

### IMPORTANT RECEIVING INSTRUCTIONS

Visually inspect all components for shipping damage. If shipping damage is found, notify carrier at once. Shipping damage is NOT covered by warranty. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

### SAFETY ISSUES

**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 that all safety measures have been taken to avoid the risk of personal injury and property damage from your application or system.

GARDNER BENDER IS NOT RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, MAINTENANCE OR THE APPLICATION OF ITS PRODUCTS. Please contact Gardner Bender for guidance when you are in doubt as to the proper safety precautions to be taken in designing and setting up your particular application.

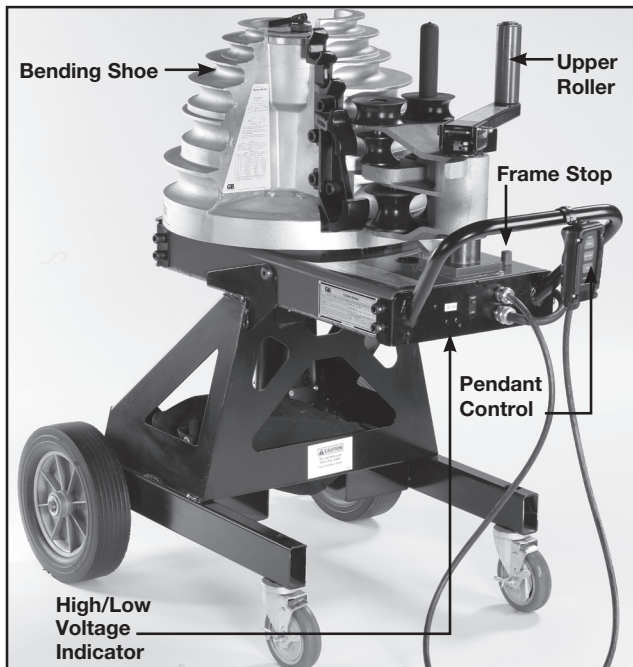


Figure 1. B2000 Cyclone® Bender

### 1.0 DESCRIPTION

- Engineered to save time; bends 0.5 inch to 2 inch Rigid, Rigid aluminum, EMT and IMC conduit with a single shoe and no loose parts
- Easy dial settings create accurate bends every time and make training time virtually non-existent
- Bends in both horizontal and vertical positions to create accurate offset bends
- Quickly creates repeated bends at the same degree
- Strong legs offer increased jobsite durability (10x life test)
- Large tires/wheels - increase mobility
- Strong upright handle provides ease of use
- Easily lift and transport using the forklift tubes built into base
- Lift Hook for security (job-site) tethering
- Incorporates storage area for tools, etc. while in use
- Includes Weather-Resistant Cover

The Cyclone®, GB model B2000 production bender is used to bend EMT, IMC, rigid steel or rigid aluminum conduit. A single bending shoe accommodates sizes 1/2", 3/4", 1", 1 1/4", 1 1/2" and 2" conduit. The shoe is driven by a 115 V, 15 A motor. The roller housing consists of a single urethane roller support arm, and three sets of nylon rollers.

The bender control pendant consists of a zero light, a green power light, a jog push button, a push button for "Bend and Return". An 8' electrical cord connects the pendant to the bender frame. The bender can be used in a horizontal or vertical position.

The end plate contains an ON-OFF switch which is also a circuit breaker. When the switch is turned on, the two leds will flash red, then green to indicate normal function.

To avoid damaging the bender control circuit, an input voltage sensing system is built into the control circuit. If input voltage is less than 92 VAC or higher than 132 VAC the bender will shut off. One of the two LEDS located on the end plate will light to indicate whether high or low voltage exists.

Re-set the bender by turning unit off then on again. If the incoming current voltage has not been corrected, the bender will not operate. The voltage range must be within 92 VAC to 132 VAC. Any situation which causes a voltage drop or increase must be corrected before using the B2000 Bender.

Voltage drops may be caused by:

- Extension cords that are too long.
- Extension cords made of light (16-18 gauge) wire.
- Multiple power tools on a single circuit.
- Other devices which require high amperes to operate.

