Standard External Cutters
CONTENTS

Logan Standard External Cutters
Overview................................................................................ 2
Uses ...................................................................................... 2
Construction .......................................................................... 2
  Spring Dog Assembly......................................................... 2
  Ratchet Pawl Assembly ..................................................... 2
  Slip Assembly..................................................................... 5
Tool Illustrations.................................................................. 3 – 4
Operation ............................................................................. 5
  Washover Procedure ......................................................... 5
  Operating the Cutter .......................................................... 5
  Operating Precautions ....................................................... 5
  Cutting Procedure ............................................................ 5
  Proving the Cut................................................................. 6
  Withdrawing from the Hole............................................... 6
Maintenance .......................................................................... 7
  Disassembly ........................................................................ 8
  Assembly .............................................................................. 9
  Maximum Pick-up Length and Load................................. 11
Specifications and Parts Lists............................................. 12 – 16

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2nd Printing, February 2013. Rev. 1
OVERVIEW
The Logan Standard External Cutter features automatic spring-fed knives that prevent excessive strain from being applied from the rig floor that could cause the knives to burn or break before the cut is completed.

Interchangeable assemblies — Spring Dog, Ratchet Pawl, and Slip — adapt the Logan Standard External Cutter to any type of drill pipe or tubing.

USES
The Logan Standard External Cutter is used to cut and remove long sections of tubing, casing, and drill pipe. It may also be run on sucker rods. When used in conjunction with a washover string, it may be used to cut and remove stuck pipe.

CONSTRUCTION
The Logan Standard External Cutter consists of a top sub, body, guide, knives, spring dog (standard) assembly, thrust washer, thrust bearing, preload sleeve, feed ring, main spring, and shear pins.

The top sub threads into the body and holds the inner parts in position. It has a suitable connection at its upper end for attaching to the running string.

The body has threaded connections top and bottom to accept the top sub and guide. A shouldered inside diameter acts as a stop for the thrust washer and the parts above it to stop against during operation. Knife slots in the lower end of the body incorporate crossholes for the knife pins. Two holes in the body, placed diametrically opposite each other, hold the shear pins.

The guide, which is usually cut-lipped, threads into the bottom of the body. It guides the fish into the Cutter. Alternate guides, such as an extra long wallhook, or a mill-toothed guide, may be substituted if necessary.

The knives are made from high-quality tempered steel for strength and durability. The cutting end of the knives is curved for the most efficient cutting action. The radius of the shank end matches the integral concave bearing face that it rests against in the body. A hole on the shank end of each knife accepts the knife pins. Set screws hold the knife pins in the body.

The Spring Dog Assembly is standard equipment on all Logan Standard External Cutters. The Spring Dog Assembly catches square shouldered collars or couplings, and retains the cut-off section after the cut is made. A variety of pipe sizes can be caught by each assembly for each different size of cutter.

Spring Dog Assembly
The Spring Dog Assembly consists of a cylinder, six rectangular vertically mounted springs, and twelve rivets. The springs are positioned to rest at their lower end on a shoulder so the force applied to the springs will be transmitted to the Spring Dog Body rather than the rivets. The springs are closed at the top to form a small opening. This arrangement allows the Spring Dog Assembly to outwardly deflect and pass over collars or couplings but stay close around the pipe or tubing so that they will always be in position to butt up against the bottom of the collar or coupling when raised. The springs are sufficiently closed to catch any size pipe or tubing that the Logan Standard External Cutter is designed to cut.

The thrust washer and thrust bearing allow the entire tool, except the catcher assembly (Spring Dog, Ratchet Pawl, or Slip Assembly), to rotate during operation while the catcher assembly remains stationary. The thrust washer and thrust bearing are placed between the main spring and the catcher assembly.

The preload sleeve is a steel cylinder located between the thrust washer and the top of the main spring. The preload sleeve maintains sufficient load on the feed ring without the necessity of applying a pull load from the surface. The preload sleeve may be removed to relieve all preload tension on the main spring. If removed, knives must be manually fed from the surface.

The preload sleeve is used with all three catcher assemblies: Spring Dog, Ratchet Pawl, and Slip Assembly. The preload sleeve is not used when the knives are fed manually.

The cylindrically-shaped feed ring has a bevelled lower face that allows it to nest below the cutting ends of the knives. The two (2) spear pin holes in the feed ring, placed diametrically opposite each other, align with the holes in the body.

During operation, the feed ring forces the knives inward against the fish. The shear pins maintain the feed ring in running-in position until the string is pulled. The force exerted by the pull shears the pins and releases the feed ring.

The main spring is located between the thrust washer and the feed ring. It is wound from steel and is tempered to provide trouble-free service. During operation, the main spring is pre-loaded by a predetermined calculated amount that will exert the best cutting load on each knife. The load is then transmitted through the feed ring. Once the shear pins have been sheared, the cutter may be moved to any point between the two collars or joints where shearing occurred for the actual cut. No additional load needs to be applied from the rig floor to make a cut.

Shear pin sizes vary with the cutter size. They are manufactured from clean shearing brass rod. The shear strength of each shear pin is listed in the table on page 7.

Ratchet Pawl Assembly
The Ratchet Pawl Assembly is a thick walled cylinder that contains five (5) to eight (8) pawls, depending on size. The pawls are arranged to form a circle around the pipe. They are spring loaded...
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to allow them to be deflected by passing a coupling or collar, then return to horizontal position after passing over the coupling. During operation, they catch the underside of the taper and transmit the load from the pawls through the pawl body and to the main spring.

