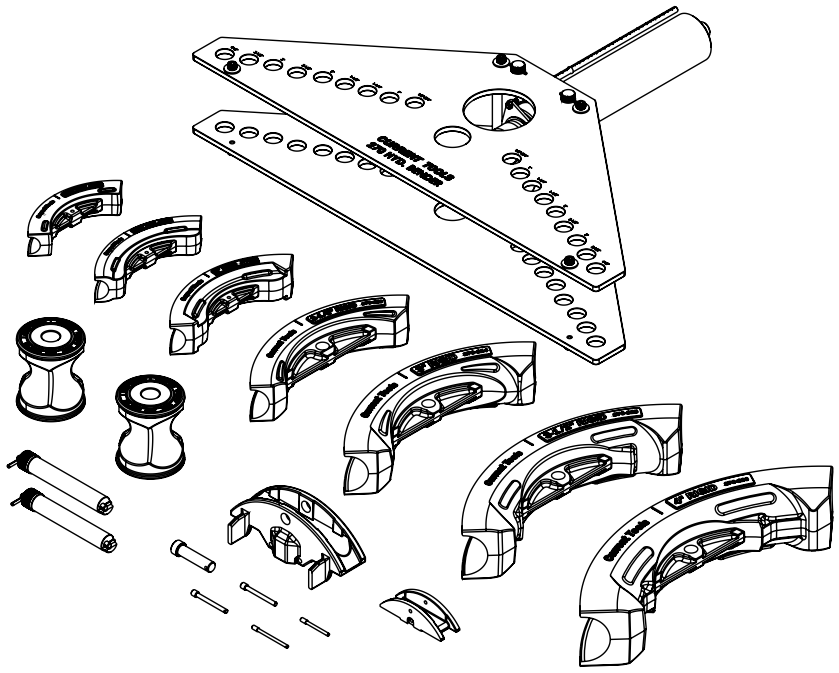
Current Tools

FOR THE PROFESSIONAL ELECTRICIAN

MODEL 270

Hydraulic Conduit Bender

for bending 1¼" thru 5" RIGID Conduit



Assembly, Operating, Maintenance, Safety and Parts Manual

01/2023

Read and understand this material before assembling, operating or servicing this Hydraulic Bender. Failure to understand how to safely assemble, operate and service this unit may result in serious injury or death.

This manual is free of charge. All personnel who assemble, operate or service this Hydraulic Bender should have a copy of this manual and read and understand its contents. To request a copy, call or write to the address below. All information, specifications and product designs may change due to design improvements or updates and are subject to change without notice. Current Tools does not assume any liability for damages resulting from misuse or incorrect application of its products.

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Safety Alert Symbol

THIS SAFETY SYMBOL is used to call your attention to instructions that concern your personal safety. It means: ATTENTION! BE AWARE! THIS IS AN IMPORTANT SAFETY INSTRUCTION!

Read, understand, and follow these safety instructions. Failure to follow these safety instructions may result in injury or death.

DANGER

Immediate hazards which, if not avoided, WILL result in serious personal injury or death.

WARNING

Hazards or unsafe practices which, if not avoided, COULD result in serious personal injury or death.

CAUTION

Hazards or unsafe practices which, if not avoided, COULD result in minor personal injury or property damage.

RETAIN SAFETY INFORMATION

This manual should be read and understood by all personnel who assemble, operate or service this hydraulic bender. Failure to understand how to safely assemble, operate and service this unit could result in injury or death. This unit should only be assembled, operated and serviced by qualified personnel.

IMPORTANT SAFETY INFORMATION

⚠ DANGER NEVER operate the bender in an explosive atmosphere.

⚠ WARNING NEVER operate the bender in wet or damp locations. DO NOT expose the bender to rain.

⚠ WARNING ALWAYS disconnect the bender from the hydraulic pump before servicing and when not in use.

⚠ WARNING ALWAYS inspect the bender before operating. Replace any damaged, missing or worn parts. Check for alignment of moving parts, binding of moving parts, breakage of parts and any other conditions that may effect its operation.

⚠ WARNING NEVER alter this equipment. Doing so will void the warranty.

⚠ WARNING ALWAYS keep hands and feet away from pinch points such as bending shoes, conduit supports, conduit and other moving parts.

⚠ WARNING ALWAYS use appropriate bending shoe, conduit supports and shoe adapter for the size conduit to be bent.

⚠ WARNING ALWAYS keep conduit under control when unloading.

⚠ WARNING ALWAYS keep the path of the bending conduit clear of obstructions. Make sure all obstacles are clear of the bending path BEFORE you bend the conduit.

⚠ WARNING ALWAYS wear approved safety glasses when the bender is in operation.

⚠ WARNING ALWAYS wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair.

⚠ WARNING NEVER stand in direct line with the hydraulic cylinder while operating or servicing the bender. Some parts of the cylinder are under high pressure and can be propelled with considerable force.

IMPORTANT SAFETY INFORMATION – continued

⚠ WARNING ALWAYS read and understand the safety and operating instructions supplied with your hydraulic pump

⚠ WARNING ALWAYS keep children away. All visitors should remain a safe distance from work area.

⚠ CAUTION The bender and some accessories exceed 50 lbs. and will require more than one person to lift, transport and assemble.

⚠ CAUTION Only use the bender for its intended purpose as specified in this manual.