### Gardner Bender B2000 vs. Competitor Benders

|                                                        | GB B2000        | Green Competitor | Brown Competitor | Blue Competitor  |
|--------------------------------------------------------|-----------------|------------------|------------------|------------------|
| <b>SINGLE SHOE BENDING FOR:</b>                        |                 |                  |                  |                  |
| EMT                                                    | 1/2" - 2"       | 1/2" - 2"        | 3/4" - 2"        | 1/2" - 2"        |
| Rigid                                                  | 1/2" - 2"       | 1/2" - 2"        | 3/4" - 2"        | 1/2" - 2"        |
| IMC                                                    | 1/2" - 2"       | 1/2" - 2"        | 3/4" - 2"        | 1/2" - 2"        |
| PVC coated rigid                                       | 1/2" - 1 1/2"   | accessory        | no               | accessory        |
| Durable and repairable analog controls                 | ✓               |                  |                  | ✓                |
| Intuitive and easy to use                              | ✓               |                  |                  | ✓                |
| No loose or separate parts for use                     | ✓               |                  |                  |                  |
| Low/high voltage shut-off/protection                   | ✓               |                  |                  |                  |
| Resettable circuit breaker                             | ✓               | fuse             | fuse             | fuse             |
| Hoist/crane lift point                                 | ✓               | ✓                |                  | ✓                |
| No changeover or adjustment for conduit types or sizes | ✓               | ✓                |                  |                  |
| No leveling before use                                 | ✓               | ✓                |                  |                  |
| No homing or initial setup before use                  | ✓               | ✓                |                  |                  |
| Horizontal and vertical bending                        | ✓               | ✓                | ✓                | ✓                |
| Operate on 15A circuit                                 | ✓               |                  |                  |                  |
| Forklift capable leg assy                              | ✓               | ✓                | ✓                | ✓                |
| Weight (lbs)                                           | 408             | 513              | 600              | 615              |
| Dimension (Inches)                                     | 47 x 33 x 43    | 46 x 30 x 33     | 38 x 30 x 50     | 45.5 x 32.5 x 44 |
| <b>PRICE</b>                                           | <b>GB PRICE</b> | <b>+21%</b>      | <b>+39%</b>      | <b>+19%</b>      |

## 2.0 WARNINGS

- This instruction manual contains warnings and safety rules which must be observed by the user to ensure safe operation of the instrument and retain it in safe condition.
- Read through and understand the instructions contained in this manual before using the instrument.
- Keep the manual at hand to enable quick reference whenever necessary.
- The instrument is to be used only in its intended applications.
- Understand and follow all the safety instructions contained in the manual.
- It is essential that all safety instructions are adhered to.
- Failure to follow the safety instructions may cause injury, instrument damage.

**⚠ WARNING** is reserved for conditions and actions that can cause serious or fatal injury.

**⚠ CAUTION** is reserved for conditions and actions that can cause injury or instrument damage.

### **⚠ WARNING:**

- Do not operate the bender on damp or wet surfaces. Do not stand on wet surfaces while operating the bender.
- To avoid possible injury, do not place fingers under the bottom edge of the bending shoe. See Figure 2.
- Read and understand all instructions and warning information in this manual before operating this machine.
- Do not use this machine in a hazardous environment. Hazards include flammable liquids, gases, or other materials. Using this tool in hazardous environments can result in a fire or explosion.
- Electric shock hazard. Inspect power cord before use. Repair or replace if it is damaged. DO not modify the power cord or plug.
- Always use safety glasses. Everyday glasses are NOT safety glasses. When using in dusty environment, use face or dust mask.
- Keep guards in place and in working order.
- Do not use extension cords that are longer than 30 m (100'). Do not use damaged extension cords. 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.
- Keep hands away from bending shoe, rollers, and conduit when bender is in use.
- Reduce the risk of unintentional starting by making sure switch is in off position before plugging in. Never leave machine unattended. Turn power off and do not leave machine until it comes to a complete stop.
- Keep working area of bender clear from any tools or other equipment when using the bender.
- Never stand on tool. Serious injury could occur if tool is tipped. Do not overreach. Keep proper footing and balance at all times.
- Adjust fork spacing to match fork tubes on bender. Ensure front wheel brakes are engaged before inserting forks into fork tubes.
- Unplug bender from any power source before disassembling, reassembling, and repairing any parts.
- Operator must ALWAYS face the front of the bender with the bending degree scale visible and maintain a minimum of 3 feet distance while the conduit is being bent. All other personnel must remain out of the area while the bender is in operation.

### **⚠ CAUTION:**

- During pipe bending, stand behind the frame handle. Keep hands, clothing and control cord away from the bending shoe and rollers.
- To prevent damage to the bending shoe, do not allow the clamping jaws to strike the upper roller support arm when the shoe is rotating. Position the roller housing against the frame stop. See Figure 1.
- Select an operating area large enough to permit loading pipe section and bending without striking objects or personnel.
- Do not attempt to bend conduit or pipe other than 1/2" through 2" IMC, EMT, rigid steel or aluminum. Bending other materials will damage the bender and void the warranty.

### **⚠ CAUTION:**

- Conduit moves rapidly as it is bent. The path of the conduit must be clear of obstructions.
- Wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.
- Do not force rollers or alter machine. It will do the job better and safer at the rate for which it was designed.
- Use for bending only. Do not force machine to do a job for which it was not designed. Use this machine only for the manufacturer's intended purpose only. Use other than that which is instructed in this manual can result in injury or property damage.
- Keep children away. All visitors should be kept safe distance from work area.
- Make workshop kid proof with padlocks, master switches, or by removing starter keys.
- Use recommended accessories. The use of improper accessories may cause risk of injury to person
- Some bender parts and accessories are heavy and may require more than one person to lift and assemble.
- Maintain tool with care. Keep tool clean for best and safest performance. Follow maintenance and troubleshooting instructions for lubricating and changing parts.
- Support conduit when unloading it from shoe. Conduit can become loose once roller housing is pulled away from the shoe.
- Keep all decals on bender clean and legible at all times.
- Inspect for any damaged/malfunctioning parts before using the bender. If any damaged/malfunctioning parts are found during inspection, repair or replace parts.

