



Lubricated Bumper Sub



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Lubricated Bumper Sub

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Lubricated Bumper Sub

OVERVIEW

The primary purpose of the Lubricated 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.

There are several secondary uses for the Lubricated Bumper Sub: to bump down, to bump a solid downward blow, and to jar up in the hole.

The Logan Lubricated Bumper Sub is a dependable accessory 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. Depending on the size of the tool, the vertical stroke length ranges from 10 to 18 inches.

USE

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

CONSTRUCTION

The Logan Lubricated Bumper Sub is constructed from high-strength, heat-treated alloy steel to withstand severe stress caused by tension, jarring, and torque.

The Lubricated Bumper Sub is composed of six major parts: a mandrel, mandrel body, middle body, knocker, washpipe, and a washpipe body. Critical seal points between the mandrel and washpipe are fitted with seal/ring assemblies (consisting of o-ring seals, seal protector rings, and seal non-extrusion rings) to increase the life of the rings and prevent o-ring extrusion.

The Lubricated 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 shoulder-type, splined mandrel fits into the mating splines of the mandrel body. The splines are always engaged and provide a continuous source of torque transmission whether bumping or not. The mandrel moves freely up and down while transmitting torque to the mandrel body. A suitable knocker and washpipe are made up on the lower end of the mandrel.

Mandrel Body

The mandrel body slides flat end up over the mandrel. The inside diameter of the mandrel body is designed with a series of straight splines near the lower end. These splines engage the corresponding splines of the mandrel to transmit torque conveyed by the running string through the middle body, washpipe body, and attached tool. A fill plug located at the upper end of the mandrel, similar to the fill plug on the lower end of the middle body, allows the Lubricated Bumper Sub to be filled with oil. (See page 4 for a detailed description of the filling process.)

Middle Body

With the mandrel body at the upper end and the washpipe body at the lower end, the middle body forms an oil chamber for the lubricating oil for the working parts of the tool. The inside diameter of the middle body is closely fitted to the outside diameter of the knocker and the upper end of the washpipe. This interior surface is highly polished to reduce frictional wear. The middle body fill plug and seal are located at the lower end of the middle body.



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Knocker

The knocker strikes a heavy impact blow to the lower end of the mandrel body. The knocker material is specially selected for use in impact loading. It is closely fitted to restrict high frequency lateral vibration, or chatter, that can shorten the life of the tool.

Washpipe

The upper end of the washpipe is designed with stabilizing features similar to the knocker. The lower end is hardfaced and ground to a high polish to reduce frictional wear in the sealed upper end of the washpipe body.

Washpipe Body

The lowermost part of the tool is the washpipe body. Its primary purposes are to close the lower end of the middle body (oil chamber) and to transmit torque.

Critical Seals

Tandem seal points located at the upper end of the mandrel and the lower end of the washpipe are fitted with seal ring assemblies consisting of o-ring seals, seal protector rings, and seal non-extrusion rings. As hydraulic pressure is applied (in either direction), these seal/ring assemblies reduce normal diametric clearance at the seal points to nearly zero. The non-extrusion rings prevent the o-rings from being pushed out or rolled out of position.

OPERATION

The Logan Lubricated 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 Lubricated Bumper Sub will transmit full torque at all times during rotation and bumping operations.

When lift load is applied, the Lubricated 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 Lubricated 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 Lubricated 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 Lubricated Bumper Sub is generally placed immediately above the fishing tool safety joint or unlatching joint.

Drilling Operations

The Lubricated 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 Lubricated Bumper Sub. Raise the fishing string to open the full stroke length of the Lubricated Bumper Sub (10 – 18 inches depending on the size of the tool) and allow for extra string stretch.

Sharply drop the string and stop with the brake approximately four to six inches above the closed position of the bumper sub to deliver a sharp downward blow. To deliver a solid downward blow, drop the full weight of the fishing string without braking.

Applying an Upward Blow

At the surface, mark the pipe to indicate the open and closed positions of the Lubricated 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 Lubricated Bumper Sub will quickly reopen. This will cause the knocker to strike the lower end of the mandrel body with a solid upward blow.

ASSEMBLY

The Logan Lubricated Bumper Sub can be assembled at the rig site where it will be used.

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 pages 5 – 7 and proceed with seal/ring assembly installation as follows:

1. Install the non-extrusion seal assemblies in the mandrel body and washpipe body:
 - a. Carefully examine each non-extrusion ring and remove any burrs or rough edges with a hand file.
 - b. Holding the non-extrusion ring between thumbs and forefingers, overlap the ends until the diameter fits inside the body.
 - c. Be sure the beveled side of the ring matches the beveled groove.



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Place the edge opposite the split into the lower groove and spread the ring towards the ends.

- d. Press the ring into the groove with the thumbs until the ends meet and the ring is firmly seated in the groove.
2. Install the seal protector rings:
 - a. Bend the ring until it is small enough to fit into the bore.
 - b. Insert one edge of the ring into the groove. Insert the opposite edge and press down until entire ring is in place.
 - c. Straighten and flatten the ring by pressing against it with the bent-tip installation tool (Logan Part No. J1073) from the jar service kit.
3. Install the o-rings:
 - a. Bend the o-ring until it is small enough to fit into the bore.
 - b. Insert the o-ring between the seal protector rings in each groove.
4. With both seal assemblies pressed into place as best as possible by hand with the aid of the installation tool, properly seat the seals with the setting tool. Refer to the installation photographs on page 7.
5. Clamp the upper mandrel body end horizontally into a suitable vise. Thoroughly coat the polished surface with a good grade of clean, light-weight oil.

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

6. Install the washpipe seal onto the lower end of the mandrel.
7. Insert the splined end of the mandrel through the top of the mandrel body.

Align the splines and push it through the splines in the mandrel body. Continue to gently push it through until the mandrel bumps against the mandrel body, bringing the polished section of the mandrel past the seal ring assemblies. The mandrel should move freely back and forth. Do not force the mandrel; damage to the seal surface may result. If resistance is encountered, remove the mandrel. Reset the seal assemblies and remove any foreign matter.