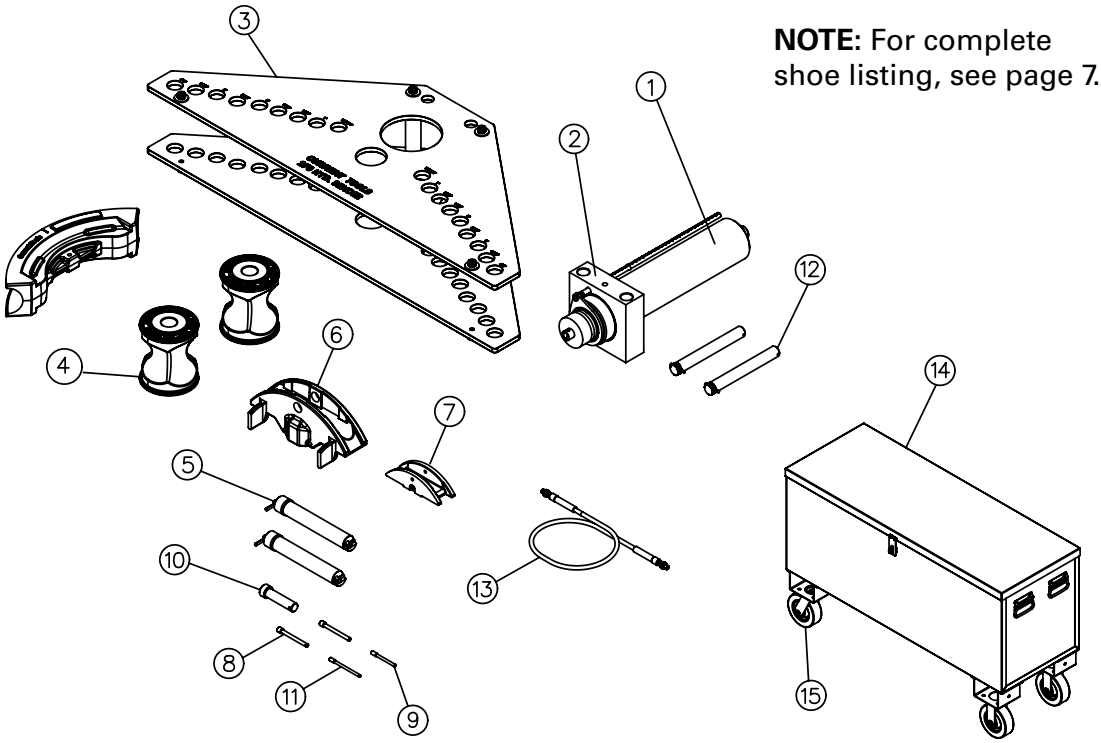
⚠ CAUTION ALWAYS maintain bender with care. Keep bender clean for best and safest performance.

⚠ CAUTION CHECK all hose connections prior to use and ensure they are properly connected. Improper connections may not allow the hydralic cylinder to retract after the bend is complete.

SPECIFICATIONS – 270 CONDUIT BENDER

Model Number	**270**
Storage Box Size	**50"W × 17"D × 20"H**
Weight (w/Storage Box)	**?**
Bending Capacity	**1¼" thru 5" Rigid conduit and schedule 40 pipe** **1¼" thru 4" PVC coated Rigid conduit with optional shoe group**

MAJOR COMPONENTS – BENDER



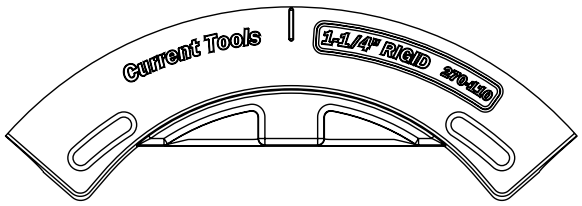
NOTE: For complete shoe listing, see page 7.

MAJOR COMPONENTS – PARTS LIST

ITEM	CATALOG	DESCRIPTION	QTY.
1	270-124	CYLINDER — HYDRAULIC (INCLUDES ITEM #2)	1
2	270-109	CYLINDER MOUNTING BLOCK	1
3	270-125	FRAME ASSEMBLY	1
4	270-117	SUPPORT — RIGID CONDUIT	2
5	270-123	PIN — CONDUIT SUPPORT	2
6	270-118	ADAPTER — SHOE (LARGE)	2
7	270-119	ADAPTER — SHOE (SMALL)	1
8	270-105	PIN — SHOE ADAPTER (LARGE)	1
9	270-104	PIN — SHOE ADAPTER (SMALL)	1
10	270-103	PIN — SHOE (LARGE)	1
11	270-106	PIN — SHOE (SMALL)	1
12	270-121	PIN — CYLINDER BLOCK	2
13	291	HOSE — HYDRAULIC	1
14	106	BOX, METAL STORAGE	1
15	506	CASTER SET — 2 RIGID, 2 SWIVEL	1

