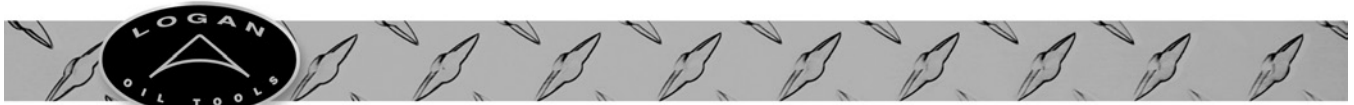




Fishing Bumper Sub



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Fishing Bumper Sub

OVERVIEW

The Logan Fishing Bumper Sub is a relatively inexpensive, dependable mechanical accessory tool that is suitable for all fishing operations — especially harsh, downhole applications and deep workover operations. It can also meet the demands of tools that require sharp, sustained bumping action to actuate or release them.

The primary purpose of the Fishing Bumper Sub is to enable the operator to release the fishing tool in the event it becomes impossible to pull the fish. It can provide the necessary vertical impact in either direction — upward or downward — and deliver the required torque to release the tool from the fish whether it is rotating or not. The tool's design allows full torque and unrestricted fluid circulation at all times. The Logan Fishing Bumper Sub can bump up or down to engage or disengage overshots or spears, or be used as a feed-off tool in milling or cutting operations.

There are several secondary uses for the Logan Fishing Bumper Sub: to bump down, to bump a solid downward blow, and to jar up in the hole. Other typical operations include releasing stuck drill pipe, drill collars, tubing, test tools, and safety joints. The fishing bumper sub can be used in conjunction with an overshot or spear.

USE

The Logan Fishing Bumper Sub is especially suited for deep fishing operations and light to medium drilling applications. Equally effective in either direction, the tool is also ideal for coring operations.

The Logan Fishing Bumper Sub delivers the sharp downward blow and torque required to disengage a fish when it is impossible to pull the fish. The tool can repeatedly bump in either direction or alternately bump up and down to dislodge drill pipe, reamers, drill collars, bits, or other tools that have become stuck.

The immediate bumping action prevents cuttings and cavings — especially sticky caving or heavy mud formations — from settling and wedging the drill string making it well suited for light to medium drilling operations. The tool is equally effective in either direction. If necessary, the operator can manipulate the drill string and deliver forceful blows to release the string. The free stroke feature enables the operator to accurately control the weight on bit or other tools. When properly used, this feature will aid in maintaining a straighter hole, thereby resulting in improved penetration and less bit wear.

The Fishing Bumper Sub is also an excellent safety device when working in very deep, crooked holes, and drilling out cement in heavy mud. The operator can manipulate the drill string as needed and deliver forceful blows to release the string if necessary.

The Logan Fishing Bumper Sub is also an ideal tool for coring operations. The bumping action effectively breaks cores sharply and cleanly for easy removal.

CONSTRUCTION

All components of the Logan Fishing Bumper Sub are constructed from high-strength, heat-treated alloy steel to withstand severe stress caused by tension, jarring, and torque.

The Fishing Bumper Sub is composed of five major parts: a mandrel, mandrel body, middle body, knocker, and a top sub. The critical seal point between the middle body and knocker is fitted with a knocker seal/ring assembly consisting of an o-ring seal, seal protector ring, and a seal non-extrusion ring to increase the life of the rings and prevent o-ring extrusion.

The Logan Fishing Bumper Sub comes with a standard box top connection and a pin bottom connection. Special connections, including left-hand threads, are available upon request.

Mandrel

The hexagon-shaped mandrel fits into the matching shape of the mandrel body. The mandrel freely moves up and down to provide a continuous source of downhole torque transmission through the mandrel body whether bumping or not. The standard 20-inch stroke length is suitable for most purposes, although longer stroke lengths of 30, 36, 42, 48, and 60 inches are available. The ends of the mandrel are made up with a knocker at the upper end and a mandrel body on the lower end.

Mandrel Body

The mandrel body slides on over the mandrel. The hexagon-shaped inside diameter of the mandrel body matches the shape of the mandrel. Transmitted torque is conveyed to the running string through the mandrel, middle body, and attached tool.



Fishing Bumper Sub

Middle Body

The inside diameter of the middle body is closely fitted to the outside diameter of the knocker and top sub at the upper end. The inside diameter of the middle body is closely fitted to the mandrel body at the lower end. The interior surface is highly polished to reduce frictional wear.

Knocker

The knocker screws onto the top of the mandrel. A lock screw on the lower end of the knocker tightens the knocker against the mandrel to prevent relative movement. The knocker material is specially selected for use in impact loading. It is closely fitted to restrict high frequency lateral vibration (chatter) that can shorten the life of the tool.

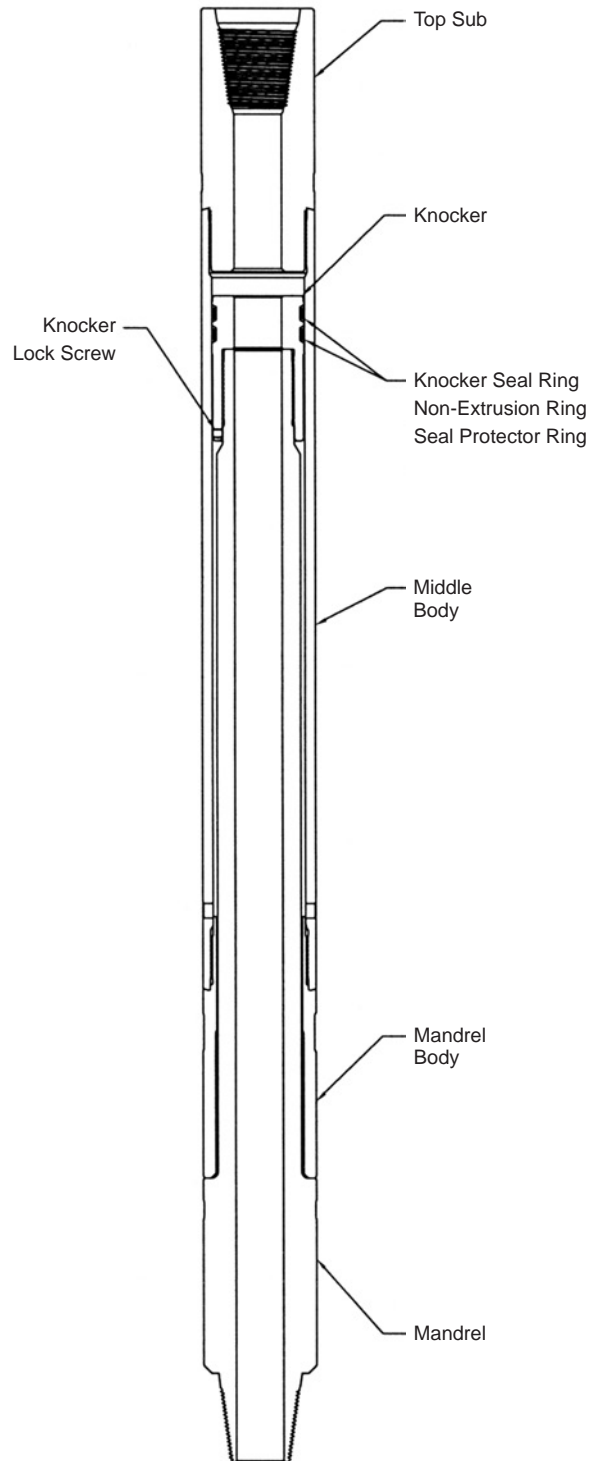
Knocker Seal/Ring Assembly

Two seal/ring assemblies are located on the upper end of the knocker. Each seal/ring assembly consists of an o-ring seal, a seal protector ring, and a seal non-extrusion ring. The non-extrusion rings prevent the o-rings from being pushed out or rolled out of position. As hydraulic pressure is applied (in either direction), these seal/ring assemblies reduce normal diametric clearance at the seal points to nearly zero.

