



FISHING & INTERVENTION

HYDRAULIC WIRELINER JAR

Manual D460

**THE LEGACY
LIVES ON**

Contents

Logan Hydraulic Wireline Jar	
Overview	2
Uses.....	2
Construction.....	2
Operation	2
Tool Illustration.....	3
Maintenance	4
Disassembly	4
Assembly	4
Testing	5
Chart A - Strength Data.....	6
Chart B - Maximum Recommended Tightening Torques.....	6
Specifications and Parts Lists.....	7 - 12

LEGAL NOTICE

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OVERVIEW

The dependable Hydraulic Wireline Jar utilizes a hydraulic system that permits controlled jarring in measuring line or stranded wireline operations when electrical continuity below the jar is not required. Such operations include permanent well completion services; setting and pulling gas lift valves, chokes, and other retrievable downhole tubing equipment; and cable services such as swabbing, bailing, and fishing.

Its simple hydraulic system permits the operator to control the intensity of the blow within a broad range — from a light blow as needed for measuring line, to one of forceful impact required for stranded wireline. It is particularly valuable in fishing, swabbing, and permanent well completion operations.

USES

Logan Hydraulic Wireline Jars may be used for any wireline operation that does not require electrical continuity to tools or instruments below the Jar. Such operations include permanent well completion services; setting and pulling gas lift valves, chokes, and other retrievable downhole tubing equipment; and cable services such as swabbing, bailing, and fishing. It is particularly valuable in fishing, swabbing, and permanent well completion operations.

CONSTRUCTION

The Logan Hydraulic Wireline Jar essentially consists of two separate assemblies: a sliding mandrel within a hydraulic chamber (middle body assembly). When the tool is completely assembled, these two principal assemblies freely move in relationship to each other. Their movement is controlled by the hydraulic fluid.

The sliding mandrel assembly includes a top sub, mandrel with integral piston, valve plug, and a valve plug seat. The middle body assembly consists of the bottom sub, middle body, middle body insert, and a balance piston.

Seal ring assemblies are installed in the critical areas — mandrel, balance piston, and valve plug — that are subject to high internal pressure. Seals are made of DuPont Viton® seals, a material that is well known for its excellent (400°F/200°C) heat resistance and resistance to aggressive fuels and chemicals.

The middle body insert for the 1-1/8", 1-1/4", and 1-1/2" O.D. Jars is a two-piece design with an insert bushing. This arrangement allows easier installation of the mandrel seal, two (2) mandrel non-extrusion rings, and two (2) seal protector. The 1-3/4", 2-1/8", and 2-3/4" O.D. Jars have larger bores in the middle body inserts that allow a one-piece seal sub-assembly.

The integral piston on the lower end of the mandrel rests in the middle body cylinder when the jar is in the closed position. A freely moving balance piston, located in the lower end of the middle body, equalizes the internal pressure of the tool with the well pressure. This balance piston also accommodates any internal hydraulic fluid expansion so high internal pressures do not occur. A valve in the piston allows the free passage of fluid to permit the jar to close freely.