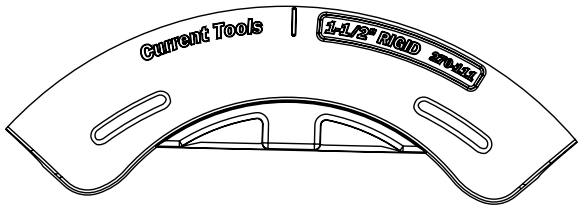
MAJOR COMPONENTS – SHOES

1 1/4" SHOE – RIGID



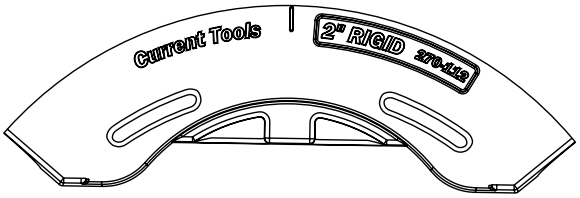
PART #270-110

1 1/2" SHOE – RIGID



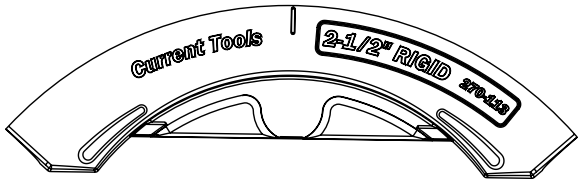
PART #270-111

2" SHOE – RIGID



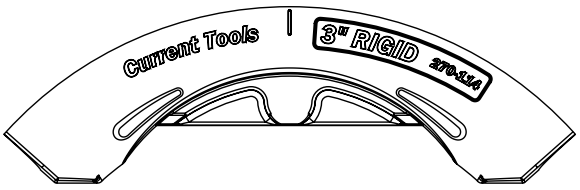
PART #270-112

2 1/2" SHOE – RIGID



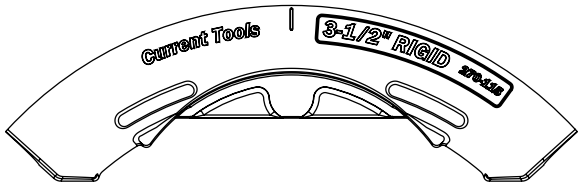
PART #270-113

3" SHOE – RIGID



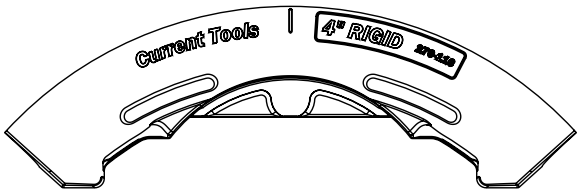
PART #270-114

3 1/2" SHOE – RIGID



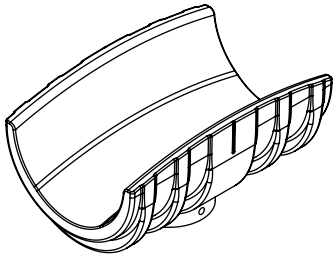
PART #270-115

4" SHOE – RIGID



PART #270-116

5" SEGMENT SHOE – RIGID



PART #270-120

CONDUIT CENTERLINE BENDING RADII

SHOE SIZE	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"
BENDING RADIUS (INCHES)	7 1/4"	8 1/4"	9 1/2"	12 1/2"	15"	17 1/2"	20"	25"

OPTIONAL SHOES FOR PVC COATED RIGID

1 1/4" SHOE – PVC COATED RIGID

PART #270-210

1 1/2" SHOE – PVC COATED RIGID

PART #270-211

2" SHOE – PVC COATED RIGID

PART #270-212

2 1/2" SHOE – PVC COATED RIGID

PART #270-213

3" SHOE – PVC COATED RIGID

PART #270-214

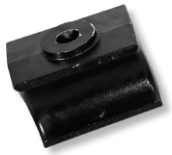
3 1/2" SHOE – PVC COATED RIGID

PART #270-215

4" SHOE – PVC COATED RIGID

PART #270-216

PIPE SUPPORT – PVC COATED RIGID



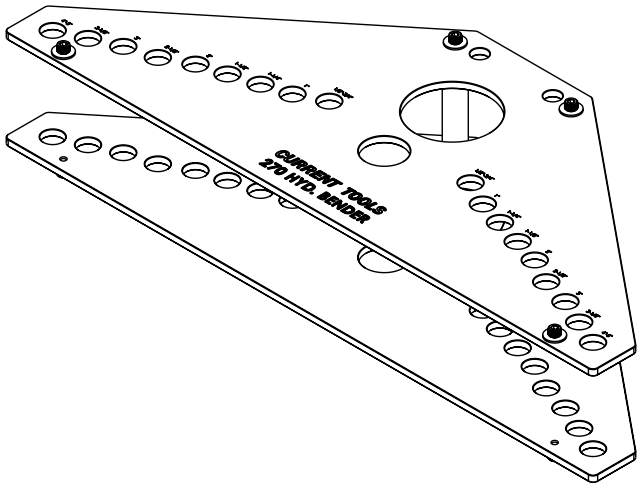
CONDUIT CENTERLINE BENDING RADII — PVC COATED RIGID

SHOE SIZE	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"
BENDING RADIUS (INCHES)	7 1/4"	8 1/4"	9 1/2"	11 7/16"	13 3/4"	16"	18 1/4"

