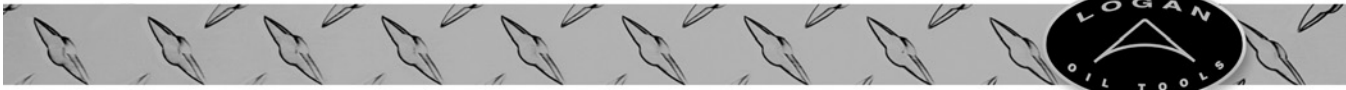




Hydraulic External Cutters



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Hydraulic External Cutters

OVERVIEW

Logan Hydraulic External Cutters are quick, smooth operating tools that allow for fast cutting and recovery of tubing or drill pipe. A hydraulic piston, fed entirely by pump pressure, forces the knives of the cutter into the pipe to give the operator sensitive cutting control.

USES

The Logan Hydraulic External Cutter is used to cut and remove long sections of tubing, casing, and drill pipe regardless of tool joint style. When used in conjunction with a washover string, it may be used to cut and remove stuck pipe.

CONSTRUCTION

The Logan Hydraulic External Cutter consists of a top sub, segmented piston assembly, knives, knife pins, guide screw, body, and guide.

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 segmented piston assembly's feed ring has four interlocking conical piston segments. A heavy-duty rubber ring stretched around the top of the segments firmly holds them in place. A fluid jet hole in each piston segment restricts fluid to provide sufficient pump down force against the piston to feed the knives while allowing enough fluid to cool and lubricate the knives during the cut. Each piston assembly is designed for one particular pipe size.

The knives are made from high quality tempered steel for strength and durability. The cutting edge 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 inside the body. The shank end of each knife has a hole that accepts the knife pin. Set screws hold the knife pins in the body.

Threaded connections at the top and bottom of the body accept the top sub and guide. Knife slots in the lower end of the body incorporate crossholes to hold the knife pins. Two holes in the body, placed opposite each other, hold the shear pins.

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

OPERATION

Washover Procedure

Before the Logan Hydraulic External Cutter can be run downhole, stuck pipe must be freed from the formation. A washover operation will 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 Hydraulic External Cutter is installed in its place.

Operating Procedure

Begin by assembling the Logan Hydraulic External Cutter with the proper size piston assembly for the size of the pipe that will be cut. Be sure the entire Cutter is properly assembled. Threaded connections should be tightly made up. Avoid placing tongs directly over the knife slots.

Run the cutter to the desired cutting depth. Engage the mud pumps with all lines open. Be sure no pressure is pumped downhole. Set the pump on idle. Slowly close the bypass valve until sufficient pressure (approximately 145 psi) forces down the drill string and shears the shear pins. A sudden movement on the weight indicator will register the shearing of the pins. The amount of pressure required depends on the size cutter and piston assembly being used. Open the standpipe valve to relieve the pressure going downhole. Begin rotating the drill string at 15 to 25 rpm. Gradually close the bypass valve to pump fluid to feed the piston assembly into the knives to start the cut. Refer to the table on page 6 for approximate pressure (psi) and gallons per minute (gpm) required to make a cut. For maximum efficiency and control when making cuts, a Logan Power Swivel is recommended.

CAUTION: Avoid pump surges when starting or during the cut. Contraction and expansion of the string during the cut will cause the cutter to move up and down the string. This motion will damage the knives.