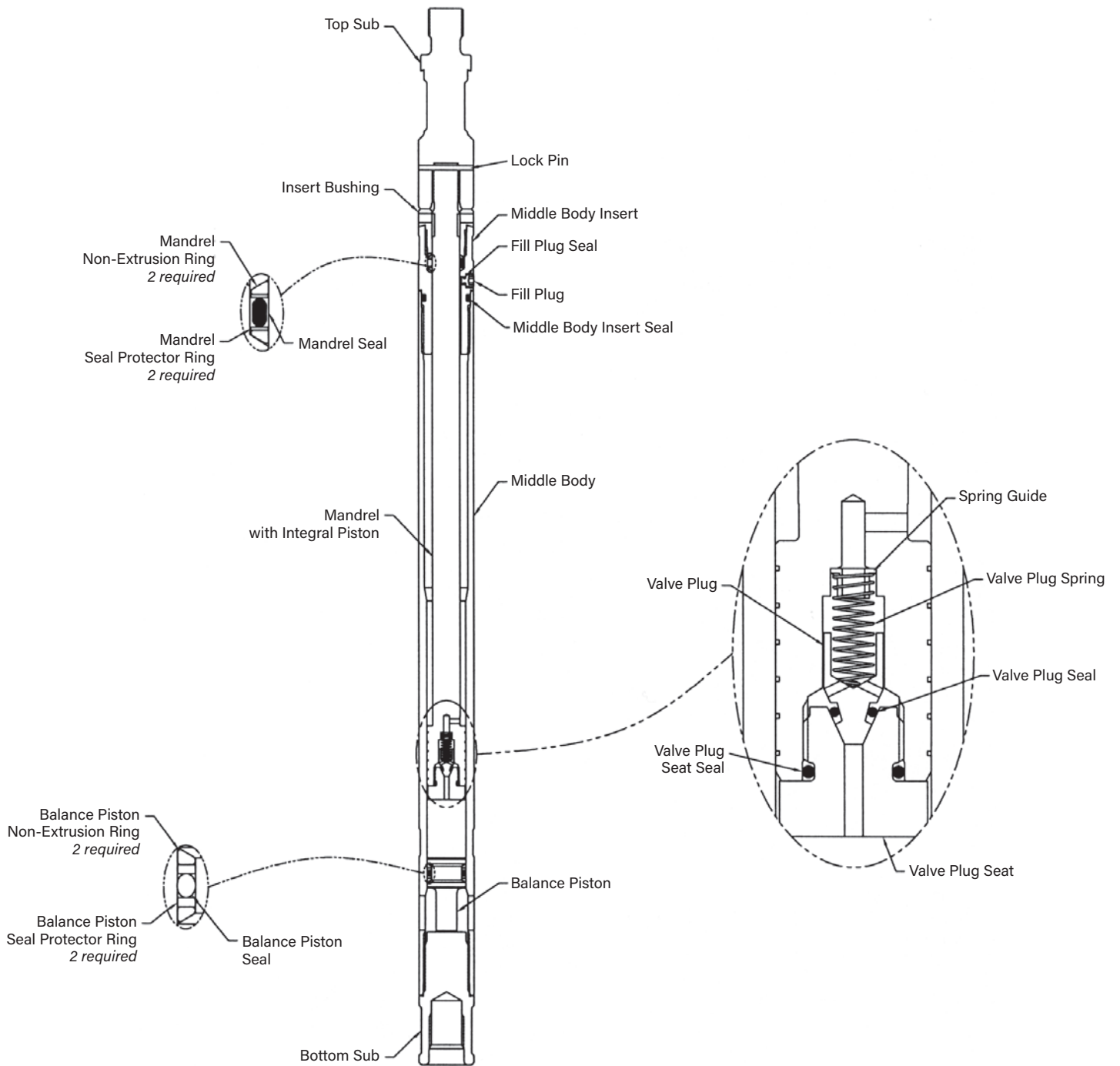
The top sub is constructed with wrench flats and a fishing neck. A lock pin secures the mandrel to the top sub and provides safety against loosening and backing off during operation during operation.

OPERATION

The Logan Hydraulic Wireline Jar is made up in the string just above the tools or equipment to be run. It is recommended that several sinker bars with an outside diameter that corresponds to the Jar be assembled above the tool. The weight of the sinker bars will determine the intensity of the jarring blow. They will also aid in closing the jar. The assembled tool is run into and out of the well like any other fishing tool but on measuring line or stranded wireline.

To provide an effective means to bump up or down, whichever may be required during the operation, a Logan Tubular Wireline Jar may be assembled in the string immediately above the Logan Hydraulic Wireline Jar. The zero point or depth measuring reference should take the length of the stroke of the Jar into account. Otherwise, no special precautions or considerations are necessary. The stroke length of each Jar is listed on pages 7-12. The stroke length of a Jar can be checked by measuring its length when it is open and closed. The difference between these two measurements is the stroke length.

When the Jar is in the closed position, the integral piston (which is part of the mandrel) rests in the restricted inside diameter of the middle body. When an upward strain is placed on the wireline, the mandrel assembly is pulled upward. This upward movement is impeded because the hydraulic fluid must pass through the extremely narrow passage between the integral piston of the mandrel and the restricted inside diameter of the middle body. Fluid resistance stops after the integral piston passes into the larger inside diameter of the middle body. The mandrel assembly then travels upward at a constantly accelerating velocity until the shoulder on the integral piston



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strikes the middle body insert. The upward jarring blow transmits energy to the tools installed below the Jar. The jarring force transmitted by the piston is proportional to the strain taken on the string. A greater strain on the string increases the intensity of the blow, while a lighter strain on the string will lessen the intensity.

