#### **SPM™ Oil & Gas Flow Control Products**



EXL PLUG VALVE Operation Instruction and Service Manual



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#### SPM<sup>™</sup> PRODUCT SAFETY GUIDE

# **WARNING:** IMPORTANT SAFETY INFORMATION ENCLOSED. READ THIS OPERATING AND MAINTENANCE INSTRUCTIONS MANUAL BEFORE OPERATING PRODUCT.

#### WARNING: THIS INFORMATION MUST BE AVAILABLE TO ALL PERSONNEL THAT WILL OPERATE AND MAINTAIN EQUIPMENT. FAILURE TO READ, UNDERSTAND AND FOLLOW THE OPERATING AND MAINTENANCE INSTRUCTIONS MANUAL COULD RESULT IN SERIOUS BODILY INJURY, DEATH, OR PROPERTY DAMAGE.

Most SPM<sup>™</sup> products generate, control or direct pressurized fluids; therefore, it is critical that those who work with these products be thoroughly trained in their proper application and safe handling. It is also critical that these products be used and maintained properly!!

SPM<sup>™</sup> flow products contain elastomeric seals and are not intended to provide proper functionality when exposed to fire.

# WARNING: MISUSE, SIDE LOADING, IMPROPER MAINTENANCE, OR DISASSEMBLY UNDER PRESSURE CAN CAUSE SERIOUS BODILY INJURY, DEATH, OR PROPERTY DAMAGE.

The following information is given in good faith and should aid in the safe use of your SPM<sup>™</sup> products. This information is not meant to replace existing Company's safety policies or practices.

#### Personal Responsibilities:

- 1. When working on SPM<sup>™</sup> flow control products, safety glasses, approved safety shoes and hard hat must be worn.
- 2. Personnel should never hammer on any component when pressure is present. Hammering on any part or component may also cause foreign material or steel slags to become airborne.
- 3. It is a personal responsibility to use the proper tools when servicing the valve. It is a personal responsibility to be knowledgeable and trained in the use and handling of tools for all maintenance of the valve.
- 4. Hot surface may be present; it is a person's own responsibility to protect against burn injury.

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#### On Location:

Each valve is clearly marked with a maximum pressure rating. This pressure must not be exceeded or **SERIOUS BODILY INJURY, DEATH, OR PROPERTY DAMAGE may occur.** 

- 1. The valve discharge connections should be properly cleaned and lightly oiled before the downstream piping is attached. Any worn, damaged or missing seals should be replaced.
- 2. Welding, brazing or heating any part of the product is prohibited. If accessories must be attached, consult SPM<sup>™</sup> Oil & Gas factory prior to installation.
- 3. A complete visual inspection of the product must be made prior to each use. Any leaking seals, broken bolts, leaking hoses or improperly tightened parts must be remedied prior to using.
- 4. Any repairs or service (even routine maintenance) performed on the product must be performed by a trained service technician who is qualified to work on high pressure flow control products. All such service and repairs must be supervised by qualified management personnel or returned to SPM<sup>™</sup> Oil & Gas for service. <u>Only SPM<sup>™</sup> replacement parts should be utilized</u>. Failure to do so may result in loss of warranty as well as SERIOUS BODILY INJURY, DEATH, OR PROPERTY DAMAGE.

#### **Special Precautions:**

- 1. The modifications to or unauthorized repair of any part of a SPM<sup>™</sup> product, or use of components not qualified by SPM<sup>™</sup> Oil & Gas can lead to damage or failure and **SERIOUS INJURY OR DEATH!**
- 2. All SPM<sup>™</sup> threaded components are right hand threaded unless specifically designated otherwise. Any turning counterclockwise will unscrew the assembly. Make sure all threaded components are assembled to the correct torque value.
- 3. All products should be properly cleaned, greased or oiled after each use and inspected prior to each use.
- 4. Each union connection is clearly marked with a pressure code (i.e. "1502", 15,000 PSI). This pressure must not be exceeded. This code should also be used with mating unions. Improper mating can result in failures. All union connections used must match (according to size, pressure rating, etc.). These connections must also match the service of the designated string they are installed in.