**NOTE:** All operations referring to "toward the operator" are viewed from the lifting handle end of the bender frame.

## 3.0 SPECIFICATIONS

|                              |                                                        |
|------------------------------|--------------------------------------------------------|
| Power Source.....            | 120 V 60 cycle AC                                      |
| Pendant Control Circuit..... | 12 VDC                                                 |
| Motor .....                  | 1 HP 100 V 60 cycle DC                                 |
| Weight.....                  | 408 lbs.                                               |
| Height.....                  | 38 inches                                              |
| Width.....                   | 31 inches                                              |
| Length.....                  | 45 inches                                              |
| Circuit Breaker .....        | 15 Amp                                                 |
| Bend Capability.....         | 1/2" - 2" IMC, EMT<br>Rigid Steel or<br>Rigid Aluminum |

## 4.0 OPERATION

### 4.1 Bending 1/2", 3/4" and 1" IMC, EMT and rigid conduit:

1. Position the bender in a level dry area large enough to permit loading and unloading various lengths of conduit. Position the frame, either horizontally or vertically, by pulling the spring loaded pin on the side of the bender frame. See Figure 2.

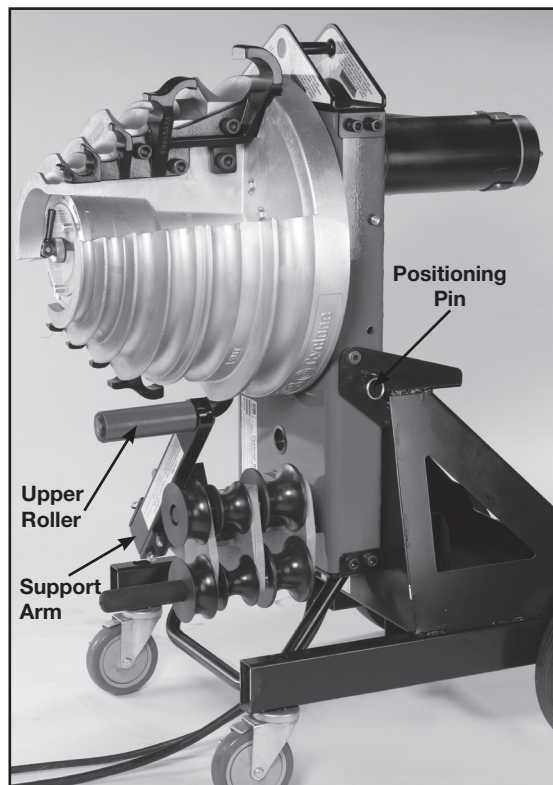


Figure 2. Vertical Position

2. Identify the type (IMC, EMT or Rigid) and size conduit to be bent.
3. Locate the markings that indicate which grooves are used for specific materials, and which grooves are used for specific size conduit. See Figure 3.

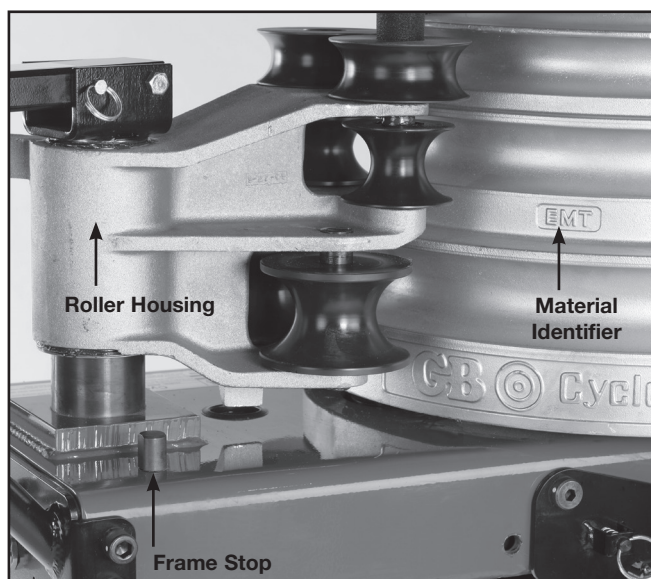


Figure 3. Set Up

**⚠ CAUTION:** To avoid damaging the rollers and roller housing, always place the roller housing against the frame stop prior to rotating the shoe.

4. Push the roller housing against the frame stop. See Figure 2. Rotate the shoe to bring the required grooves (EMT, IMC or Rigid) facing toward the operator. To activate the shoe, hold the pendant toggle switch in "Return" and press the jog button until the zero light goes out. The shoe will rotate and stop in the load position. The zero light will come on.
5. The upper urethane roller and support arm (See Figure 4) is used for bending 1/2" through 1" conduit. One of the top three shoe grooves will be used, depending on conduit size.