8. Install the large and small middle body seals.
9. Lubricate and install the knocker on the lower end of the mandrel. Tighten using the wrench flats.

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.

10. Screw the washpipe onto the mandrel. Mate it with the mandrel body. Tighten, exercising the same care as described for the knocker installation.
11. Thoroughly coat the washpipe with light oil. Slide the middle body onto the washpipe and over the lower end of the mandrel body. Tighten connection to the lower end of the mandrel body.
12. Slide the washpipe body over the washpipe. Tighten, exercising the same care as described for the mandrel installation.
13. Tighten all connections to the recommended torque before running the tool in the hole.
14. Paint or lubricate exterior surfaces to prevent corrosion.

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

Filling the Jar

1. Tilt the mandrel body end upward at a 30° angle. If possible, position mandrel body fill plug and middle body fill plug at the top.
2. Attach the six-foot exhaust hose (Logan Part No. J1072) from the Jar Service Kit (see pages 16 – 17) to the mandrel body fill plug hole.
3. Attach the pump hose from the jar service kit to the middle body fill plug hole.
4. Position a clean, open-mouthed receptacle under the tool. Place the free end of the exhaust hose into the receptacle.
5. Fill the volume pump (Logan Part No. J1069) from the jar service kit with oil and connect the volume pump hose.
6. Pump oil into the tool at moderate speed to allow a smooth, uniform flow of oil.
7. As the tool fills with oil, oil will begin to flow out of the exhaust hose. Air bubbles will be observed in the exhaust oil. Continue to pump oil into the tool until air bubbles cease in the outflowing exhaust oil.
8. Immediately detach the exhaust hose and insert the mandrel body fill plug. Tighten the mandrel fill plug snugly but do not overtighten.
9. Bleed off any residual air by pumping moderate pressure into the tool and allowing it to bleed back into the volume pump. Detach the volume pump hose and install the middle body fill plug. Tighten the fill plug snugly but do not overtighten.



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SEAL ASSEMBLY INSTALLATION



Before installation, examine each non-extrusion ring and remove any burrs or rough edges with a small file. Hold the non-extrusion ring between the thumbs and forefingers.



Install the non-extrusion ring in the mandrel body. Overlap the ends of the ring until the diameter fits inside the body.



Place the edge of the ring opposite the split into the lower groove. Be sure the beveled side of the ring matches the beveled side of the groove.



Spread the ring from the center out towards the ends. Press the ring into the groove with the thumbs until the ends meet and the ring is firmly seated in the groove.



Press the non-extrusion ring into place as best as possible by hand.



Seal protector ring before it is bent. It will look like this after it is properly installed in the groove.



Bend the seal protector ring until it is small enough to fit into the bore.



Insert one edge of the seal protector ring into the groove. Insert the opposite edge and press down until entire ring is in place.



Straighten and flatten the seal protector ring by pressing against it with the bent-tip installation tool (Logan Part No. J1073) from the Jar Service Kit.



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SEAL ASSEMBLY INSTALLATION (CONTINUED)



Repeat the installation sequence for the seal protector ring.



Bend the seal protector ring until it is small enough to fit into the bore.



Insert one edge of the seal protector ring into the groove. Insert the opposite edge and press down until entire ring is in place.



Straighten and flatten the seal protector ring by pressing against it with the bent-tip installation tool (Logan Part No. J1073) from the Jar Service Kit.



Grasp the non-extrusion ring between the thumbs and forefingers.

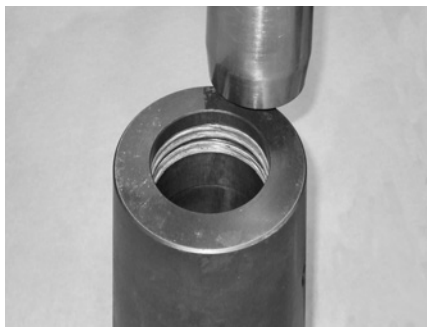


Overlap the ends of the ring until the diameter fits inside the body. Place the edge of the ring opposite the split into the lower groove. Be sure the beveled side of the ring matches the beveled side of the groove.



Spread the ring from the center out towards the ends. Press the ring into the groove with the thumbs until the ends meet and the ring is firmly seated in the groove.

Thoroughly coat the surfaces of the seals with a good grade of clean, lightweight oil. Do not apply lubricant to the seals if the tool is going to be stored.



Place the setting tool in a sling and position it over the top of the mandrel.

Coat the polished surface of the setting tool with a good grade of clean, lightweight oil.

Lower the setting tool into position and remove the sling.



Insert a bar or rod through the top of the setting tool to make handles to hold the tool.



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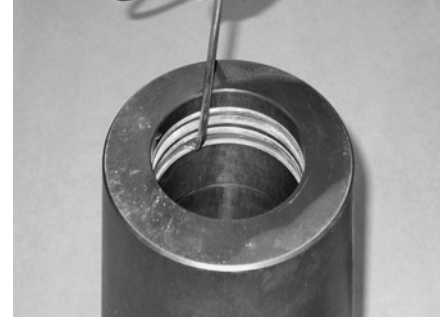
SEAL ASSEMBLY INSTALLATION (CONTINUED)



Properly seat the seals with the aid of the setting tool, tapping around the entire top edge of the setting tool to seat the rings if necessary. (Setting tools are not included in the Jar Service Kit and must be ordered separately. Refer to Parts Lists on pages 10 – 13 for part numbers.)



Remove the setting tool and continue with seal assembly installation.



Make sure the seal protector rings are straight and flat. Press against them with the bent-tip installation tool (Logan Part No. J1073) from the Jar Service Kit if necessary. The o-rings will be inserted in the grooves between the seal protector rings.