The Ratchet Pawl Assembly is designed to catch tapered upset integral tool joints. They are also capable of catching square shouldered collars or couplings.

As a general rule, Ratchet Pawl Assemblies fit only one particular size of pipe or tubing joint and will be provided upon request. A separate Ratchet Pawl Assembly must be used for each size. An assembly may be redressed with proper length pawls in the size for which it is to be used.

Special Note: A Single Pawl Spacer is required when using the Ratchet Pawl Assembly.

A Single Pawl Spacer is used with the Ratchet Pawl Assembly. The length of a Ratchet Pawl Assembly is half the length of the Spring Dog Assembly. The spacer adds extra length to the Ratchet Pawl Assembly to make their combined length the same as a standard Spring Dog Assembly. If two Ratchet Pawl Assemblies are run in tandem, a Single Pawl Spacer is not necessary.

In the event the operator desires to abort the cut once the cutting position is reached, the Cutter may be released by repeatedly jarring the Ratchet Pawl Assembly against the collar or taper to shear the pawl pins. This will allow the cutter to be backed out of the hole without making a cut.

**Slip Assembly**

This optional assembly is designed to cut and retain pipe with external tool joints. The slips can grip the pipe at any point and retain the cut-off section after making the cut. Slip assemblies are provided upon request.

The Slip Assembly requires a slip adapter. The slip adapter is positioned between the top sub and body to provide an extra length housing for the Slip Assembly. The upper end of the slip adapter screws onto the top sub. The lower end screws into the body. The slip spring pushes against the slip adapter's internal shoulder that is located just below the threads at the upper end. The lower pin end of the slip adapter forms a shoulder that holds the slip retainer bowl in position after assembly.

**OPERATION**

**Washover Procedure**

Before the Logan Standard External Cutter can be run, stuck pipe must be freed from the formation with a washover operation to provide adequate clearance so the tool can be lowered over the stuck pipe. It is recommended that the stuck pipe be washed over at least one full joint below where the cut is to be made so that the stuck pipe will be centered in the hole at the point where the cut will be made.

The washpipe is equipped with a suitable Logan Rotary Shoe. The shoe should have a slightly larger outside diameter and slightly smaller inside diameter than the Logan Standard External Cutter being used.

After the stuck pipe has been washed over the required depth, the washover string is withdrawn from the well. The rotary shoe is removed from the bottom of the string and the Logan Standard External Cutter is installed in its place.

**Operating Procedure**

Before use, be sure the Logan Standard External Cutter is properly assembled. Threaded connections should be tightly made up. Avoid placing tongs directly over the knife slots. To prevent the knives from falling towards the inside of the cutter and being damaged while moving down hole, it is recommended that the knives be wedged into the knife slots. Bind the knives in the slots by passing a strand of string or cord around each knife and pulling it towards the outside of the body. The tool should be dressed for the size of pipe to be cut. Refer to the specifications on pages 12 - 16 for the correct assembly number for the size of pipe to be cut.

The Logan Standard External Cutter is made up on the bottom of the cutting string. The cutting string is lowered into the well until the guide on the Logan Standard External Cutter contacts and passes over the top of the fish. Run the cutter to the desired depth. Apply enough pull load on the work string to pull the spring dog assembly (or other catcher assembly if used) up against a coupling or upset of a tool joint. This will apply load to the thrust bearings, preload ring, and main spring that will shear the pins on the feed ring. This allows the main spring to apply sufficient load on the knives so the cut can be made. The length of pipe passed over should not exceed the weight shown in the table on page 9.

**Operating Precautions**

Careful measurements taken during running in will ensure cuts are made at the correct depths. Use the knives as a reference point when taking all measurements.

1. Select the proper place to make the cut. The cut should be made one joint above the lowest position where the rotary washover shoe was run. One joint of free pipe below the cutter will be left that will align itself in the cutter.

2. Circulation is advisable when reaching the top of the fish to condition the mud and to flush all caked mud or debris from the tool.

3. Make up the kelly in the string and establish a normal rate of circulation. Rotate the cutting string to determine the amount of torque required to run the cutter when the knives are not in contact with the
fish. Wash the hole sufficiently and allow the cutter to rotate freely. Stop the circulation and rotation. Raise the cutting string until the spring dogs contact the next highest coupling or tool joint tool.

When using a cutter with a Slip Assembly, the slips will stay in contact with the pipe at all times. Raising the cutter will shear the shear pins between the feed ring and the body will be sheared and the knives will be forced against the fish when the cutter is raised.

4. Exercise care when going over the top of the fish. When going over a fish, the Logan Standard External Cutter should be rotated to the right whenever possible. After the fish has entered the cutter, the cutter must not be raised more than absolutely necessary. The cutting string should be lifted only high enough to free the table slips on the rig. If one table slip segment is free and the others are tight, turn the table to free the tight ones. If the cutting string is pulled higher than needed to release the table slips, the upward movement will shear the shear pins and force the knives into the fish. If this should happen, the cutter will not pass over the next lower tool joint or coupling without breaking the knives. It will be necessary to cut the fish at this point.

5. Exercise care when running circulation pumps so pulsations are not transmitted to the cutting string. The pulsations will cause the knives to move up and down and result in an uneven cutting action.