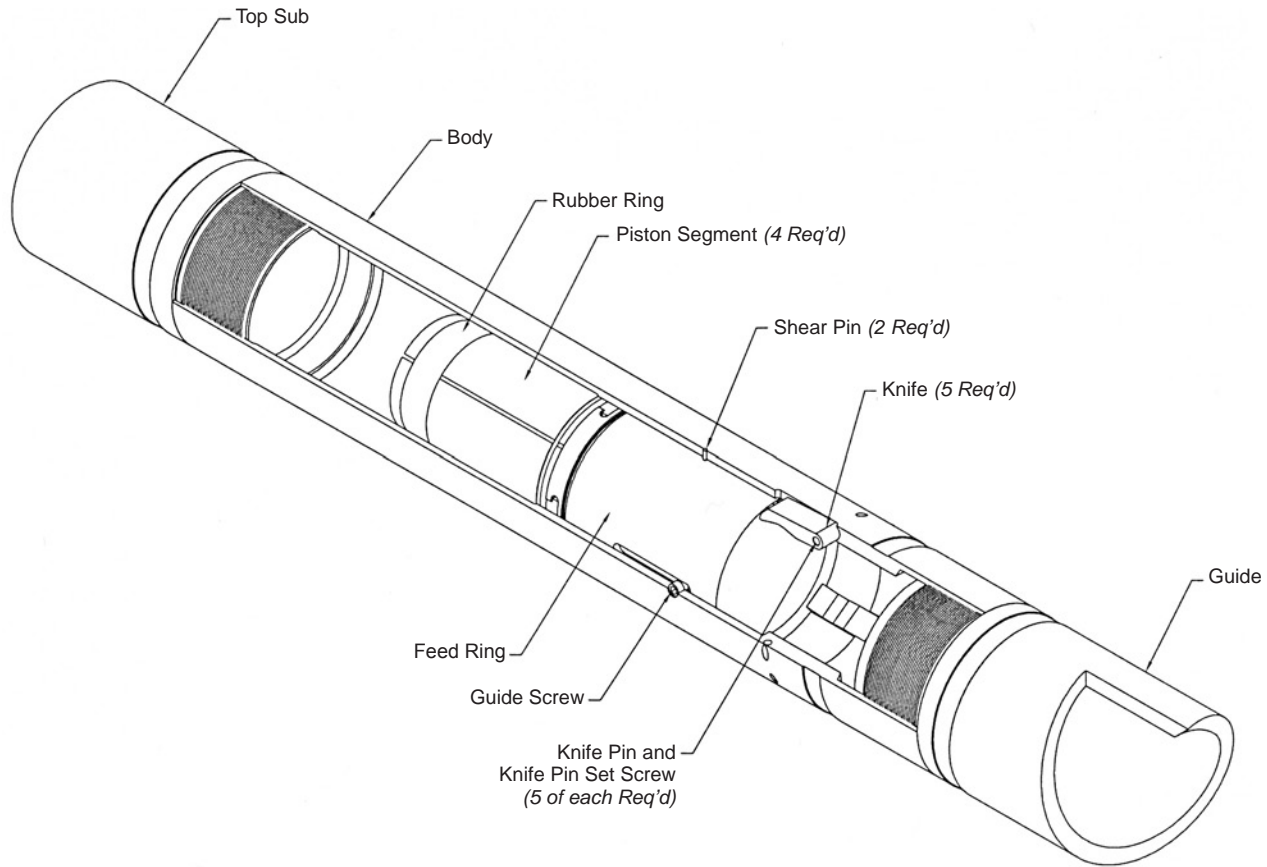
For an alternate method for shearing the shear pins: raise the string until the Piston Assembly shoulders underneath a collar. An approximately 377 lb. pull on the cutting string will shear one pin; a 754 lb. pull will shear two pins.

After the pins have been sheared, the cut may be made at any point on the pipe or tubing. 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.

Completion of the cut is signaled by initial rough chattering followed by smooth rotation. Withdraw the cut-off section from the well. Repeat the cutting procedure until all of the pipe is removed.



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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. Attach the Kelly or Logan Power Swivel to 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. Sufficiently wash the hole and allow the cut-

ter to rotate freely. Stop the circulation and rotation. Raise the cutting string to the next highest coupling or tool joint.

3. 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.
4. 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.
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. Piston segments cannot be pulled back after they have passed a coupling.
7. The pins will be sheared if the Cutter is lifted against a collar. The feed ring will then force the knives against the pipe. In the event this should occur, avoid passing another collar and damaging the knives by making a cut.



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8. Exercise care and rotate the Logan Hydraulic External to the right whenever possible when passing over the top of a fish. Do not raise the cutter more than absolutely necessary after the fish has entered the cutter. The cutting string should be lifted only high enough to free the rotary slips on the rig. If one rotary slip segment is free and the others are tight, turn the rotary table to free the tight ones. If the cutting string is pulled higher than needed to release the rotary 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.

Proving the Cut

There will be noticeable movement on the weight indicator when the Logan Hydraulic 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. Pull 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 weight 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 two or three 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, the knife pins must be sheared to bring the cutter to the surface. The tool 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 Hydraulic External Cutter. The tool should be thoroughly washed and cleaned to remove all drilling mud and other debris. All 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.

DISASSEMBLY

After the Logan Hydraulic 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.



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1. Place the cutter in a suitable vise. Clamp near the center.

CAUTION: Do not clamp too tightly on the thin wall section.

