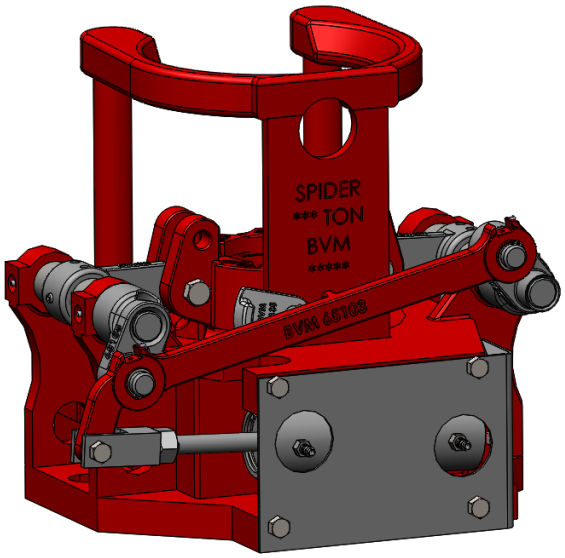
BVM Corporation Maintenance Manual
PNEUMATIC / HYDRAULIC TUBING SPIDER
83 & 125 Tons

Part number: _____ **Serial Number:** _____



Safety

CAUTION: Practice safety in the operation and maintenance and use only approved safety methods, materials and tools. Keep hands away from any pinch point or undesignated areas. The lifting procedures should be observed carefully and carried out according to this manual. BVM equipment is designed for specific functions and application and should be used only for its intended purpose, which is limited to vertical lifting / driving tubular goods, making up and breaking out tubular connections and must not be used for any other purpose.

WARNING: Spiders which have experienced wear beyond established wear criteria set by OEM, or are found to have cracks must be replaced or repaired by a BVM authorized repair facility.

WARNING: Only original BVM parts may be used. Spiders are produced from cast alloy heat treated steel and must not be welded in the field. Improper welding can cause cracks and brittleness in heat-affected areas which can result in dramatic weakening of the part and possible failure. Repairs involving welding and/or machining should be performed only by a BVM authorized repair facility. Using a Spider that has been improperly welded or repaired is dangerous.

NOTE: The owner and user together with the manufacturer should jointly develop and update inspection, maintenance, repair and remanufacture procedures consistent with

equipment application, loading, work environment, usage and other operational conditions. These factors may change from time to time as a result of new technology, equipment history, product improvements, new maintenance techniques and changes in service conditions. Alternatively, BVM recommends using the Periodic inspection and maintenance Categories and Frequencies as mentioned in API RP8B Table 1.

Load test

WARNING: BVM spiders are load tested after manufacture or repair. Load testing is mandatory on spiders which have not been load tested before. Load testing is required on spiders which have been overloaded, for example jarring operations or operations that have induced spiders to high accelerations or high impact loads. In addition, after the load test, an annual inspection should be performed.

Confidentiality Statement

Note: Original Instructions are published in English; in the event the end-user may wish to obtain a translation of these in the official language of the country in which the machinery is to be used please contact your local BVM representative or BVM directly. Please note that this service may not be free of charge. Original Instruction can be downloaded from www.bvmcorp.com

Contents

Purpose

This manual contains operation and service instructions for 83 & 125 ton tubing spider. This manual provides a guide for assembly, disassembly, inspection, and repair.

Description

The BVM Tubing Spider is a pneumatically or hydraulically operated tool capable of handling tubing sizes up to 5-1/2" and comes in a capacity of either 83 or 125 tons. The purpose of the Tubing Spider assembly is to support the tubing string when it is lowered into or raised from the well bore of an oil or gas well. The bore of the tubing spider assembly is located and held in position over the wellhead and blowout preventer system.