Knocker seal rings, seal protector rings, and non-extrusion rings are provided on the standard knocker. Optional chevron packing sets are available and are recommended when circulation through the fishing bumper sub will be extensive.

Top Sub

The top sub is fitted to the upper end of the middle body and has a box connection.





Fishing Bumper Sub

OPERATION

The Logan Fishing Bumper Sub is typically run directly above the spear, overshot, screw-in sub, or safety joint. The tool is designed to allow a vertical stroke — upward or downward — whether it is rotating or not, and is always available to the operator. The Fishing Bumper Sub will transmit full torque at all times during rotation and bumping operations.

When lift load is applied, the Fishing Bumper Sub will slide open until the knocker hits the mandrel body. Slackening weight off the string will cause the mandrel to slide back down the mandrel body until the bottom shoulder of the mandrel hits the top shoulder of the mandrel body.

Fishing Operations

A Fishing Bumper Sub should be included in the fishing string whenever a releasing type fishing tool will be used. If it becomes impossible to pull the fish, the operator will have means available to release the fishing tool. The Fishing Bumper Sub will deliver a sharp blow and transmit the torque required to disengage and release a fishing tool from the fish.

A properly made-up Fishing Bumper Sub is generally placed immediately above the fishing tool, safety joint, or unlatching joint.

Drilling Operations

The Fishing Bumper Sub is generally installed in the drill string immediately above the drill collars.

Applying a Downward Blow

At the surface, mark the pipe to indicate the open and closed positions of the Fishing Bumper Sub. Raise the fishing string to open the full stroke length (20 – 60 inches depending on the size of the tool) and allow for extra string stretch.

To deliver a sharp downward blow, sharply drop the string and abruptly stop with the brake approximately four (4) to six (6) inches above the closed position of the Fishing Bumper Sub. To deliver a solid downward blow, drop the full weight of the fishing string without braking. This will cause the lower end of the fishing string to drop downward and the Fishing Bumper Sub will close. If the fishing string has sufficient stretch and elasticity, the Fishing Bumper Sub will then deliver a series of downward blows to the tool below.

Applying an Upward Blow

At the surface, mark the pipe to indicate the open and closed positions of the Fishing Bumper Sub. Raise the fishing string to open the bumper sub and allow for additional string stretch. Drop the string by the amount of the stretch only and stop it abruptly with the brake. As the pipe rebounds at the bottom of the hole, the Fishing Bumper Sub will quickly reopen. This will cause the knocker to strike the lower end of the mandrel body with a solid upward blow.

Feeding-Off

When employing a Logan Fishing Bumper Sub as a feed-off tool, install the Fishing Bumper Sub in a cutting string several joints above a Logan Internal Cutter. In this operation, a Fishing Bumper Sub with a 20-inch stroke will pick up ten inches of the cutting string after the cutter is set. Only the predetermined weight of the pipe between the internal cutter and the Fishing Bumper Sub is applied to the cutter, thus ensuring smooth operation of the cutter.

ASSEMBLY

Check all parts to ensure that they are in good working condition before beginning assembly. Make sure the tool is the proper size for the operation.

Thoroughly clean and lubricate parts. If the tool will be stored for a long period, paint or lubricate the exterior surfaces to prevent corrosion.

NOTE: Do not paint or lubricate the seals. Paint, sunlight, solvents, and most lubricants are harmful to rubber products.

Refer to the photographs on page 5 and proceed with the knocker seal/ring assembly installation as follows. If using the optional chevron packing set, skip to step 5.

1. Starting with the lowest groove, replace the knocker seals.
 - a. Carefully examine and thoroughly clean each groove. Smooth out any nicks or burrs with emery cloth.
 - b. Matching the bevel of the non-extrusion ring to the bevel of the groove, slide the non-extrusion ring over the knocker. Carefully expand the non-extrusion ring to fit over the outside diameter of the knocker. **Do not expand the non-extrusion ring more than is absolutely necessary.**
2. Press the seal protector ring into the groove next to the non-extrusion ring with the thumbs until the ring is firmly seated in the groove.
3. Install the o-rings:
 - a. Stretch the o-ring until it is large enough to fit around the knocker.
 - b. Insert the o-ring between the seal protector ring and non-extrusion ring.



Fishing Bumper Sub

KNOCKER SEAL/RING ASSEMBLY INSTALLATION



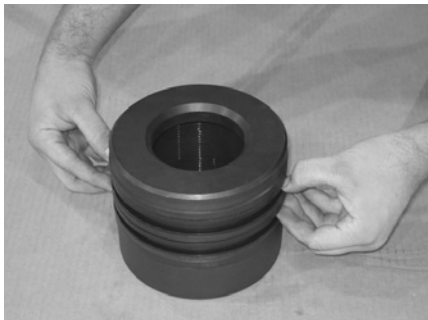
Before installation, carefully examine and clean each groove. Smooth out any nicks or burrs with emery cloth.



Matching the bevel of the non-extrusion ring to the bevel of the groove, carefully expand the non-extrusion ring to fit over the outside diameter of the knocker. Do not expand the non-extrusion ring more than absolutely necessary. Slide the non-extrusion ring over the knocker and into the groove.



With the aid of the o-ring installation tool (Logan Part No. J1074, available upon request), press the seal protector ring into the groove next to the non-extrusion ring with the thumbs until the ring is firmly seated in the groove.



Install the o-ring. Stretch the o-ring until it is large enough to fit around the knocker.



Using the o-ring installation tool, insert the o-ring in the groove between the seal protector ring and non-extrusion ring.