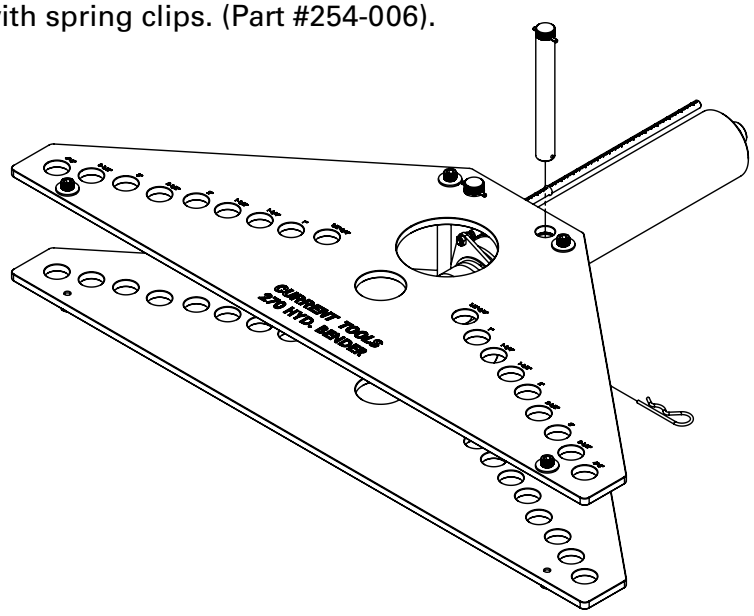
FOR OPERATING ON THE FLOOR

BENDER ASSEMBLY

1. Locate the frame assembly and place it on the floor with the decals facing up.

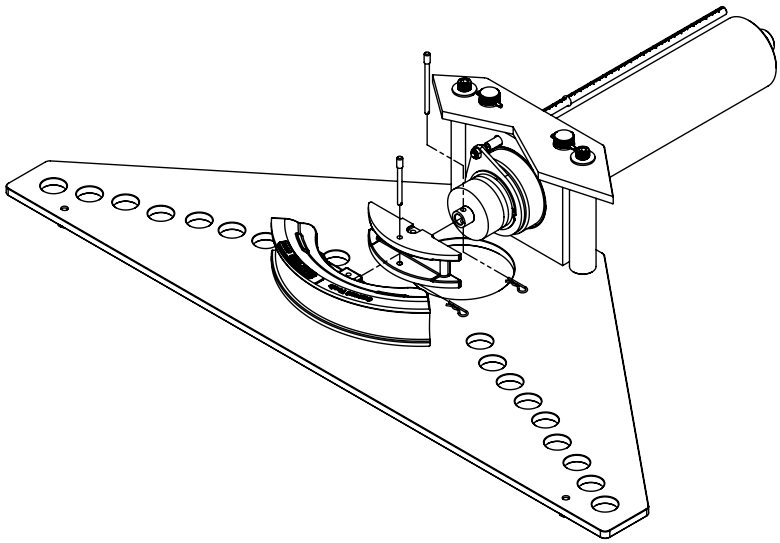


2. Place the hydraulic cylinder with the cylinder mounting block between the frame sides. Insert the two cylinder block pins through the frame sides and cylinder block and secure with spring clips. (Part #254-006).

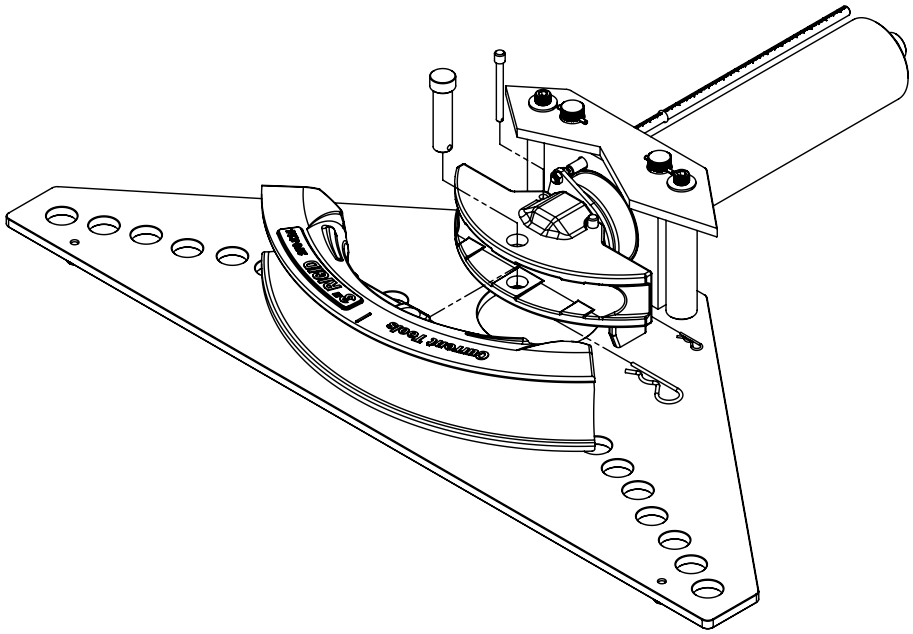


3. Pin the correct shoe adapter (large or small) onto the hydraulic cylinder as noted below:

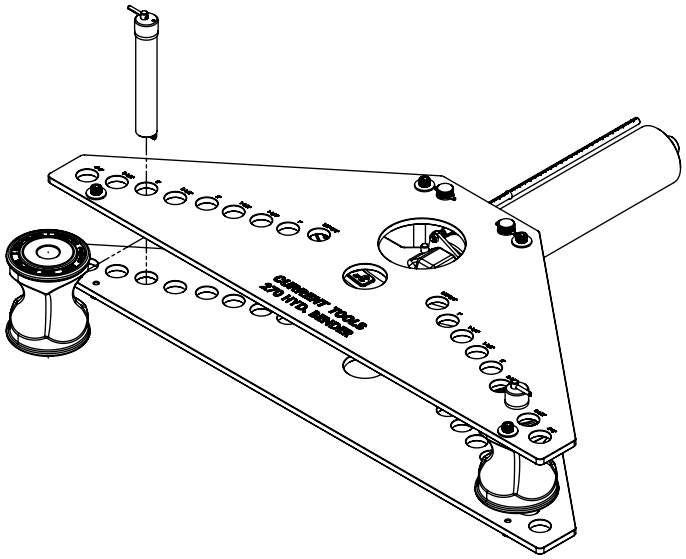
   — For bending 2" and smaller conduit, pin the small shoe adapter (Part #270-119) to the hydraulic cylinder using the small shoe adapter pin (Part #270-104) and secure the pin with spring clip (Part #270-007). Attach the shoe to the shoe adapter with the small shoe pin (Part #270-106).



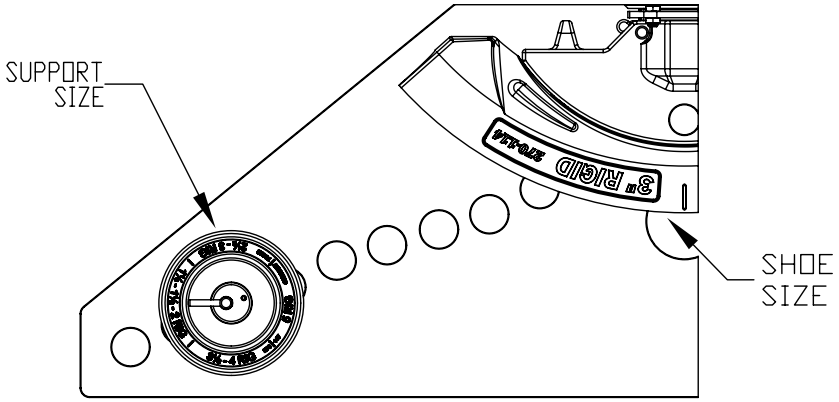
   — For bending 2 1/2" and larger conduit, pin the large shoe adapter (Part #270-118) to the hydraulic cylinder using the two large shoe adapter pins (Part #270-105) and secure the pins with spring clips (Part #254-006). Attach the shoe to the shoe adapter with the large shoe pin (Part #270-103) and secure with spring clip
   (Part #254-006).