#### WARNING: OBSERVE ALL INSTRUCTIONS, CAUTIONS AND WARNINGS AS NOTED IN THIS MANUAL. FAILURE TO DO SO CAN LEAD TO EQUIPMENT DAMAGE AND SERIOUS BODILY INJURY, DEATH, OR PROPERTY DAMAGE.

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# **SECTION I: General Information**

## Assemblies/Kits/Tools:

Size	Part No	Description		Configuration		
	2A36546	3" PLUG VALVE/MANUAL OPERATI	ED	HAMMER UNION – MANUAL		
	2A36659	3" PLUG VALVE/GEAR WHEEL OPERATED		HAMMER UNION – WHEEL		
	2A38171	3" PLUG VALVE/HYDRAULIC		HAMMER UNION – HYDRAULIC		
	2A34137	3" PLUG VALVE/MANUAL OPERATI	ED	SAFETY IRON <sup>®</sup> – MANUAL		
	2A36654	3" PLUG VALVE/GEAR WHEEL OPERATED		SAFETY IRON – WHEEL		
3" 1502	2A38388	3" PLUG VALVE /HYDRAULIC		SAFETY IRON <sup>®</sup> - HYDRAULIC		
3" 15K		REBUILI	D KIT	S		
	2A37019	KIT/PARTS/PV/3 SP150WU/EXL		PARTS KIT – (3" 1502/15K ONLY)		
	2A37039	KIT/SEAL/PV/3 SP150WU/EXL		SEAL KIT – (3" 1502/15K ONLY)		
	TOOLS					
	2A38435	i8435   PLUG PUSHER				
	2A37197	J7 CAP WRENCH				
	2A42166   ACTUATOR BEARING INSTALLATION TOOL					
	2A34084	4" PLUG VALVE/GEAR WHEEL OPERATED		HAMMER UNION – WHEEL		
	2A38394	4" PLUG VALVE/HYDRAULIC		HAMMER UNION – HYDRAULIC		
	2A36870	4" PLUG VALVE/GEAR WHEEL OPERATED		SAFETY IRON <sup>®</sup> – WHEEL		
	2A38493	4" PLUG VALVE/HYDRAULIC	4" PLUG VALVE/HYDRAULIC SAFETY IRON <sup>®</sup> – HYD			
<b>A'' 1002</b>		REBUIL	D KIT	S		
4" 1002 4" 10K	2A38414	KIT/PARTS/PLUG VALVE/4 SP150WU/EXL	P	PARTS KIT – 4" 1002/10K & 4"1502/15K		
	2A38417	KIT/SEAL/PLUG VALVE/4 SP150WU/EXL	JG VALVE/4 SEAL KIT – 4" 1002/10K & 4"1502/15K			
		ТОО	LS			
	2A38469	PLUG PUSHER				
	2A37333	CAP WRENCH				
	2A42166	ACTUATOR BEARING INSTALLATION TOOL				

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Size	Part No	Description	Configuration	
	2A34099	PLUG VALVE/4 SP150/EXL/GEAR		HAMMER UNION – WHEEL
	2A38372	PLUG VALVE/4 SP150/ EXL /HYD		HAMMER UNION – HYDRAULIC
	2A36697	PLUG VALVE/4 SP150/SAFETY IRON/GEAR		SAFETY IRON <sup>®</sup> – WHEEL
	2A38466	PLUG VALVE/4 SP150/SAFETY IRC EXL HYD	N	SAFETY IRON <sup>®</sup> – HYDRAULIC
4" 4502	REBUILD KITS			
4 1502 4" 15K	2A38414	KIT/PARTS/PLUG VALVE/4 SP150WU/EXL	T/PARTS/PLUG VALVE/4 P150WU/EXL PARTS KIT –4" 1002/10K & 4"1	
	2A38417	KIT/SEAL/PLUG VALVE/4 SP150WU/EXL	SEAL KIT - 4" 1002/10K & 4"1502/1	
		ТОО	LS	
	2A38469	PLUG PUSHER		
	2A37333 CAP WRENCH			
	2A42166	ACTUATOR BEARING INSTALLATION	ON TO	OOL