The tubing spider assembly operates from pressure that forces a cylinder to move a piston. The piston is connected to the slip assembly via lift arms, crankshafts and link. When the piston moves in one direction, the slip assembly moves "up", which prevents the teeth on the slip inserts from engaging or supporting the tubing string. If the piston moves in the other direction, the slip assembly moves "down", which causes the teeth of the slip inserts to contact, engage, and support the tubing string, if the tubing string is lowered slightly. The location of the valve for controlling the pressure to the cylinder is easily accessible by the rig crew operator. If the tubing spider needs to support the tubing string for an extended period of time, the accidental operation of the valve might cause the tubing spider to release the tubing string. The valve needs protection from such a potential accident. Also, engage the safety latch to prevent the link from moving to release the holding slip assembly.

The slip insert size needs to match the size of the tubing string, or the Tubing Spider will not support the tubing string.

When the rig crew operates the tubing spider assembly, they need to watch of operational and functional problems. This monitoring might reveal necessary maintenance or repair requirements.

Keep fingers, hands, feet, etc. away from the moving lift arm and slip assembly and from the moving link and Crank Shafts to prevent possible bodily injury to the rig crew. Also carefully route the pressure hoses to the Tubing Spider, control valve, and pressure sources in order to prevent a "trip hazard" or to interfere with personnel movement on the rig floor.

Specifications

	83 & 125 Ton	
	English	**Metric**
Pipe Size Range	1.315 thru 5 1/2 in	33 thru 140 mm
Material	Alloy steel, heat treated	
Approximate Weight		
Spider (Less Slips)	348 lbs	158 kg
Operating Pressure		
Pneumatic	90 to 120 psi	620 to 827 kPa
Hydraulic	300 to 500 psi	2068 to 3447 kPa
Dimensions		
Gate opening	5-3/4”	146 mm
Bowl opening	6 ½”	165 mm
Base	18-1/4 x 18-1/2”	463 x 470 mm
Height	18”	457 mm
Base bolt slot centers	13 to 16”	330 to 406 mm
Approximate Cycle Time		
To Set Slips	One Second	
To Release Slips	Two Seconds	
Minimum Temperature	-20°C (-4°F), unless specified otherwise	
Maximum Temperature	55°C (131°F)	
Maximum Humidity	100% RH	
Use limits	Trained persons only (Users responsibility)	
Design life	20 years	

CE Marking (if applicable):

CE

Installation

Before any attempt is made to operate the Tubing Spider, the following section should be read, understood and then followed.

Control Valve & Hoses

Clean, dry air, filtered and regulated to 90 – 120 psi is required to operate these units. Always place the control valve in a location that is easily accessed by the rig crew operator. Verify that the cylinder hoses do not present a trip hazard or interfere with any moving machinery. When connecting and disconnecting the hoses, ensure that there is no pressure on the lines.

Quick Disconnects

The hoses are fitted with quick disconnects. Before a connection is made, inspect the end faces of the quick disconnect. If any foreign material is present, then carefully remove the debris with a lint free rag or towel. Dust caps and plugs should be used with the quick disconnects to protect the ends and minimize contact with debris.

Inspection

Before moving the spider over the well, ensure the correct size slip assembly and inserts match the tube diameter. After the lines are connected, cycle the cylinder and observe the linkage system to see if there are any functional problems. Disconnect the lines before moving the tubing spider.

Mounting

The Spider must be secured over the wellhead. The slotted holes in the base could be used to bolt the Spider to an adapter plate. There are also eyes on the spider where it can be chained down.

Warning:

- The load rating of the Spider should never be exceeded. Both the static and dynamic loads must be calculated to ensure safe working loads.
- Make sure the spider is used with the correct size, tubing or pipe (per specifications). Undersized or oversized pipe could cause uneven stress distribution. Inadequate load-bearing area, and possible Spider failure.
- Spiders are made from cast alloy steel and should not be welded in the field. Improper welding can cause cracks and brittleness in repaired area and can result in drastic weakening of the Spider and Parts and possible Failure.
- Repairs which involve welding and or machining by others that is not authorized by BVM will void the warranty.
- Using a Spider which has been improperly welded can result in serious bodily harm and property damage.
- Never use the Spider other than what it is intended for: size and tonnage, which is clearly marked on Spider.
- Only use the Spider within the specified temperature rating, which is -4°F to 131°F unless otherwise specified.