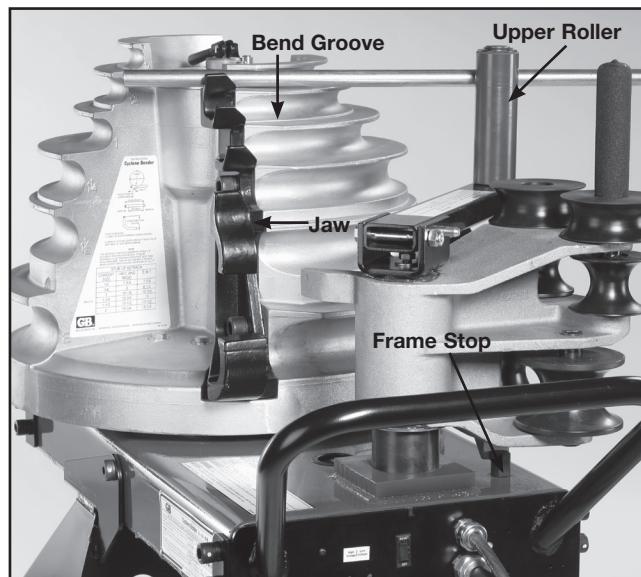


Figure 4. Bending 1/2" - 1"

6. When bending 1/2" - 1" conduit the upper roller and support arm must be positioned between the shoe and the roller housing. Position the urethane roller by moving the roller housing against the frame stop and removing the pin.
7. Lift the roller support arm to clear the nylon rollers and swing the arm (toward shoe) over the roller housing. Lower the arm into the support bracket and insert the ring pin. See Figure 5.

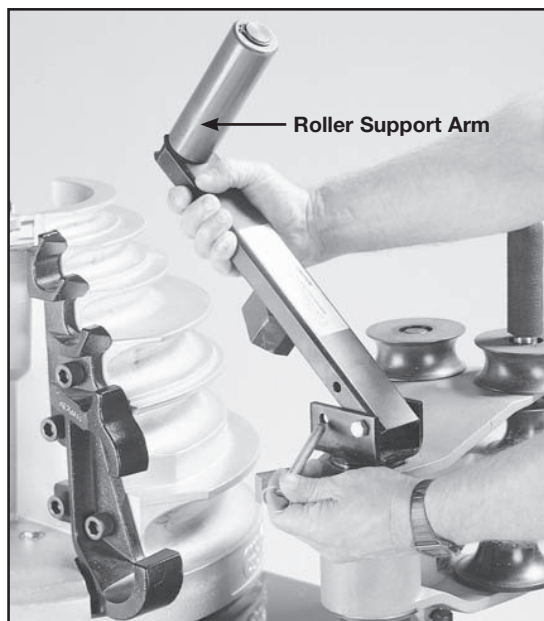
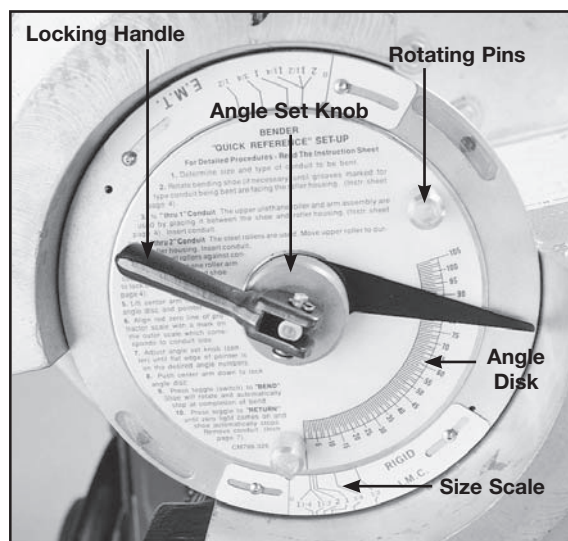


Figure 5. Position Roller Support

8. Insert the conduit in the shoe groove marked with the number matching the size conduit being bent. The conduit must set in the shoe and in the jaw. The end of the conduit must extend a minimum of 2" beyond the jaw. See Figure 3. Refer to table A or B on page 5 for bending data.
9. Each time a different size and type of conduit is being bent, three facts must be determined and set into the bender shoe control system. The required settings are: conduit size, material and desired bend angle. Prior to setting, be sure the desired size indicator scale is toward the operator and the correct shoe grooves are also toward the operator.
  - a. Lift the locking handle. See Figure 6. Use the two small pins to rotate the angle disc, clockwise, until the red zero line is directly in line with the zero line on the size scale.
  - b. Set the bender for specific conduit size by turning the angle disc until the red line is on the size indicator mark which matches the size conduit being bent. Be sure the correct size scale is being used (EMT, IMC, or Rigid).
  - c. Move the bend angle set knob (See Figure 6) until the flat edge of the pointer is on a line indicating the exact degree of bend desired. Lower the center arm to lock the pointer and scale and to prevent inadvertent movement during bending.