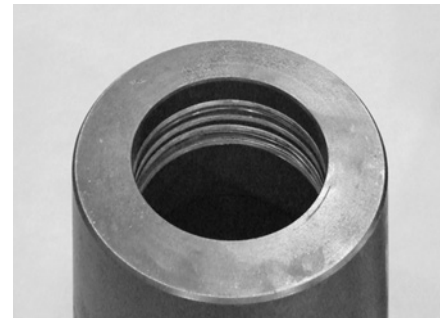


Grasp the o-ring between the thumbs and forefingers.

Bend the o-ring until it is small enough to fit into the bore.



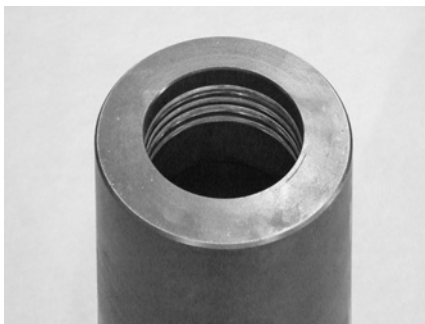
Insert one edge of the o-ring into the groove between the seal protector rings. Insert the opposite edge and press down until entire o-ring is in place.



O-rings are inserted in each groove between the seal protector rings.



Repeat the installation sequence for the second o-ring.



Completed seal assemblies.



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10. Work the tool back and forth several times to ensure that all seals are leakproof and the tool is functioning properly before putting it into service.

The tool is now ready for service.

Apply a good grade of thread dope to the tool joints and install thread protectors if the tool will be stored for future service. 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. Thoroughly grease the bore if the climate is very humid or corrosive (salty).

MAINTENANCE

The Logan Lubricated Bumper Sub requires minimal maintenance. Complete redressing is only necessary after prolonged or hard use. If the tool has been used lightly on a short job, carefully check and service the tool as follows:

1. Thoroughly wash the tool — inside and out.
2. Clamp the middle body horizontally in a vise.
3. Pull the tool open.
4. Remove the fill plugs in the mandrel body and middle body.
5. Attach the six-foot exhaust hose (Logan Part No. J1072) from the jar service kit (see to pages 16 – 17) to the mandrel body fill plug hole.
6. Tilt the mandrel body end upward to a 30° angle.
7. Attach the pump hose from the jar service kit to the middle body fill plug hole.

8. Position a clean, open-mouthed receptacle under the tool to catch the drained oil. Place the free end of the exhaust hose into the receptacle. Pump clean oil into the tool with the volume pump (Logan Part No. J1069) from the jar service kit.

9. A tool taking a substantial amount of oil indicates oil has been lost due to seal weakness or failure during operation. The tool should be completely disassembled, redressed, and refilled. Refer to the “Complete Disassembly” procedure below.

10. If the tool requires only a small amount of oil to fill it, inspect the displaced oil for cleanliness. If the oil is clean, detach the exhaust and volume pump hoses and replace the fill plugs in the mandrel body and middle body.

NOTE: Always replace the two fill plug seals before installing the fill plugs. Seals and oil should never be reused.

Complete Disassembly

Place a bucket or pan under the tool to catch oil that will drain out of the washpipe body, middle body, and mandrel body as each connection is broken. Referring to the illustration on page 9, 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 upper middle body end horizontally into a suitable vise.
2. Position a clean, open-mouthed receptacle under the tool to catch the drained oil. Remove the middle body fill plug to drain the oil from the tool.

3. Remove the washpipe body from the middle body and lay it aside.

CAUTION: Do not scratch or dent the washpipe seal surface.

4. Reposition the tool in the vise, clamping on the mandrel body. Do not clamp over the fill plug hole.
5. Remove the middle body from the mandrel body. Catch any fluid that drains from the middle body as it is removed.
6. Remove the washpipe from the mandrel and lay it aside.
7. Remove the knocker from the mandrel.

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 top of the mandrel body. Because of the tight grip of the seals, it may be necessary to strike the mandrel with forceful blows from a sledge hammer until it begins to slide out. Protect the end of the mandrel with a wood block before striking it.

9. After the mandrel is free, support the weight of the mandrel with a soft line or wire rope sling as it is removed.

10. Remove the mandrel and lay it aside.

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



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12. Examine the mandrel body and washpipe body 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) from the jar service kit 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.

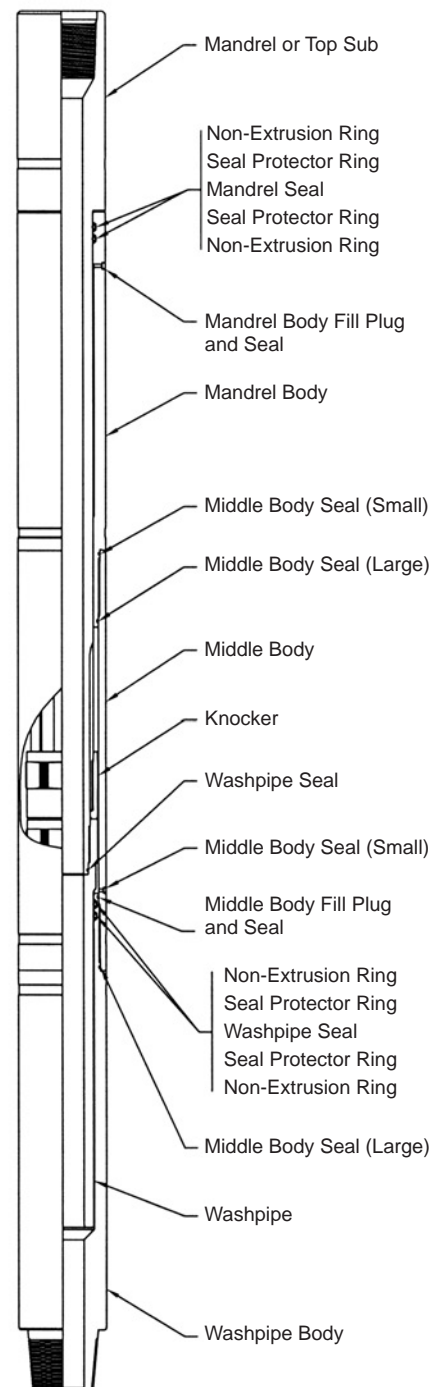
13. Examine the o-rings for damage or distortion. Check the seal protector rings and non-extrusion rings, using the forefinger to feel for burrs or other damage.