## Pressure /Temperature Ratings:

Size	Part Number	Description	Conn End Type	Service	Working Pressure (PSI)	Temp Ranç	erature ge (C)
	2A36546	3" PLUG VALVE/MANUAL OPERATED	H.U.				
3" 1502 3" 15K	2A36659	3" PLUG VALVE/GEAR WHEEL OPERATED	H.U.	STD	15,000	-30	110
	2A38171	3" PLUG VALVE/HYDRAULIC	H.U.				
	2A34137	3" PLUG VALVE/MANUAL OPERATED	S.I.				
	2A36654	3" PLUG VALVE/GEAR WHEEL OPERATED	S.I.				
	2A38388	3" PLUG VALVE /HYDRAULIC	S.I.				

	2A34084	4" PLUG VALVE/GEAR WHEEL OPERATED	H.U.				
4" 1002	2A38394	4" PLUG VALVE/HYDRAULIC	H.U.	етр	10.000	20	110
4" 10K	2A36870	4" PLUG VALVE/GEAR WHEEL OPERATED	S.I.	510	10,000	-30	110
	2A38493	4" PLUG VALVE/HYDRAULIC	S.I.				

4" 1502 4" 15K 2A3 2A3 2A3	2A34099	PLUG VALVE/4 SP150/EXL/GEAR	H.U.		45.000	20	110
	2A38372	PLUG VALVE/4 SP150/EXL/ HYDRAULIC	H.U.	etn			
	2A36697	PLUG VALVE/4 SP150/SAFETY IRON/EXL/GEAR	S.I.	310	15,000	-30	TIU
	2A38466	PLUG VALVE/4 SP150/SFTY IRN/EXL/ HYDRAULIC	S.I.				

Note: H.U. denotes Hammer Union End Connection S. I. denotes Safety Iron End Connection

#### **Product Description:**

The SPM<sup>™</sup> EXL plug valve features the following attributes:

- Dual static face seals incorporate a self-energizing design to allow for proper sealing in both low- and high-pressure applications
- Free-floating plug design provides reliable, adjustment-free operations
- Proprietary pre-loaded seal segments create initial seal between dynamic seal surfaces to eliminate sand trapping and decrease washouts
- Dual grease ports, one on each side, offer easy access, uniform grease distribution and decreased maintenance time
- Enhanced internal geometry for prevention of erosion damage
- Robust, forged body and high-strength alloy steel pressure-bearing components provide longer life

SPM<sup>™</sup> plug valves are designed to regulate the transport of fluid through a flow line. By rotating the plug 90 degrees, the flow can either be terminated, or allowed to flow through the plug valve bore. They require minimum space, are simple to operate, exhibit a fast response, and add relatively little internal disturbance to the flow.

Operation is accomplished by a 90 degree rotation of the plug. This can be performed manually, with a wheel/gear operator or with a hydraulic actuator.

#### **General Description:**

All SPM<sup>™</sup> plug valves are in compliance with the following regulations:

- Pressure Equipment Directive 97/23/EC.
- Det Norske Veritas' Rules of Classification of Mobile Offshore Units (DNV)
- NACE MR0175-09 (H2S Exposure) (Applicable models)

#### **End Connection Options:**

The SPM<sup>™</sup> plug valve family is available with SPM<sup>™</sup> wing union or Safety Iron<sup>®</sup> connections. The data band will indicate the allowable cold working pressure for each assembly.