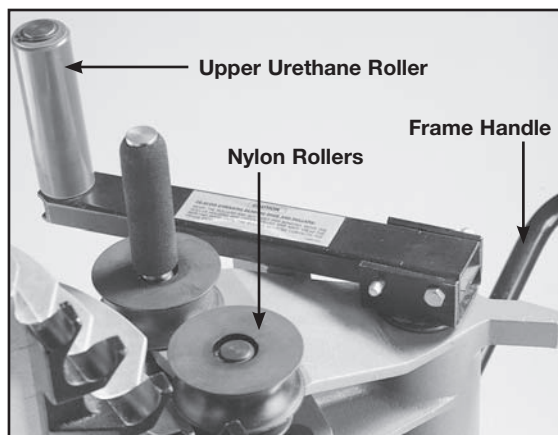
**Figure 6. Set Angle Scale**

10. Activate the bending shoe by holding the pendant control Bend button. The shoe will rotate until the angle set on the pointer is reached.
11. To remove the conduit, hold the "Return" button. The shoe will return to the start position and stop automatically. The zero set light will come on. Bending more conduit of the same type and size is accomplished by loading conduit and pressing the bend button.

#### 4.2 Bending 1¼", 1½" and 2" Conduit

**NOTE:** All operations referring to "toward the operator" are viewed from the lifting handle end of the bender frame.

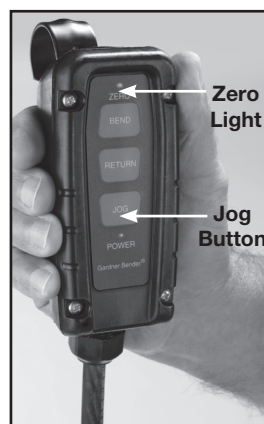
1. Bending 1¼" through 2" requires using one of the three sets of nylon rollers and one of the grooves on the lower half of the bending shoe.
2. Move the roller housing against the frame stop. See Figure 11. The upper urethane roller must be on the outside (toward frame handle) of the roller housing. See Figure 7. If it's not, pull the ring pin. Lift the roller support arm, swing it over the roller housing, lower the handle into the bracket and insert the ring pin.



**Figure 7. Position Roller Support**

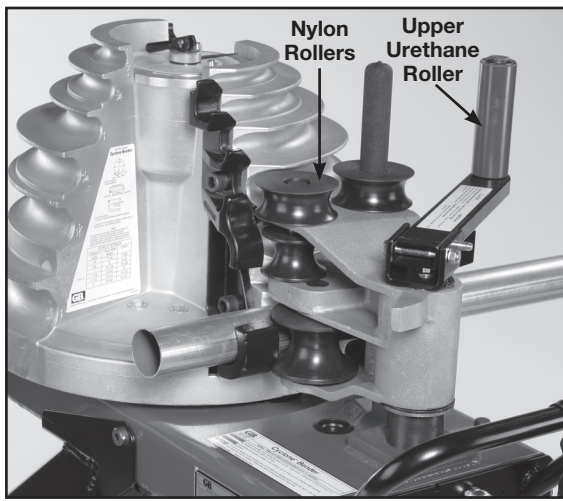
**⚠ CAUTION:** To avoid damage to the bending shoe, always place the roller housing against the frame stop, prior to activating the bending shoe.

3. Check the bending shoe to be sure the correct grooves for the conduit being bent are facing toward the operator. If the shoe must be rotated, hold the pendant control Return button and press the jog button until the zero light goes out. The shoe will rotate 180° then stop in the load position. See Figure 8. The zero light will come on.



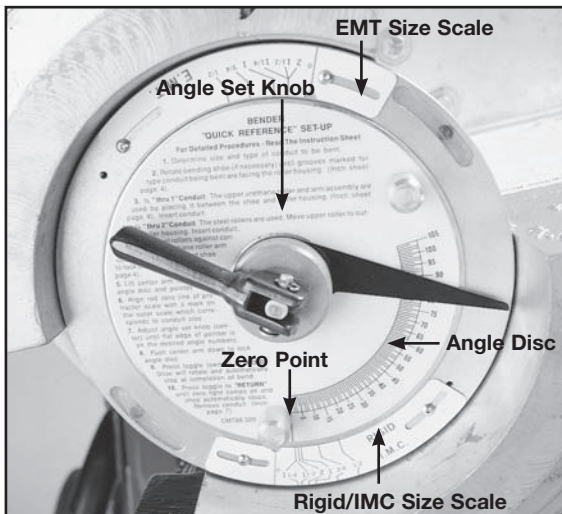
**Figure 8. Pendant Control**

4. When bending 1¼" - 2" conduit, position roller housing and upper arm. Then push the conduit between the shoe groove and the 2" nylon rollers until the bend mark on the conduit is in line with the outside edge of the clamp jaw.
5. Grasp the upper urethane roller and move the support arm counterclockwise until it contacts the roller housing. The two nylon rollers should have moved against the conduit and should firmly hold the conduit in the shoe. See Figure 9.



**Figure 9. Locking in Roller Support**

6. Each time a different size and type of conduit is being bent, three facts must be determined and set into the bender shoe control system. The required settings are: conduit size, material and desired bend angle. Prior to setting, be sure the pipe size scale is toward the operator and the correct shoe grooves are also toward the operator.
  - a. Lift the locking handle to release the angle set knob and angle disc. Use the two small pins to rotate the angle disc, clockwise. See Figure 10.
  - b. Set the bender for specific conduit size by turning the angle disc until the red line is on an outer size scale mark which matches the size conduit being bent. See Figure 10. Be sure the correct size scale is being used (EMT, IMC, or Rigid).
  - c. Move the angle set knob (See Figure 10) until the flat edge of the pointer is on the line indicating the exact degree of bend desired. Lower the center arm to lock the pointer, angle disc and to prevent inadvertent movement during bending.