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

15. 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.

16. Examine all parts for defects, especially the polished surfaces for pits or scratches. Parts with polished surfaces (mandrel and washpipe) that have become pitted or scratched must be replaced with new parts prior to reassembly.

CAUTION: Defects on the polished surfaces of the mandrel and/or washpipe will damage the o-ring seals, resulting in fluid loss during operation. Replace any defective parts prior to reassembly.





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| | | | | | | | | |
|-------------------------------|-----------------------|----------------------|------------------|------------------|------------------|-----------------|------------------|-----------------|
| CONNECTION | | 1-13/16 WILSON FJ | 1-1/4 API REG | 2-3/8 API REG | 2-7/8 API REG | 2-3/8 API IF | 2-3/8 EUE | 2-7/8 API IF |
| OUTSIDE DIAMETER | | 1-13/16 | 2-1/4 | 3-1/8 | 3-3/4 | 3-3/4 | 3-3/4 | 4-1/4 |
| INSIDE DIAMETER | | 3/8 | 3/8 | 1 | 1-1/4 | 1-1/2 | 1-7/8 | 1-15/16 |
| STROKE LENGTH | | 10 | 10 | 15-1/2 | 15-1/2 | 15-1/2 | 15-1/2 | 15-1/2 |
| COMPLETE ASSEMBLY | Logan Part No. | 607-181 | 607-225 | 607-312 | 607-375 | 607-376 | 607-377 | 607-425 |
| | Bowen No. | 54781 | 41490 | 43501 | 43509 | 43470 | 43521 | 43531 |
| TOP SUB | Logan Part No. | AJ1000 | ... | ... | ... | ... | ... | ... |
| | Bowen No. | 36811 | ... | ... | ... | ... | ... | ... |
| MANDREL BODY | Logan Part No. | AJ2000 | AJ2001 | AJ2002 | AJ2003 | AJ2004 | AJ2005 | AJ2006 |
| | Bowen No. | 36742 | 41491 | 43502 | 43510 | 43471 | 43522 | 43532 |
| MIDDLE BODY | Logan Part No. | AJ3000 | AJ3001 | AJ3002 | AJ3003 | AJ3004 | AJ3005 | AJ3006 |
| | Bowen No. | 36744 | 41492 | 43503 | 43511 | 43472 | 43523 | 43533 |
| WASHPIPE BODY | Logan Part No. | AJ4000 | AJ4001 | AJ4002 | AJ4003 | AJ4004 | AJ4005 | AJ4006 |
| | Bowen No. | 54783 | 41493 | 43504 | 43512 | 43473 | 43524 | 43534 |
| MANDREL | Logan Part No. | AJ5000 | AJ5001 | AJ5002 | AJ5003 | AJ5004 | AJ5005 | AJ5006 |
| | Bowen No. | 53721 | 41520 | 43506 | 43514 | 43475 | 43526 | 43536 |
| WASHPIPE | Logan Part No. | ... | AJ6001 | AJ6002 | AJ6003 | AJ6004 | AJ6005 | AJ6006 |
| | Bowen No. | ... | 41495 | 43505 | 43513 | 43474 | 43525 | 43535 |
| NON-EXTRUSION RING | Logan Part No. | L365-19 | L365-24 | L365-32 | L365-35 | L365-36 | L365-37.5 | L365-40 |
| | Bowen No. | 365-19 | 365-24 | 365-32 | 365-35 | 365-36 | 365-37.5 | 365-40 |
| | No. Req'd | 4 | 8 | 8 | 8 | 8 | 8 | 8 |
| SEAL PROTECTOR RING | Logan Part No. | L375-19 | L375-24 | L375-32 | L375-35 | L375-36 | L375-37.5 | L375-40 |
| | Bowen No. | 375-19 | 375-24 | 375-32 | 375-35 | 375-36 | 375-37.5 | 375-40 |
| | No. Req'd | 4 | 8 | 8 | 8 | 8 | 8 | 8 |
| MANDREL BODY FILL PLUG | Logan Part No. | AG10000 | AG10002 | AG10002 | AG10002 | AG10002 | AG10002 | AG10002 |
| | Bowen No. | 617 | 329 | 329 | 329 | 329 | 329 | 329 |
| MIDDLE BODY FILL PLUG | Logan Part No. | AG10000 | AG10000 | AG10004 | AG10000 | AG10000 | AG10000 | AG10000 |
| | Bowen No. | 617 | 617 | 10641 | 617 | 617 | 617 | 617 |
| KNOCKER | Logan Part No. | ... | AJ7001 | AJ7002 | AJ7003 | AJ7004 | AJ7005 | AJ7006 |
| | Bowen No. | ... | 41845 | 43508 | 43516 | 39845 | 43528 | 43538 |

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) Connections, if other than standard
- (3) Outside diameter, if other than standard
- (4) Name and number of any desired spares

Recommended Spare Parts:

- (1) 1 Service Kit
- (2) 6 Seal Packing Sets
- (3) 4 Middle Body Fill Plugs
- (4) 4 Mandrel Body Fill Plugs
- (5) 16 Main Mandrel Non-Extrusion Rings
- (6) 16 Main Mandrel Seal Protector Rings
- (7) 1 Seal Ring Setting Tool