Wing union connections on the plug valve are interchangeable with other SPM<sup>™</sup> union connections of the same size and figure (pressure rating). Caution must be taken to avoid mixing different ratings of wing connections. There are various sizes and figures that are capable of making marginal connections. SPM<sup>™</sup> Safety Iron<sup>®</sup> connections are universal, requiring no male or female as does the wing union. Failure to observe good judgment may lead to failure of components and danger to life and limb. **Always verify working pressure ratings of each connection before use.** 

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# **SECTION II: Assembly Procedure**

#### **BOM Table:**

ITEM	QTY	DESCRIPTION			
1	1	CAP BOLT			
2	1	SPRING WASHER			
3	2	MANUAL KEY			
4	1	ACTUATOR			
5	1	SEAL RING			
6	1	DATABAND			
7	2	GREASE FITTINGS (PRIMARY) (SHOWN ON PAGE 10 & 20)			
	2	GREASE FITTINGS (WITH SLOT) – ONLY ON SELECT VERSIONS (PAGE 20)			
8	1	NAMEPLATE			
9	2	DRIVE RIVETS			
10	4	GROVE PINS			
11	1	SET SCREW			
12	1	PLUG VALVE BODY			
13	1	RETAINER RING			
14	3	RETAINER SEGMENT			
15	1	WING NUT			
16	1	THRUST BEARING			
17	1	PLUG ADAPTER			
18	1	BACK-UP RING			
19	1	O-RING SEAL			
20	1	SPACER			
21	1	BACK-UP RING			
22	1	O-RING SEAL			
23	1	PLUG			
24	2	SIDE SEGMENTS			
25	2	SEAL SEGMENTS			
26	2	SEGMENT SEAL - OUTSIDE			
27	2	SEGMENT SEAL - INSIDE			
28	1	CAP BACK-UP RING			
29	1	CAP O-RING SEAL			
30	1	ACTUATOR CAP COVER			
31	1	ACTUATOR CAP NUT			

# Bill of Material (BOM) is based off of Hammer Union configuration. Descriptions on unions connection components may vary for SPM<sup>®</sup> Safety Iron<sup>®</sup> (S.I.) connections. See S.I. technical literature for additional information.

# Exploded View – Top Assembly:



# **Exploded View – Internals**



# **Required Tools:**



	DESCRIPTION	ID	DESCRIPTION		
1	SAFETY GLASSES	13	IMPACT WRENCH		
2	SAFETY GLOVES (CUT RESISTANT)	14	SOCKET (3/4")		
3	SAFETY GLOVES (NITRILE)	15	SOCKET WRENCH		
4	SAFETY BOOTS	16	CRESCENT WRENCH		
5	LOCTITE <sup>®</sup> 243	17	RUBBER MALLET		
			GREASE GUN (HAND PUMP) – (P40156) – VALTEX		
6	SUPER LUBE 41050	18	VIPER 8-11 OZ CAPACITY		
7	C5A COPPER LOCTITE® ANTI-SEIZE	19	PIN SETTER		
8	ALLEN WRENCH SET (STD)	20	HOIST		
9	ACTUATOR BEARING TOOL (2A42166)	21	GREASE MACHINE (2A39533) – VALTEX QS-5000- C – 5LBS CAPACITY		
10	VISE (MOUNTED)	-	VALTEX 1502 (FOR ASSEMBLY) - P36791		
			VALTEX 972 (FOR RE-GREASING)		
	PLUG BODY PRESS TOOL (2A38435)		P32553 – 5 LBS GREASE FOR MACHINE		
11	See Page 5 for other sizes	-	P40230 – 8 OZ. FOR HAND PUMP		
12	CAP WRENCH (See Page 5 for correct size)	AIR AND OTHER SHOP TOOLS MAY BE PREFFERED			

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#### Assembly



#### Mount Body onto table with union connection & Use Seal Segment Pin setter to install pins



<u>Plug Adapter Installation:</u> Install Plug Adapter/Spacer and seals. Apply Super Lube<sup>®</sup> 41050 Synthetic Grease or approved equivalent on the seals as shown. Use vise to position Spacer on so that Plug Adapter can easily install.

#### Assembly continued

<u>Thrust Bearing Installation</u>: Lubricate thrust bearing liberally. Install thrust bearing into bottom of valve body. Verify that its groove is facing up as highlighted in yellow. This is not a press fit, so it should drop right into position.