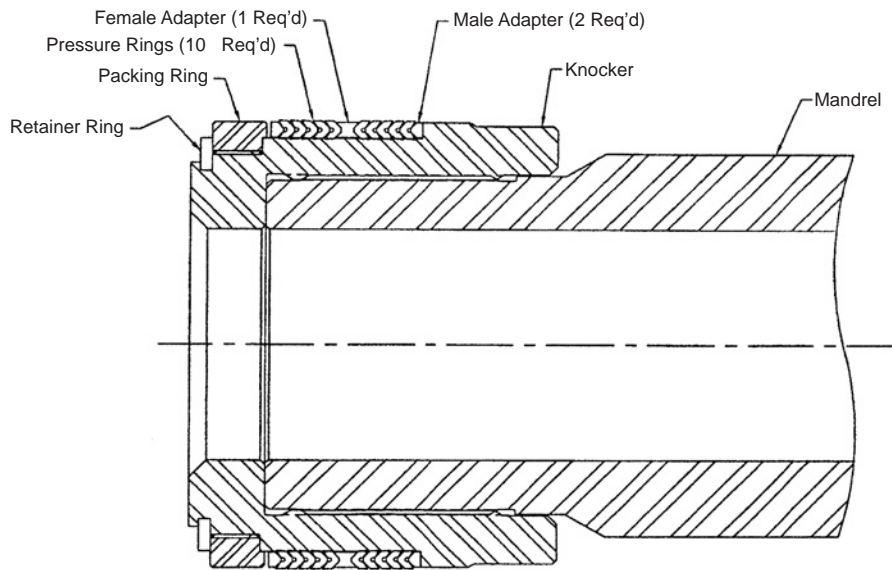
Repeat seal/ring installation procedure on the upper groove.



Completed knocker assembly with seal protector rings, non-extrusion rings, and o-rings correctly installed in the upper and lower grooves.



Fishing Bumper Sub



Chevron Packing

4. Repeat seal/ring installation procedure on the upper groove. Skip to step 6 to continue.
5. Install optional chevron packing according to the diagram above. Reinstall the packing ring and retainer ring.
6. Secure the upper end of the mandrel body horizontally into a suitable vise. Thoroughly coat the polished surfaces with a good grade of clean, lightweight oil.

CAUTION: Use only enough gripping action in the vise to secure the body. Avoid making heavy tool marks.

7. Align the hexagon shapes of the mandrel and mandrel body and slide the mandrel through the bottom of the mandrel body. Continue to gently push the mandrel through until the mandrel bumps against the mandrel body. Do not force the mandrel — the mandrel should freely move back and forth. If resistance is encountered, remove the mandrel and remove any foreign matter.
8. Lubricate and install the knocker on the upper end of the mandrel. Tighten.
9. Install the lock screw in the knocker. Make sure it locks onto the undercut provided on the mandrel.
10. Carefully slide the middle body over the knocker and mandrel to avoid damaging the knocker seals. Tighten the connection to the mandrel body.

11. Install top sub on middle body. Tighten the connection between the top sub and the upper end of the middle body.
12. Tighten all connections before running the tool in the hole. Refer to the Tightening Torques table on page 23.
13. Paint or lubricate exterior surfaces to prevent corrosion. If the tool will be stored outside, the exterior of the tool should be cleaned and painted, or coated with a heavy application of grease.

Assembly is now complete and the tool is ready for service.

If the tool will be stored for future service, install thread protectors and apply a good grade of thread dope to the tool joints.



Fishing Bumper Sub

MAINTENANCE

The wear-resistant Logan Fishing Bumper Sub requires minimal maintenance. Thoroughly wash the tool — inside and out — and remove all drilling mud and debris after each use. Lubricate cleaned tool to prevent corrosion. The knocker seal rings should be periodically examined for damage and wear. The tool should be disassembled and the rings replaced when damage is evident.

Complete Disassembly

Refer to the illustration on page 3 and proceed with disassembly as follows:

CAUTION: Use only enough gripping action in the vise to break the connections. Avoid making heavy tool marks.

1. Secure the Logan Fishing Bumper Sub a suitable vise, approximately in the middle of the mandrel body.
2. Remove the top sub and lay it aside.
3. Remove the middle body from the mandrel body and lay it aside.
4. Back-off or remove the knocker lock screw before removing the knocker to prevent damage to the mandrel.

CAUTION: Before removing the knocker, make certain the knocker lock screw is removed or backed-off. The knocker set screw could damage the mandrel.

5. Remove the knocker from the mandrel and lay it aside.

CAUTION: Do not wrench on the hardfaced bands between the wrench flats or gouge them with the sides of the wrench jaws. If they are inadvertently upset or otherwise damaged, remove the upset or burr with fine emery cloth or a hand file. Clean and lubricate.

8. Slide the mandrel out through the bottom of the mandrel body. Support the weight of the mandrel with a soft line or wire rope sling as it is removed.

9. Remove the mandrel and lay it aside.

10. Remove the mandrel body from the vise and lay it aside.

11. Skip to step 15 if the optional chevron packing set has been used.

12. Examine the knocker o-ring seals, seal protector rings, and seal non-extrusion rings for wear and/or damage. Remove seals and rings that show signs of wear and/or damage.

- a. Carefully insert the tip of either the bent-tip installation tool* (Logan Part No. J1073) or o-ring installation tool* (Logan Part No. J1074) between the o-ring and the seal protector ring. Carefully lift out the o-ring, taking care not to damage the seal protector ring or non-extrusion ring.

CAUTION: Do not run the installation tool around the groove under the rings. This will scratch and damage the grooves.

13. Examine the o-rings for damage or distortion. Check the seal protector rings and non-extrusion rings, using the forefinger to feel for burrs or other damage.

14. Remove all damaged seal protector rings and non-extrusion rings.

15. Inspect optional chevron packing set (if used) by removing the retainer ring and packing ring. Refer to the diagram on page 5. Replace chevron packing set if it is worn or damaged.

16. Thoroughly clean all disassembled parts in solvent and wipe dry with a clean, soft cloth. Lubricate parts with a thin coating of a good grade of clean lightweight oil.

17. Examine all parts for defects, especially polished surfaces, for pits or scratches. Parts that have become pitted or scratched must be replaced with new parts prior to reassembly.

18. Inspect the mandrel for upsets. Grind off upsets with a small hand file or grinder.

Disassembly is now complete.

* These installation tools are available from Logan upon request.