2. Remove the loosened top sub from the body.
3. Lift out the piston assembly.
4. Slide out and remove the feed ring.
5. Using a suitable punch, drive out the sheared halves of the shear pins from the body.
6. Remove the set screws that hold the knife pins with a socket head wrench.
7. Push out the knife pins with a rod or 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.

8. Loosen and remove the guide from the lower end of the body.
9. 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.

10. 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.

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

12. 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 Hydraulic External Cutter is now complete.

ASSEMBLY

The Logan Hydraulic 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 blades that are chipped or severely worn. Use high quality thread compound on the top sub and guide connections.

1. Secure the Logan Hydraulic External Cutter in a suitable vise. Clamp near the center of the tool.
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 five (5) knives have been assembled, attach the piston assembly to the feed ring.

4. Insert the feed ring and piston assembly into the body so the two (2) shear pin holes in the feed ring align with the two (2) shear pin holes in the body.
5. Insert the two (2) shear pins into the holes in the body and feed ring. If the ends of the shear pins are slightly upset, tap them with a small hammer until they snugly fit the shear pin holes.

CAUTION: Do not use brass welding rod for shear pins. Use only quality tested and proven brass pins from Logan Oil Tools.

6. Thread the top sub into the body. Tighten the connection.
7. Thread the guide onto the lower end of the body. Tighten the connection.

The Logan Hydraulic External Cutter is now ready for use.



Hydraulic External Cutters

MAX LENGTH AND LOAD OF TUBING AND DRILL PIPE					REQUIRED TO MAKE CUT	
Size	Logan No.	Bowen No.	Length (ft)	Load (lbs)	Pressure (psi)	GPM
1.315 Tbg	411-375	70086	1,409	2,530	20 – 30	120
1.600 Tbg	411-375	70086	1,293	3,100	20 – 30	125
1.900 Tbg	411-375	70086	1,400	4,060	25 – 35	220
2-1/16 Tbg	411-375	70086	1,979	7,910	30 – 40	200
1.315 Tbg	411-406	34415	1,033	1,860	20 – 30	120
1.660 Tbg	411-406	34415	916	2,200	20 – 30	125
1.900 Tbg	411-406	34415	862	2,500	25 – 35	220
2-1/16 Tbg	411-406	34415	785	2,670	30 – 40	200
2-3/8 Tbg	411-406	34415	710	3,340	35 – 45	200
1.900 Tbg	411-444	70209	534	1,550	10 – 20	125
2-1/16 Tbg	411-444	70209	536	2,140	15 – 25	120
2-3/8 Tbg	411-444	70209	360	2,140	15 – 25	135
2-3/8 DP	411-444	70209	186	1,240	20 – 30	180
2-7/8 Tbg	411-444	70209	410	3,570	15 – 25	145
2-7/8 DP	411-444	70209	142	1,480	20 – 30	200
1.900 Tbg	411-456	79215	*	*	*	*
2-1/16 Tbg	411-456	79215	*	*	*	*
2-3/8 Tbg	411-456	79215	*	*	*	*
2-7/8 Tbg	411-456	79215	*	*	*	*
1.900 Tbg	411-468	41727	388	1,128	10 – 20	125
2-1/16 Tbg	411-468	41727	345	1,140	10 – 20	100
2-3/8 Tbg	411-468	41727	290	1,360	15 – 25	120
2-7/8 Tbg	411-468	41727	275	1,780	15 – 25	130
2-1/16 Tbg	411-563	34551	1,794	6,100	15 – 25	210
2-3/8 Tbg	411-563	34551	1,470	6,900	15 – 25	225
2-7/8 Tbg	411-563	34551	1,320	8,586	20 – 30	220
3-1/2 Tbg	411-563	34551	1,650	16,800	30 – 40	180
3-1/2 DP	411-563	34551	814	12,620	45 – 55	230
4	411-563	34551	*	*	*	*
2-3/8 Tbg	411-606	51148	500	2,350	15 – 25	135
2-7/8 Tbg	411-606	51148	415	2,700	15 – 25	125
3-1/2 Tbg	411-606	51148	387	3,600	20 – 30	160
4 Tbg	411-606	51148	436	4,800	30 – 40	200
3-1/2 DP	411-800	35957	330	5,160	10 – 15	140
4 DP	411-800	35957	393	6,170	10 – 15	160
4-1/2 DP	411-800	35957	350	7,030	10 – 15	160
5 DP	411-800	35957	460	9,040	10 – 20	180