6. Apply only a small amount of torque when starting rotation. The cutter should be lowered slightly until the string can be turned with a minimum of torque. After the cutter has rotated freely for a few minutes, stop the rotation. Raise the cutting string about 1/4" and rotate again. Raising and rotating should be repeated until increased torque is evident. This will indicate to the operator that the knives are cutting the pipe. The operator should take every precaution to guard against excessive torque until the cut is complete.

7. Springs dogs sometimes may rotate off the coupling or tool joint shoulder before the cut has been completed. This occurs when the coupling or tool joint, under which the spring dogs are engaged, are quite thin. If the spring dogs rotate off the shoulder, the pipe must be backed down until the spring dogs are engaged under the coupling or tool joint, and cutting operations resumed.

CAUTION: If there is an indication that the spring dogs have rotated off the coupling or tool joint shoulder, immediately stop rotation to prevent damage to the knives.

Carefully raise the pipe. The knives may catch under the collar or tool joint and break. Do not exceed the maximum load ratings to prevent damage to the knives.

Cutting Procedure

When the desired depth is reached, the cutting string is raised until the Spring Dog Assembly (Ratchet Pawl Assembly or Slip assembly) engages the tool joint. Strain on the string compresses the main spring and shears the feed ring shear pins. A sudden movement on the weight indicator will register the shearing of the pins.

After the pins have been sheared, the cut may be made at any point on the pipe or tubing. The main spring will provide the force to feed the knives into the pipe at a predetermined rate. Rotate the cutting string to the right at a uniform rate of speed. There will be a noticeable movement of the weight indicator when the pipe is severed.

Unless the preload sleeve has been removed, it is not necessary to maintain an upward strain against the collar or upset. However, maintaining an upward strain will help provide an indication when the cut is complete.

Withdraw the cut-off section from the well. Repeat the cutting procedure until all of the stuck pipe is removed.

For maximum efficiency and control when making cuts, a Logan Power Swivel is recommended.

Proving the Cut

There will be noticeable movement on the weight indicator when the Logan Standard External Cutter severs a pipe.

To prove a cut, raise the drill string to avoid pinching the knives between the cut fish and the portion of fish remaining in the hole. Raise the drill string 1" to 2" or until there is two to three points additional load (a load sufficient to lift the cut portion of the fish) shows on the indicator. Rotate the string after it is raised. A freely rotating string is almost conclusive proof that the cut has been successful.

Carefully raise the string. If no additional obstacles are encountered, the entire string may be hoisted and the fish removed from the hole.

As the operator gains experience, changes in the action of the cutter that may indicate cut has been completed will become more noticeable and familiar. When cutting a short fish, rotation speed may increase and the cutter will run freely immediately after the cut is completed.

Just before the cut is completed on a long fish, the portion of the fish above the cutter may slightly pinch the knives against the lower portion of the fish and make forward rotation impossible. The cutter may continue to rotate smoothly but additional rotational torque will be
required. While rotating, the weight indicator may suddenly rise. The weight increase will indicate the cut has been completed and the cutter is carrying the weight of the severed piece.

None of these indications should be taken as positive proof of a completed cut. In any case, the string should not be withdrawn from the hole until the proof test described at left has been made.

**Withdrawing from the Hole**
The operator may slowly raise the string when he is convinced the cut has been completed. Slowly raise the string for one or two joints to be sure the cut has actually been made and to prevent striking a collar with excessive force.

If the cut has not been made, spring dogs, ratchet pawls, or knife pins must be sheared to bring the cutter to the surface. It will need to be completely redressed.

When the washpipe reaches the surface, it should be evident where the top of the fish will be in relation to the top of the washpipe. To allow the fish to extend above the top of the washpipe, the operator may lay down the required number of joints of washpipe. This will permit him to hoist the fish from the washpipe with the aid of two elevators while it is held in the table with the slips.

It is recommended that a safety clamp be placed around the fish and a drill pipe elevator used under the clamp to raise the top section of the fish when there is no coupling on the top of the fish.

After the fish has been laid down, the washpipe can be pulled from the hole and the cutter unscrewed from the bottom joint. The operator should supervise the breaking loose of the cutter.

Place the tongs in the same manner as when making up. Loosen the threaded connection between the top sub and the body to hand-tight for ease of servicing.

**MAINTENANCE**
Good maintenance will ensure the best performance and maximum life of the Logan Standard External Cutter. The tool should be thoroughly washed and cleaned to remove all drilling mud and other debris. Worn or damaged parts, especially the knives, should be examined for wear or damage and replaced during disassembly/assembly. It is recommended that the tool be completely disassembled, cleaned, lubricated (or painted), and reassembled after each use and before storing.