Fishing Bumper Sub

CONNECTION		1-13/16 WFJ	1-1/4 API REG	2-3/8 EUE	2-3/8 API REG	2-3/8 API IF	2-3/8 API IF	2-3/8 EUE
OUTSIDE DIAMETER (INCHES)		1-13/16	2-1/4	3-1/8	3-5/32	3-3/8	3-3/4	3-3/4
INSIDE DIAMETER (INCHES)		3/8	1/2	1-17/32	1	1	1-1/2	1-7/8
STROKE (INCHES)		20	20	20	20	20	20	20
COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	10120	18785	42592	10105	10190	39887	39893
TOP SUB	Logan Part No.	AF1000	AF1001	AF10015	AF1002	AF10025	AF1003	AF1004
	Bowen No.	10121	18786	42593	10106	10191	39888	39894
MANDREL BODY	Logan Part No.	AF2000	AF2001	AF20015	AF2002	AF20025	AF2003	AF2004
	Bowen No.	10123	18788	42596	10108	10193	39890	39896
MIDDLE BODY 20" STROKE	Logan Part No.	AF3000-20	AF3001-20	AF30015-20	AF3002-20	AF30025-20	AF3003-20	AF3004-20
	Bowen No.	10122	18787	42594	10107	10192	39889	39895
MANDREL 20" STROKE	Logan Part No.	AF4000-20	AF4001-20	AF40015-20	AF4002-20	AF40025-20	AF4003-20	AF4004-20
	Bowen No.	10125	18789	42597	10110	10194	39891	39897
KNOCKER	Logan Part No.	AF5000	AF5001	AF50015	AF5002	AF50025	AF5003	AF5004
	Bowen No.	10126	18790	42595	10111	10195	39892	39898
NON-EXTRUSION RING	Logan Part No.	L385-22	L385-27	L216-34	L387-6	L385-35	L216-38	L216-38
	Bowen No.	385-22	385-27	216-34	387-6	385-35	216-38	216-38
	No. Req'd	4	4	4	4	4	4	4
SEAL PROTECTOR RING	Part No.	L386-22	L386-27	L227-34	L388-6	L386-35	L227-38	L227-38
	Bowen No.	386-22	386-27	227-34	388-6	386-35	227-38	227-38
	No. Req'd	4	4	4	4	4	4	4
KNOCKER SEAL RING	Logan Part No.	568-217	568-222	568-331	568-228	568-332	568-335	568-335
	Bowen No.	568217	568222	568331	568228	568332	568335	568335
	No. Req'd	2	2	2	2	2	2	2
KNOCKER LOCK SCREW	Logan Part No.	...	...	AF6001	AF6000	AF6000	AF6000	AF6001
	Bowen No.	...	...	54775	48879	48879	48879	54775

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

Special Notes:

- (1) Standard stroke for Bumper Subs is 20". Only the Mandrel and Middle Body need to be ordered to convert a standard 20" stroke assembly to one of greater stroke length. All other parts interchange for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the Mandrel and Middle Body by part number.

When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

CONNECTION	1-13/16 WFJ	1-1/4 API REG	2-3/8 EUE	2-3/8 API REG	2-3/8 API IF	2-3/8 API IF	2-3/8 EUE	
OUTSIDE DIAMETER (INCHES)	1-13/16	2-1/4	3-1/8	3-5/32	3-3/8	3-3/4	3-3/4	
INSIDE DIAMETER (INCHES)	3/8	1/2	1-17/32	1	1	1-1/2	1-7/8	
STROKE (INCHES)	20	20	20	20	20	20	20	
COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-181 10120	604-225 18785	604-313 42592	604-315 10105	604-338 10190	604-375 39887	604-376 39893

OPTIONAL ACCESSORIES

CHEVRON PACKING KNOCKER ASSEMBLY - BREAKDOWN:

COMPLETE ASSEMBLY	Logan Part No.	...	...	...	...	...	...	...
	Bowen No.	...	...	...	...	...	...	...
KNOCKER	Logan Part No.	...	...	...	...	...	...	...
	Bowen No.	...	...	...	...	...	...	...
PACKING RING	Logan Part No.	...	...	...	...	...	...	...
	Bowen No.	...	...	...	...	...	...	...
CENTER RING	Logan Part No.	...	...	...	...	...	...	...
	Bowen No.	...	...	...	...	...	...	...
CHEVRON PACKING SET	Logan Part No.	...	...	...	...	...	...	...
	Bowen No.	...	...	...	...	...	...	...
RETAINING RING	Logan Part No.
	Bowen No.
PACKING RETAINER	Logan Part No.
	Bowen No.
	No. Req'd

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Special Notes:

(1) Standard stroke for Bumper Subs is 20". Only the Mandrel and Middle Body need to be ordered to convert a standard 20" stroke assembly to one of greater stroke length. All other parts interchange for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the Mandrel and Middle Body by part number.

When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Klocker Seals



Fishing Bumper Sub

CONNECTION	1-13/16 WFJ	1-1/4 API Reg	2-3/8 EUE	2-3/8 API Reg	2-3/8 API IF	2-3/8 API IF	2-3/8 EUE
OUTSIDE DIAMETER (INCHES)	1-13/16	2-1/4	3-1/8	3-5/32	3-3/8	3-3/4	3-3/4
INSIDE DIAMETER (INCHES)	3/8	1/2	1-17/32	1	1	1-1/2	1-7/8

30" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-181 29523	604-225 29529	604-313 46881	604-315 29535	604-338 29538	604-375 46863	604-376 46866
MANDREL	Logan Part No. Bowen No.	AF4000-30 29524	AF4001-30 29530	AF40015-30 46882	AF4002-30 29536	AF40025-30 29539	AF4003-30 46864	AF4004-30 46867
MIDDLE BODY	Logan Part No. Bowen No.	AF3000-30 29525	AF3001-30 29531	AF30015-30 46883	AF3002-30 29537	AF30025-30 29540	AF3003-30 46865	AF3004-30 46868

36" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-181 29574	604-225 29580	604-313 49608	604-315 29586	604-338 29589	604-375 46890	604-376 46893
MANDREL	Logan Part No. Bowen No.	AF4000-36 29575	AF4001-36 29581	AF40015-36 46909	AF4002-36 29587	AF40025-36 29590	AF4003-36 46891	AF4004-36 46894
MIDDLE BODY	Logan Part No. Bowen No.	AF3000-36 29576	AF3001-36 29582	AF30015-36 46910	AF3002-36 29588	AF30025-36 29591	AF3003-36 46892	AF3004-36 46895

42" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-181 29619	604-225 29625	604-313 46935	604-315 16933	604-338 29643	604-375 46917	604-376 46920
MANDREL	Logan Part No. Bowen No.	AF4000-42 29620	AF4001-42 29626	AF40015-42 46936	AF4002-42 16935	AF40025-42 26944	AF4003-42 46918	AF4004-42 46921
MIDDLE BODY	Logan Part No. Bowen No.	AF3000-42 29621	AF3001-42 29627	AF30015-42 46937	AF3002-42 16934	AF30025-42 26945	AF3003-42 46919	AF3004-42 46922

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Special Notes:

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

CONNECTION	1-13/16 WFJ	1-1/4 API Reg	2-3/8 EUE	2-3/8 API Reg	2-3/8 API IF	2-3/8 API IF	2-3/8 EUE
OUTSIDE DIAMETER (INCHES)	1-13/16	2-1/4	3-1/8	3-5/32	3-3/8	3-3/4	3-3/4
INSIDE DIAMETER (INCHES)	3/8	1/2	1-17/32	1	1	1-1/2	1-7/8

48" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-181 29682	604-225 29688	604-313 46962	604-315 16936	604-338 29694	604-375 46944	604-376 46947
MANDREL	Logan Part No. Bowen No.	AF4000-48 29683	AF4001-48 29689	AF40015-48 46963	AF4002-48 16938	AF40025-48 29695	AF4003-48 46945	AF4004-48 46948
MIDDLE BODY	Logan Part No. Bowen No.	AF3000-48 29684	AF3001-48 29690	AF30015-48 46964	AF3002-48 16937	AF30025-48 29696	AF3003-48 46946	AF3004-48 46949

60" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-181 29748	604-225 29754	604-313 46989	604-315 29760	604-338 29763	604-375 46971	604-376 46974
MANDREL	Logan Part No. Bowen No.	AF4000-60 29749	AF4001-60 29755	AF40015-60 46990	AF4002-60 29761	AF40025-60 29764	AF4003-60 46972	AF4004-60 46975
MIDDLE BODY	Logan Part No. Bowen No.	AF3000-60 29750	AF3001-60 29756	AF30015-60 46991	AF3002-60 29762	AF30025-60 29765	AF3003-60 46973	AF3004-60 46976

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Special Notes:

(1) Standard stroke for Bumper Subs is 20". Only the Mandrel and Middle Body need to be ordered to convert a standard 20" stroke assembly to one of greater stroke length. All other parts interchange for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the Mandrel and Middle Body by part number.