Note: If a Spider is used despite the above warnings BVM voids all warranties.

Operation

Verify the following before and during operation of the Spider:

- Keep the insert teeth clean from buildup of mud, grease, sand or other debris.
- Lubricate the bushing via the grease fittings found along the linkage assembly.

Depending on the setup of the control valve, pressure applied to the cylinder will either cause it to extend or retract. This cylinder moves the slip assembly via lift arms, crankshafts and links.

Opening the Slips

Retracting the cylinder prevents the insert teeth from engaging and supporting the tubing string by moving the slip up and out of the way.

Closing the Slips

To engage the insert teeth on the tubing string, the cylinder is extended. Then, the load of the tubing string can be held if it is lowered slightly thereby transferring the load from the hook to the spider.

Objects Larger than Spider Bore

When an object is coming in or out of the well that has a diameter larger than the bore of the spider, then the tubing spider has to be removed. Ensure the weight of the tubing string is not being held by the spider. Remove the gate so the spider can be removed from the string. Pass the object, and reinstall the tubing spider over the well. Install the gate back onto the spider and pin it in place. Secure the Spider over the wellhead.

Slip Assembly

The slip assembly must correlate with the size of tubing being held. The following instructions are for the replacement of the slip assembly or inserts. Refer to the warning section of the manual before working on the spider.

Slip Replacement

Follow the steps below. Refer to the parts drawing in this manual for a visual aid.

1. Use the pneumatic/hydraulic system to hold the slip bodies in the raised position.
2. Loosen and remove the nut from the bolt that secures the slip to the lift arm. Lift the slip assembly out of the spider. Repeat for the other side.
3. Replace with the new slip assemblies with inserts already installed. Note: The slip assembly halves are a machined set and must always be kept together. Align the bottom slip hole with the hole in the lift arm and secure using a new bolt and nut. Tighten the nut until the end of the bolt is flush with the end of the nut. Repeat for the other side. Do not over tighten as it is necessary for the slip to float relative to the lift arm.
4. Function test the slip to verify correct operation before usage.

Insert Replacement

Use the following steps as a guide. Refer to the parts drawing in this manual for a visual aid.

1. Use the pneumatic/hydraulic system to hold the slip bodies in the raised position.
2. Remove the four cotter pins.

3. Using a 3/16" or 7/32" drift pin, remove the four retainer pins that are located in the hole formed between the slip body and slip insert.
4. Slide or drive the four slip inserts out of the slip body dove tail groove.
5. Clean the built up debris out of the slip body. Apply a new coating of grease to the slip body.
6. Install the new slip inserts by aligning the vertical groove in the insert with the slip body. Note: Always replace inserts in a full set.
7. Knock the retainer pins back into their corresponding holes.
8. Reinstall the four cotter pins or replace with new ones. Spread the legs of the pins to keep them from falling out.
9. Function test the slip to verify correct operation before usage.

Lubrication

See below for BVM recommendations for grease / lubricants:

General
Lubricate the grease fittings to the four crankshaft bushings and to the two bushings with Shell B&B code 70919 or equivalent.

Slot Coating
Coat the insert slot with a corrosion preventative ISO-L-REE according to ISO 6743-8:1987.

Air Tool Lubricant (Pneumatic Spider only)
It is recommended to use a proper air tool lubricant according to ISO 6743-11:1990 Lubricants, industrial oils and related products (class L) - Classification - Part 11: Family P (Pneumatic tools), classified as PAB and PBB. These fluids do not contain harmful additives that can cause damage or corrosion to components.

Temperature range	Lube oil type	Note
-40° to +20°C	ISO 5	
-30° to +30°C	ISO 10	
-8° to +64°C	ISO 32	Control assembly lubricator shipped with this oil unless otherwise specified
-2° to +73°C	ISO 46	
+4° to +84°C	ISO 68	

Inspection

Caution: Wear proper personal safety protection like safety glasses, hard hats, etc. as applicable while performing maintenance and inspection tasks. Move the tool to a safe and convenient working location.