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

** Available upon request.*



Hydraulic External Cutters

COMPLETE ASSEMBLY				PISTON ASSEMBLY			
Logan Part No.	Bowen No.	Cutter OD	Cutter ID	Logan Part No.	Bowen No.	Pipe Size	Max Pass Over OD
411-375	70086	3-3/4	2-7/8	10000-010	70091	2-1/16	2-3/4
411-375	70086	3-3/4	2-7/8	10000-019	70094	1.900	2-7/16
411-375	70086	3-3/4	2-7/8	10000-028	70097	1.600	2-3/8
411-375	70086	3-3/4	2-7/8	10000-037	70100	1.315	2-5/16
411-406	34415	4-1/16	3-3/16	10000-013	34425	2-3/8	3-1/16
411-406	34415	4-1/16	3-3/16	10000-022	34427	2-1/16	2-7/8
411-406	34415	4-1/16	3-3/16	10000-031	34429	1.900	2-13/16
411-406	34415	4-1/16	3-3/16	10000-040	34432	1.660	2-11/16
411-406	34415	4-1/16	3-3/16	10000-045	34434	1.315	2-9/16
411-444	70209	4-7/16	3-5/8	10000-011	70232	2-7/8	3-7/16
411-444	70209	4-7/16	3-5/8	10000-020	70214	2-3/8	3-3/16
411-444	70209	4-7/16	3-5/8	10000-029	70217	2-1/16	3-1/8
411-444	70209	4-7/16	3-5/8	10000-038	70219	1.900	3-1/16
411-456	79215	4-9/16	3-13/16	10000-047	79283	2-7/8	*
411-456	79215	4-9/16	3-13/16	10000-048	79281	2-3/8	*
411-456	79215	4-9/16	3-13/16	10000-049	79279	2-1/16	*
411-456	79215	4-9/16	3-13/16	10000-050	79277	1.900	*
411-468	41727	4-11/16	3-7/8	10000-014	41733	2-7/8	3-5/8
411-468	41727	4-11/16	3-7/8	10000-023	41736	2-3/8	3-9/16
411-468	41727	4-11/16	3-7/8	10000-032	41738	2-1/16	3-7/8
411-468	41727	4-11/16	3-7/8	10000-041	41740	1.900	3-3/8
411-563	34551	5-5/8	4-5/16	10000-015	34559	3-1/2	4-1/8
411-563	34551	5-5/8	4-5/16	10000-024	34562	2-7/8	4-1/16
411-563	34551	5-5/8	4-5/16	10000-033	34565	2-3/8	4
411-563	34551	5-5/8	4-5/16	10000-042	34568	2-1/16	4
411-563	34551	5-5/8	4-5/16	10000-046	53881	4	4-3/16
411-606	51148	6-1/16	4-7/8	10000-016	51151	4	4-13/16
411-606	51148	6-1/16	4-7/8	10000-025	51230	3-1/2	4-3/4
411-606	51148	6-1/16	4-7/8	10000-034	51345	2-7/8	4-5/8
411-606	51148	6-1/16	4-7/8	10000-043	51344	2-3/8	4-1/2
411-800	35957	8	6-1/2	10000-017	35963	5	6-3/8
411-800	35957	8	6-1/2	10000-026	35966	4-1/2	6-1/4
411-800	35957	8	6-1/2	10000-035	35968	4	5-7/8
411-800	35957	8	6-1/2	10000-044	35971	3-1/2	5-7/8

* Available upon request.