### TUBING/CASING SIZE TO CUT

<table>
<thead>
<tr>
<th>TUBING/CASING SIZE TO CUT</th>
<th>1.050 to 1.315 Tbg</th>
<th>1.315 to 2-3/8 Tbg</th>
<th>1.660 to 2-3/8 Tbg</th>
<th>1.900 to 2-7/8 Tbg</th>
<th>2-1/16 to 3-1/2 Tbg</th>
<th>2-3/8 to 4 Tbg</th>
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</thead>
<tbody>
<tr>
<td>MAXIMUM SIZE WILL PASS OVER</td>
<td>1-5/8</td>
<td>3-1/8</td>
<td>3-1/4</td>
<td>3-7/8</td>
<td>4-3/8</td>
<td>4-5/8</td>
</tr>
<tr>
<td>INSIDE DIAMETER (CUTTER)</td>
<td>2-5/16</td>
<td>3-7/16</td>
<td>4-1/2</td>
<td>4-11/16</td>
<td>5-5/8</td>
<td>5-7/8</td>
</tr>
<tr>
<td>OUTSIDE DIAMETER (CUTTER)</td>
<td>2-7/16</td>
<td>4-1/8</td>
<td>4-3/4</td>
<td>4-15/16</td>
<td>5-7/8</td>
<td>6-1/8</td>
</tr>
<tr>
<td>MINIMUM SIZE HOLE TO RUN IN</td>
<td>COMPLETE ASSEMBLY w/SPRING DOG</td>
<td>410-231</td>
<td>410-388</td>
<td>410-450</td>
<td>410-468</td>
<td>410-563</td>
</tr>
<tr>
<td>LOAD REQUIRED TO SHEAR EACH SHEAR PIN (LBS)</td>
<td>32848</td>
<td>47127</td>
<td>47167</td>
<td>47210</td>
<td>47309</td>
<td>47264</td>
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<tr>
<td>LOAD REQUIRED TO SHEAR DOUBLE SHEAR STRENGTH (LBS)</td>
<td>16,500</td>
<td>16,500</td>
<td>16,500</td>
<td>33,150</td>
<td>33,150</td>
<td>33,150</td>
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<tr>
<td>LOAD REQUIRED TO SHEAR EACH SLIP BOWL SHEAR PIN (LBS)</td>
<td>805</td>
<td>805</td>
<td>805</td>
<td>805</td>
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<tr>
<td>QUADRUPLE SHEAR STRENGTH (LBS)</td>
<td>33,150</td>
<td>33,150</td>
<td>33,150</td>
<td>33,150</td>
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<td>33,150</td>
</tr>
</tbody>
</table>

### TUBING/CASING SIZE TO CUT

<table>
<thead>
<tr>
<th>TUBING/CASING SIZE TO CUT</th>
<th>3-1/2, 4, 4-1/2 &amp; 5 DP</th>
<th>4 to 5-3/4 Csg</th>
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</thead>
<tbody>
<tr>
<td>MAXIMUM SIZE WILL PASS OVER</td>
<td>6-1/4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>INSIDE DIAMETER (CUTTER)</td>
<td>6-3/8</td>
<td>6-5/8</td>
</tr>
<tr>
<td>OUTSIDE DIAMETER (CUTTER)</td>
<td>7-5/8</td>
<td>8-1/8</td>
</tr>
<tr>
<td>MINIMUM SIZE HOLE TO RUN IN</td>
<td>COMPLETE ASSEMBLY w/SPRING DOG</td>
<td>410-763</td>
</tr>
<tr>
<td>LOAD REQUIRED TO SHEAR EACH SHEAR PIN (LBS)</td>
<td>805</td>
<td>805</td>
</tr>
<tr>
<td>DOUBLE SHEAR STRENGTH (LBS)</td>
<td>1,610</td>
<td>1,610</td>
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<tr>
<td>LOAD REQUIRED TO SHEAR EACH SLIP BOWL SHEAR PIN (LBS)</td>
<td>8,285</td>
<td>8,285</td>
</tr>
<tr>
<td>QUADRUPLE SHEAR STRENGTH (LBS)</td>
<td>33,150</td>
<td>33,150</td>
</tr>
</tbody>
</table>

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DISASSEMBLY

After the Logan Standard External Cutter is removed from the well, it should be thoroughly washed down with clean water to remove all excess drilling mud and other debris. At the rig, it is advisable to break the top sub from the body with the rig tongs. Loosen the connection to a point where it may be uncoupled by hand. Move the entire assembly to a clean and convenient location for disassembly. Disassembly and repairs should be conducted in a clean, well-equipped shop.

NOTE: These instructions are for a Logan Standard External Cutter with a Spring Dog Assembly. See instructions on pages 8 – 9 for Ratchet Pawl and Slip Assemblies.

1. Place the cutter in a suitable vise. Clamp near the center.
2. Remove the loosened top sub from the body.

CAUTION: The shouldered knife pins must be removed from the side of the hole that has the set screw holes. They can not be removed from the other side. The knives will fall free when the knife pins are removed.

3. Lift out the spring dog assembly.
4. Remove the thrust bearing and thrust washer.
5. Remove the preload sleeve.
6. Remove the spring seat and main spring.
7. Slide out and remove the feed ring.
8. Drive the sheared halves of the two (2) shear pins from the body with a suitable punch.
9. Using a socket head wrench, remove the set screws that lock the knife pins in place.
10. Push out the knife pins with a suitable punch.

11. Loosen and remove the guide from the lower end of the body.
12. With a suitable punch, remove the sheared pins from the feed ring.

CAUTION: Carefully remove the sheared pins from the body and feed ring. Do not distort or damage the shear pin holes.

13. Thoroughly clean and examine each part for any sign of damage or advanced wear. The body interior should be free of mars or scratches, and bits of shear pin and other loose debris.
14. Examine the feed ring. It should be free of mars and scratches. Smooth any distortion on the edges with a hand file.
15. Examine the knives. They must be in perfect condition for re-use. Replace them if they are chipped or worn. Minor wear or damage may sometimes be repaired with skillful regrinding. However, it is important that the contour and overall length of each knife be preserved.
16. Check the Spring Dog Assembly to ensure that all dog springs are in place with tight rivets.