Daily Inspection (when in use)

1. Check for worn and damaged parts.
2. Check for loose and missing parts.
3. Check for any pneumatic/hydraulic leakage.
4. Check hoses for signs of cracks, wear, or abrasion.
5. Grease all fittings on the Tubing Spider.
6. Inspect inserts for debris or wear.
7. Verify linkages operate properly.

6 Month Inspection (when in use)

1. MPI the following critical areas as per MPI procedure
    a. Slip bodies
    b. Spider Base & door
    c. Door Retaining Pins
2. Replace the crank and link bushings (Page 10).
3. Rebuild the cylinder with new seals.
4. Perform and function test and a pressure test (Page 11)
5. Check condition of the filter and lubricator.

Annual Inspection

1. MPI the following critical areas as per MPI procedure
    a. Slip bodies
    b. Spider Base & door
    c. Door Retaining Pins
2. Replace the crank and link bushings (Page 10).
3. Replace the crank shafts (Page 10).
4. Replace the cylinder.
5. Inspect the fit between the door retaining pins and the gate and body. Replace the pins if too loose.
6. Perform and function test and a pressure test (Page 11).
7. Check condition of the filter and lubricator.

Magnetic Particle Inspection (MPI)
Carry out MPI according to ASTM E709 or ASME BPVC sub section A, article 7 and subsection B, article 25; determine the type of defects and the degree by comparing defects to ASTM E125 reference photographs to the acceptance criteria.

Only cracks may develop and as such need to be reviewed. All other indication types have been addressed by the manufacturer during production. As such, the spider has left the factory with indication (if at all) which were deemed acceptable. All cracks which have developed in service are relevant and need to be examined.

Evaluation of indications:
Relevant indications: Only those indications with major dimensions greater than 1/16 Inch (1.6mm) and associated with a surface rupture shall be considered relevant. Relevant indications are indications that results from, discontinuities within the test part. Non relevant indications are indications that results from excessive magnetizing current, structural design or permeability variances within the test parts. Any indication believed to be non-relevant shall be regarded as relevant and shall be re-examined to determine whether an actual defect exists. Linear indications shall be considered as those having a length of more than three times the width. Rounded indications shall be considered as those having a length less than three times the width. A lined indication shall be considered as a group of three more indications which touch an imaginary straight line connecting any two of the group.

For equipment certified in accordance with API 8A & 8C PSL 1:

	Maximum Allowable Degree		
Type	**Discontinuity Descriptions**	**Critical Areas**	**Non-critical Areas**
I	Hot tears, cracks	None	Degree 1
II	Shrinkage	Degree 2	Degree 2
III	Inclusions	Degree 2	Degree 2
IV	Internal chills, chaplets	Degree 1	Degree 1
V	Porosity	Degree 1	Degree 2

For equipment certified in accordance with API 8A & 8C PSL 2:

	Maximum Allowable Degree		
Type	**Discontinuity Descriptions**	**Critical Areas**	**Non-critical Areas**
I	Hot tears, cracks	None	None
II	Shrinkage	None	Degree 1
III	Inclusions	Degree 1	Degree 2
IV	Internal chills, chaplets	None	Degree 1
V	Porosity	Degree 1	Degree 2

Note: Only BVM authorized repair facilities are allowed to repair spiders with indications outside the acceptance criteria.

Lubricator Maintenance
Note: Have spill kit nearby in case of spill while performing this maintenance operation.

1. Close shutoff valve.
2. Remove self-venting fill plug.
3. Fill reservoir to within ¼" (6 mm) of top of bowl with industrial type ISO air tool lubricant (Page 7).

4. Install fill plug.
5. Open shutoff valve one turn.

Regulator/Filter Maintenance

1. Open petcock at bottom of the bowl and drain accumulated water.
2. Remove filter element and clean every 3 months or more often if required.