WARNING: At no time during the pull cycle should the maximum recommended load be exceeded. Refer to Chart A - Strength Data on page 6 for pull loads.

An upward strain on the wireline is created by reeling the hoist until the wireline is stretched. Set the hoist brake and wait for the Jar to strike. After the Jar has struck, slack off the string to allow the Jar to close.

Repeat the jarring action by pulling another strain on the string. The frequency of the blows struck can be as rapid as the operator can pick up and slack off the running string.

MAINTENANCE

After prolonged field service, the Logan Hydraulic Wireline Jar should be disassembled, cleaned, inspected, and redressed.

The Logan Hydraulic Wireline Jar will usually come out of the hole in the open position.

CAUTION: If the Jar comes out of the hole in the closed or cocked position, it should not be left hanging, especially with any amount of weight suspended from the tool. If the Jar is allowed to fall the length of its free stroke, bodily harm or damage to the rig or working string could result.

To prevent corrosion, all exposed surfaces should be cleaned and greased prior to closing the Jar for storage.

DISASSEMBLY

Disassembly should be conducted in a clean, well-equipped shop. Proceed as follows:

1. Secure the Jar horizontally in a suitable vise. Clamp on the middle body.
2. Remove the bottom sub.
3. Before removing the fill plug, place an open-mouthed container under the middle body insert to catch the oil as it drains from the Jar. Remove the fill plug and allow the oil to drain. Slowly slide out the mandrel and force the oil out with the piston.

CAUTION: The Jar could contain residual well pressure. Care should be taken when draining oil from the tool to avoid bodily harm.

4. Loosen and remove the middle body insert from the middle body.
5. Remove the middle body sub-assembly consisting of the top sub, mandrel, and middle body insert from the middle body. Lay it aside.
6. With the aid of a wood dowel or brass rod, remove the balance piston from the middle body.
7. Remove the middle body from the vise and set it aside.
8. Secure the top sub/mandrel sub-assembly in the vise. Clamp on the top sub.
9. Loosen and remove the valve plug seat from the piston. Remove the valve plug and valve plug spring.
10. Using a punch, remove the lock pin from the top sub.
11. Loosen and remove the mandrel from the top sub.

CAUTION: Use a wrench only on the wrench flats. Gouges or upsets on the polished mandrel surface will damage the seals and cause fluid leaks.

11. Loosen and remove the mandrel from the top sub.
12. Slide off the middle body insert from the mandrel.
13. If applicable, secure the middle body insert in a vise to remove the insert bushing.
14. Remove all of the O-ring seals from the middle body insert, by pass valve, and the balance piston.
15. Examine the non-extrusion rings and seal protector rings. Replace any damaged or worn parts.

ASSEMBLY

The Logan Hydraulic Wireline Jar is easily assembled using standard shop tools. A Logan Jar Service Kit is recommended.

Make sure all parts have been thoroughly cleaned, inspected, and lubricated prior to assembly. Replace any damaged or worn parts.

1. To replace a seal assembly, insert the non-extrusion ring (or rings) into the groove. The bevel of the non-extrusion ring should face the matching bevel of the groove.
2. Insert the seal protector ring (or rings) into the groove, against the flat face of the non-extrusion ring. Press and straighten the rings in place with the thumbs.
3. Insert the O-rings between the seal protector rings.
4. Position the seal assemblies and set them in place with the setting tool from the Jar Service Kit.
5. Secure the top sub horizontally in a vise. Clamp on the large outside diameter.

6. Screw the insert bushing into the middle body insert. Carefully slide them over the threaded end of the mandrel without damaging the seals in the process.
7. Screw the mandrel into the top sub. Use the wrench flats to tighten.
8. Insert the lock pin into the top sub and through the mandrel end. Drive in the lock pin with a light hammer until it is flush with the top sub O.D.
9. Install the check valve assembly, with the spring guide in the spring, and the valve plug and valve plug seat with their seals in place, into the piston end of the mandrel.
10. Reposition the tool in the vise, this time clamping on the O.D. of the middle body insert bushing. Tighten the middle body insert on the insert bushing.
11. Slide the middle body over the mandrel with the slotted end of the middle body facing towards the lower end of the mandrel.
12. Re-clamp the assembly vertically with the top sub down and the mandrel pulled out (with the Jar open) in the vise.
13. Pour 10-W-30 oil into the middle body until the oil overflows through the equalizing holes.
14. Insert the balance piston into the middle body with the stinger end facing towards the bottom sub.
15. Screw the bottom sub into the middle body and hand-tighten.
16. Clamp the assembly horizontally with the fill plug facing up in the vise. Remove the fill plug. Tighten the bottom sub.
17. Slowly close the Jar. When it is completely closed, insert and tighten the fill plug. Avoid over-tightening.
18. Tighten all connections. Refer to Chart B – Maximum Recommended Tightening Torques on page 6.

