite side of conduit as illustrated above.
4. Place conduit in Egor® bender with first mark aligned with leading edge of U-strap (see figure above) and make first bend to the desired angle.
5. Advance the bent conduit through the frame assembly of the Egor® bender and rotate the conduit 180°, so the second mark aligns with the leading edge of the U-strap.
6. Complete offset by making second bend to the exact same angle as the first bend.

### 3" Conduit Offset Chart

Desired Offset (H) (inches)	Measurement (B) (inches)			
	15°	30°	45°	60°
2	7 <sup>5</sup> / <sub>8</sub>	—	—	—
4	15 <sup>3</sup> / <sub>16</sub>	—	—	—
6	23 <sup>1</sup> / <sub>16</sub>	11 <sup>5</sup> / <sub>8</sub>	—	—
8	30 <sup>3</sup> / <sub>4</sub>	15 <sup>5</sup> / <sub>8</sub>	—	—
10	38 <sup>1</sup> / <sub>2</sub>	19 <sup>5</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	—
12	46 <sup>1</sup> / <sub>4</sub>	23 <sup>5</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>16</sub>	—
14	53 <sup>15</sup> / <sub>16</sub>	27 <sup>5</sup> / <sub>8</sub>	18 <sup>7</sup> / <sub>8</sub>	—
16	61 <sup>1</sup> / <sub>16</sub>	31 <sup>5</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>4</sub>	16 <sup>5</sup> / <sub>8</sub>
18	69 <sup>7</sup> / <sub>16</sub>	35 <sup>5</sup> / <sub>8</sub>	24 <sup>9</sup> / <sub>16</sub>	18 <sup>15</sup> / <sub>16</sub>
20	77 <sup>1</sup> / <sub>8</sub>	39 <sup>5</sup> / <sub>8</sub>	27 <sup>3</sup> / <sub>8</sub>	21 <sup>1</sup> / <sub>4</sub>
22	84 <sup>7</sup> / <sub>8</sub>	43 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>2</sub>
24	92 <sup>5</sup> / <sub>8</sub>	47 <sup>5</sup> / <sub>8</sub>	33 <sup>1</sup> / <sub>16</sub>	25 <sup>13</sup> / <sub>16</sub>
26	100 <sup>5</sup> / <sub>16</sub>	51 <sup>5</sup> / <sub>8</sub>	35 <sup>7</sup> / <sub>8</sub>	28 <sup>1</sup> / <sub>8</sub>
28	108 <sup>1</sup> / <sub>16</sub>	55 <sup>5</sup> / <sub>8</sub>	38 <sup>1</sup> / <sub>16</sub>	30 <sup>7</sup> / <sub>16</sub>
30	115 <sup>9</sup> / <sub>4</sub>	59 <sup>5</sup> / <sub>8</sub>	41 <sup>1</sup> / <sub>2</sub>	32 <sup>3</sup> / <sub>4</sub>

### 3 1/2" Conduit Offset Chart

Desired Offset (H) (inches)	Measurement (B) (inches)			
	15°	30°	45°	60°
2	7 <sup>9</sup> / <sub>16</sub>	—	—	—
4	15 <sup>5</sup> / <sub>16</sub>	—	—	—
6	23	—	—	—
8	30 <sup>3</sup> / <sub>4</sub>	15 <sup>1</sup> / <sub>2</sub>	—	—
10	38 <sup>1</sup> / <sub>2</sub>	19 <sup>1</sup> / <sub>2</sub>	—	—
12	46 <sup>3</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>2</sub>	—	—
14	53 <sup>15</sup> / <sub>16</sub>	27 <sup>1</sup> / <sub>2</sub>	18 <sup>5</sup> / <sub>8</sub>	—
16	61 <sup>1</sup> / <sub>16</sub>	31 <sup>1</sup> / <sub>2</sub>	21 <sup>1</sup> / <sub>2</sub>	—
18	69 <sup>5</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>2</sub>	24 <sup>5</sup> / <sub>16</sub>	—
20	77 <sup>1</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>2</sub>	27 <sup>1</sup> / <sub>8</sub>	—
22	84 <sup>7</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>2</sub>	28 <sup>15</sup> / <sub>16</sub>	—
24	92 <sup>5</sup> / <sub>16</sub>	47 <sup>1</sup> / <sub>2</sub>	32 <sup>13</sup> / <sub>16</sub>	25 <sup>1</sup> / <sub>4</sub>
26	100 <sup>5</sup> / <sub>16</sub>	51 <sup>1</sup> / <sub>2</sub>	35 <sup>5</sup> / <sub>8</sub>	27 <sup>9</sup> / <sub>16</sub>
28	108	55 <sup>1</sup> / <sub>2</sub>	38 <sup>7</sup> / <sub>16</sub>	29 <sup>7</sup> / <sub>8</sub>
30	115 <sup>9</sup> / <sub>4</sub>	59 <sup>1</sup> / <sub>2</sub>	41 <sup>1</sup> / <sub>4</sub>	32 <sup>3</sup> / <sub>16</sub>

### 4" Conduit Offset Chart

Desired Offset (H) (inches)	Measurement (B) (inches)			
	15°	30°	45°	60°
4	15 <sup>5</sup> / <sub>16</sub>	—	—	—
6	23	—	—	—
8	30 <sup>3</sup> / <sub>4</sub>	—	—	—
10	38 <sup>7</sup> / <sub>16</sub>	19 <sup>7</sup> / <sub>16</sub>	—	—
12	46 <sup>3</sup> / <sub>16</sub>	23 <sup>7</sup> / <sub>16</sub>	—	—
14	53 <sup>15</sup> / <sub>16</sub>	27 <sup>7</sup> / <sub>16</sub>	—	—
16	61 <sup>5</sup> / <sub>8</sub>	31 <sup>7</sup> / <sub>16</sub>	21 <sup>5</sup> / <sub>16</sub>	—
18	69 <sup>3</sup> / <sub>8</sub>	35 <sup>7</sup> / <sub>16</sub>	24 <sup>1</sup> / <sub>8</sub>	—
20	77 <sup>1</sup> / <sub>8</sub>	39 <sup>7</sup> / <sub>16</sub>	27	—
22	84 <sup>13</sup> / <sub>16</sub>	43 <sup>7</sup> / <sub>16</sub>	29 <sup>13</sup> / <sub>16</sub>	—
24	92 <sup>5</sup> / <sub>16</sub>	47 <sup>7</sup> / <sub>16</sub>	32 <sup>5</sup> / <sub>8</sub>	24 <sup>15</sup> / <sub>16</sub>
26	100 <sup>5</sup> / <sub>16</sub>	51 <sup>7</sup> / <sub>16</sub>	35 <sup>7</sup> / <sub>16</sub>	27 <sup>1</sup> / <sub>4</sub>
28	108	55 <sup>7</sup> / <sub>16</sub>	38 <sup>5</sup> / <sub>16</sub>	29 <sup>9</sup> / <sub>16</sub>
30	115 <sup>9</sup> / <sub>4</sub>	59 <sup>7</sup> / <sub>16</sub>	41 <sup>1</sup> / <sub>8</sub>	31 <sup>7</sup> / <sub>8</sub>

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

<p><b>PARTS AND SERVICE:</b> For quality workmanship and genuine Gardner Bender 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><b>WARRANTY:</b> Gardner Bender warrants its product 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><b>WARRANTY RETURN PROCEDURE:</b> 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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