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|--|-----------------------|----------------------|------------------|------------------|------------------|------------------|--------------------|------------------|
| CONNECTION | | 1-13/16 WILSON FJ | 1-1/4 API REG | 2-3/8 API REG | 2-7/8 API REG | 2-3/8 API IF | 2-3/8 EUE | 2-7/8 API IF |
| OUTSIDE DIAMETER | | 1-13/16 | 2-1/4 | 3-1/8 | 3-3/4 | 3-3/4 | 3-3/4 | 4-1/4 |
| INSIDE DIAMETER | | 3/8 | 3/8 | 1 | 1-1/4 | 1-1/2 | 1-7/8 | 1-15/16 |
| STROKE LENGTH | | 10 | 10 | 15-1/2 | 15-1/2 | 15-1/2 | 15-1/2 | 15-1/2 |
| COMPLETE ASSEMBLY | Logan Part No. | 607-181 | 607-225 | 607-312 | 607-375 | 607-376 | 607-377 | 607-425 |
| | Bowen No. | 54781 | 41490 | 43501 | 43509 | 43470 | 43521 | 43531 |
| SERVICE KIT | Logan Part No. | 26000-055 | 26000-055 | 26000-055 | 26000-055 | 26000-055 | 26000-055 | 26000-055 |
| | Bowen No. | 55403 | 55403 | 55403 | 55403 | 55403 | 55403 | 55403 |
| SETTING TOOL | Logan Part No. | AG1000-19 | AG1000-24 | AG1000-32 | AG1000-35 | AG1000-36 | AG1000-37.5 | AG1000-40 |
| | Bowen No. | 22709-19 | 22709-24 | 22709-32 | 22709-35 | 22709-36 | 22709-37.5 | 22709-40 |
| SEAL PACKING | Logan Part No. | 28000-013 | 28000-014 | 28000-015 | 28000-016 | 28000-017 | 28000-018 | 28000-019 |
| <i>Consists of:</i> | Bowen No. | 54784 | 41846 | 43519 | 43517 | 39720 | 43529 | 43539 |
| MAIN MANDREL & W.P. BODY SEAL | Logan Part No. | 568-211 | 568-219 | 568-329 | 568-332 | 568-333 | 568-334 | 568-337 |
| | Bowen No. | 568211 | 568219 | 568329 | 568332 | 568333 | 568334 | 568337 |
| | No. Req'd | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MIDDLE BODY SEAL LARGE | Logan Part No. | 568-029 | 568-224 | 568-231 | 568-235 | 568-235 | 568-236 | 568-239 |
| | Bowen No. | 568029 | 568224 | 568231 | 568235 | 568235 | 568236 | 568239 |
| | No. Req'd | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| MIDDLE BODY SEAL SMALL | Logan Part No. | 568-027 | 568-222 | 568-229 | 568-233 | 568-233 | 568-233 | 568-237 |
| | Bowen No. | 568027 | 568222 | 568229 | 568233 | 568233 | 568233 | 568237 |
| | No. Req'd | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| WASHPIPE SEAL | Logan Part No. | ... | 568-210 | 568-220 | 568-222 | 568-223 | 568-229 | 568-227 |
| | Bowen No. | ... | 568210 | 568220 | 568222 | 568223 | 568229 | 568227 |
| MIDDLE BODY FILL PLUG SEAL | Logan Part No. | 568-005 | 568-005 | ... | 568-005 | 568-005 | 568-005 | 568-005 |
| | Bowen No. | 568005 | 568005 | ... | 568005 | 568005 | 568005 | 568005 |
| MANDREL BODY FILL PLUG SEAL | Logan Part No. | 568-005 | 568-006 | 568-006 | 568-006 | 568-006 | 568-006 | 568-006 |
| | Bowen No. | 568005 | 568006 | 568006 | 568006 | 568006 | 568006 | 568006 |

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) Connections, if other than standard
- (3) Outside diameter, if other than standard
- (4) Name and number of any desired spares

Recommended Spare Parts:

- (1) 1 Service Kit
- (2) 6 Seal Packing Sets
- (3) 4 Middle Body Fill Plugs
- (4) 4 Mandrel Body Fill Plugs
- (5) 16 Main Mandrel Non-Extrusion Rings
- (6) 16 Main Mandrel Seal Protector Rings
- (7) 1 Seal Ring Setting Tool