Disassembly of the Logan Standard External Cutter with a Spring Dog Assembly is now complete.

Ratchet Pawl Assembly

The following disassembly instructions are for a Logan Standard External Cutter with a Ratchet Pawl Assembly:

1. Place the cutter in a suitable vise. Clamp near the center.
2. Remove the loosened top sub from the body.

CAUTION: The main spring exerts considerable tension load. Exercise care during its removal to avoid damage to the top sub or injury to the operator.

3. Lift out the spring dog assembly.
4. Remove the thrust bearing and thrust washer.
5. Remove the preload sleeve.
6. Remove the spring seat and main spring.
7. Slide out and remove the feed ring.
8. Drive the sheared halves of the two (2) shear pins from the body with a suitable punch.
9. Using a socket head wrench, remove the set screws that lock the knife pins in place.
10. Push out the knife pins with a suitable punch.

CAUTION: The shouldered knife pins must be removed from the side of the hole that has the set screw holes. They can not be removed from the other side. The knives will fall free when the knife pins are removed.

11. Loosen and remove the guide from the lower end of the body.
12. With a suitable punch, remove the sheared pins from the feed ring.

CAUTION: Carefully remove the sheared pins from the body and feed ring. Do not distort or damage the shear pin holes.

13. Thoroughly clean and examine each part for any sign of damage or advanced wear. The body interior should be free of mars or scratches, and bits of shear pin and other loose debris.
14. Examine the feed ring. It should be free of mars and scratches. Smooth any distortion on the edges with a hand file.

15. Examine the knives. They must be in perfect condition for re-use. Replace them if they are chipped or worn. Minor wear or damage may sometimes be repaired with skillful regrinding. However, it is important that the contour and overall length of each knife be preserved.

16. Check the Ratchet Pawl Assembly to ensure that the pawls, pawl pins, and pawl springs are in usable condition. Replace any collapsed springs or those that have a weak recoil. Be sure the pawls freely swing on the pawl pins.

17. Thoroughly clean and inspect all parts. Replace any blades that are chipped or severely worn. Tong and wrench marks should be filed smooth.

Disassembly of the Logan Standard External Cutter with a Ratchet Pawl Assembly is now complete.

Slip Assembly
The following disassembly instructions are for a Logan Standard External Cutter with a Slip Assembly:

1. Place the cutter in a suitable vise. Clamp near the center.
2. Remove the loosened top sub from the body.
3. Lift out the spring dog assembly.
4. Remove the thrust bearing and thrust washer.
5. Remove the preload sleeve.
6. Remove the spring seat and main spring.
7. Slide out and remove the feed ring.
8. Drive the sheared halves of the two (2) shear pins from the body with a suitable punch.
9. Using a socket head wrench, remove the set screws that lock the knife pins in place.
10. Push out the knife pins with a suitable punch.

CAUTION: The shouldered knife pins must be removed from the side of the hole that has the set screw holes. They can not be removed from the other side. The knives will fall free when the knife pins are removed.

11. Loosen and remove the guide from the lower end of the body.
12. With a suitable punch, remove the sheared pins from the feed ring.

CAUTION: Carefully remove the sheared pins from the body and feed ring. Do not distort or damage the shear pin holes.

13. Thoroughly clean and examine each part for any sign of damage or advanced wear. The body interior should be free of mars or scratches, and bits of shear pin and other loose debris.

CAUTION: The main spring exerts considerable tension load. Exercise care during its removal to avoid damage to the top sub or injury to the operator.

14. Examine the feed ring. It should be free of mars and scratches. Smooth any distortion on the edges with a hand file.

15. Examine the knives. They must be in perfect condition for re-use. Replace them if they are chipped or worn. Minor wear or damage may sometimes be repaired with skillful regrinding. However, it is important that the contour and overall length of each knife be preserved.

Disassembly of the Logan Standard External Cutter with a Slip Assembly is now complete.

ASSEMBLY
The Logan Standard External Cutter is easily assembled using standard shop tools. No special tools are required. Make sure all parts have been thoroughly cleaned, inspected, and lubricated prior to assembly. Replace any collapsed springs or those that have a weak recoil. Replace any blades that are chipped or severely worn. Use high quality thread compound on the top sub and guide connections.

The following assembly instructions are for a Logan Standard External Cutter with a Spring Dog Assembly:

2. Set the knives in the body with the cutting edges facing the inside. Slip a knife pin through the hole in the body and through the pin hole in the knife. Insert a set screw and tighten. Wedge the knives in place with a piece of soft rope or string to help maintain their position while the remaining knives are assembled.

3. After all of the knives have been assembled, insert the feed ring, with the bevelled face toward the knives, through the top of the body. Position the feed ring so the two (2) shear pin holes in the feed ring
align with the two (2) shear pin holes in the body.

4. Insert the two (2) shear pins into the holes in the body and feed ring.

**NOTE:** If the ends of the shear pins are slightly upset, tap them with a small hammer until they snugly fit the shear pin holes.

5. Insert the main spring in the body. Slide it down until it seats against the feed ring.

6. Slide the preload sleeve into the body until it seats against the main spring.

7. Insert the thrust washer, followed by the thrust bearing, into the body.

8. Insert the Spring Dog Assembly into the body.

**CAUTION:** Be sure that the dog springs in the Spring Dog Assembly face the upper end of the body to deflect and pass collars going into the hole.