   Caution: Plastic bowl can be damaged and fail if strong solvents are used for cleaning.

3. Use soap and warm water to clean the filter bowl.

Bushing Replacement

Use the following steps as a guide. Refer to the data sheet for a visual aid.

1. Use the pneumatic/hydraulic system to hold the slip bodies in the raised position.
2. Remove the slip assemblies per the instructions found in the operation section.
3. Release the pressure on the cylinder allowing it to extend. Bleed any remaining pressure out of the cylinder.
4. Loosen and remove the nut on the bolt that pins the cylinder yoke to the link. Remove the bolt, and rotate the cylinder so that the yoke is away from the link.
5. The link is held onto the left and right hand crank shafts by two external retaining rings. Remove these rings so the link can be removed.
6. There are two bushings in the link. Using a press or bushing puller, remove these bushings from the link and discard. Install two new bushings into the link. Set the link aside.
7. Rotate the lift arms so the taper pins are exposed. These taper pins connect the lift arms to the crank shafts. Drive out the taper pins and set aside.
8. Loosen and remove the set screws that hold the lift arms to the crank shafts. Set the set screws aside.
9. Remove the crank shafts from the spider by lightly tapping the ends. Set these aside along with the lift arms and spacers.
10. Bushings are located in the spider body in four locations. Using a press or bushing puller, remove these bushings from the body and discard. Install four new bushings into the body.
11. Reassemble the Tubing Spider (page 12).

Crank Shaft and Lift Arm Replacement

Use the following steps as a guide. Refer to the data sheet for a visual aid. This procedure can be difficult, if there are any doubts to the successful completion of the repair, consult with an authorized repair facility.

1. Replace the old cranks shafts and lift arms with new ones using the instructions in the bushing replacement section. Reassembly will stop when the taper pins are to be installed. The replacement crank shafts do not have holes drilled through them.

2. Ensure the crankshafts are slid into the spider body until they bottom out. This should position the back side of the link arm approximately 1/8" (3.2 mm) from the head of the safety latch bolt.
3. Position the lifting arms on the crank shaft so their midlines are centered with the bore of the spider body. Turn the lift arms in toward the spider body until they rest on top of the bowl.
4. Tighten the lift arm set screws to lock down their position relative to the crank shafts. Secure the position of the lift arms with tie downs so they may not move while being drilled.
5. Using the lift arm holes as a guide, center punch the crank shafts. Drill the four holes with an 11/32" drill bit. Ream the holes with a #7 tapered reamer.
6. Drive the taper pins back through the lift arm and crank shaft.
    a. Align the cylinder yoke with the hole in the link. Insert the bolt and tighten the nut until the nut edge is flush with the end of the bolt.
    b. Install the slip assemblies back onto the lifting arms.
    c. Function test the spider to verify proper operation.

Pressure Test

Conduct a pressure test to verify the integrity of the air circuit and the condition of the cylinder seals as follows:

1. Add a ball valve and pressure gauge to the air supply line according to schematic below:

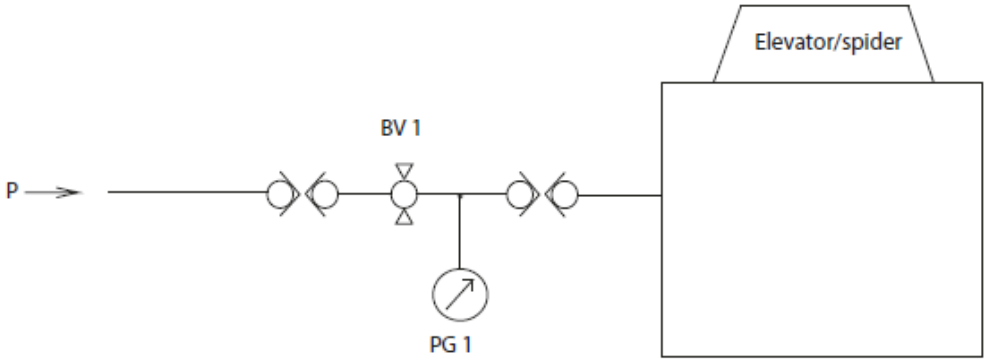


Figure 1: Pressure test schematic

2. Dress the spider with slips.
3. Raise the slips to their full UP position.
4. Close the ball valve BV1 to isolate the spider from the air supply.
5. The pressure drop must not be more than 25 psi over a time of 5 minutes, the slips must be kept in their full UP position.
6. At any higher pressure loss or observed sagging of the slips, inspect the tool for air leakage and repair.
7. Repeat the pressure test.