TESTING THE JAR

Test the Jar for operation by making up a lifting-type sub with a bail, or equivalent, to the top sub. Make up another sub that an 850 lb. weight can be attached and install it on the bottom sub.

Hang the Jar on a hoist (2,000 lb. minimum capacity). Suspend approximately 850 lbs. of dead weight from the bottom sub. Slack off the hoist until the weight rests on the floor and the Jar closes. Rapidly hoist the Jar until the weight is raised off the floor by a height equal to the stroke of the Jar minus one (1) or two (2) inches. Begin clocking the time required for the Jar to stroke open as soon as the load is lifted.

The table below lists the approximate time required for a Logan Hydraulic Wireline Jar with an 850 lb. fixed pull load to stroke:

Jar O.D.	Load (lbs)	Time Req'd to Stroke
1-1/8	850	30 sec to 1 min
1-1/4	850	45 sec to 1-1/2 min
1-1/2	850	1 to 2 min
1-3/4	850	1-1/2 to 2-1/2 min
2-1/8	850	2 to 3 min

CAUTION: The hoist must have at least one (1) ton (2,000 lb.) capacity. Damage to the hoist or injury to rig personnel may occur if the hoist is too light. If leaks are detected at the seals, or if the Jar is low on fluid, the tool should be disassembled for repair.

CHART A – STRENGTH DATA

COMPLETE ASSEMBLY	Logan Part No.	700-000	700-925	700-875	700-002	700-003	700-004	700-1000	700-1163	700-006
	Bowen No.	35097	11740	11180	48383	51227	35518	79297	11550	...
OUTSIDE DIAMETER (INCHES)		1-1/8	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-3/4	2-1/8	2-3/4
MAXIMUM JARRING LOAD (LBS)		5,300	6,500	9,200	9,200	9,200	9,200	15,500	21,000	...
TENSILE @ YIELD (LBS) AFTER JARRING		22,000	22,000	37,500	37,500	37,500	37,500	54,500	92,500	...

Tensile strength is a calculated theoretical yield point and is considered accurate to ± 20%.

CHART B – RECOMMENDED TIGHTENING TORQUES (FT-LBS)

COMPLETE ASSEMBLY	Logan Part No.	700-000	700-925	700-875	700-002	700-003	700-004	700-1000	700-1163	700-006
	Bowen No.	35097	11740	11180	48383	51227	35518	79297	11550	...
OUTSIDE DIAMETER (INCHES)		1-1/8	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-3/4	2-1/8	2-3/4
TOP SUB TO MANDREL		40	35	75	75	75	75	135	325	...
INSERT BUSHING TO MIDDLE BODY INSERT		80	80	180	180	180	180	230	...	...
MIDDLE BODY INSERT TO MIDDLE BODY		90	160	210	210	210	210	390	690	...
MIDDLE BODY TO BOTTOM SUB		130	190	300	300	300	300	440	800	...

Makeup torques are the maximum recommended makeup torques for each connection and are set at 50% of the calculated theoretical yield torque.

Hydraulic Wireline Jar

OUTSIDE DIAMETER		1-1/8	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-3/4
CONNECTIONS		5/8	15/16	15/16	15/16	15/16	15/16	3/4
PIN UP - BOX DOWN		11 THD	10 THD	10 THD	10 THD	10 THD	10 THD	SR
LENGTH OF STROKE		6-3/4	9-1/4	8-3/4	8-3/4	20	12	10
COMPLETE ASSEMBLY	Logan Part No.	700-000	700-925	700-875	700-002	700-003	700-004	700-1000
	Bowen No.	35097	11740	11180	48383	51227	35518	79297
TOP SUB	Logan Part No.	AL1000	AL1001	AL1002	AL1002	AL1002	AL1002	AL1003
	Bowen No.	35098	11741	10761	10761	10761	10761	12761
MIDDLE BODY	Logan Part No.	AL2000	AL2001	AL2002	AL2002	AL2003	AL2004	AL2005
	Bowen No.	35099	11744	11182	11182	51228	35519	12765
MIDDLE BODY INSERT	Logan Part No.	AL3000	AL3001	AL3002	AL3002	AL3002	AL3002	AL3003
	Bowen No.	35100	29486	28652	28652	28652	28652	79298
INSERT BUSHING	Logan Part No.	AL4000	AL4001	AL4002	AL4003	AL4002	AL4003	AL4006
	Bowen No.	35101	33572	33571	35085	33571	35085	79299
MANDREL	Logan Part No.	AL5000	AL5001	AL5002	AL5003	AL5004	AL5005	AL5006
	Bowen No.	35102	11742	11184	35086	51229	35520	79300
BOTTOM SUB	Logan Part No.	AL6000	AL6001	AL6002	AL6002	AL6002	AL6002	AL6003
	Bowen No.	35103	11747	11181	11181	11181	11181	12767