When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

CONNECTION		2-7/8 API Reg	2-7/8 API IF	2-7/8 EUE	3-1/2 API IF	3-1/2 API IF	4-1/2 API FH	4-1/2 API IF
OUTSIDE DIAMETER (INCHES)		3-3/4	4-1/4	4-1/2	4-3/4	4-3/4	6	6-1/4
INSIDE DIAMETER (INCHES)		1-1/4	1-15/16	2-3/8	2	1-1/2	2	2-1/4
STROKE (INCHES)		20	20	20	20	20	20	20
COMPLETE ASSEMBLY	Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
	Bowen No.	10090	41824	36794	39905	10225	10135	10257
TOP SUB	Logan Part No.	AF1005	AF1006	AF1007	AF1008	AF10085	AF1009	AF1010
	Bowen No.	10091	41825	36795	39906	10226	10136	1025
MANDREL BODY	Logan Part No.	AF2005	AF2006	AF2007	AF2008	AF20085	AF2009	AF2010
	Bowen No.	10093	10158	36797	39908	10228	10138	10267
MIDDLE BODY <i>(20-inch stroke)</i>	Logan Part No.	AF3005-20	AF3006-20	AF3007-20	AF3008-20	AF30085-20	AF3009-20	AF3010-20
	Bowen No.	10092	10157	36796	39907	10227	10137	10262
MANDREL <i>(20-inch stroke)</i>	Logan Part No.	AF4005-20	AF4006-20	AF4007-20	AF4008-20	AF40085-20	AF4009-20	AF4010-20
	Bowen No.	10095	41828	36798	39909	10229	10140	10268
KNOCKER	Logan Part No.	AF5005	AF5006	AF5007	AF5008	AF50085	AF5009	AF5010
	Bowen No.	10096	41829	36799	39910	10230	10141	10250
NON-EXTRUSION RING	Logan Part No.	L385-37	L385-41	L216-44.5	L385-44	L385-44	L385-52	L385-54
	Bowen No.	385-37	385-41	216-44.5	385-44	385-44	385-52	385-54
	No. Req'd	4	4	4	4	4	4	4
SEAL PROTECTOR RING	Logan Part No.	L386-37	L386-41	L227-44.5	L386-44	L386-44	L386-52	L386-54
	Bowen No.	386-37	386-41	227-44.5	386-44	386-44	386-52	386-54
	No. Req'd	4	4	4	4	4	4	4
KNOCKER SEAL RING	Logan Part No.	568-334	568-338	568-341	568-341	568-341	568-349	568-427
	Bowen No.	568334	568338	568341	568341	568341	568349	568427
	No. Req'd	2	2	2	2	2	2	2
KNOCKER LOCK SCREW	Logan Part No.	AF6002	AF6000	AF6000	AF6000	AF6002	AF6003	AF6003
	Bowen No.	54769	48879	48879	48879	54769	43305	43305

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

Special Notes:

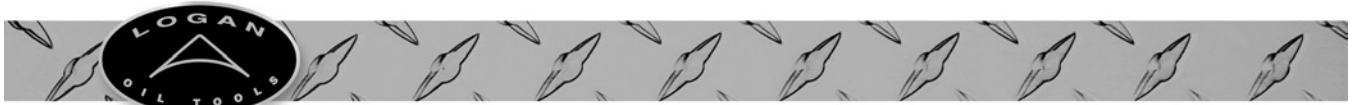
(1) Standard stroke for Bumper Subs is 20". Only the Mandrel and Middle Body need to be ordered to convert a standard 20" stroke assembly to one of greater stroke length. All other parts interchange for a given size. When a long stroke assembly is ordered by assembly number, the entire tool is ordered. To convert, order only the Mandrel and Middle Body by part number.

When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

CONNECTION		2-7/8 API Reg	2-7/8 API IF	2-7/8 EUE	3-1/2 API IF	3-1/2 API IF	4-1/2 API FH	4-1/2 API IF
OUTSIDE DIAMETER (INCHES)		3-3/4	4-1/4	4-1/2	4-3/4	4-3/4	6	6-1/4
INSIDE DIAMETER (INCHES)		1-1/4	1-15/16	2-3/8	2	1-1/2	2	2-1/4
STROKE (INCHES)		20	20	20	20	20	20	20
COMPLETE ASSEMBLY	Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
	Bowen No.	10090	41824	36794	39905	10225	10135	10257

OPTIONAL ACCESSORIES

CHEVRON PACKING KNOCKER ASSEMBLY - BREAKDOWN:

COMPLETE ASSEMBLY	Logan Part No.	25000-014	25000-015	25000-016	25000-017	25000-023	25000-018	25000-019
	Bowen No.	30910	59191	62774	59177	81172	50321	62205
KNOCKER	Logan Part No.	AF7000	AF7001	AF7002	AF7003	AF70035	AF7004	AF7005
	Bowen No.	30911	59192	62775	59178	81173	50322	62206
PACKING RING	Logan Part No.	AF8000	AF8001	AF8002	AF8003	AF80035	AF8004	AF8005
	Bowen No.	30912	59193	62776	59179	81174	50323	62207
CENTER RING	Logan Part No.	AF9000	AF9001	AF9002	AF9003	AF90035	AF9004	AF9005
	Bowen No.	30913	59194	62777	59180	81175	50324	62208
CHEVRON PACKING SET	Logan Part No.	AF10000	AF10001	AF10002	AF10003	AF100035	AF10004	AF10005
	Bowen No.	30914	59195	62778	59181	81176	50325	62209
RETAINING RING	Logan Part No.	AF11000	AF11001	AF11002	AF11003	AF110035	AF11004	AF11005
	Bowen No.	19812	59196	59182	59182	81177	50326	13177
PACKING RETAINER	Logan Part No.	AF12000	AF12001	AF12002	AF12003	...	AF12004	AF12005
	Bowen No.	62345	59197	62780	59183	...	50009	62210
	No. Req'd	2	2	2	2	...	2	2

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Special Notes:

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Klocker Seals



Fishing Bumper Sub

CONNECTION	2-7/8 API Reg	2-7/8 API IF	2-7/8 EUE	3-1/2 API IF	3-1/2 API IF	4-1/2 API FH	4-1/2 API IF
OUTSIDE DIAMETER (INCHES)	3-3/4	4-1/4	4-1/2	4-3/4	4-3/4	6	6-1/4
INSIDE DIAMETER (INCHES)	1-1/4	1-15/16	2-3/8	2	1-1/2	2	2-1/4

30" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-377 29541	604-425 46869	604-450 46875	604-475 46878	604-476 29562	604-600 16150	604-625 20005
MANDREL	Logan Part No. Bowen No.	AF4005-30 29542	AF4006-30 46870	AF4007-30 46876	AF4008-30 46879	AF40085-30 29563	AF4009-30 16151	AF4010-30 20007
MIDDLE BODY	Logan Part No. Bowen No.	AF3005-30 29543	AF3006-30 46871	AF3007-30 46877	AF3008-30 46880	AF30085-30 29564	AF3009-30 16152	AF3010-30 20006

36" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-377 25180	604-425 46896	604-450 46902	604-475 46905	604-476 29604	604-600 10147	604-625 29610
MANDREL	Logan Part No. Bowen No.	AF4005-36 25182	AF4006-36 46897	AF4007-36 46903	AF4008-36 46906	AF40085-36 29605	AF4009-36 10149	AF4010-36 29611
MIDDLE BODY	Logan Part No. Bowen No.	AF3005-36 25181	AF3006-36 46898	AF3007-36 46904	AF3008-36 46907	AF30085-36 29606	AF3009-36 10148	AF3010-36 29612

42" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-377 29646	604-425 46923	604-450 46929	604-475 46932	604-476 29661	604-600 29667	604-625 29670
MANDREL	Logan Part No. Bowen No.	AF4005-42 29647	AF4006-42 46924	AF4007-42 46930	AF4008-42 46933	AF40085-42 29662	AF4009-42 29668	AF4010-42 29671
MIDDLE BODY	Logan Part No. Bowen No.	AF3005-42 29648	AF3006-42 46925	AF3007-42 46931	AF3008-42 46934	AF30085-42 29663	AF3009-42 29669	AF3010-42 29672

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Special Notes:

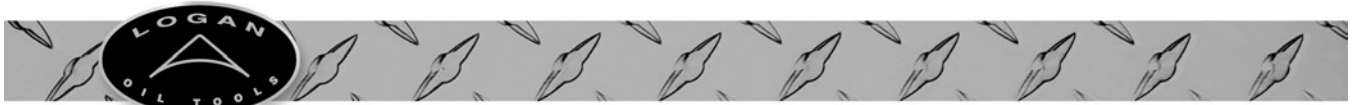
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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

48" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
	Bowen No.	29697	46956	46950	46959	29715	19880	29736
MANDREL	Logan Part No.	AF4005-48	AF4006-48	AF4007-48	AF4008-48	AF40085-48	AF4009-48	AF4010-48
	Bowen No.	29698	46957	46951	46960	29716	19881	29737
MIDDLE BODY	Logan Part No.	AF3005-48	AF3006-48	AF3007-48	AF3008-48	AF30085-48	AF3009-48	AF3010-48
	Bowen No.	29699	46958	46952	46961	29717	19882	29738

60" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
	Bowen No.	29766	46983	46977	46986	29781	29790	25385
MANDREL	Logan Part No.	AF4005-60	AF4006-60	AF4007-60	AF4008-60	AF40085-60	AF4009-60	AF4010-60
	Bowen No.	29767	46984	46978	46987	29782	29791	25387
MIDDLE BODY	Logan Part No.	AF3005-60	AF3006-60	AF3007-60	AF3008-60	AF30085-60	AF3009-60	AF3010-60
	Bowen No.	29768	46985	46979	46988	29786	29792	25386

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Special Notes:

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

CONNECTION		5-1/2 API Reg	6-5/8 API Reg	7-5/8 API Reg				
OUTSIDE DIAMETER (INCHES)		6-3/4	7-3/4	9				
INSIDE DIAMETER (INCHES)		2-3/4	3-1/2	4				
STROKE (INCHES)		20	20	20				
COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900				
	Bowen No.	10690	26595	61596				
TOP SUB	Logan Part No.	AF1011	AF1012	AF1013				
	Bowen No.	10691	26596	61597				
MANDREL BODY	Logan Part No.	AF2011	AF2012	AF2013				
	Bowen No.	10693	26598	61599				
MIDDLE BODY	Logan Part No.	AF3011-20	AF3012-20	AF3013-20				
<i>20- inch Stroke</i>	Bowen No.	10692	26597	61598				
MANDREL	Logan Part No.	AF4011-20	AF4012-20	AF4013-20				
<i>20- inch Stroke</i>	Bowen No.	10694	26599	61600				
KNOCKER	Logan Part No.	AF5011	AF5012	AF5013				
	Bowen No.	10695	26594	61601				
NON-EXTRUSION RING	Logan Part No.	L385-58	L385-65	L216-68.5				
	Bowen No.	385-58	385-65	216-68.5				
	No. Req'd	4	4	4				
SEAL PROTECTOR RING	Logan Part No.	L386-58	L386-65	L227-68.5				
	Bowen No.	386-58	386-65	227-68.5				
	No. Req'd	4	4	4				
KNOCKER SEAL RING	Logan Part No.	568-431	568-438	568-441				
	Bowen No.	568431	568438	568441				
	No. Req'd	2	2	2				
KNOCKER LOCK SCREW	Logan Part No.	AF6003	AF6003	AF6004				
	Bowen No.	43305	43305	54770				

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

CONNECTION	5-1/2 API Reg	6-5/8 API Reg	7-5/8 API Reg				
OUTSIDE DIAMETER (INCHES)	6-3/4	7-3/4	9				
INSIDE DIAMETER (INCHES)	2-3/4	3-1/2	4				
STROKE (INCHES)	20	20	20				
COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	10690	26595	61596			

OPTIONAL ACCESSORIES

CHEVRON PACKING KNOCKER ASSEMBLY - BREAKDOWN:

COMPLETE ASSEMBLY	Logan Part No.	25000-020	25000-021	...			
	Bowen No.	57013	61103	...			
KNOCKER	Logan Part No.	AF7006	AF7007	...			
	Bowen No.	57014	61104	...			
PACKING RING	Logan Part No.	AF8006	AF8007	...			
	Bowen No.	57015	61105	...			
CENTER RING	Logan Part No.	AF9006	AF9007	...			
	Bowen No.	62374	62378	...			
CHEVRON PACKING SET	Logan Part No.	AF10006	AF10007	...			
	Bowen No.	57016	61106	...			
RETAINING RING	Logan Part No.	AF11006	AF11007	...			
	Bowen No.	57017	59907	...			
PACKING RETAINER	Logan Part No.	AF12006	AF12007	...			
	Bowen No.	62375	62379	...			
	No. Req'd	2	2	...			