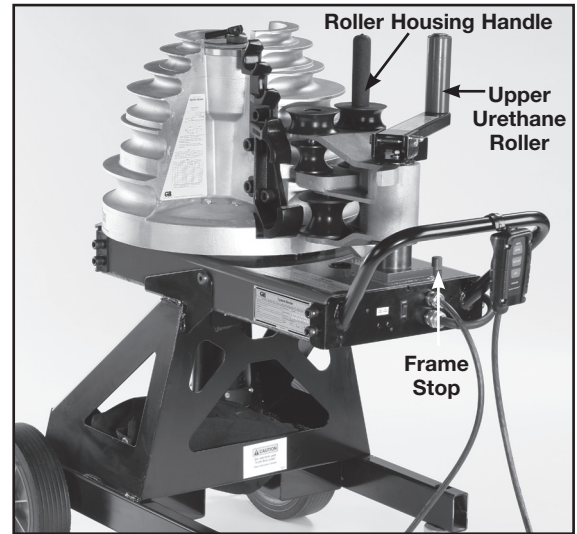


**Figure 10. Set Angle Indicator**

7. Use the control pendant. The zero light should be on. Hold the Bend button. The shoe will rotate until the desired bend is achieved, then stop automatically.

**NOTE:** If the zero light is not on, press the Return button until the shoe stops and the zero light comes on.

8. To unload conduit, hold the Return button. The shoe will return to the start position and stop automatically.
9. Grasp the upper urethane roller and move the support arm clockwise until the rollers move away from the conduit. See Figure 11. Push the roller housing against the frame stop. Remove bent conduit.

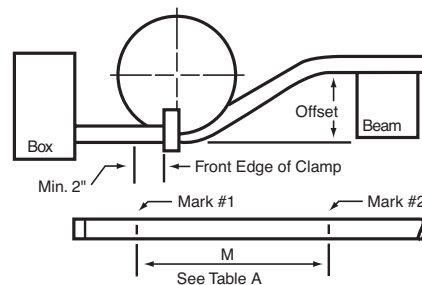


**Figure 11. Unload Conduit**

10. To bend more conduit of the same material and at the same angle, load and secure as described in steps 3 through 6. To bend the same type conduit but at a different angle, load and secure; turn angle set knob to the desired angle, then press the bend button.
11. Bending different type and size conduit requires repeating steps 2 through 10.

### 4.3 Offset Bending

1. Obtain distance "M" from table A, and measure this distance from mark #1 and place mark #2.
2. Now place mark #1 in line with front edge of shoe clamp and make first bend.
3. Next rotate conduit 180° level, place mark #2 in line with front edge of shoe clamp and make second bend.



**NOTE:** When bending rigid aluminum, set bend angle indicator approximately 4° short of desired angle, since aluminum does not have spring-back of steel.

Table A

| Offset<br>Required | 15° Bend             |      | 30° Bend             |     | 45° Bend             |      |
|--------------------|----------------------|------|----------------------|-----|----------------------|------|
|                    | Conduit<br>Max. Size | M    | Conduit<br>Max. Size | M   | Conduit<br>Max. Size | M    |
| 2"                 | ¾"                   | 7¼"  |                      |     |                      |      |
| 4"                 | 1½"                  | 15⅝" | ¾"                   | 8"  |                      |      |
| 6"                 | 2"                   | 23⅜" | 1"                   | 12" | ½"                   | 8½"  |
| 8"                 |                      | 30⅝" | 1½"                  | 16" | 1"                   | 11⅝" |
| 10"                |                      | 38⅝" | 2"                   | 20" | 1¼"                  | 14⅝" |
| 12"                |                      | 46⅝" |                      | 24" | 1½"                  | 16⅝" |
| 14"                |                      | 54⅝" |                      | 28" | 2"                   | 19⅝" |
| 16"                |                      | 61⅝" |                      | 32" |                      | 22⅝" |
| 18"                |                      | 67⅝" |                      | 36" |                      | 25⅝" |
| 20"                |                      | 77⅝" |                      | 40" |                      | 28⅝" |
| 22"                |                      | 85"  |                      | 44" |                      | 31⅝" |

To locate distance between centers of offset bending marks other than listed in table A use the following multipliers:  
15° bend - 3.9  
30° bend - 2.0  
45° bend - 1.4

4.4 Stub-up Bending

- 1. Table C shows minimum length (inches).
- 2. Mark #1 is stub length, deduct from this as per table C and obtain mark #2.

