Proper tool adjustment steps

Tool change procedure

Handle Adjustment

... and more.

Air/Oil Booster Powered

DuroLoc7 Unit User Guide

For hand held sheet metal clinching applications.

Part of our Clinching Production Equipment line of Products

www.btmcomp.com/clinching-equipment.html
BEFORE YOU BEGIN

☐ Inspect your unit, hose(s), booster, and any components for damage prior to operation of the unit.

☐ Be sure to check that your desired tooling is installed in the unit.

☐ Add oil or verify that the oil level is correct in the booster. (See 3.0 - Start-up Procedure)

For product questions or service issues, contact BTM’s sales department at +1-810-364-4567.

TABLE OF CONTENTS

Section 1: 1.0 Safety ....................................................................................................................................... 3

Section 2: 2.0 DuroLoc7 Unit Overview ...................................................................................................... 4

2.1 Compatible Clinch Tooling ................................................................................................................... 5

Section 3: 3.0 Start-up Procedure ................................................................................................................... 6 - 7

Section 4: 4.0 Bleeding Air from the Hand Unit .............................................................................................. 8

Section 5: 5.0 Operation ................................................................................................................................. 9

Section 6: 6.0 Tooling Information & Tool Change .......................................................................................... 10

6.1 Cap Thickness (CT) Adjustment Procedure ........................................................................................... 11

Section 7: 7.0 Handle Replacement / Repositioning ........................................................................................ 12

Section 8: 8.0 Pneumatic Circuit ...................................................................................................................... 13
1.0 - SAFETY

**USER RESPONSIBILITY:** Each person who is to operate or maintain the Duroloc7 unit must be familiar with these, and all other safety precautions before attempting to use or to service the press equipment. The owner is responsible to train and supervise all personnel in the safe operation & maintenance of this equipment.

**SAFETY GLASSES:** Always wear safety glasses while operating and maintaining this equipment.

**DANGER:** NEVER place hands, fingers, or other body parts in the path of the die and the punch. Accidental operation or damaged and worn control devices can result in severe injuries. ALWAYS use tongs, or other inserting devices, to place materials in the press operating area. DO NOT operate with a second person holding the parts in the unit for joining.

**SAFETY CONTROL INTEGRITY:** Do not alter the control systems, or safety guarding, in any way.

**SAFETY CONTROL MAINTENANCE:** If a control or operating component is damaged, or fails to work properly, discontinue use immediately and do not use until the controls are repaired or replaced, and the machine is tested by qualified machine maintenance personnel.

**EQUIPMENT REPLACEMENT PARTS:** Use only genuine BTM punches, dies, hoses, and other spare parts with this system.

**WORK MATERIAL COMPATIBILITY:** Do not attempt to join materials other than those approved for joining by BTM with your tooling.

**REGULAR MAINTENANCE:** Check hand unit, hose, and booster regularly for damage or cracks. Discontinue use if such conditions exist. Do not operate if punch or die tooling is chipped or cracked.
2.0 - DUROLOC7 UNIT OVERVIEW

The Duroloc7 unit is a hydraulically operated unit powered by an air/oil booster. It features interchangeable anvils which will accommodate a wide range of part cross sections. A quick change shim kit makes shut height adjustment easy when joining multiple thickness combinations. Duroloc7 units are sold separately or as a complete system including a hose and air/oil booster.

Hangers and balancers are also available for increasing operator productivity.

For more information see our catalog and contact BTM’s sales department at 810-364-4567.

COMPONENTS
2.1 - COMPATIBLE CLINCH TOOLING

Tog-L-Loc®

Ideal for joining MILD STEEL!

BTM’s patented Tog-L-Loc® sheet metal joining system is the simple solution for fastening plain or coated sheet metals. Tog-L-Loc® forms a strong, leakproof joint without welding or riveting in almost any combination of ductile sheet metals.

The Tog-L-Loc® system is widely used in the manufacture of automobiles, appliances, furniture, electrical products, building supplies, and more.

V-Loc™

Ideal for joining ALUMINUM!

V-Loc™ is a visually improved Tog-L-Loc® joint which features a raised spherical inner diameter with a concentric outer ring.