Lubricated Bumper Sub

| | | | | | | | | |
|----------------------------|-----------------------|----------------|-----------------------|-----------------|-------------------|-----------------------|------------------|------------------|
| CONNECTION | | 2-7/8 EUE | 3-1/2 API IF OR FH | 3-1/2 API IF | 4-1/2 API FH | 4-1/2 API IF OR FH | 5-1/2 API REG | 6-5/8 API REG |
| OUTSIDE DIAMETER | | 4-1/2 | 4-3/4 | 4-3/4 | 6 | 6-1/4 | 6-3/4 | 7-3/4 |
| INSIDE DIAMETER | | 2-3/8 | 2 | 2-1/4 | 2-13/16 | 3-1/8 | 2-3/4 | 3-1/2 |
| STROKE LENGTH | | 15-1/2 | 15-1/2 | 15-1/2 | 18 | 18 | 18 | 18 |
| COMPLETE ASSEMBLY | Logan Part No. | 607-450 | 607-475 | 607-476 | 607-600 | 607-625 | 607-675 | 607-775 |
| | Bowen No. | 42700 | 39727 | ... | 39732 | 39737 | 39778 | 39752 |
| TOP SUB | Logan Part No. | ... | ... | ... | ... | ... | ... | ... |
| | Bowen No. | ... | ... | ... | ... | ... | ... | ... |
| MANDREL BODY | Logan Part No. | AJ2007 | AJ2008 | AJ2008 | AJ2009 | AJ2010 | AJ2011 | AJ2012 |
| | Bowen No. | 42701 | 39861 | 39861 | 30541 | 34966 | 33244 | 34992 |
| MIDDLE BODY | Logan Part No. | AJ3007 | AJ3008 | AJ3008 | AJ3009 | AJ3010 | AJ3011 | AJ3012 |
| | Bowen No. | 42702 | 33156 | 33156 | 30542 | 34967 | 33245 | 34993 |
| WASHPIPE BODY | Logan Part No. | AJ4007 | AJ4008 | AJ40085 | AJ4009 | AJ4010 | AJ4011 | AJ4012 |
| | Bowen No. | 42703 | 39728 | ... | 39733 | 39738 | 39779 | 39753 |
| MANDREL | Logan Part No. | AJ5007 | AJ5008 | AJ50085 | AJ5009 | AJ5010 | AJ5011 | AJ5012 |
| | Bowen No. | 42705 | 39860 | ... | 30545 | 34970 | 33248 | 34996 |
| WASHPIPE | Logan Part No. | AJ6007 | AJ6008 | AJ60085 | AJ6009 | AJ6010 | AJ6011 | AJ6012 |
| | Bowen No. | 42704 | 39729 | ... | 39734 | 39739 | 39780 | 39754 |
| NON-EXTRUSION RING | Logan Part No. | L365-43 | L365-42 | L365-42 | L365-50.25 | L365-53 | L365-54 | L365-61 |
| | Bowen No. | 365-43 | 365-42 | 365-42 | 365-50.25 | 365-53 | 365-54 | 365-61 |
| | No. Req'd | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| SEAL PROTECTOR RING | Logan Part No. | L375-43 | L375-42 | L375-42 | L375-50.25 | L375-53 | L375-54 | L375-61 |
| | Bowen No. | 375-43 | 375-42 | 375-42 | 375-50.25 | 375-53 | 375-54 | 375-61 |
| | No. Req'd | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| MANDREL BODY | Logan Part No. | AG10002 | AG10002 | AG10002 | AG10002 | AG10002 | AG10002 | AG10002 |
| FILL PLUG SEAL | Bowen No. | 329 | 329 | 329 | 329 | 329 | 329 | 329 |
| MIDDLE BODY | Logan Part No. | AG10000 | AG10000 | AG10000 | AG10000 | AG10000 | AG10000 | AG10000 |
| FILL PLUG SEAL | Bowen No. | 617 | 617 | 617 | 617 | 617 | 617 | 617 |
| KNOCKER | Logan Part No. | AJ7007 | AJ7008 | AJ7008 | AJ7009 | AJ7010 | AJ7011 | AJ7012 |
| | Bowen No. | 42708 | 39863 | 39863 | 30546 | 34972 | 33250 | 34998 |

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Recommended Spare Parts:

- (1) 1 Service Kit
- (2) 6 Seal Packing Sets
- (3) 4 Middle Body Fill Plugs
- (4) 4 Mandrel Body Fill Plugs
- (5) 16 Main Mandrel Non-Extrusion Rings
- (6) 16 Main Mandrel Seal Protector Rings
- (7) 1 Seal Ring Setting Tool



Lubricated Bumper Sub

| | | | | | | | | |
|--|-----------------------|------------------|-----------------------|------------------|------------------|-----------------------|------------------|------------------|
| CONNECTION | | 2-7/8 EUE | 3-1/2 API IF OR FH | 3-1/2 API IF | 4-1/2 API FH | 4-1/2 API IF OR FH | 5-1/2 API REG | 6-5/8 API REG |
| OUTSIDE DIAMETER | | 4-1/2 | 4-3/4 | 4-3/4 | 6 | 6-1/4 | 6-3/4 | 7-3/4 |
| INSIDE DIAMETER | | 2-3/8 | 2 | 2-1/4 | 2-13/16 | 3-1/8 | 2-3/4 | 3-1/2 |
| STROKE LENGTH | | 15-1/2 | 15-1/2 | 15-1/2 | 18 | 18 | 18 | 18 |
| COMPLETE ASSEMBLY | Logan Part No. | 607-450 | 607-475 | 607-476 | 607-600 | 607-625 | 607-675 | 607-775 |
| | Bowen No. | 42700 | 39727 | ... | 39732 | 39737 | 39778 | 39752 |
| SERVICE KIT | Logan Part No. | 26000-055 | 26000-055 | 26000-055 | 26000-055 | 26000-055 | 26000-055 | 26000-055 |
| | Bowen No. | 55403 | 55403 | 55403 | 55403 | 55403 | 55403 | 55403 |
| SETTING TOOL | Logan Part No. | AG1000-43 | AG1000-42 | AG1000-42 | AJ8000 | AG1000-53 | AG1000-54 | AG1000-61 |
| | Bowen No. | 22709-43 | 22709-42 | 22709-42 | 10572 | 22709-53 | 22709-54 | 22709-61 |
| SEAL PACKING | Logan Part No. | 28000-020 | 28000-021 | 28000-021 | 28000-022 | 28000-023 | 28000-024 | 28000-025 |
| <i>Consists of:</i> | Bowen No. | 42709 | 39730 | ... | 39735 | 39740 | 39781 | 39755 |
| MAIN MANDREL & W.P. BODY SEAL | Logan Part No. | 568-340 | 568-339 | 568-339 | 568-347 | 568-426 | 568-427 | 568-434 |
| | Bowen No. | 568340 | 568339 | 568339 | 568347 | 568426 | 568427 | 568434 |
| | No. Req'd | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MIDDLE BODY SEAL LARGE | Logan Part No. | 568-242 | 568-242 | 568-242 | 568-250 | 568-253 | 568-256 | 568-261 |
| | Bowen No. | 568242 | 568242 | 568242 | 568250 | 568253 | 568256 | 568261 |
| | No. Req'd | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| MIDDLE BODY SEAL SMALL | Logan Part No. | 568-239 | 568-239 | 568-239 | 568-247 | 568-251 | 568-254 | 568-260 |
| | Bowen No. | 568239 | 568239 | 568239 | 568247 | 568251 | 568254 | 568260 |
| | No. Req'd | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| WASHPIPE SEAL | Logan Part No. | 568-231 | 568-229 | 568-036 | 568-236 | 568-239 | 568-238 | 568-246 |
| | Bowen No. | 568231 | 568229 | ... | 568236 | 568239 | 568238 | 568246 |
| MIDDLE BODY FILL PLUG SEAL | Logan Part No. | 568-005 | 568-005 | 568-005 | 568-005 | 568-005 | 568-005 | 568-005 |
| | Bowen No. | 568005 | 568005 | 568005 | 568005 | 568005 | 568005 | 568005 |
| MANDREL BODY FILL PLUG SEAL | Logan Part No. | 568-006 | 568-006 | 568-006 | 568-006 | 568-006 | 568-006 | 568-006 |
| | Bowen No. | 568006 | 568006 | 568006 | 568006 | 568006 | 568006 | 568006 |