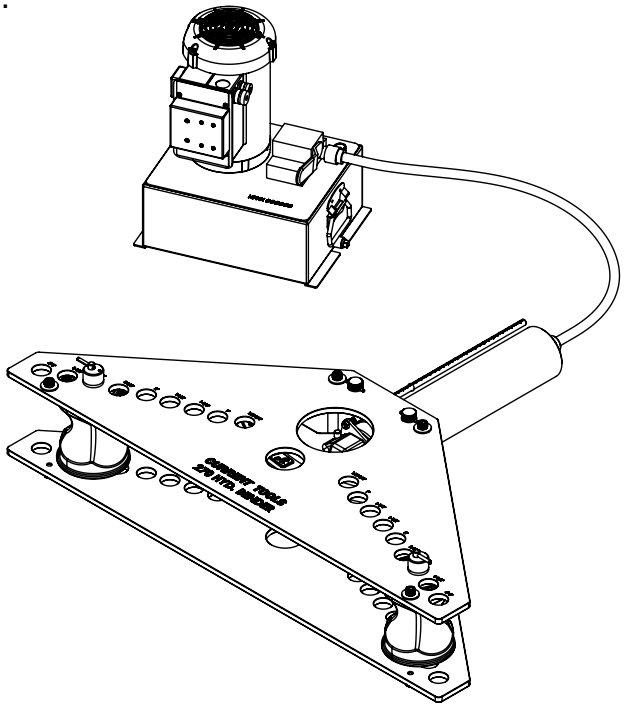
4. Place the conduit supports (Part #270-117) in between the frame pieces and line up the mounting holes with the correct hole position on the frame for the size conduit you will be bending. Insert the conduit support pins (Part #270-122) through the frame sides and conduit supports. Secure the pins by turning the locking pin over the ball on the end of the pin.



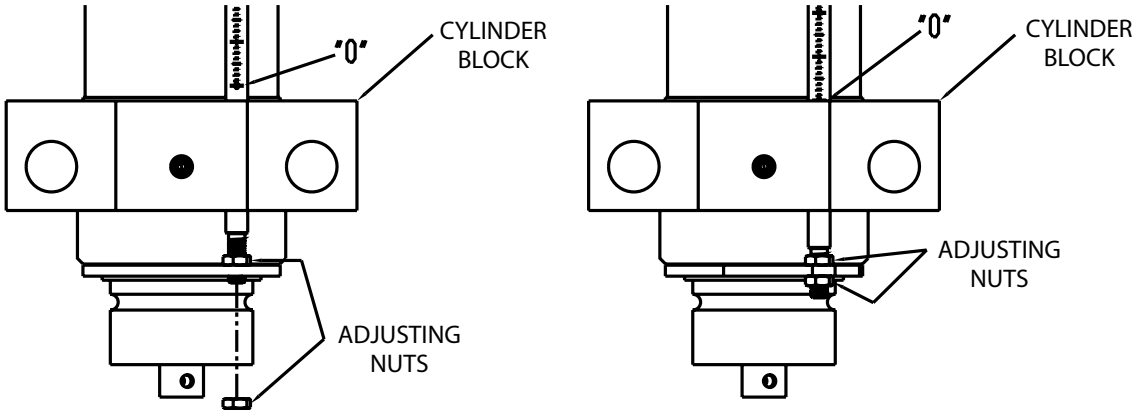
5. Turn the conduit support so that the correct side for the size conduit you are bending is facing the hydraulic cylinder.



6. Connect the hydraulic hose (Part #291) to the pump and hydraulic cylinder. Rotate the pump valve lever to the open position to ensure the cylinder is fully retracted. NOTE: Make sure all fittings are clean, free of debris and completely tightened prior to bending.

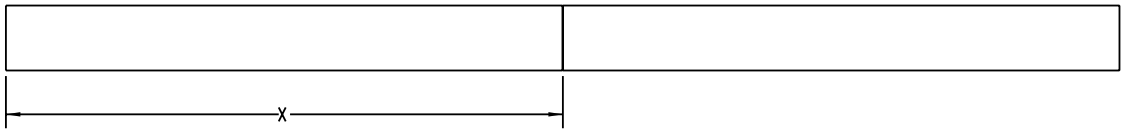


7. Adjust the gauge rod on the cylinder such that gauge reads zero when the cylinder is fully retracted.
   NOTE: To adjust gauge rod, loosen gauge rod adjusting nuts and adjust rod such that zero (Ø) is flush with the top of the cylinder block.

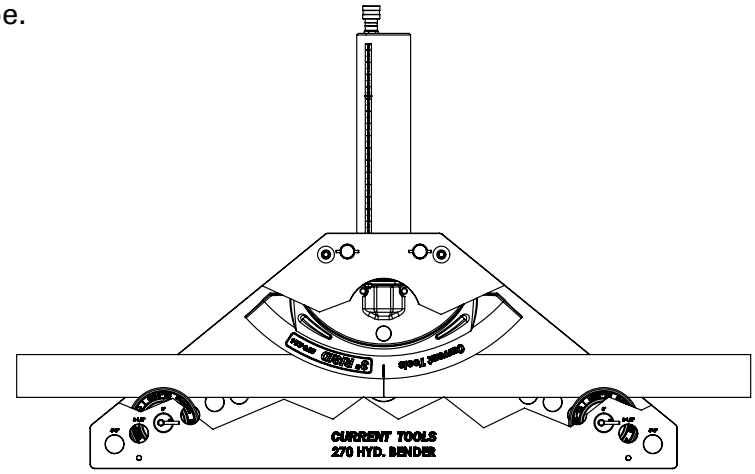


BENDING CONDUIT

1. Refer to the "bending information and charts" section of this manual to determine bending mark locations for the bend you will making. Mark the conduit accordingly.