This design is intended to give the appearance of a more traditional fastener, but the process is essentially the same as the trusted Tog-L-Loc® joining method, which clinches sheet metals together using a punch and a die rather than the application of external fasteners or welding.
3.0 - START-UP PROCEDURE

**REQUIREMENTS:**

- Safety Glasses
- 2 Adjustable Wrenches
- 2.5mm, 3.0mm, & 8.0mm Hex Keys
- A regulated air line capable of supplying 5.5 bar [80 psi]

<table>
<thead>
<tr>
<th>BTM Booster Operating Air Pressure:</th>
<th>5.5 bar [80 psi]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTM recommends that clean, dry air is used.</td>
<td></td>
</tr>
<tr>
<td>Oil: Amoco AW 32 to DTE 24 or any equivalent, non-foaming oil.</td>
<td></td>
</tr>
<tr>
<td>DuroLoc7 Maximum Input Pressure:</td>
<td>345 bar [5000 psi]</td>
</tr>
</tbody>
</table>

*Note: Oil should be handled and disposed of properly.*

---

**IMPORTANT!**

*Read all safety instructions before operating the unit.*

1. After removing your DuroLoc7 system from its shipping box, visually inspect the system for damage due to shipping.

   **If damage has occurred, call BTM immediately.**
   **+1-810-364-4567**

2. Make sure that you have received two sets of tooling. One set is already installed in the hand unit. The second set is in a package with the DuroLoc7 unit. Remove the second set of tooling and store it for future access.

3. Hang the booster from the hole in the hanger bracket.

   **Make sure the booster unit is securely hung in an appropriate location.**

   **The booster should be higher than the hand unit during operation.**
3.0 - START-UP PROCEDURE (CONTINUED)...

4. The booster may be shipped with oil in the reservoir. If the oil level is low, add oil by removing the plug at the top of the booster. The proper oil level is denoted by a sticker on the booster.

5. Supply an airline to the booster with clean, dry air, regulated to 5.5 bar [80 psi] pressure.

Now you are ready to setup the unit to make clinch joints.

6. To set the cap thickness (CT) put part material between the punch and die and press the trigger valve to make a joint. The trigger must be pressed and held throughout the cycle to ensure the hand unit has fully extended the tooling.

Reference Section 6.1 “Tooling” for a chart containing general CT sizes.

Contact BTM to optimize your CT for your specific part material.

7. If the proper CT is not reached, then follow the instructions found in Section 4.0 – “Bleeding the Hand Unit”, and return to step 6.
4.0 - BLEEDING THE HAND UNIT

**YOU WILL NEED:**
- (2) Adjustable Wrenches
- 8mm Hex Key

1. Disconnect air supply to booster.  
   *Do not attempt bleeding procedure under air pressure.*

2. Position gun lower than booster. Keep hose free of loops or kinks to ensure best flow. (A)

3. Using an 8mm hex key, remove plug (B) from top of booster sight glass.

4. Slowly loosen the hose fitting connection from the swivel fitting. This will require 2 wrenches. (C)

5. By gravity, all air (along with a small amount oil) should be expelled.

6. Reconnect/tighten fitting at gun. (C)

7. Reinstall plug on top of booster sight glass. (B)

8. Reconnect air to booster inlet.

9. Dry cycle unit multiple times.

10. Make some clinch joints and check cap thickness.

11. If results are not optimal, bleeding procedure may need to be repeated.

12. When unit has been bled, check the oil level at the booster through the sight glass. The level should be between the two points indicated on the decal. Fill as needed. (D)
5.0 - OPERATION

1. Observe all safety instructions as described in Section 2.0 “Safety” in this manual.

2. Verify that the metals to be joined are within the thickness range as shown in the chart in Section 6.0 “Tooling”. Contact BTM if your metal thickness falls outside of this range.

3. Always hold the unit perpendicular to the work.

4. Never attempt to make a clinch joint through another clinch joint, spot weld, or other obstruction.

5. Only join designated material.

6. The trigger must be pressed and held throughout the cycle to ensure the hand unit has fully extended the tooling.

7. When metals of dissimilar thickness are to be joined, the thicker layer should be to the punch side for best results.

8. For best tool life, make sure the punch stripper is in good condition.

9. The die assembly, punch, and stripper must be in place when joining metals. These components are crucial to joint quality.

10. Joint quality is monitored nondestructively by measuring the cap thickness (CT) of the formed joint.
6.0 - TOOLING

GENERAL JOINT STRENGTH DATA: Joint Type: TL-4.6-940-SSI

<table>
<thead>
<tr>
<th>Cap Thickness</th>
<th>A(x2)</th>
<th>Shear</th>
<th>Peel</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>In</td>
<td>mm</td>
<td>In</td>
</tr>
<tr>
<td>2x .6</td>
<td>.024</td>
<td>0.50</td>
<td>.020</td>
</tr>
<tr>
<td>2x .7</td>
<td>.029</td>
<td>0.48</td>
<td>.019</td>
</tr>
<tr>
<td>2x 1.1</td>
<td>.045</td>
<td>0.83</td>
<td>.033</td>
</tr>
</tbody>
</table>

Tog-L-Loc® tools are preset by BTM to give best joining results with a specific range of metal type and thickness as charted above. Higher strengths for a specific metal thickness may be obtained with optimized tooling from BTM. All Tog-L-Loc® and V-Loc™ tools are marked with numbers for easy identification.