9. Thread the top sub into the body. Tighten the connection.

**NOTE:** The main spring is partially compressed when it enters the top sub. Considerable resistance will be felt as the top sub is made up.

10. Thread the guide onto the lower end of the body. Tighten the connection.

The Logan Standard External Cutter with a Spring Dog Assembly is now ready for use.

**Ratchet Pawl Assembly**

The following assembly instructions are for a Logan Standard External Cutter with a Ratchet Pawl Assembly:


2. Set the knives in the body with the cutting edges facing the inside. Slip a knife pin through the hole in the body and through the pin hole in the knife. Insert a set screw and tighten. Wedge the knives in place with a piece of soft rope or string to help maintain their position while the remaining knives are assembled.

3. After all of the knives have been assembled, insert the feed ring, with the bevelled face toward the knives, through the top of the body. Position the feed ring so the two (2) shear pin holes in the feed ring align with the two (2) shear pin holes in the body.

4. Insert the two (2) shear pins into the holes in the body and feed ring.

**NOTE:** If the ends of the shear pins are slightly upset, tap them with a small hammer until they snugly fit the shear pin holes.

5. Insert the main spring in the body. Slide it down until it seats against the feed ring.

6. Insert the preload sleeve into the body until it seats against the main spring.

7. Insert the thrust washer, followed by the thrust bearing, into the body.

8. Insert the Ratchet Pawl Assembly into the body.

9. Thread the top sub into the body. Tighten the connection.

10. Thread the guide onto the lower end of the body. Tighten the connection.

The Logan Standard External Cutter with a Ratchet Pawl Assembly is now ready for use.

**Slip Assembly**

The following assembly instructions are for a Logan Standard External Cutter with a Slip Assembly:


2. Set the knives in the body with the cutting edges facing the inside. Slip a knife pin through the hole in the body and through the pin hole in the knife. Insert a set screw and tighten. Wedge the knives in place with a piece of soft rope or string to help maintain their position while the remaining knives are assembled.

3. After all of the knives have been assembled, insert the feed ring, with the bevelled face toward the knives, through the top of the body. Position the feed ring so the two (2) shear pin holes in the feed ring align with the two (2) shear pin holes in the body.

4. Insert the two (2) shear pins into the holes in the body and feed ring.

**NOTE:** If the ends of the shear pins are slightly upset, tap them with a small hammer until they snugly fit the shear pin holes.

5. Insert the main spring in the body. Slide it down until it seats against the feed ring.

6. Insert the preload sleeve into the body until it seats against the main spring.

7. Insert the thrust washer, followed by the thrust bearing, into the body.

8. Insert the Slip Assembly into the body.

9. Thread the top sub into the body. Tighten the connection.

10. Thread the guide onto the lower end of the body. Tighten the connection.

The Logan Standard External Cutter with a Slip Assembly is now ready for use.
## LOGAN STANDARD EXTERNAL CUTTERS

### MAXIMUM LENGTH AND LOAD OF TUBING OR DRILL PIPE TO BE PICKED UP

<table>
<thead>
<tr>
<th>EXTERNAL CUTTER KNIVES</th>
<th>RATCHET PAWLS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size (ins)</strong></td>
<td><strong>ID</strong></td>
</tr>
<tr>
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<td>1-5/8</td>
</tr>
<tr>
<td>1.315 Tbg</td>
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<tr>
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<td>3-1/8</td>
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<tr>
<td>1.660 Tbg</td>
<td>3-1/8</td>
</tr>
<tr>
<td>1.900 Tbg</td>
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</tr>
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<td>3-1/8</td>
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<tr>
<td>3-1/2 Tbg</td>
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<td>4 Tbg</td>
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<tr>
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</tr>
<tr>
<td>5-3/4 Csg</td>
<td>6-5/8</td>
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</tbody>
</table>

* These are maximum static loads. Reduce values by 50% if shock loaded.

---

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## LOGAN STANDARD EXTERNAL CUTTERS

<table>
<thead>
<tr>
<th>TUBING/CASING SIZE TO CUT</th>
<th>LOGAN Part No.</th>
<th>BOWEN Part No.</th>
<th>Qty Req'd</th>
</tr>
</thead>
</table>

### MAX SIZE WILL PASS OVER
- 1.552 Tbg 3-1/16
- 3-1/8
- 3-3/4
- 4-1/4
- 4-1/2
- 4-3/4

### INSIDE DIAMETER (CUTTER)
- 1.050 Tbg
- 1.315 Tbg
- 1.660 Tbg
- 1.900 Tbg
- 2-1/16 Tbg
- 2-3/8 Tbg
- 2-15/16 Tbg

### OUTSIDE DIAMETER (CUTTER)
- 1.315 Tbg
- 2-3/8 Tbg
- 2-3/8 Tbg
- 2-7/8 Tbg
- 3-1/2 Tbg
- 3-1/2 Tbg
- 4 Tbg

### MINIMUM SIZE HOLE TO RUN IN
- 2-7/16
- 4-1/8
- 4-3/4
- 4-15/16
- 5-7/8
- 6-1/8

### COMPLETE ASSEMBLY
- LOGAN Part No.: 410-231
  - BOWEN Part No.: 32848
  - Qty Req'd: 2
- LOGAN Part No.: 410-388
  - BOWEN Part No.: 47127
  - Qty Req'd: 2
- LOGAN Part No.: 410-450
  - BOWEN Part No.: 47167
  - Qty Req'd: 2
- LOGAN Part No.: 410-468
  - BOWEN Part No.: 47210
  - Qty Req'd: 2
- LOGAN Part No.: 410-563
  - BOWEN Part No.: 47309
  - Qty Req'd: 2
- LOGAN Part No.: 410-588
  - BOWEN Part No.: 47264
  - Qty Req'd: 2
- LOGAN Part No.: 410-606
  - BOWEN Part No.: 47360
  - Qty Req'd: 2