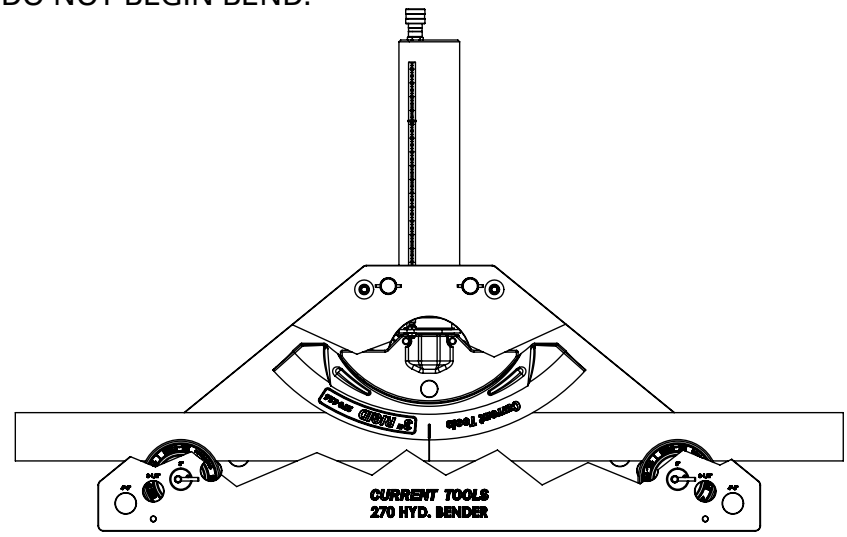


2. Insert the conduit into the bender frame between the conduit supports and bending shoe. Align the bending mark you made in step 1 with the center mark on the bending shoe.



ALIGN

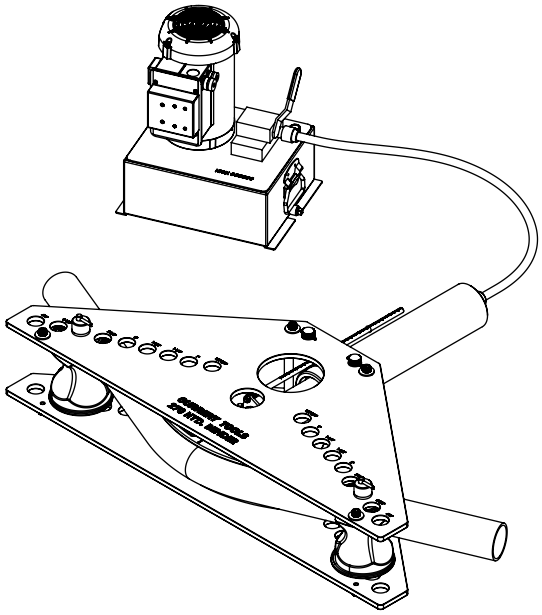
3. Rotate the pump valve lever to the closed position and activate the hydraulic pump until the shoe contacts the conduit and the conduit is tight against the conduit supports. DO NOT BEGIN BEND.



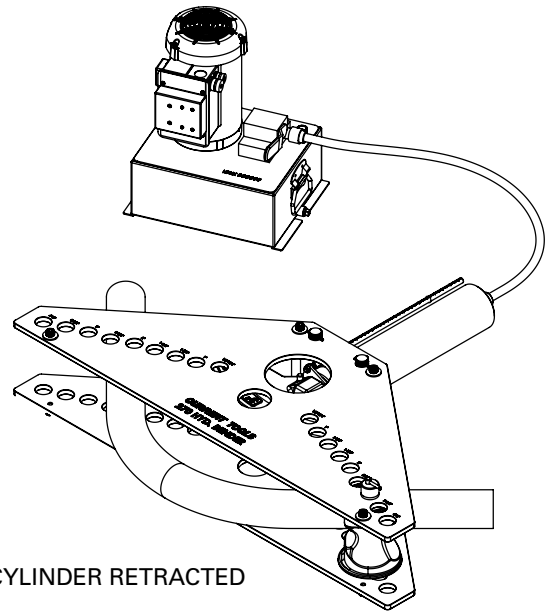
SNUG

4. Determine the amount of cylinder travel for the size, type and degree of bend by referring to the cylinder travel and bender calibration information on page 13.

5. Activate the hydraulic pump to begin the bend.
   NOTE: DO NOT overextend the hydraulic cylinder during operation. This will allow hydraulic fluid to escape the cylinder and may cause a hazardous condition.



6. When the desired degree of bend is complete, rotate the pump valve lever to the open position to release the hydraulic pressure and the hydraulic cylinder will retract. Move the conduit to the next bending position.
   NOTE: For an offset bend, rotate the conduit 180° and make the second bend. For a three bend saddle, rotate the conduit 180° before making the second and third bends. For a four bend saddle, rotate the conduit 180° before making the second and fourth bends.