Table B

| BEND RADIUS     |                       |               |
|-----------------|-----------------------|---------------|
| Conduit<br>Size | Radius<br>Rigid / IMC | Radius<br>EMT |
| ½"              | 3⅜"                   | 3⅝"           |
| ¾"              | 4⅝"                   | 4⅞"           |
| 1"              | 5⅝"                   | 5⅞"           |
| 1¼"             | 6⅝"                   | 7⅞"           |
| 1½"             | 7⅝"                   | 7⅞"           |
| 2"              | 8⅝"                   | 8⅞"           |

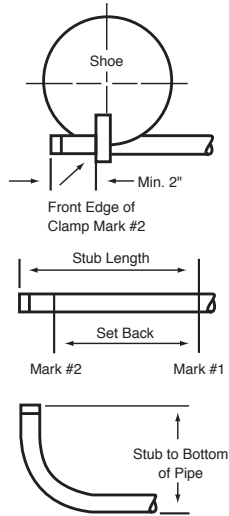


Table C

| Conduit<br>Size |       | Stub-up<br>Set-back | Conduit<br>Size |       | Stub-up<br>Set-back |
|-----------------|-------|---------------------|-----------------|-------|---------------------|
| ½"              | Rigid | 7¼"                 | 1¼"             | Rigid | 12¼"                |
| ½"              | IMC   | 7¼"                 | 1¼"             | IMC   | 12½"                |
| ½"              | EMT   | 7⅞"                 | 1¼"             | EMT   | 13"                 |
| ¾"              | Rigid | 9"                  | 1½"             | Rigid | 13½"                |
| ¾"              | IMC   | 9"                  | 1½"             | IMC   | 13½"                |
| ¾"              | EMT   | 8½"                 | 1½"             | EMT   | 13½"                |
| 1"              | Rigid | 10⅞"                | 2"              | Rigid | 15¼"                |
| 1"              | IMC   | 10⅞"                | 2"              | IMC   | 15½"                |
| 1"              | EMT   | 10⅞"                | 2"              | EMT   | 15½"                |

5.0 ANGLE ADJUSTMENT

Two different type scales are mounted on the shoe outer rim. One for ½" thru 2" IMC and Rigid, the other for EMT ½" thru 2" See Figure 12.

Each scale indicator is adjustable to compensate for over long or short bends which may be due to differences in conduit characteristics or other variations.

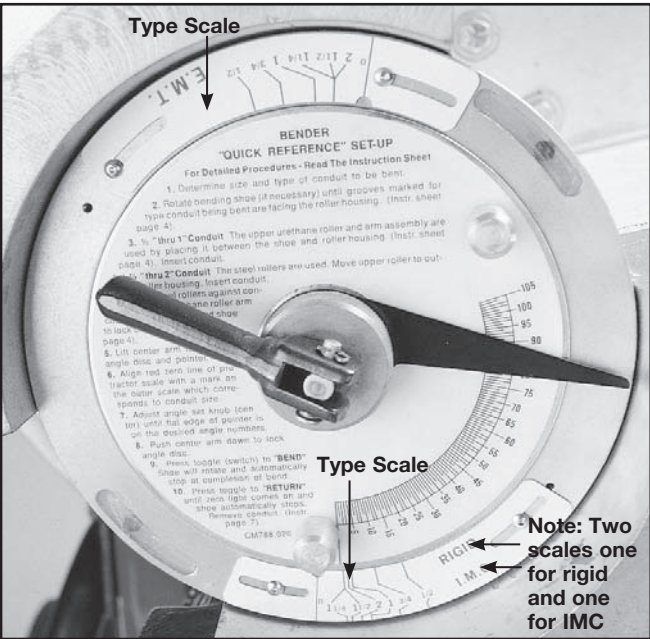


Figure 12. Two Type Scales

**Bends which are too long:** Loosen the size scale (for type material being bent) mounting screws. Slide the scale clockwise as many degrees as the overbend (if bend is 5° over, move indicator 5° clockwise). The degree of movement is observed by watching one of the size marks as it moves past the angle disc scale. Tighten the mounting screws.

**Bends which are too short:** Loosen the size scale (for type material being bent) mounting screws. Slide the scale counterclockwise as many degrees as the bend is short (if bend is 5° short move counterclockwise 5°). The degree movement is observed by watching one of the size marks as it moves past the angle disc scale. Tighten the mounting screws.

## 6.0 MAINTENANCE

Periodic general maintenance to the bender may be required to reduce the risk of malfunctioning rollers, sprockets, gear teeth, and/or chains. These parts can become dirty, worn, or damaged over time and may need to be greased or cleaned. Pressurized air can be used to clean any dust or residue inside the bender housing. The bender should not make any uncommon noises such as rattling during use. If this happens, turn off the bender and perform an inspection on the machine.

A troubleshooting aid exists on the printed circuit board mounted to the inside of the operating handle. If all systems are functional, a white L.E.D. (pictured in Figure 13) will flash once every two seconds while the machine is powered up.

Error codes consist of different light patterns.

1. Blink twice = the motor is over heated.
2. Blink three times = limit switch has failed.
3. Blink 4 times = pendant control malfunction.

In addition the L.E.D. will be steady on if the bend or return button is being pressed.