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When ordering, please specify:

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- (2) Connections, if other than standard

Recommended Spare Parts:

- (1) 1 Balanced Piston
- (2) 2 Valve Plugs
- (3) 4 Valve Plug Springs
- (4) 2 Valve Plug Seats
- (5) 6 Mandrel Non-Extrusion Rings
- (6) 6 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 6 Complete Packing Sets

Hydraulic Wireline Jar

OUTSIDE DIAMETER		1-1/8	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-3/4
CONNECTIONS		5/8	15/16	15/16	15/16	15/16	15/16	3/4
PIN UP - BOX DOWN		11 THD	10 THD	10 THD	10 THD	10 THD	10 THD	SR
LENGTH OF STROKE		6-3/4	9-1/4	8-3/4	8-3/4	20	12	10
COMPLETE ASSEMBLY	Logan Part No.	700-000	700-925	700-875	700-002	700-003	700-004	700-1000
	Bowen No.	35097	11740	11180	48383	51227	35518	79297
BALANCE PISTON	Logan Part No.	AL7000	AL7001	AL7002	AL7002	AL7002	AL7002	AL7003
	Bowen No.	35104	11746	11185	11185	11185	11185	12766
VALVE PLUG	Logan Part No.	AL8000	AL8000	AL8000	AL8000	AL8000	AL8000	AL8000
	Bowen No.	11189	11189	11189	11189	11189	11189	11189
VALVE PLUG SPRING	Logan Part No.	AL9000	AL9000	AL9000	AL9000	AL9000	AL9000	AL9000
	Bowen No.	834	834	834	834	834	834	834
VALVE PLUG SEAT	Logan Part No.	AL10000	AL10000	AL10001	AL10001	AL10001	AL10001	AL10001
	Bowen No.	11745	11745	11186	11186	11186	11186	11186
FILL PLUG	Logan Part No.	AG10004	AG10000	AG10000	AG10000	AG10000	AG10000	AG10000
	Bowen No.	39941	617	617	617	617	617	617
LOCK PIN	Logan Part No.	AL11000	AL11001	AL11002	AL11002	AL11002	AL11002	AL11003
	Bowen No.	15136	16010	13432	13432	13432	13432	18183
SPRING GUIDE	Logan Part No.	AL16000	AL16000	AL16000	AL16000	AL16000	AL16000	AL16000
	Bowen No.	48307	48307	48307	48307	48307	48307	48307
MANDREL	Logan Part No.	L365-11	L365-11	L365-15	L365-15	L365-15	L365-15	L365-17
NON-EXTRUSION RING	Bowen No.	365-11	365-11	365-15	365-15	365-15	365-15	365-17
	No. Req'd	2	2	2	2	2	2	2
MANDREL SEAL	Logan Part No.	L375-11	L375-11	L375-15	L375-15	L375-15	L375-15	L375-17
PROTECTOR RING	Bowen No.	375-11	375-11	375-15	375-15	375-15	375-15	375-17
	No. Req'd	2	2	2	2	2	2	2
BALANCE PISTON	Logan Part No.	L366-11	L366-11	L366-16	L366-16	L366-16	L366-16	L366-20
NON-EXTRUSION RING	Bowen No.	366-11	366-11	366-16	366-16	366-16	366-16	366-20
	No. Req'd	2	2	2	2	2	2	2
BALANCE PISTON SEAL	Logan Part No.	L82-11	L82-11	L82-16	L82-16	L82-16	L82-16	L82-20
PROTECTOR RING	Bowen No.	82-11	82-11	82-16	82-16	82-16	82-16	82-20
	No. Req'd	2	2	2	2	2	2	2