Assembly

Note: All assembly should be performed in a dry, dirt free area.

1. Install the left hand crank shaft into the spider body. When inserting the shaft, put the spacer and lift arm back in their correct positions.
2. Repeat for the right hand crank shaft.
3. Install the link onto the left and right hand crank shafts. Hold the link arm onto the shafts by the two retaining rings.
4. Move the link to the left. Rotate and shift the lift arm on the crank shaft until the holes for the taper pins are aligned. Drive the taper pins back through the lift arm and crank shaft. Install the set screw and tighten to hold these two parts in relation to each other.
5. Repeat the above for the right hand crank shaft.
6. Align the cylinder yoke with the hole in the link. Insert the bolt and tighten the nut until the nut edge is flush with the end of the bolt.
7. Install the slip assemblies back onto the lifting arms.
8. Function test the spider to verify proper operation.

Storage & Transportation

1. Unpainted surfaces should be coated with rust preventing agent.
2. Prevent excessive exposure to water and moisture.
3. Clean the tool after use – steam clean as needed; remove mud, debris and any other substances.
4. Ensure the pneumatic/hydraulic connections are clean and install dust caps.
5. Transport the unit on a suitable container or pallet.

Critical Area Drawings

- The entire Body-Door Retaining Pin is critical

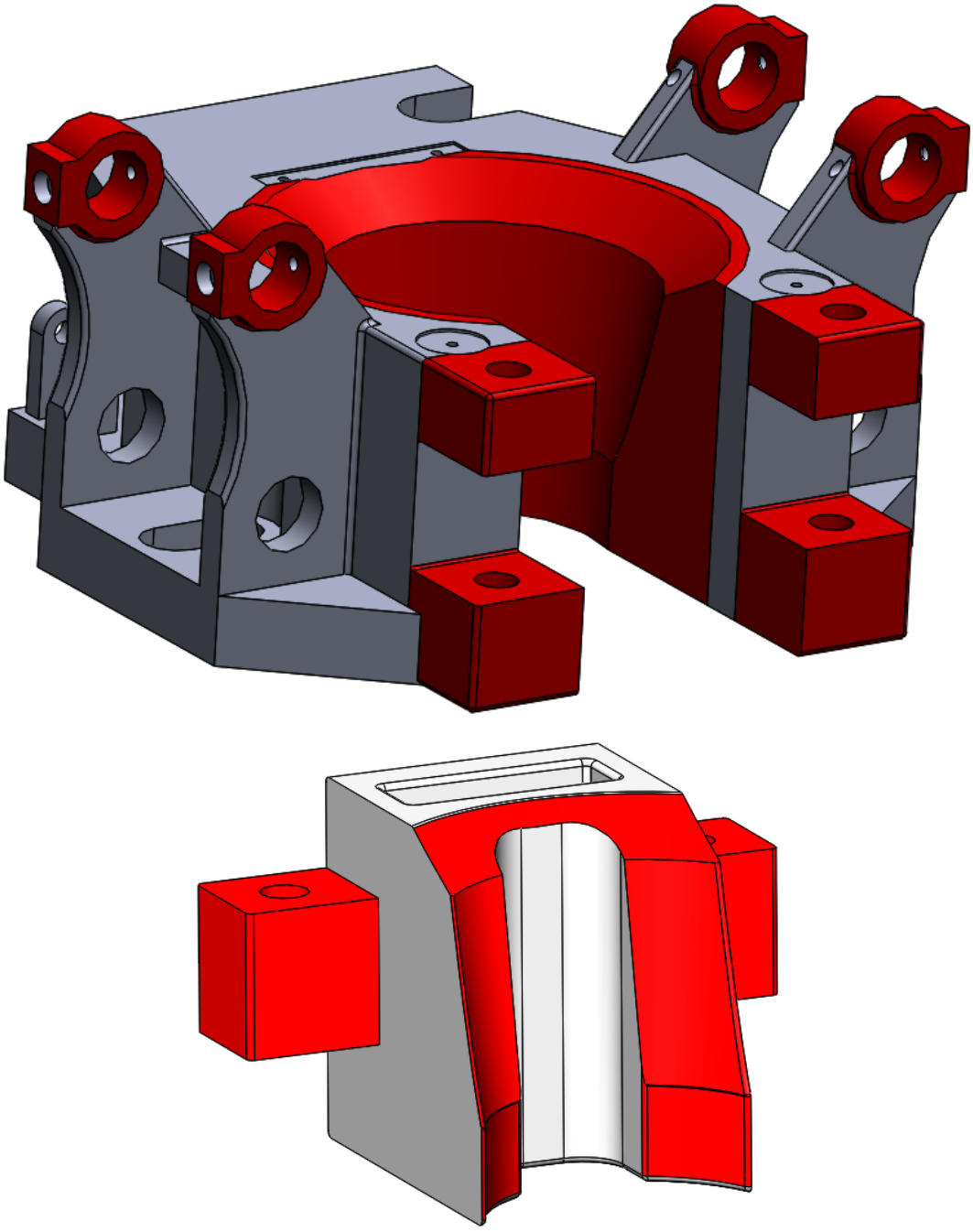


Figure 2: Body & Door critical areas shown in red

Troubleshooting

When problems cannot be solved, contact an authorized BVM repair facility.

Prior to troubleshooting a problematic spider, perform check based on PCAL-rule:

P	Check available **P**ressure after the filter fitted before the hook up manifold is 90-120 psi.
C	Check that all hoses and quick disconnects are properly **C**onnected.
A	Check if there is **A**ir leakage at manifold block, operation panel, quick disconnects, or hoses.