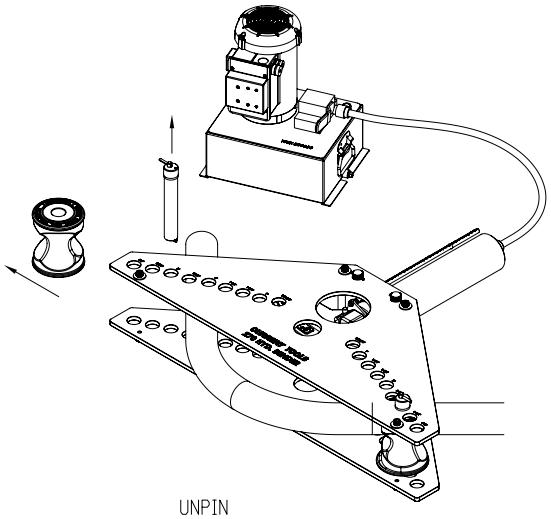


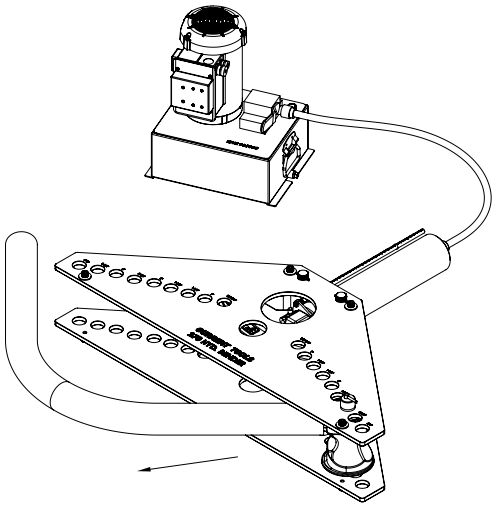
CYLINDER RETRACTED

BENDING CONDUIT

7. Repeat steps 5 and 6 until the bend is complete.

8. Rotate the pump valve lever to the open position to retract the cylinder. Remove the conduit from the bender.



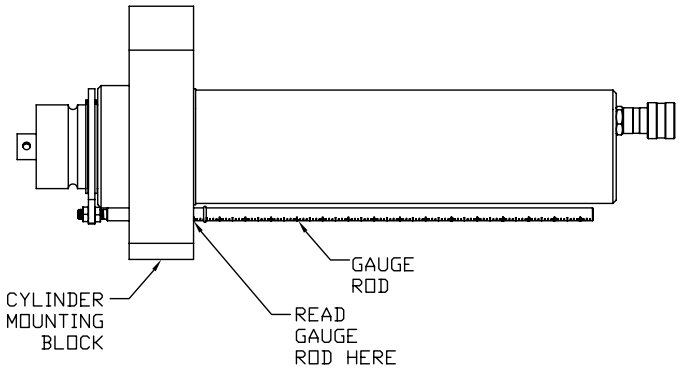


NOTE: To facililate easy removal of bent conduit, slightly retract the cylinder and remove one conduit support from the bending frame. Then operate the pump to advance the cylinder until the conduit releases from the shoe.

CYLINDER TRAVEL AND BENDER CALIBRATION

NOTE: Read the gauge rod at the edge of the cylinder mounting block. Gauge rod should read zero (Ø) when cylinder is fully retracted.

TO ADJUST GAUGE ROD, loosen the gauge rod adjusting nuts and adjust rod so that zero (Ø) is flush with the top of the cylinder block.



1. The bender must be calibrated prior to bending. To calibrate, rotate the pump valve lever to the closed position and activate the pump to advance the hydraulic cylinder until the shoe contacts the counduit and the conduit is tight against the conduit supports. Stop the pump and DO NOT advance the cylinder far enough to start a bend.

2. Read the measurement on the gauge rod and compare that with the 0" (tight) number for the appropriate conduit size on the chart below. If there is a difference in these two numbers, that difference must be included in the cylinder travel measurements for that size of conduit.

CYLINDER TRAVEL (APPROXIMATE)

DEGREE OF BEND	CONDUIT SIZE						
	1 1/4"	**1 1/2"**	**2"**	**2 1/2"**	**3"**	**3 1/2"**	**4"**
0° (tight)							
10°	1 7/8"	2"	2 3/16"	2 1/4"	2 5/16"	3"	3 1/16"
15°	2 1/4"	2 7/16"	2 3/4"	2 7/8"	3 1/4"	3 3/4"	3 15/16"
30°	3 5/16"	3 3/4"	4 1/4"	4 5/8"	5 3/16"	5 15/16"	6 5/16"
45°	4 5/16"	5 1/16"	5 3/4"	6 1/4"	7"	7 15/16"	8 1/2"
60°	5 1/4"	6 5/16"	7 3/16"	7 3/4"	8 11/16"	9 13/16"	10 1/2"
90°	7"	8 11/16"	10 1/8"	10 11/16"	11 13/16	13 1/4"	14 1/16"

NOTE: To use the cylinder travel table, locate the conduit size in the second row and the desired degree of bend in the first column. Where that row and column intersects gives you the approximate cylinder travel to achieve your desired degree of bend.

BENDING INFORMATION AND CHARTS

NOTE: Current Tools Model #270 bender is designed to make up to 90˚ bends with one extension of the hydraulic cylinder. The Greenlee™ Model #884/885 hydraulic bender major components will fit the Current Tools Model #270 hydraulic bender.

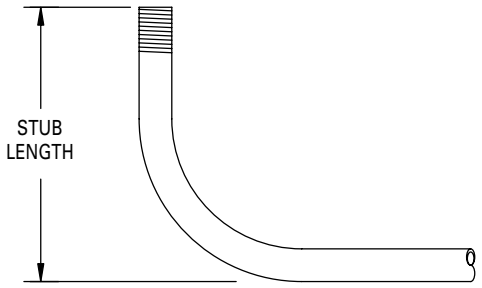
To locate bending marks for a 90˚ bend with a desired stub length.

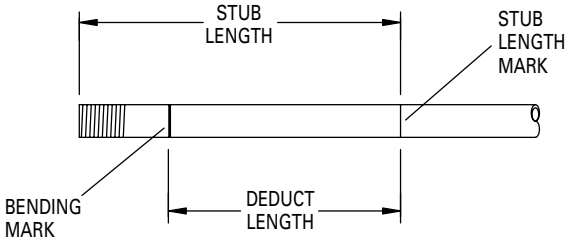
1. Determine the desired stub length
   NOTE: Check corresponding chart on page 15 for the size conduit being bent and ensure the desired stub length is greater than the "minimum stub length" shown in the chart.