<u>Adapter/Spacer Installation</u> Use Actuator Bearing Tool (SPM<sup>™</sup> part number 2A42166) to install Adapter/Spacer sub assembly into Plug Valve Body. Verify Adapter/Spacer Flats are perpendicular to the Plug Valve Body bore. Using a rubber mallet, lightly tap assembly into position.

#### Assembly continued



<u>Segment Installation:</u> Install Seal Segment Inner & Outer Seals. Apply a coat of Valtex 1502 grease (SPM<sup>™</sup> part number P36791) onto whole segment assembly



<u>Segment Installation</u>: Line up slots on Seal Segments to match the Body's pins inside Body. Install Segment assembly

#### Assembly continued



Plug Installation: Use Plug Body Press Tool (2A38435) to press Plug down into Body. (See page 5 for part numbers) The use of a lifting eye will assist in lowering the plug to avoid pinch points. Once Plug is in position remove the lifting eye and use Body Press Tool to lower Plug into position. Apply small amount of Val-Tex 1502 grease (SPM<sup>™</sup> PN P36791) onto the Plug before installing.

All alternate methods of installing/removing plug shall be approved by SPM<sup>™</sup> Engineering before implementation and use.



<u>Cap Installation:</u> Place Back-Up Ring (Concave Up) and follow it with the O-Ring Seal as shown into the Cap Seal pocket grooves.

Apply Anti-seize to the threads of the Cap Nut Apply Super Lube<sup>®</sup> 41050 Synthetic Grease or approved equivalent on the Cap Cover Seals

#### Assembly continued



<u>Cap Installation:</u> Use appropriate Cap Wrench referenced on page 5 to tighten the Cap onto the body. Tighten cap by striking tool firmly with mallet until the cap ceases to rotate. No specific torque value is required.



<u>Wing nut Installation:</u> Install retainer ring onto plug valve body end as shown, followed by the Wing Nut and Retainer segments. A flat tip screwdriver to open the Retainer Ring will assist in installing the retainer ring into grove. Rotate body 180 degrees to complete the actuator assembly.

Note: Ensure that the retainer segments are all installed in the correct configuration and are SPM<sup>™</sup> manufactured. (Please see S.I. technical literature for instructions regarding S.I. unions)

#### Assembly continued



<u>Actuator Assembly Installation:</u> Apply a small amount of Loctite<sup>®</sup> 243 onto set screw before tightening with a 1/2" Allen Wrench. Line up Actuator and install the two Actuator keys. Install and tighten washer and Actuator Bolt with 1/2" socket.



<u>Grease Fitting Installation:</u> Install both grease fittings onto valve body. Tightening by hand first will prevent cross threading from occurring.

There are two versions of the grease fittings as shown above. (Please see page 21 for details)

#### Grease fitting versions

Grease fittings are designed for long life and may be reinstalled as required. Select early production units included the P39430 to allow for the ability to vent excess grease pressure after completion of the grease procedure. The standard product offering is the P10064, which is offered on all SPM<sup>™</sup> legacy plug valves. Any visual damage to the threads on the grease fitting will require the replacement of the fitting. This will require that the technician identify the Part Number and order the appropriate replacement component. Be advised that this component is not included with the standard kit.

- a. P10064 Standard product offering. Incorporates a 3/8" tapered pipe thread profile and must be installed using Teflon tape
- b. P39430 Only available in the initial release. This fitting incorporates standard <sup>3</sup>/<sub>4</sub>" straight threads and does not require Teflon tape.

#### The two grease fittings are not interchangeable

#### **Wheel Actuator Option**

In order to install the wheel actuator onto the EXL plug valve, a modified actuator adapter will need to be used as illustrated below. If it is desired to have this option, contact SPM<sup>™</sup> Oil & Gas for the necessary parts needed



TORQUE SPECIFICATIONS: AMOUNT OF TURNS FOR OPEN/CLOSE OF VALVE: 12 TURNS RATIO: 48:1 MECHANICAL ADVANTAGE: 16.3 OUTPUT TORQUE: 42,400 in-lbs.

