### Replacement Parts

**Diagram Number** | **Description** | **Part Number**
--- | --- | ---
4 | Crossbar shoe assembly complete 3/4" - 7/8" (Includes pieces 4, 1 & 2) | 60329
4 | Crossbar assembly complete 1/4" - 5/8" (Includes pieces 4, 1 & 2) | 60330
5 | Clamping Spring | n/a
6 | Sheet metal screw | n/a
7 | Fillister head screw | n/a
8, 11 | Wing nut and e-clip | 60348
9 | Ratchet bar | 60340
10 | Bender body housing | 60343
12 | Spiral pin | n/a
13 | Catch pin | 60344
14 | Catch bolt | n/a
15 | Pressure spring | n/a
16 | Catch lever | 60345
17 | Flat spring | 60346
18 | Tension spring | 60349
19 | Feed lever | 60347
20 | Fillister head screw | 60328

### Ratchet Hand Bender

Easy one hand bending of 1/4" to 7/8" soft copper, aluminum and light wall hydraulic tubing. **Hard copper must be annealed before bending.**

- Quick change bending mandrels and shoes
- Trouble free ratchet mechanism
- Index marks to locate bends

### UPCs

<table>
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<tr>
<th>UPC#</th>
<th>Description</th>
<th>Bending Radius</th>
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<tr>
<td>60331</td>
<td>Complete Kit</td>
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<tr>
<td>60326</td>
<td>1/4&quot; O.D. Bending Mandrel</td>
<td>1&quot;</td>
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<td>60327</td>
<td>5/16&quot; O.D. Bending Mandrel</td>
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<td>3/8&quot; O.D. Bending Mandrel</td>
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<td>1/2&quot; O.D. Bending Mandrel</td>
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<td>7/8&quot; O.D. Bending Mandrel</td>
<td>3-3/8&quot;</td>
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<tr>
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<td>Crossbar Assembly Complete 3/4&quot; to 7/8&quot;</td>
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<td>Plastic Carrying Case</td>
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<td>60339</td>
<td>Ratchet Body</td>
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<td>60342</td>
<td>Reverse Bending Kit</td>
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<td>60101</td>
<td>Small Cutter for 1/8&quot; to 1-1/8&quot; OD</td>
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<td>60161</td>
<td>Tube Reamer - 1/16&quot; to 1-3/8&quot;</td>
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Operating Instructions

Preparing Unit for Operation
Choose the desired size bending mandrel (6) and slide the square hole on the ratchet bar (4). Fasten the correctly sized crossbar assembly (1) on the bender body (2), so that the desired size bending shoes (3) are in the same plane as the mandrel. Use the wing screw (5) to fasten. The bending shoes are marked with the various tube sizes. Rotate the desired size shoe to face the bender handle. Pull the feed lever (7) away from the handle in the indicated direction (8) and push the mandrel and ratchet bar back towards the handle. Release feed lever (7). You are now ready to bend tubing.

Bending Operation
Put your tubing between the mandrel and bending shoes making sure the bending shoe (3) and mandrel (6) are matched for size. Squeeze the feed lever a few times in the indicated direction (10) to begin the bend. When the bender is in the desired position, continue squeezing the lever until the bend is complete. To remove the tube, pull the feed lever (7) away from the handle in the indicated direction (8), push the mandrel back toward the handle and take the tubing out.

CAUTION: Annealed tubing must be cooled prior to bending so bending mandrel and bending shoes are not damaged.

Tool Maintenance
This unit is maintenance free, no service is required.

Minimum Distance Between Bends

Tubing Diameter    Inches (mm)
1/4"               4" 102
5/16"              4" 102
3/8"               5" 127
1/2"               5" 127
5/8"               5.5" 140
3/4"               8.5" 216
7/8"               8.5" 216

Optional Reverse Bending Kit 60342
To bend tubing from the outside of the bend, Adapter Kit 60342 which mounts on the bender handle is required. Adapter “A” attaches to the end of the bender body.

Bend Location Index
Use the two indexes (9) on top of the mandrel to locate your bends. If the desired bend is to be finished 10 inches from the left end of the tube, locate the 10-inch mark to the right side index and bend. Likewise, if the desired bend is to be 10 inches from the right, locate the 10-inch mark to the left side index and bend.