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When ordering, please specify:

- (1) Name and number of assembly or part
- (2) Connections, if other than standard
- (3) Outside diameter, if other than standard
- (4) Name and number of any desired spares

Recommended Spare Parts:

- (1) 1 Service Kit
- (2) 6 Seal Packing Sets
- (3) 4 Middle Body Fill Plugs
- (4) 4 Mandrel Body Fill Plugs
- (5) 16 Main Mandrel Non-Extrusion Rings
- (6) 16 Main Mandrel Seal Protector Rings
- (7) 1 Seal Ring Setting Tool



Strength Data

| | | | | | | | | |
|---|------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| CONNECTION | 1-13/16 WILSON FJ | 1-1/4 API REG | 2-3/8 API REG | 2-7/8 API REG | 2-3/8 API IF | 2-3/8 EUE | 2-7/8 API IF | |
| OUTSIDE DIAMETER | 1-13/16 | 2-1/4 | 3-1/8 | 3-3/4 | 3-3/4 | 3-3/4 | 4-1/4 | |
| INSIDE DIAMETER | 3/8 | 3/8 | 1 | 1-1/4 | 1-1/2 | 1-7/8 | 1-15/16 | |
| STROKE LENGTH | 10 | 10 | 15-1/2 | 15-1/2 | 15-1/2 | 15-1/2 | 15-1/2 | |
| COMPLETE ASSEMBLY | Logan Part No. Bowen No. | 607-181 54781 | 607-225 41490 | 607-312 43501 | 607-375 43509 | 607-376 43470 | 607-377 43521 | 607-425 43531 |
| TENSILE STRENGTH (LBS) | 75,400 | 116,415 | 239,070 | 363,780 | 300,750 | 291,735 | 397,650 | |
| BUMPER SUB YIELD TORQUE (FT-LBS) | 480 | 1,740 | 3,400 | 7,100 | 7,100 | 4,920 | 9,260 | |
| MAX OPERATING TORQUE (FT-LBS) | 240 | 870 | 1,700 | 3,550 | 3,550 | 2,460 | 4,630 | |

| | | | | | | | | |
|---|------------------------------------|-------------------------|-------------------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| CONNECTION | 2-7/8 EUE | 3-1/2 API IF OR FH | 3-1/2 API IF | 4-1/2 API FH | 4-1/2 API IF OR FH | 5-1/2 API REG | 6-5/8 API REG | |
| OUTSIDE DIAMETER | 4-1/2 | 4-3/4 | 4-3/4 | 6 | 6-1/4 | 6-3/4 | 7-3/4 | |
| INSIDE DIAMETER | 2-3/8 | 2 | 2-1/4 | 2-13/16 | 3-1/8 | 2-3/4 | 3-1/2 | |
| STROKE LENGTH | 15-1/2 | 15-1/2 | 15-1/2 | 18 | 18 | 18 | 18 | |
| COMPLETE ASSEMBLY | Logan Part No. Bowen No. | 607-450 42700 | 607-475 39727 | 607-476 ... | 607-600 39732 | 607-625 39737 | 607-675 39778 | 607-775 39752 |
| TENSILE STRENGTH (LBS) | 388,650 | 484,650 | 433,000 | 622,295 | 777,150 | 1,130,400 | 1,276,950 | |
| BUMPER SUB YIELD TORQUE (FT-LBS) | 7,100 | 11,030 | 15,000 | 23,000 | 32,600 | 43,200 | 62,400 | |
| MAX OPERATING TORQUE (FT-LBS) | 3,550 | 5,518 | 7,500 | 11,500 | 16,300 | 21,600 | 31,200 | |

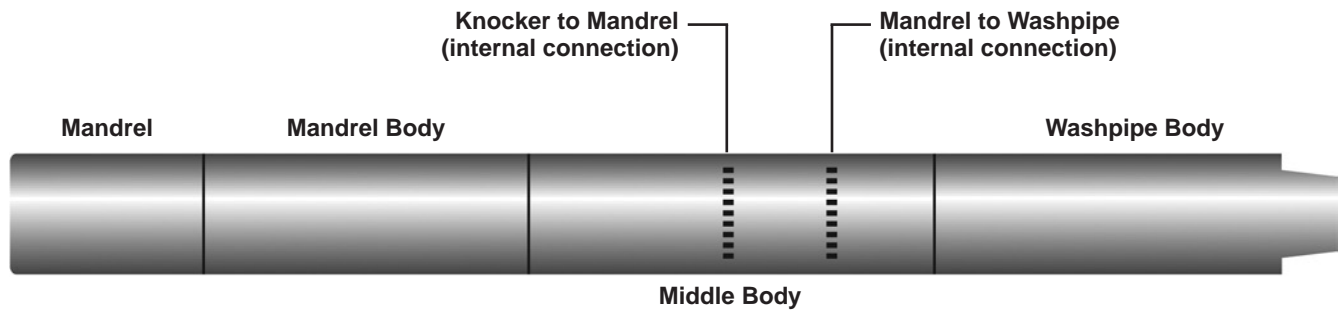
The tensile strengths listed above are calculated theoretical yield strengths and are considered accurate to $\pm 20\%$.

Operating torques are set at 50% of the calculated theoretical yield torque and are the maximum recommended operating torques.

These figures do not constitute a guarantee, actual or implied. They are meant to serve as a guide only, and an appropriate safety allowance must be made in use.