# Wheel Actuator Exploded view



ITEM	QTY	DESCRIPTION
1	1	GEAR BOX ASSEMBLY
2	4	POSITIONING SET SCREWS
3	1	TOP MOUNTING ADAPTER (TO GEAR BOX)
4	1	GEAR BOX KEY
5	4	MOUNTING BOLTS (GEAR BOX)
6	1	GEAR ADAPTER
7	2	MOUNTING BOLTS (TO BODY)
8	1	BOTTOM MOUNTING ADAPTER (TO BODY)
9	2	MOUNTING NUT FASTENERS
10	1	WHEEL KEY ADAPTER
11	1	15.5" WHEEL WITH HANDLE/HARDWARE

## Hydraulic actuator option:

The SPM<sup>™</sup> EXL plug valve is also available with the option of a hydraulic actuator. This would allow remote actuation where personnel are not permitted during operations.

## Hydraulic actuator exploded view:



ITEM	QTY	DESCRIPTION
1	1	3" & 4" HYDRAULIC ACTUATOR
2	6	ACTUATOR BOLTS
3	2	GEAR KEY
4	1	DRIVE GEAR
5	1	ACTUATOR PLATE
6	4	MOUNTING ADAPTER BOLTS
7	1	MOUNTING ADAPTER
8	4	POSITIONING SET SCREWS
9	4	HEX NUT

## Hydraulic Actuator Specifics:

Per manufacturer the following is the hydraulic actuator's specifics:

Recommended working pressure range	30 to 135 bar
Burst test	675 bar
Total dry weight incl. mounting set (25.8 kg)	68.9 kg
Oil displacement	0.8001
Temperature range	Normal application: -25°C to +80°C (NBR seal set) High temperature application: -20°C to +120°C (Viton <sup>®</sup> seal set) Low temperature application: -45°C to +40°C (T.L.T. NITRIL seal set)
Rotation	90 ± 1°
Hydraulic media and viscosities	We recommend acid-free hydraulic oil. Viscosity range: 15-200 cSt. For recommended brands and for other media than oil, please refer to separate data sheet.



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## SECTION III: Maintenance and Repair

#### ALWAYS REMEMBER:

- 1. DISASSEMBLY UNDER PRESSURE CAN CAUSE SERIOUS INJURY OR DEATH.
- 2. Clean all components thoroughly prior to reassembly using protective clothing and safety glasses (wear appropriate PPE).
- 3. Check sealing areas of segments, plug and body for pitting or erosion. Failure in sealing can result if these areas are not smooth.
- 4. Use Engineering Document (ENG-129) "EXL Assembly Grease Procedure" for greasing.
- 5. Use only SPM<sup>™</sup> component parts.
- 6. Flush and grease valve thoroughly after each use.

#### **Required Tools:**

- 1. Assembly tools specific to size of valve, referenced on page 5
- 2. 400 Grit Sandpaper
- 3. Soft Face Mallet
- 4. Grease Gun (SPM<sup>™</sup> P13335)
- 5. Val-Tex 1502 (Temp Range -20F to 400F) SPM™ P/N P36791 (For assembly)
- 6. Val-Tex 972- (Temp Range -20F to 600F), SPM™ P/N P32553 (For Re-greasing)
- 7. Appropriate PPE for your company; Safety Glasses, Steel Toe Boots, Gloves, Protective Clothing

#### **Maintenance Requirements:**

SPM<sup>™</sup> plug valves are made from high quality materials selected to provide the best performance for the customer. However, the application of this product subjects it to handling fluids which are by their very nature corrosive and abrasive. These fluids operate at high velocities and usually at high pressures. Some fluids may also require being conveyed at elevated temperatures. Combinations of any and all of these conditions will speed up the deterioration of internal surfaces including seals and seal surfaces.

Without the benefit of scheduled maintenance to routinely service and inspect the condition of components, premature failure of parts can occur. This can lead to unnecessary material replacement along with the danger of injury to personnel.