Hydraulic External Cutters

PIPE SIZE TO CUT		1.315 to 2-1/16	1.315 to 2-3/8	1.900 to 2-7/8	1.900 to 2-7/8	1.900 to 2-7/8	2-1/16 to 4 FJ	2-3/8 to 4
MAXIMUM SIZE WILL PASS OVER		2-3/4	3-1/16	3-7/16	3-9/16	3-5/8	4-1/8	4-13/16
INSIDE DIAMETER (CUTTER)		2-7/8	3-3/16	3-5/8	3-13/16	3-7/8	4-5/16	4-7/8
OUTSIDE DIAMETER (CUTTER)		3-3/4	4-1/16	4-7/16	4-9/16	4-11/16	5-5/8	6-1/16
MINIMUM SIZE HOLE TO RUN IN		4	4-5/16	4-11/16	4-13/16	4-15/16	5-7/8	6-1/4
COMPLETE ASSEMBLY	Logan Part No.	411-375	411-406	411-444	411-456	411-468	411-563	411-606
	Bowen No.	70086	34415	70209	79215	41727	34551	51148
TOP SUB	Logan Part No.	N1001	N10027	N1002	N10025	N1003	N1004	N1005
	Bowen No.	70087	34416	70210	79271	33081	33574	13177
BODY	Logan Part No.	N2001	N2004	N2002	N20025	N2005	N2006	N2007
	Bowen No.	70088	34417	70211	79272	41728	34552	56992
FEED RING	Logan Part No.	N3001	N3004	N3002	N30025	N3005	N3006	N3007
	Bowen No.	70089	49819	70212	79273	49824	49829	51150
SHEAR PIN	Logan Part No.	P9000	P9000	P9000	N40015	P9000	N4006	N4007
	Bowen No.	33087	33087	33087	34420	33087	34555	7227
	No. Req'd	2	2	2	2	2	2	2
KNIFE	Logan Part No.	N5001	N5004	P10003	N50025	P10003	P10004	N5007
	Bowen No.	80147	34421	33088	79275	33088	34553	12382
	No. Req'd	5	5	5	5	5	5	5
KNIFE PIN	Logan Part No.	N6001	N6004	P11003	N60025	P11003	P11004	N6007
	Bowen No.	80148	34422	33089	A14348	33089	34554	37022
	No. Req'd	5	5	5	5	5	5	5
KNIFE PIN SET SCREW	Logan Part No.	N7001	N7002	N7002	...	N7002	P12004	...
	Bowen No.	23654	23666	23666	...	23666	23703	...
	No. Req'd	5	5	5	...	5	5	...
FEED RING O-RING	Logan Part No.	568-235	568-237	568-241	568-242	568-243	568-247	568-251
	Bowen No.	568235	568237	568241	568242	568243	568247	568251
GUIDE	Logan Part No.	N8001	N8004	N8002	N80025	P13003	N8006	N8007
	Bowen No.	70090	34424	70213	79274	33093	187	13412
GUIDE SCREW	Logan Part No.	N9001	N9001	N9001	N9001	N9001	N9006	N9007
	Bowen No.	34418	34418	34418	34418	34418	34556	51149
	No. Req'd	2	2	2	2	2	2	2
PISTON ASSEMBLY	Logan Part No.	10000-010	10000-013	10000-011	10000-047	10000-014	10000-015	10000-016
<i>(Consists of):</i>	Bowen No.	70091	34425	70232	79283	41733	34559	51151
	Pipe Size	2-1/16	2-3/8	2-7/8	2-7/8	2-7/8	3-1/2	4
PISTON SEGMENT SET	Logan Part No.	N10001	N10004	N10002	N100025	N10005	N10006	N10007
	Bowen No.	70092	49814	70233	79284	49825	49830	51152
RUBBER RING	Logan Part No.	N11002	N11001	N11001	N11001	N11001	N11006	N11007
	Bowen No.	70093	34564	34564	34564	34564	34561	51153
PISTON O-RING	Logan Part No.	568-234	568-236	568-235	568-236	568-237	568-246	568-250
	Bowen No.	568234	568236	568235	568236	568237	568246	568250

Logan Oil Tools reserves the right to change or discontinue designs without notice.

When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Size and type of top connection
- (3) Name and number of any desired options

Recommended Spare Parts:

- | | |
|-------------------------|--------------------------|
| (1) 2 Piston Assemblies | (6) 5 Pin Screws |
| (2) 1 Feed Ring | (7) 6 Rubber Rings |
| (3) 24 Shear Pins | (8) 6 Piston O-rings |
| (4) 30 Knives | (9) 6 Feed Rings O-rings |
| (5) 10 Knife Pins | |



Hydraulic External Cutters

PIPE SIZE TO CUT		1.315 to 2-1/16	1.315 to 2-3/8	1.900 to 2-7/8	1.900 to 2-7/8	1.900 to 2-7/8	2-1/16 to 4 FJ	2-3/8 to 4
MAXIMUM SIZE WILL PASS OVER		2-3/4	3-1/16	3-7/16	3-9/16	3-5/8	4-1/8	4-13/16
INSIDE DIAMETER (CUTTER)		2-7/8	3-3/16	3-5/8	3-13/16	3-7/8	4-5/16	4-7/8
OUTSIDE DIAMETER (CUTTER)		3-3/4	4-1/16	4-7/16	4-9/16	4-11/16	5-5/8	6-1/16
MINIMUM SIZE HOLE TO RUN IN		4	4-5/16	4-11/16	4-13/16	4-15/16	5-7/8	6-1/4
COMPLETE ASSEMBLY	Logan Part No.	411-375	411-406	411-444	411-456	411-468	411-563	411-606
	Bowen No.	70086	34415	70209	79215	41727	34551	51148