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Recommended Spare Parts:

- (1) 1 Balanced Piston
- (2) 2 Valve Plugs
- (3) 4 Valve Plug Springs
- (4) 2 Valve Plug Seats
- (5) 6 Mandrel Non-Extrusion Rings
- (6) 6 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 6 Complete Packing Sets

Hydraulic Wireline Jar

OUTSIDE DIAMETER		1-1/8	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-3/4
CONNECTIONS		5/8	15/16	15/16	15/16	15/16	15/16	3/4
PIN UP - BOX DOWN		11 THD	10 THD	10 THD	10 THD	10 THD	10 THD	SR
LENGTH OF STROKE		6-3/4	9-1/4	8-3/4	8-3/4	20	12	10
COMPLETE ASSEMBLY	Logan Part No.	700-000	700-001	700-875	700-002	700-003	700-004	700-1000
	Bowen No.	35097	11740	11180	48383	51227	35518	79297
VITON O-RING PACKING SET	Logan Part No.	28000-008	28000-009	28000-010	28000-010	28000-010	28000-010	28000-011
<i>Consists of:</i>	Bowen No.	35106	11754	11191	11191	11191	11191	79327
MANDREL SEAL	Logan Part No.	568-112	568-112	568-210	568-210	568-210	568-210	568-212
	Bowen No.	568112	568112	568210	568210	568210	568210	568212
BALANCE PISTON SEAL	Logan Part No.	568-113	568-113	568-211	568-211	568-211	568-211	568-215
	Bowen No.	568113	568113	568211	568211	568211	568211	568215
MIDDLE BODY	Logan Part No.	568-116	568-116	568-215	568-215	568-215	568-215	568-218
INSERT SEAL (LARGE)	Bowen No.	568116	568116	568215	568215	568215	568215	568218
MIDDLE BODY	Logan Part No.	...	...	...	...	...	...	...
INSERT SEAL (SMALL)	Bowen No.	...	...	...	...	...	...	...
VALVE PLUG SEAL	Logan Part No.	568-007	568-007	568-007	568-007	568-007	568-007	568-007
	Bowen No.	568007	568007	568007	568007	568007	568007	568007
VALVE PLUG	Logan Part No.	568-110	568-110	568-112	568-112	568-112	568-112	568-112
SEAT SEAL	Bowen No.	568110	568110	568112	568112	568112	568112	568112
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

ACCESSORIES

SERVICE KIT	Logan Part No.	28001-013	28001-014	28001-015	28001-015	28001-015	28001-015	28001-016
	Bowen No.	35105	11751	11178	11178	11178	11178	15997
MANDREL BODY	Logan Part No.	AG1000-10	AG1000-11	AG1000-15	AG1000-15	AG1000-15	AG1000-15	AG1000-17
SETTING TOOL	Bowen No.	22709-10	22709-11	22709-15	22709-15	22709-15	22709-15	22709-17
BALANCE PISTON	Logan Part No.	AL13000-11	AL13001	AL13000-16	AL13000-16	AL13000-16	AL13000-16	AL13000-20
SETTING TOOL	Bowen No.	22729-11	11753	22729-16	22729-16	22729-16	22729-16	22729-20

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Recommended Spare Parts:

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- (2) 2 Valve Plugs
- (3) 4 Valve Plug Springs
- (4) 2 Valve Plug Seats
- (5) 6 Mandrel Non-Extrusion Rings
- (6) 6 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 6 Complete Packing Sets