Recommended Tightening Torques



MAXIMUM RECOMMENDED TIGHTENING TORQUES (FT-LBS)

| COMPLETE ASSEMBLY | Logan No. | 607-181 | 607-225 | 607-312 | 607-375 | 607-376 | 607-377 | 607-425 |
|-------------------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|
| | Bowen No. | 54781 | 41490 | 43501 | 43509 | 43470 | 43521 | 43531 |
| MANDREL TO MANDREL BODY | | 240 | ... | ... | ... | ... | ... | ... |
| MANDREL BODY TO MIDDLE BODY | | 370 | 870 | 1,700 | 3,550 | 3,550 | 2,460 | 4,630 |
| KNOCKER TO MANDREL | | ... | 90 | 430 | 580 | 410 | 330 | 670 |
| MANDREL TO WASHPIPE | | ... | 140 | 660 | 500 | 490 | 1,220 | 730 |
| MIDDLE BODY TO WASHPIPE BODY | | 370 | 870 | 1,700 | 3,550 | 3,550 | 2,460 | 4,630 |

MAXIMUM RECOMMENDED TIGHTENING TORQUES (FT-LBS)

| COMPLETE ASSEMBLY | Logan No. | 607-450 | 607-475 | 607-476 | 607-600 | 607-625 | 607-675 | 607-775 |
|-------------------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|
| | Bowen No. | 42700 | 39727 | 152719 | 39732 | 39737 | 39778 | 39752 |
| MANDREL TO MANDREL BODY | | ... | ... | ... | ... | ... | ... | ... |
| MANDREL BODY TO MIDDLE BODY | | 3,550 | 7,500 | 7,500 | 11,500 | 16,300 | 21,600 | 31,200 |
| KNOCKER TO MANDREL | | 370 | 1,100 | 1,000 | 2,270 | 3,120 | 3,000 | 7,690 |
| MANDREL TO WASHPIPE | | 1,450 | 1,690 | 1,500 | 3,800 | 9,750 | 13,300 | 21,000 |
| MIDDLE BODY TO WASHPIPE BODY | | 3,550 | 7,500 | 7,500 | 13,500 | 16,300 | 22,600 | 31,200 |

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.



Jar Service Kit *Note: Photos of parts are not actual size.*



J1045-001
3/8" Fill Plug
Adapter



J1046-001
7/16" Fill Plug
Adapter



J1224-001
5/8" Fill Plug
Adapter



J1086
1/4" Female Couplers



J1374
Hex Bushing



J1373
Box Coupler



J1376
Hose Fitting



J1085
1/4" Male Couplers



J1078
1/4" x 1" Pipe Nipple



J1080
Line Filter

568010-100
O-Ring



568005-100
O-Rings



J1073
Installation Tool



J1074
O-Ring Installation Tool

J1077
Fill Plug Wrench



J1075
Torx Head
Fill Plug Wrench



AG1000-xx *
Mandrel Setting Tool

Setting Tools are not included in the Service Kit and must be ordered separately for each tool size at additional cost.
** Refer to Parts Lists on pages 9 and 11 for complete part numbers.*



Jar Service Kit



Pump Hose



J1072
6 Ft. Exhaust Hose



J1069
Volume Pump



J1070
Metal Box

| | | |
|---|-----------------------|------------------|
| COMPLETE ASSEMBLY | Logan Part No. | 26000-055 |
| <i>Consists of:</i> | Bowen No. | 145213 |
| SEAL PROTECTOR RING | Logan Part No. | J1073 |
| INSTALLATION TOOL | Bowen No. | 625 |
| O-RING | Logan Part No. | J1074 |
| INSTALLATION TOOL | Bowen No. | 626 |
| FILL PLUG WRENCH — T30 TORX HEAD | Logan Part No. | J1075 |
| | Bowen No. | 359T |
| FILL PLUG WRENCH — ALLEN HEAD | Logan Part No. | J1077 |
| | Bowen No. | 620A |
| 1/4" x 1" PIPE NIPPLE | Logan Part No. | J1078 |
| | Bowen No. | 36953 |
| LINE FILTER | Logan Part No. | J1080 |
| | Bowen No. | 56565 |
| 1/4" MALE COUPLER | Logan Part No. | J1085 |
| | Bowen No. | 656 |
| 1/4" FEMALE COUPLER | Logan Part No. | J1086 |
| | Bowen No. | 655 |
| 3/8" BOX x 1/4" GALVANIZED BOX COUPLER | Logan Part No. | J1373 |
| | Bowen No. | ... |
| 1/8" BOX x 1/4" PIN HEX BUSHING | Logan Part No. | J1374 |
| | Bowen No. | ... |

| | | |
|--------------------------------------|-----------------------|-------------------|
| 1/4" 19 NPT PIN HOSE FITTING | Logan Part No. | J1376 |
| | Bowen No. | ... |
| 6 FT. EXHAUST HOSE | Logan Part No. | J1072 |
| | Bowen No. | 33435 |
| PUMP HOSE | Logan Part No. | ... |
| | Bowen No. | 2581 |
| VOLUME PUMP | Logan Part No. | J1069 |
| | Bowen No. | 2580 |
| METAL BOX | Logan Part No. | J1070 |
| | Bowen No. | 1995 |
| 5/8" FILL PLUG ADAPTER | Logan Part No. | J1224-001 |
| | Bowen No. | ... |
| 7/16" 20 NF FILL PLUG ADAPTER | Logan Part No. | J1046-001 |
| | Bowen No. | ... |
| 3/8" 24 NF FILL PLUG ADAPTER | Logan Part No. | J1045-001 |
| | Bowen No. | ... |
| O-RING | Logan Part No. | 568010-100 |
| | Bowen No. | 568010 |
| O-RING — 70 DURO NITRILE | Logan Part No. | 568005-100 |
| | Bowen No. | 568005 |

Mandrel Setting Tools are not included in the Service Kit and must be ordered separately for each tool size at additional cost. See pages 9 and 11 for part numbers.

When ordering, please specify:

(1) Name and number of assembly or part



Notes

HEADQUARTERS

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