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Klocker Seals



Fishing Bumper Sub

CONNECTION	5-1/2 API Reg	6-5/8 API Reg	7-5/8 API Reg				
OUTSIDE DIAMETER (INCHES)	6-3/4	7-3/4	9				
INSIDE DIAMETER (INCHES)	2-3/4	3-1/2	4				

30" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-675 14520	604-775 29568	604-900 70408			
MANDREL	Logan Part No. Bowen No.	AF4011-30 14522	AF4012-30 29569	AF4013-30 70410			
MIDDLE BODY	Logan Part No. Bowen No.	AF3011-30 14521	AF3012-30 29570	AF3013-30 70409			

36" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-675 13590	604-775 29616	604-900 70411			
MANDREL	Logan Part No. Bowen No.	AF4011-36 13592	AF4012-36 29617	AF4013-36 70413			
MIDDLE BODY	Logan Part No. Bowen No.	AF3011-36 13591	AF3012-36 29618	AF3013-36 70412			

42" STROKE

COMPLETE ASSEMBLY	Logan Part No. Bowen No.	604-675 29676	604-775 29679	604-900 70414			
MANDREL	Logan Part No. Bowen No.	AF4011-42 29677	AF4012-42 29680	AF4013-42 70416			
MIDDLE BODY	Logan Part No. Bowen No.	AF3011-42 29678	AF3012-42 29681	AF3013-42 70415			

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Special Notes:

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Fishing Bumper Sub

48" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900				
	Bowen No.	29742	29745	70417				
MANDREL	Logan Part No.	AF4011-48	AF4012-48	AF4013-48				
	Bowen No.	29743	29746	70419				
MIDDLE BODY	Logan Part No.	AF3011-48	AF3012-48	AF3013-48				
	Bowen No.	29744	29747	70418				

60" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900				
	Bowen No.	29796	29799	70420				
MANDREL	Logan Part No.	AF4011-60	AF4012-60	AF4013-60				
	Bowen No.	29797	29800	70422				
MIDDLE BODY	Logan Part No.	AF3011-60	AF3012-60	AF3013-60				
	Bowen No.	29798	29801	70421				

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Special Notes:

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Stroke length
- (4) O.D., if other than standard

Recommended Spare Parts:

- (1) 8 Non-Extrusion Rings
- (2) 8 Seal Protector Rings
- (3) 16 Knocker Seals



Strength Data

20" STROKE

CONNECTION	1-13/16 WILSON FJ	1-1/4 API REG	2-3/8 EUE	2-3/8 API REG	2-3/8 API IF	2-3/8 API IF	2-3/8 EUE	
OUTSIDE DIAMETER (INCHES)	1-13/16	2-1/4	3-1/8	3-5/32	3-3/8	3-3/4	3-3/4	
INSIDE DIAMETER (INCHES)	3/8	1/2	1-17/32	1	1	1-1/2	1-7/8	
STROKE LENGTH (INCHES)	20	20	20	20	20	20	20	
COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	10120	18785	42592	10105	10190	39887	39893
TENSILE STRENGTH (LBS)	80,250	126,150	166,500	282,000	300,000	316,200	292,000	
BUMPER SUB YIELD TORQUE (FT-LBS)	1,580	15,120	8,600	12,900	11,250	17,872	19,200	

30" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	29523	29529	46881	29535	29538	46863	46866
TENSILE STRENGTH (LBS)	80,250	146,000	166,500	282,000	300,000	316,200	292,000	
BUMPER SUB YIELD TORQUE (FT-LBS)	1,580	16,700	8,600	12,900	11,250	17,872	19,200	

36" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	29574	29580	49608	29586	29589	46890	46893
TENSILE STRENGTH (LBS)	80,250	146,000	166,500	282,000	300,000	316,200	292,000	
BUMPER SUB YIELD TORQUE (FT-LBS)	1,580	16,700	8,600	12,900	11,250	17,872	19,200	

42" STROKE

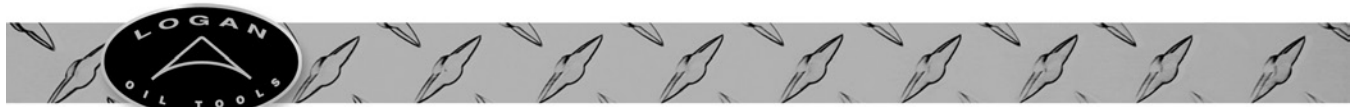
COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	29619	29625	46935	16933	29643	46917	46920
TENSILE STRENGTH (LBS)	80,250	132,000	166,500	282,000	283,500	316,200	292,000	
BUMPER SUB YIELD TORQUE (FT-LBS)	1,440	2,760	8,600	12,900	10,880	17,872	19,200	

48" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	29682	29688	46962	16936	29694	46944	46947
TENSILE STRENGTH (LBS)	80,250	132,000	166,500	282,000	283,500	316,200	292,000	
BUMPER SUB YIELD TORQUE (FT-LBS)	1,440	2,760	8,600	12,900	10,880	17,872	19,200	

60" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	29748	29754	46989	29760	29763	46971	46974
TENSILE STRENGTH (LBS)	80,250	132,000	166,500	240,750	283,500	316,200	292,000	
BUMPER SUB YIELD TORQUE (FT-LBS)	1,440	2,760	8,600	9,000	10,880	17,872	19,200	



Strength Data

20" STROKE

CONNECTION	2-7/8 API Reg	2-7/8 API IF	2-7/8 EUE	3-1/2 API IF	3-1/2 API IF	4-1/2 API FH	4-1/2 API IF
OUTSIDE DIAMETER (INCHES)	3-3/4	4-1/4	4-1/2	4-3/4	4-3/4	6	6-1/4
INSIDE DIAMETER (INCHES)	1-1/4	1-15/16	2-3/8	2	1-1/2	2	2-1/4
STROKE LENGTH (INCHES)	20	20	20	20	20	20	20
COMPLETE ASSEMBLY Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
Bowen No.	10090	41824	36794	39905	10225	10135	10257
TENSILE STRENGTH (LBS)	409,200	327,000	378,000	473,850	647,000	800,700	1,030,000
BUMPER SUB YIELD TORQUE (FT-LBS)	12,400	22,900	32,750	34,000	32,500	57,300	76,700

30" STROKE

COMPLETE ASSEMBLY Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
Bowen No.	29541	46875	46869	46878	29562	16150	20005
TENSILE STRENGTH (LBS)	409,200	327,000	378,000	473,850	647,000	800,700	1,015,000
BUMPER SUB YIELD TORQUE (FT-LBS)	12,440	22,900	32,750	34,000	32,500	57,300	61,700

36" STROKE

COMPLETE ASSEMBLY Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
Bowen No.	25180	46896	46902	46905	29604	10147	29610
TENSILE STRENGTH (LBS)	409,200	327,000	378,000	473,850	647,000	800,700	933,000
BUMPER SUB YIELD TORQUE (FT-LBS)	12,440	22,900	32,750	34,000	32,500	57,300	69,600