Proper usage and maintenance of the plug valve is necessary for safe operation. It is recommended that a routine maintenance include the following criteria (contact the local SPM<sup>™</sup> Service Facility for additional details):

- c. Disassembly, inspection, and gauging of applicable features
- d. Verification of remaining wall thickness at critical locations
- e. Replacement of all expendable items
- f. Hydrostatic pressure testing

In addition, SPM<sup>™</sup> recommends greasing the valve every six (6) actuations of the valve. Frequent greasing is critical to provide successful operation of the valve. Please reference "Recommended Greasing Procedure" on Page 2.

SPM<sup>™</sup> Oil & Gas recommends that the valve be serviced during the following:

#### 1. Preventative Maintenance

Re-greasing the plug valve **after every six (6) actuations of the valve** will increase the life of the plug valve. Normal working operations will allow for grease loss if the plug valve is not serviced. This can create voids within the assembly. These voids will quickly accumulate sand and/or proppants thus increasing the force required to open/close the valve. Frequent greasing of the valve will ensure easier operation.

Reference – "Re-Greasing Procedure" beginning on page 28.

#### 2. <u>Periodic Inspection</u>

Periodic inspections are required to verify that all internal components of the valve are working properly and are to SPM<sup>™</sup> Oil & Gas Engineering's specifications. All inspections must be completed by a qualified technician following SPM<sup>™</sup> approved procedures. It is imperative that technician follow the assembly/inspection instructions beginning on page 13.

Rebuild Kits are available through SPM<sup>™</sup> Oil & Gas Service Centers. They are referenced on page 5.

#### **Re-greasing Requirements:**

#### **Optimal Grease Procedure**

The following procedure is intended for all greasing applications, including new manufacturing, rekitting, and field greasing. See page 29 for all field applications in which the 2<sup>nd</sup> grease port is inaccessible:

- i. Ensure that the plug valve is in the **OPEN** position
- ii. Pump to 2000 PSI to Side 1 of the plug valve
- iii. Close and open valve
- iv. Pump to 2000 PSI to Side 2 of the plug valve
- v. Close and open valve
- vi. Pump to 3500 PSI to Side 1 of the plug valve
- vii. Close and open valve
- viii. Pump to 3500 PSI to Side 2 of the plug valve
- ix. Close and open valve



#### **Grease Procedure When Both Sides Not Accessible**

It is highly recommended that both grease ports be employed during field re-greasing. However, the following procedure maybe implemented for all field greasing requirements in which only a single grease port is accessible:

- i. Ensure that the plug valve is in the **OPEN** position
- ii. Pump to 2000 PSI to one side of the plug valve
- iii. Close and open valve
- iv. Pump to 3500 PSI to one side of the plug valve
- v. Close and open valve



<u>Note:</u> Air may be heard "popping" during opening and closing of the valve. This is acceptable and indicates that excess air is being displaced.

#### Visual inspection

Visually inspect the inside of the valve to ensure the grease is extruding around the sides of the plug.

<u>Note:</u> Use extreme caution when inspecting the interior portion of the valve as the grease may be under high pressure.

#### Approved Grease/Grease Guns:

Grease Gun						
Acceptable			Unacceptable			
Description	SPM™ P/N	Grease Type/Size	Description	SPM™ P/N		
Valtex QS-5000-C	2A39533	Valtex 972/V	Valtex 5-70	-		
Valtex Viper QS-1800	P40156	Valtex 972/J	Valtex 10-70	-		
Valtex QS-2000A	P136985	Valtex 972/J	Valtex 40-70	-		
Climax 10516	P13335	Valtex 972/J	Climax 40- 90MT	-		
Climax 1700*	P23792	Valtex 972/J	Climax 40-90	-		
Valtex 6268A-13*	-	Valtex 972/K	Climax 120-90	-		
Valtex 1400*	-	Valtex 972/J	Climax 40-90- OS	-		
Valtex 1000-31*	-	Valtex 972/K				
Valtex QS-2200A*	-	Valtex 972/J or K				
Any K or J stick hand pump*	-	Valtex 972/J or K				
Grease						
Acceptable		Unacceptable				
Description	SPM™ P/N	SPM Description P/N		SPM™ P/N		
Valtex 972 V Stick	P32553	Climax Stick STD		P13336		
Valtex 972 J Stick	P40230	Climax Stick LT		P13337		
Valtex 972 K Stick*	-	Climax LT 8204		P16832		
Valtex 1502 (Assembly Only)	P36791	Valtex P Pack		-		
		Valtex P-4 Pack		-		
		Valtex 10 (5 Gal.)		-		
		Valtex 40	(16 Gal.)	-		
		Valtex 10	(5 Qt.)	-		
		Any Climax Brand Grease		-		