Hydraulic Wireline Jar

OUTSIDE DIAMETER		2-1/8	2-3/4				
CONNECTIONS		7/8	1-9/16				
PIN UP - BOX DOWN		SR	10 THD				
LENGTH OF STROKE (INCHES)		11-5/8	20				
COMPLETE ASSEMBLY	Logan Part No.	700-1163	700-006				
	Bowen No.	11550	...				
TOP SUB	Logan Part No.	AL1004	AL1005				
	Bowen No.	11543	...				
MIDDLE BODY	Logan Part No.	AL2006	AL2007				
	Bowen No.	11537	...				
MIDDLE BODY INSERT	Logan Part No.	AL3004	AL3005				
	Bowen No.	11538	...				
INSERT BUSHING	Logan Part No.	...	...		
	Bowen No.	...	...		
MANDREL	Logan Part No.	AL5007	AL5008				
	Bowen No.	11539	...				
BOTTOM SUB	Logan Part No.	AL6004	AL6005				
	Bowen No.	11536	...				
BALANCE PISTON	Logan Part No.	AL7004	AL7005				
	Bowen No.	11540	...				
VALVE PLUG	Logan Part No.	AL8000	AL8001				
	Bowen No.	11189	...				
VALVE PLUG SPRING	Logan Part No.	AL9000	AL9001				
	Bowen No.	834	...				
VALVE PLUG SEAT	Logan Part No.	AL10001	AL10002				
	Bowen No.	11186	...				
FILL PLUG	Logan Part No.	AG10002	AG10003				
	Bowen No.	329	...				
LOCK PIN	Logan Part No.	AL11004	AL11005				
	Bowen No.	42732	...				
SPRING GUIDE	Logan Part No.	AL16000	AL16001				
	Bowen No.	48307	...				

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- (9) 6 Complete Packing Sets

Hydraulic Wireline Jar

OUTSIDE DIAMETER		2-1/8	2-3/4				
CONNECTIONS		7/8	1-9/16				
PIN UP - BOX DOWN		SR	10 THD				
LENGTH OF STROKE (INCHES)		6-3/4	20				
COMPLETE ASSEMBLY	Logan Part No.	700-1163	700-006				
	Bowen No.	11550	...				
MANDREL	Logan Part No.	L365-21	L365-27				
NON-EXTRUSION RING	Bowen No.	365-21	365-27				
	No. Req'd	2	2				
MANDREL SEAL	Logan Part No.	L375-21	L375-27				
PROTECTOR RING	Bowen No.	375-21	375-27				
	No. Req'd	2	2				
BALANCE PISTON	Logan Part No.	L366-24	L366-28.5				
NON-EXTRUSION RING	Bowen No.	366-24	...				
	No. Req'd	2	2				
BALANCE PISTON SEAL	Logan Part No.	L82-24	8-235				
PROTECTOR RING	Bowen No.	82-24	...				
	No. Req'd	2	2				

Innovex 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

Recommended Spare Parts:

- (1) 1 Balanced Piston
- (2) 2 Valve Plugs
- (3) 4 Valve Plug Springs
- (4) 2 Valve Plug Seats
- (5) 6 Mandrel Non-Extrusion Rings
- (6) 6 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 6 Complete Packing Sets

Hydraulic Wireline Jar

OUTSIDE DIAMETER		2-1/8	2-3/4				
CONNECTIONS		7/8	1-9/16				
PIN UP - BOX DOWN		SR	10 THD				
LENGTH OF STROKE (INCHES)		11-5/8	20				
COMPLETE ASSEMBLY	Logan Part No.	700-1163	700-006				
	Bowen No.	11550	...				
VITON O-RING PACKING SET	Logan Part No.	28000-012	28000-013				
<i>Consists of:</i>	Bowen No.	11553	...				
MANDREL SEAL	Logan Part No.	568-216	568-222				
	Bowen No.	568216	568222				
BALANCE PISTON SEAL	Logan Part No.	568-219	568-325				
	Bowen No.	568219	568325				
MIDDLE BODY	Logan Part No.	568-223	568-226				
INSERT SEAL (LARGE)	Bowen No.	568223	568226				
MIDDLE BODY	Logan Part No.	568-211	568-224				
INSERT SEAL (SMALL)	Bowen No.	568211	568224				
VALVE PLUG SEAL	Logan Part No.	568-007	568-007				
	Bowen No.	568007	568007				
VALVE PLUG	Logan Part No.	568-112	568-112				
SEAT SEAL	Bowen No.	568112	568112				
FILL PLUG SEAL	Logan Part No.	568-006	568-006				
	Bowen No.	568006	568006				

Accessories

SERVICE KIT	Logan Part No.	28001-017					
	Bowen No.	11554					
MANDREL BODY	Logan Part No.	AG1000-24					
SETTING TOOL	Bowen No.	22709-21					
BALANCE PISTON	Logan Part No.	AL13000-24					
SETTING TOOL	Bowen No.	22729-24					

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- (6) 6 Mandrel Seal Protector Rings
- (7) 4 Balance Piston Non-Extrusion Rings
- (8) 4 Balance Piston Seal Protector Rings
- (9) 6 Complete Packing Sets



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