42" STROKE

COMPLETE ASSEMBLY Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
Bowen No.	29619	29625	46935	16933	29643	46917	46920
TENSILE STRENGTH (LBS)	409,200	132,000	378,000	282,000	283,500	800,700	933,000
BUMPER SUB YIELD TORQUE (FT-LBS)	12,440	2,760	32,750	12,900	10,880	57,300	69,600

48" STROKE

COMPLETE ASSEMBLY Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
Bowen No.	29682	29688	46962	16936	29694	46944	46947
TENSILE STRENGTH (LBS)	80,250	132,000	378,000	282,000	283,500	800,700	933,000
BUMPER SUB YIELD TORQUE (FT-LBS)	1,440	2,760	32,750	12,900	10,880	57,300	69,600

60" STROKE

COMPLETE ASSEMBLY Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
Bowen No.	29748	29754	46989	29760	29763	46971	46974
TENSILE STRENGTH (LBS)	80,250	132,000	378,000	240,750	283,500	800,700	933,000
BUMPER SUB YIELD TORQUE (FT-LBS)	1,440	2,760	32,750	9,000	10,880	57,300	69,600



Strength Data

20" STROKE

CONNECTION	5-1/2 API Reg	6-5/8 API Reg	7-5/8 API Reg				
OUTSIDE DIAMETER (INCHES)	6-3/4	7-3/4	9				
INSIDE DIAMETER (INCHES)	2-3/4	3-1/2	4				
STROKE LENGTH (INCHES)	20	20	20				
COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	10690	26595	61596			
TENSILE STRENGTH (LBS)	882,000	1,060,000	...				
BUMPER SUB YIELD TORQUE (FT-LBS)	82,800	137,500	...				

30" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	14520	29568	70408			
TENSILE STRENGTH (LBS)	882,000	1,060,000	...				
BUMPER SUB YIELD TORQUE (FT-LBS)	82,800	137,500	...				

36" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	13590	29616	70411			
TENSILE STRENGTH (LBS)	882,000	1,008,000	...				
BUMPER SUB YIELD TORQUE (FT-LBS)	82,800	134,700	...				

42" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	29676	29679	70414			
TENSILE STRENGTH (LBS)	745,000	1,008,000	...				
BUMPER SUB YIELD TORQUE (FT-LBS)	69,600	134,700	...				

48" STROKE

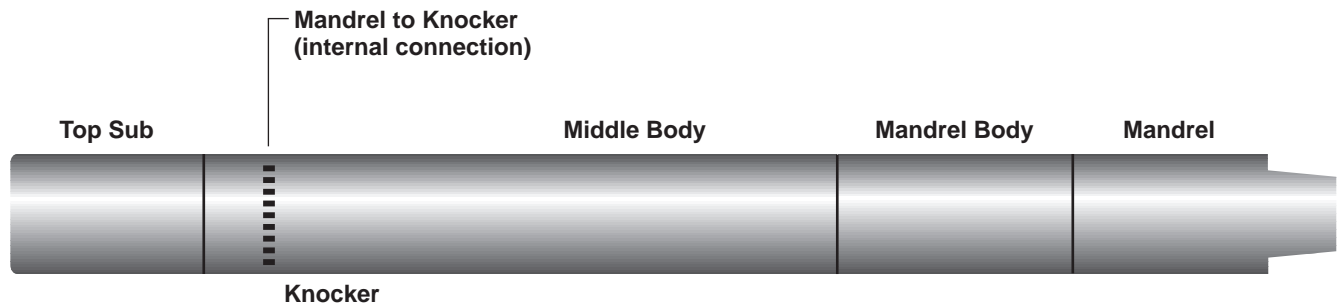
COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	29742	29745	70417			
TENSILE STRENGTH (LBS)	745,000	1,008,000	...				
BUMPER SUB YIELD TORQUE (FT-LBS)	69,600	134,700	...				

60" STROKE

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900			
	Bowen No.	29796	29799	70420			
TENSILE STRENGTH (LBS)	745,000	1,008,000	...				
BUMPER SUB YIELD TORQUE (FT-LBS)	69,600	134,700	...				



Recommended Tightening Torques



MAXIMUM RECOMMENDED TIGHTENING TORQUES (FT-LBS)

COMPLETE ASSEMBLY	Logan Part No.	604-181	604-225	604-313	604-315	604-338	604-375	604-376
	Bowen No.	10120	18785	42592	10105	10190	39887	39893
MANDREL TO KNOCKER		325	650	1,600	1,700	2,150	3,800	3,100
MANDREL BODY TO MIDDLE BODY		1,250	1,125	1,550	2,500	2,850	3,500	3,400
MIDDLE BODY TO TOP SUB		1,250	1,125	1,550	2,500	2,850	3,500	3,400
TORQUE@YIELD (FT-LBS)		2,500	2,250	3,100	5,050	5,800	6,800	6,800

MAXIMUM RECOMMENDED TIGHTENING TORQUES (FT-LBS)

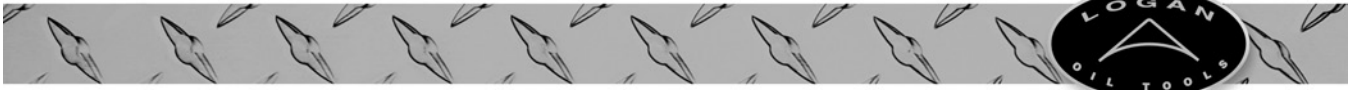
COMPLETE ASSEMBLY	Logan Part No.	604-377	604-425	604-450	604-475	604-476	604-600	604-625
	Bowen No.	10090	41824	36794	39905	10225	10135	10257
MANDREL TO KNOCKER		2,300	3,400	4,650	5,450	6,050	9,850	12,000
MANDREL BODY TO MIDDLE BODY		4,700	6,000	5,075	9,100	8,950	19,000	18,650
MIDDLE BODY TO TOP SUB		4,700	6,000	5,075	9,100	8,950	19,000	18,650
TORQUE@YIELD (FT-LBS)		9,400	12,000	10,150	18,250	17,950	38,850	37,250

MAXIMUM RECOMMENDED TIGHTENING TORQUES (FT-LBS)

COMPLETE ASSEMBLY	Logan Part No.	604-675	604-775	604-900				
	Bowen No.	10690	26595	61596				
MANDREL TO KNOCKER		10,500	20,250	31,250				
MANDREL BODY TO MIDDLE BODY		17,250	23,150	47,000				
MIDDLE BODY TO TOP SUB		17,250	23,150	47,000				
TORQUE@YIELD (FT-LBS)		34,500	46,200	94,450				

The makeup torques listed above are the maximum recommended makeup torques for each connection. Values are set at 50% of the calculated theoretical yield torque. Torques this high are not required for all fishing jobs. Lower values will result in less thread wear.

The tightening torque values were calculated assuming Itcolube or similar zinc-based grease was applied to all threads and shoulders.



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