### TOP SUB
- LOGAN Part No.: P1000
  - BOWEN Part No.: 13626
  - Qty Req'd: 2
- LOGAN Part No.: P1001
  - BOWEN Part No.: 10001
  - Qty Req'd: 2
- LOGAN Part No.: P1002
  - BOWEN Part No.: 32891
  - Qty Req'd: 2

### BODY
- LOGAN Part No.: P2000
  - BOWEN Part No.: 13627
  - Qty Req'd: 2
- LOGAN Part No.: P2001
  - BOWEN Part No.: 13633
  - Qty Req'd: 2

### THRUST WASHER
- LOGAN Part No.: P3000
  - BOWEN Part No.: 32852
  - Qty Req'd: 2
- LOGAN Part No.: P3001
  - BOWEN Part No.: 47127
  - Qty Req'd: 2

### THRUST BEARING
- LOGAN Part No.: P4000
  - BOWEN Part No.: 47167
  - Qty Req'd: 2
- LOGAN Part No.: P4001
  - BOWEN Part No.: 47171
  - Qty Req'd: 2

### PRELOAD SLEEVE
- LOGAN Part No.: P5000
  - BOWEN Part No.: 47127
  - Qty Req'd: 2
- LOGAN Part No.: P5001
  - BOWEN Part No.: 47172
  - Qty Req'd: 2

### SPRING SEAT
- LOGAN Part No.: P6000
  - BOWEN Part No.: 32852
  - Qty Req'd: 2
- LOGAN Part No.: P6001
  - BOWEN Part No.: 47127
  - Qty Req'd: 2

### MAIN SPRING
- LOGAN Part No.: P7000
  - BOWEN Part No.: 13634
  - Qty Req'd: 2
- LOGAN Part No.: P7001
  - BOWEN Part No.: 13635
  - Qty Req'd: 2

### FEED RING
- LOGAN Part No.: P8000
  - BOWEN Part No.: 13635
  - Qty Req'd: 2
- LOGAN Part No.: P8001
  - BOWEN Part No.: 13635
  - Qty Req'd: 2

### SHEAR PIN
- LOGAN Part No.: P9000
  - BOWEN Part No.: 13635
  - Qty Req'd: 2
- LOGAN Part No.: P9000
  - BOWEN Part No.: 13635
  - Qty Req'd: 2

### KNIFE
- LOGAN Part No.: P10000
  - BOWEN Part No.: 13637
  - Qty Req'd: 2
- LOGAN Part No.: P10001
  - BOWEN Part No.: 32910
  - Qty Req'd: 2

### KNIFE PIN
- LOGAN Part No.: P11000
  - BOWEN Part No.: 37015
  - Qty Req'd: 2
- LOGAN Part No.: P11001
  - BOWEN Part No.: 32910
  - Qty Req'd: 2

### KNIFE PIN SET SCREW
- LOGAN Part No.: P12000
  - BOWEN Part No.: 32911
  - Qty Req'd: 2

### GUIDE
- LOGAN Part No.: P13000
  - BOWEN Part No.: 13628
  - Qty Req'd: 2

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**Special Notes:**
1. Assembly includes one Spring Dog assembly, which differs from Ratchet Pawl or Slip assemblies; see chart above.
2. Connections other than API available upon request.
3. Single Pawl Spacer is required when using Ratchet Pawl Assembly.

**When ordering, please specify:**
1. Name and number of assembly or part
2. Size and type of top connection
3. Any desired options by name and number
4. Any desired spares by name and number

**Recommended Spare Parts:**
1. 2 sets Knife Pins
2. 1 Feed Ring
3. 24 Shear Pins
4. 6 sets of Knives
5. 2 Spring Dog, Ratchet Pawl, or Slip Assemblies
6. 1 set Knife Pin Screws

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LOGAN STANDARD EXTERNAL CUTTERS

<table>
<thead>
<tr>
<th>TUBING/CASING SIZE TO CUT</th>
<th>1.050 to 1.315 Tbg</th>
<th>1.315 to 1.660 Tbg</th>
<th>1.660 to 1.900 Tbg</th>
<th>2-1/16 to 2-3/8 Tbg</th>
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<tr>
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SPRING DOG ASSEMBLY

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(2) Connections other than API available upon request.
(3) Single Pawl Spacer is required when using Ratchet Pawl Assembly.