OPTIONAL

PISTON ASSEMBLY	Logan Part No.	10000-019	10000-022	10000-020	10000-048	10000-023	10000-024	10000-025
<i>Consists of:</i>	Bowen No.	70094	34427	70214	79281	41736	34562	51230
	Pipe Size	1.900	2-1/16	2-3/8	2-3/8	2-3/8	2-7/8	3-1/2
PISTON SEGMENT SET	Logan Part No.	N12001	N12004	N12002	N120025	N12005	N12006	N12007
	Bowen No.	70095	49817	70215	79282	49828	49831	51231
RUBBER RING	Logan Part No.	N13001	N13002	N13002	N11001	N13002	N11001	N11006
	Bowen No.	70096	34567	34567	34564	34567	34564	34561
PISTON O-RING	Logan Part No.	568-234	568-236	568-235	568-236	568-237	568-246	568-250
	Bowen No.	568234	568236	568235	568236	568237	568246	568250

PISTON ASSEMBLY	Logan Part No.	10000-028	10000-031	10000-029	10000-049	10000-032	10000-033	10000-034
<i>Consists of:</i>	Bowen No.	70097	34429	70217	79279	41738	34565	51345
	Pipe Size	1.660	1.900	2-1/16	2-1/16	2-1/16	2-3/8	2-7/8
PISTON SEGMENT SET	Logan Part No.	N14001	N14004	N14002	N140025	N14005	N14006	N14007
	Bowen No.	70098	49818	70218	79280	49826	49832	51346
RUBBER RING	Logan Part No.	N13001	N13002	N13002	N13002	N13002	N11001	N11001
	Bowen No.	70096	34567	34567	34567	34567	34564	34564
PISTON O-RING	Logan Part No.	568-234	568-236	568-235	568-236	568-237	568-246	568-250
	Bowen No.	568234	568236	568235	568236	568237	568246	568250

PISTON ASSEMBLY	Logan Part No.	10000-037	10000-040	10000-038	10000-050	10000-041	10000-042	10000-043
<i>Consists of:</i>	Bowen No.	70100	34432	70219	79277	41740	34568	51344*
	Pipe Size	1.315	1.600	1.900	1.900	1.900	2-1/16	2-3/8
PISTON SEGMENT SET	Logan Part No.	N16001	N16004	N16002	N160025	N16005	N16006	N16007
	Bowen No.	70101	49815	70220	79278	49827	49833	51343
RUBBER RING	Logan Part No.	N17001	N17004	N13002	N13002	N13002	N13002	N11001
	Bowen No.	70102	34431	34567	34567	34567	34567	34564
PISTON O-RING	Logan Part No.	568-234	568-236	568-235	568-236	568-237	568-246	568-250
	Bowen No.	568234	568236	568235	568236	568237	568246	568250

PISTON ASSEMBLY	Logan Part No.	...	10000-045	...	...	...	10000-046	...
<i>Consists of:</i>	Bowen No.	...	34434	...	...	...	53881	...
	Pipe Size	...	1.315	...	...	...	4	...
PISTON SEGMENT SET	Logan Part No.	...	N18004	...	...	...	N18006	...
	Bowen No.	...	49816	...	...	...	53880	...
RUBBER RING	Logan Part No.	...	N19004	...	...	...	N19006	...
	Bowen No.	...	34436	...	...	...	51153	...
PISTON O-RING	Logan Part No.	...	568-236	...	...	...	568-246	...
	Bowen No.	...	568236	...	...	...	568246	...

Logan Oil Tools reserves the right to change or discontinue designs without notice.