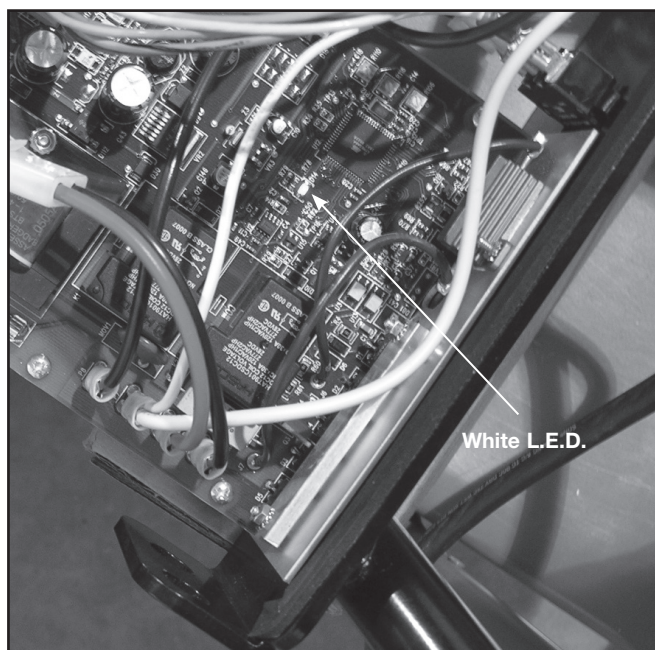


Figure 13. L.E.D. Location

## 7.0 TRANSPORTATION

### 7.1 On ground Transportation

1. Rotate bender to the horizontal bending position.
  - a. Pull handle end of the bender to remove the preload applied on the locking pin of the bender (Figure 14, #14), and pull positioning pin.
  - b. While pulling positioning pin, carefully raise the handle end of the bender until the sprocket housing (Figure 14, #4) locks in the horizontal position.
2. Unlock wheels (if locked) (Figure 14, #13), and use handle (Figure 14, #38) to push/pull bender to the desired location.

### 7.2 Forklift Transportation

1. Rotate bender to the horizontal bending position.
  - a. Pull handle end of the bender to remove the preload applied on the positioning pin of the bender (Figure 14, #14), and pull locking pin.
  - b. While pulling positioning pin, carefully raise the handle end of the bender until the sprocket housing (Figure 14, #4) locks in the horizontal position.
2. From the back of the bender opposite to the handle, insert forks into fork tubes. Refer to decals located on frame for detailed instructions.
3. Move to the desired location.

### 7.3 Lift/Hoist Transportation

1. If nylon sling is being used, ensure sling is long enough to avoid contact with the bender. Bender should be hoisted in the vertical bending position only.
2. Confirm that the Roller Housing (Figure 14, #20) and Upper Roller (Figure 14, #12) are in place and locked.
3. Loop the nylon sling through the End Plate Lift Hook (Figure 14, #26). DO NOT HOIST BENDER USING THE HANDLE (Figure 14, #38).
4. NOTE: End Plate Lift Hook can also be used for job site tethering for added security.

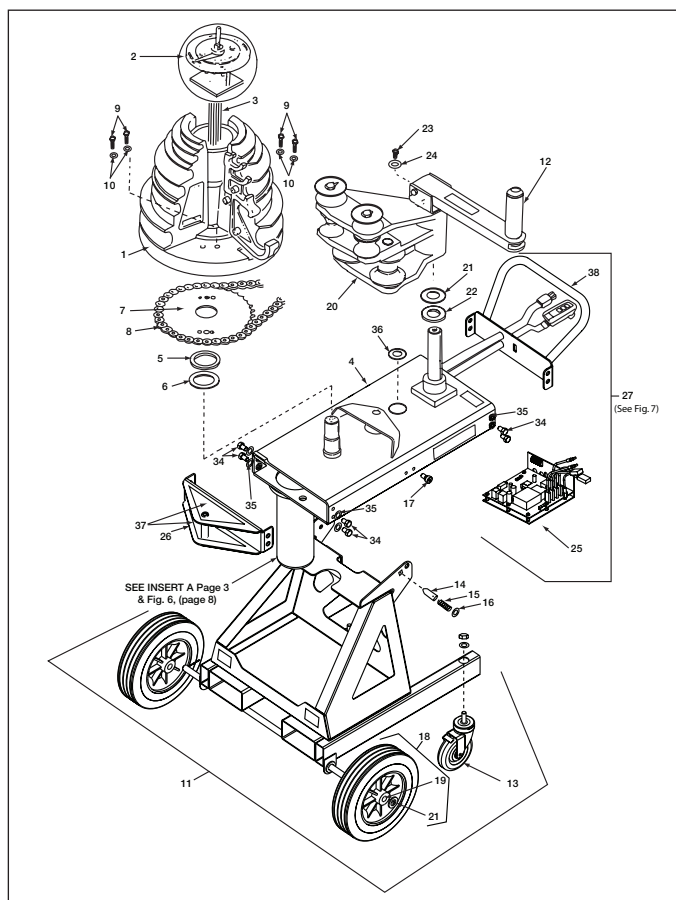


Figure 14. Bender Transportation