\*Grease/grease gun is compatible and/or acceptable for use, but is not supported by SPM™ part numbers.

<u>Note:</u> The mixing of grease brands/types may create reduced tack at the interface between greases and result in an increased grease loss rate during pumping operations. While the occurrence will not have any impact on valve performance, it is not recommended to mix greases.

# Troubleshooting Guide:

PROBLEM:	SOLUTION:
A.) Valve leaks through bore when closed	<ol> <li>Seal segments from two different manufacturers have been installed. (ALWAYS REPLACE SEGMENTS IN PAIRS FROM THE SAME MANUFACTURER).</li> <li>Sealing area of segments or body scored or pitted. Resurface with 400 grit sandpaper or replace segments and/ or body.</li> <li>Plug scored or worn. Replace plug.</li> <li>ID of body or OD of seal segments not cleaned properly. Remove parts and clean out any contaminants. If the ID of the body is not cleaned properly, this will not let the O- ring or seal segments seat properly. ID of body may be too pitted to reuse.</li> <li>Segment seal left out, not properly installed, or damaged during assembly. Remove segments, inspect seals and reinstall or replace as necessary.</li> <li>Wrong actuator cap installed forcing plug to tilt to one side. Ensure actuator cap is from same manufacturer as body. (Always use SPM™ actuator caps on SPM™</li> </ol>
B.) Valve will not fully open.	<ol> <li>Worn or damaged actuator cap or not an SPM<sup>™</sup> actuator cap. Remove and install SPM<sup>™</sup> actuator cap. (Always use SPM<sup>™</sup> actuator caps on SPM<sup>™</sup> valves).</li> </ol>
C) Valve leaks at body threads.	<ol> <li>Body cap not tight. Re-tighten. Cap should bottom out.</li> <li>Body cap O-ring scored or cut or no longer maintains seal. Replace O-ring.</li> <li>Body cap damaged or worn. Replace cap. (Always use SPM™ body caps in SPM™ valves).</li> <li>Install back-up ring above the O-ring with concave surface touching the O-ring.</li> <li>Seal area scored or pitted in body. Clean up with 400 grit sandpaper or replace body.</li> </ol>
D) Seals swollen and softened or tacky.	<ol> <li>Avoid solvents. Buna seals are not compatible with solvents such as toluene or xylene. If Buna seals are used, replace with Viton.</li> </ol>
E) Lower edge of plug chipped.	<ol> <li>Always start plug into valve upon reassembly by hand to align chambers on plug and seal segments. Hammering plug before it is properly started can chip the plug's leading edge and often score or damage the seal segments. Use only soft type hammers.</li> </ol>

## SECTION IV: Service and Support

#### Service Center Order Information:

SPM<sup>™</sup> Oil and Gas stocks a large inventory of genuine original equipment replacement parts. In order to expedite a parts order and avoid any delays, please provide the following information with your order:

- The part number and description (refer to drawings and parts lists in this section) of each item ordered.
- The quantity of each part, kit, or assembly ordered.
- The model number and serial number.
- Your purchase order number.
- Specify method of shipment, complete shipping address, complete billing address and telephone number at the destination of the shipment.

Please refer to our web site for global locations:

SPM™ Oil & Gas

601 Weir Way Fort Worth, TX 76108 USA

Tel: +1-(800) 342 7458 Fax:+1- 817-977-2508

www.spmoilandgas.com

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