Hydraulic External Cutters

PIPE SIZE TO CUT	3-1/2 to 5
MAXIMUM SIZE WILL PASS OVER	6-3/8
INSIDE DIAMETER (CUTTER)	6-1/2
OUTSIDE DIAMETER (CUTTER)	8
MINIMUM SIZE HOLE TO RUN IN	8-1/2
COMPLETE ASSEMBLY	Logan Part No. 411-800 Bowen No. 35957
TOP SUB	Logan Part No. N1006 Bowen No. 35958
BODY	Logan Part No. N2008 Bowen No. 35959
FEED RING	Logan Part No. N3008 Bowen No. 49834
SHEAR PIN	Logan Part No. N4006 Bowen No. 34555 No. Req'd 2
KNIFE	Logan Part No. N5008 Bowen No. 35960 No. Req'd 5
KNIFE PIN	Logan Part No. P11004 Bowen No. 34554 No. Req'd 5
KNIFE PIN SET SCREW	Logan Part No. P12004 Bowen No. 23703 No. Req'd 5
FEED RING O-RING	Logan Part No. 568-438 Bowen No. 568438
GUIDE	Logan Part No. N8008 Bowen No. 35932
GUIDE SCREW	Logan Part No. N9006 Bowen No. 34556 No. Req'd 2

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Size and type of top connection
- (3) Name and number of any desired options

Recommended Spare Parts:

- (1) 2 Piston Assemblies
- (2) 1 Feed Ring
- (3) 24 Shear Pins
- (4) 30 Knives
- (5) 10 Knife Pins
- (6) 5 Pin Screws
- (7) 6 Rubber Rings
- (8) 6 Piston O-rings
- (9) 6 Feed Rings O-rings

PISTON ASSEMBLY	Logan Part No. 10000-017
<i>Consists of:</i>	Bowen No. 35963 Pipe Size 5
PISTON SEGMENT SET	Logan Part No. N10008 Bowen No. 49821
RUBBER RING	Logan Part No. N11008 Bowen No. 35965
PISTON O-RING	Logan Part No. 568-259 Bowen No. 568259

OPTIONAL

PISTON ASSEMBLY	Logan Part No. 10000-026
<i>Consists of:</i>	Bowen No. 35966 Pipe Size 4-1/2
PISTON SEGMENT SET	Logan Part No. N12008 Bowen No. 49823
RUBBER RING	Logan Part No. N11008 Bowen No. 35965
PISTON O-RING	Logan Part No. 568-259 Bowen No. 568259

PISTON ASSEMBLY	Logan Part No. 10000-035
<i>Consists of:</i>	Bowen No. 35968 Pipe Size 4
PISTON SEGMENT SET	Logan Part No. N14008 Bowen No. 49822
RUBBER RING	Logan Part No. N15008 Bowen No. 35970
PISTON O-RING	Logan Part No. 568-259 Bowen No. 568259

PISTON ASSEMBLY	Logan Part No. 10000-044
<i>Consists of:</i>	Bowen No. 35971 Pipe Size 3-1/2
PISTON SEGMENT SET	Logan Part No. N16008 Bowen No. 49820
RUBBER RING	Logan Part No. N11001 Bowen No. 34564
PISTON O-RING	Logan Part No. 568-259 Bowen No. 568259

HEADQUARTERS

11006 Lucerne Street
Houston, TX 77016
Tel: (281) 219-6613
Fax: (281) 219-6638

sales@loganoiltools.com

UNITED STATES

California

3155 Pegasus
Bakersfield, CA 93308
Tel: (661) 387-1449
Fax: (661) 387-1624

Louisiana

103 Bluffwood Drive
Broussard, LA 70518
Tel: (337) 839-2331
Fax: (337) 839-2334

118 Common Court
Houma, LA 70360
Tel: (985) 868-7333
Fax: (985) 868-7007

Mississippi

6 Donald Drive
Laurel, MS 39440
Tel: (601) 649-0636
Fax: (601) 649-6909

North Dakota

4925 Highway 85 South
Williston, ND 58801
Tel: (701) 572-0565
Fax: (701) 572-0644

Oklahoma

424 South Eagle Lane
Oklahoma City, OK 73128
Tel: (405) 782-0625
Fax: (405) 782-0760

Texas

101 Commerce Street
Alice, TX 78332
Tel: (361) 396-0139
Fax: (361) 396-0112

1305 Energy Drive
Kilgore, TX 75662
Tel: (903) 984-6700
Fax: (903) 984-6755

1617 South Viceroy
Odessa, TX 79763
Tel: (432) 580-7414
Fax: (432) 580-7656

Utah

1369 South 1100 East
Vernal, UT 84078
Tel: (435) 781-2856
Fax: (435) 781-2858

INTERNATIONAL STOCKING DISTRIBUTORS

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