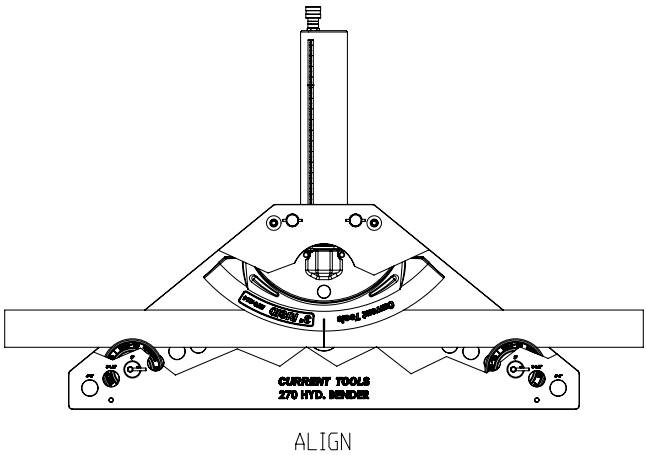
2. From the end of the conduit, measure and mark the desired stub length on the conduit (stub length mark). See Figure ?.

3. Subtract "deduct length" from the stub length mark and make a second mark (bending mark). See Figure ?.
   NOTE: Check corresponding chart on page 15 for the deduct length of the size conduit you are bending.

4. Insert the conduit into the bender frame between the conduit supports and bending shoe. Align the bending mark made in Step 3 with the center mark on the bending shoe. Proceed with the bend as shown in the assembly and operating section of this manual.
   NOTE: Refer to the cylinder travel chart on page 16 to determine approximate cylinder travel to achieve the desired bend degree.







* Greenlee® is a registered trademark of Emerson.

MINIMUM STUB LENGTH CHART

Conduit Size	Deduct Length	Minimum Stub Length
1 1/4"	2 3/8"	15 13/16"
1 1/2"	2 3/4"	18 3/4"
2"	3 1/4"	21 9/16"
2 1/2"	4 1/8"	25"
3"	4 15/16"	28 1/8"
3 1/2"	5 3/4"	31"
4"	6 1/2"	33 7/8"

OFFSET BENDING INFORMATION AND CHARTS

To locate bending marks for an offset bend.

NOTE: Offset bends are used to route conduit around an obstacle. Two bends are necessary to make an offset. The height and angle of the offset must be determined prior to making the bend, and the distance between the two bends is the center to center distance.

1. Measure the height of the obstacle you are working away from.

2. Determine the offset angles for the bends. Common offset angles are noted in the "common calculated offsets" chart on pg. 20.

3. Calculate the center-to-center distance for both bends (see the "center-to-center calculations" chart on pg. 20.

   NOTE: See chart "center-to center calculations with shrinkage" to calculate shrink if you are working towards an obstacle.

4. Mark the conduit at the two center-to-center locations determined in step 3.

5. Bend the conduit as described in the Assembly and Operating Instructions section of this manual.

OFFSET ANGLE	OFFSET IN INCHES	MAX. CONDUIT SIZE	CENTER-TO-CENTER DISTANCE
	2	3/4″	7 3/4″
	4	1 1/2″	15 7/16″
	6	3 1/2″	23 3/16″
	8	4″	30 15/16″
	10	4″	38 5/8″
15 DEG.	12	4″	46 3/8″
	14	4″	54 1/16″
	16	4″	61 13/16″
	18	4″	69 9/16″
	20	4″	77 1/4″
	22	4″	85″
	2	-	-
	4	3/4″	8″
	6	1″	12″
	8	1 1/2″	16″
	10	2″	20″
30 DEG.	12	2 1/2″	24″
	14	3 1/2″	28″
	16	4″	32″
	18	4″	36″
	20	4″	40″
	22	4″	44″
	2	-	-
	4	-	-
	6	1/2″	8 1/2″
	8	1″	11 5/16″
	10	1 1/4″	14 1/8″
45 DEG.	12	1 1/2″	16 15/16″
	14	2″	19 13/16″
	16	2 1/2″	22 5/8″
	18	3″	25 7/16″
	20	3 1/2″	28 1/4″
	22	4″	31 1/8″

CENTER-TO-CENTER CALCULATIONS

Multiply the measured height of the obstacle by the correct multiplier in the chart below to find your center-center distance for your bend.

OFFSET ANGLE	MULTIPLIER
15 DEG.	3.86
30 DEG.	2
45 DEG.	1.4
60 DEG.	1.2

Example: — 8" offset (obstacle is 9" high) with a 30˚ offset angle
— Multiplier for 30˚ angle is 2
— 8 × 2 = 16" center-to-center

CONDUIT "SHRINK"

When making offsets as close as possible to the obstacle, it is necessary to figure in "shrinkage" when approaching the obstacle. Page 21 & 22 illustrates how to figure shrinkage in those circumstances.

To compensate for shrinkage when approaching an obstacle, both bends need to be adjusted forward. The example below (Figure 21A) illustrates an offset bend without shrinkage figured in.

The example below (Figure 21B) illustrates the example above with the shrinkage factor figured in. Instructions on how to figure the shrinkage can be found page 22.

CENTER-TO-CENTER CALCULATIONS WITH SHRINKAGE

Use the table below to determine the center-to-center distance and shrinkage per inch of offset for a particular offset bend.

OFFSET ANGLE	MULTIPLIER	SHRINK PER INCH OF OFFSET HEIGHT
10 DEG.	6	1/16″
15 DEG.	3.86	1/8″
30 DEG.	2	1/4″
45 DEG.	1.4	3/8″
60 DEG.	1.2	1/2″

Example on how to use the above table:

1. Measure the height of the obstacle you are working towards. We will use 8" in this example.
2. Determine the offset angle you will use. In this example we will use 45 degrees.
3. Find the multiplier in the chart above for the offset angle you will using. The multiplier for 45 deg. is 1.4.
4. Multiply the offset height (8") by the multiplier (1.4) to get your center-to-center distance (8 × 1.4 = 11.2).
5. Find the shrink per inch of offset height number for you chosen offset angle in the chart above. This is 3/8" for our example.
6. Multiply the shrink per inch number (3/8) by the measured height of your offset (8"). 8 × 3/8 = 3".
7. Now mark the conduit by placing the second bending mark 3" past the obstacle. Measure back towards the starting point and put the first bending mark 11.2 inches before the second bending mark.
8. Bend the conduit as described in the assembly and operating instructions section of this manual.