TOOL CHANGE PROCEDURE

YOU WILL NEED:
- 2.5mm Hex Key
- 3mm Hex Key

DIE CHANGE / REMOVAL
1. Remove air supply from booster, and make sure unit is in returned position.
2. From back of anvil, remove M4 SHCS from die with a 3mm hex key.
3. Remove die from die pocket.

STRIPPER CHANGE / REMOVAL
1. Remove air supply from booster, and make sure unit is in returned position.
2. Die must be removed prior to stripper removal due to limited opening.
3. Pull stripper off punch directly toward anvil. No tools should be required.

PUNCH CHANGE / REMOVAL
1. Remove air supply from booster, and make sure unit is in returned position.
2. Die must be removed prior to punch removal due to limited opening.
3. Remove the retaining set screw with a 2.5mm hex key.
4. Remove punch.
6.1 - CAP THICKNESS (CT) ADJUSTMENT PROCEDURE

**YOU WILL NEED:**
- 3mm Hex Key

**WARNING! - DO NOT OPERATE UNIT WITHOUT SHIM KIT IN PLACE.**

1. Remove air supply from booster, and make sure unit is in returned, open position.
2. Install M4 SHCS to aid in shim kit removal.
3. Pull shim kit assembly straight up, ball plungers will release.
4. Using a 3mm hex key, remove M4 SHCS from front shim plate.
5. Adjustment is achieved by adding and removing shims from assembly. Remove shims to move punch toward die and reduce cap thickness (CT). Add shims to move punch away from die and increase CT.
6. Reassemble shim kit assembly.
7. If needed, install M4 SHCS to aid shim kit installation back in unit.
8. Make sure the ball plungers are aligned toward front of unit (toward tooling). They engage in (2) holes in body sides.
9. Push straight down until ball plungers are engaged and secure.
10. Attach air hose to booster and make test clinch joints. Repeat shim adjustment until desired CT is achieved.
7.0 - HANDLE REPLACEMENT / REPOSITIONING

The Duroloc7 unit features a replaceable handle assembly that can also be flipped 180° and re-mounted to the body.

REMOVING THE HANDLE

**YOU WILL NEED:**
- 3mm Hex Key

1. Remove air pressure from booster.
2. Remove air lines from quick disconnect fittings on handle.
3. Remove (2) M4 SHCS from handle.
4. Pull handle mount from unit body.

1. Flip the handle assembly 180° and mount to body.
2. Fasten (2) M4 SHCS to secure handle to unit body. Counterbores will now face opposite side.
3. Reroute and reconnect air lines.

HANDLE OPTIONS

<table>
<thead>
<tr>
<th>12° HANDLE (STANDARD)</th>
<th>STRAIGHT HANDLE</th>
<th>-15° HANDLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="12° Handle" /></td>
<td><img src="image" alt="Straight Handle" /></td>
<td><img src="image" alt="15° Handle" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BTM Number</th>
<th>BTM Number</th>
<th>BTM Number</th>
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</thead>
<tbody>
<tr>
<td>PD281500H</td>
<td>PD281500L</td>
<td>PD281500M</td>
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</tbody>
</table>

BTM COMPANY, LLC • 300 DAVIS ROAD • MARYSVILLE, MI 48040 • Tel: 810-364-4567 • Fax: 810-364-6178 • www.BTMcomp.com
8.0 - 15cc Booster Pneumatic Circuit

- Plant air supply: minimum 3/8" pipe, recommend dry air.
- Air supply port: < 5.5 bar [80 PSI] max.
- Signal air to trigger valve (green tubing).
- Signal air to booster (white tubing).
- 15cc Booster.
- Pressure limit valve.
- Exhaust.
- Set at 80 PSI.
- Filter regulator lubricator.
- Single acting hydraulic cylinder.
BTM offers a range of Production Equipment for applying our Clinch tooling.

<table>
<thead>
<tr>
<th>Hand Held Units</th>
<th>Die Sets</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTM’s handheld units are an economical approach to fastening sheet metal assemblies. Pneumatic, Hydraulic, and Self-Contained Units in a variety of styles are available. The units can be set up to join a range of thicknesses.</td>
<td>Clinch tooling can be inexpensively designed into single or compound motion die set packages.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Universal Presses</th>
<th>Special Fixtures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal presses easily adapt to join a variety of parts.</td>
<td>Manually loaded and unloaded dedicated tooling can be built for a single part or a family of parts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialized Units</th>
<th>Special Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTM provides pneumatic, hydraulic, air/oil, and electrically driven units with single or dual motions for both stationary and robotic applications.</td>
<td>Achieve faster cycle times with automatic part transfer and by combining processes.</td>
</tr>
</tbody>
</table>

Find more information online:

www.btmcomp.com/clinching-equipment.html