When ordering, please specify:
(1) Name and number of assembly or part
(2) Size and type of top connection
(3) Any desired options by name and number
(4) Any desired spares by name and number

Recommended Spare Parts:
(1) 2 sets Knife Pins
(2) 1 Feed Ring
(3) 24 Shear Pins
(4) 6 sets of Knives
(5) 2 Spring Dog, Ratchet Pawl, or Slip Assemblies
(6) 1 set Knife Pin Screws

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<tr>
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<td>INSIDE DIAMETER (CUTTER)</td>
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<td>MINIMUM SIZE HOLE TO RUN IN</td>
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**COMPLETE ASSEMBLY**

- **LOGAN STANDARD EXTERNAL CUTTERS**
- **TUBING/CASING SIZE TO CUT**
- **MAXIMUM SIZE WILL PASS OVER**
- **INSIDE DIAMETER (CUTTER)**
- **OUTSIDE DIAMETER (CUTTER)**
- **MINIMUM SIZE HOLE TO RUN IN**

**COMPLETE ASSEMBLY**

- **Logan Part No.** 410-231 410-388 410-450 410-468 410-563 410-588 410-606
- **Bowen No.** 32848 47127 47167 47210 47309 47264 47360

**OPTIONAL RATCHET PAWL ASSEMBLY**

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</table>

**OPTIONAL SLIP ASSEMBLY**

<table>
<thead>
<tr>
<th>COMPLETE ASSEMBLY</th>
<th>Logan Part No.</th>
<th>Bowen No.</th>
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<th>11000-011</th>
<th>11000-012</th>
<th>11000-013</th>
<th>11000-014</th>
<th>11000-015</th>
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<td>Bowen No.</td>
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<td>P21001</td>
<td>P21002</td>
<td>P21003</td>
<td>P21004</td>
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<td>P21006</td>
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<td>SLIP BOWL</td>
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<td>Bowen No.</td>
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<td>P22002</td>
<td>P22003</td>
<td>P22004</td>
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<td>P22006</td>
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<tr>
<td>SLIP BOWL RETAINER</td>
<td>Logan Part No.</td>
<td>Bowen No.</td>
<td>P23000</td>
<td>P23001</td>
<td>P23002</td>
<td>P23003</td>
<td>P23004</td>
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<tr>
<td>SLIP SPRING</td>
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<td>Bowen No.</td>
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<tr>
<td>SLIP BOWL SHEAR PIN</td>
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<td>P25002</td>
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<td>SLIP ADAPTER</td>
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</table>

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### LOGAN STANDARD EXTERNAL CUTTERS

<table>
<thead>
<tr>
<th>TUBING/CASING SIZE TO CUT</th>
<th>3-1/2, 4, 4-1/2 &amp; 5 DP</th>
<th>4 to 5-3/4 Csg</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXIMUM SIZE WILL PASS OVER</td>
<td>6-1/4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>INSIDE DIAMETER (CUTTER)</td>
<td>6-3/8</td>
<td>6-5/8</td>
</tr>
<tr>
<td>OUTSIDE DIAMETER (CUTTER)</td>
<td>7-5/8</td>
<td>8-1/8</td>
</tr>
<tr>
<td>MINIMUM SIZE HOLE TO RUN IN</td>
<td>8-1/4</td>
<td>8-5/8</td>
</tr>
</tbody>
</table>

**COMPLETE ASSEMBLY**

- **Logan Part No.** 410-763
- **Bowen No.** 47422
- **Logan Part No.** 410-813
- **Bowen No.** 47541

**SPRING DOG ASSEMBLY**

<table>
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<tr>
<th>COMPLETE ASSEMBLY</th>
<th>Logan Part No.</th>
<th>11000-007</th>
<th>11000-008</th>
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<tbody>
<tr>
<td>SPRING DOG BODY</td>
<td>Logan Part No.</td>
<td>P14007</td>
<td>P14008</td>
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<td>Bowen No.</td>
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<td>47546</td>
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<td>P15007</td>
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<td>No. Req’d</td>
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</tr>
</tbody>
</table>

**LOGAN STANDARD EXTERNAL CUTTERS**

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Special Notes:
1. Assembly includes one Spring Dog Assembly which differs from Ratchet Pawl or Slip Assemblies. See table on next page.
2. Connections other than API available upon request.
3. Single Pawl Spacer is required when using Ratchet Pawl Assembly. It is not included in the Complete Assembly.

When ordering, please specify:
1. Name and number of assembly or part
2. Size and type of top connection
3. Any desired options by name and number
4. Any desired spares by name and number

Recommended Spare Parts:
1. 2 sets Knife Pins
2. 1 Feed Ring
3. 24 Shear Pins
4. 6 sets of Knives
5. 2 Spring Dog, Ratchet Pawl, or Slip Assemblies
6. 1 set Knife Pin Screws

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## LOGAN STANDARD EXTERNAL CUTTERS

<table>
<thead>
<tr>
<th>TUBING/CASING SIZE TO CUT</th>
<th>3-1/2, 4, 4-1/2 &amp; 5 DP</th>
<th>6-1/4, 6-1/2 &amp; 5-3/4 Csg</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXIMUM SIZE WILL PASS OVER</td>
<td>6-1/4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>INSIDE DIAMETER (CUTTER)</td>
<td>6-3/8</td>
<td>6-5/8</td>
</tr>
<tr>
<td>OUTSIDE DIAMETER (CUTTER)</td>
<td>7-5/8</td>
<td>8-1/8</td>
</tr>
<tr>
<td>MINIMUM SIZE HOLE TO RUN IN</td>
<td>8-1/4</td>
<td>8-5/8</td>
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### OPTIONAL RATCHET PAWL ASSEMBLY

<table>
<thead>
<tr>
<th>COMPLETE ASSEMBLY</th>
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<td>RATCHET PAWL</td>
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<td>SINGLE PAWL SPACER</td>
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<th>Logan Part No.</th>
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<td>SLIP</td>
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<td>SLIP ADAPTER</td>
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