L	Check **L**ubrication status of tool.

Overview possible problems:

Problem	Possible Cause	Possible Solution
Slips do not operate or operate slowly in both directions.	Air pressure supply too low.	Check air pressure at regulator. Adjust as necessary.
	Airline kinked or leaking.	Straighten or replace.
	Incorrect oil/grease used	Use appropriate viscosity/grade oil/grease
	Control valve faulty*.	Replace.
	Defective cylinder seal.	Replace.
Tubing slides thru set slips or tubing is damaged.	Incorrect slip segments or inserts mixed with correct slip segments or insert.	Install correct slip segments or inserts.
	Inserts are dirty	Clean inserts
	Inserts are loose	Replace slip body assembly
	Worn or re-sharpened inserts.	Replace with new inserts.
Spider lift arms contact the spider body when the tubing is engaged	Parts worn	If the slip assembly extends below the bottom of the bowl, replace the slips. If new slips still extend below bowl, the spider base needs to be replaced
Linkage assembly loose or does not function properly	Bushings are worn	Replace bushings
	Cranks are worn	Replace Crank assembly
	Cylinder is loose	Replace cylinder or cylinder bolts

*Air escaping from the control valve does not necessarily mean that the control valve is faulty. If there is a defective cylinder O-ring seal, the air leaking through the cylinders will be released back through the control valve. If control valve leakage is suspected, remove valve from unit and test. If valve is not leaking, inspect cylinder assemblies for defective seals. Consider replacing cylinder or returning to BVM for redress.

Risk Assessment According to EN-ISO 12100:2010

The conclusion of the risk assessment is that in general, the crew must:

- Wear person safety protection like safety glasses, hard hats, etc.
- Follow instructions as stated in the manual.
- Have knowledge of rig procedures.
- Must have been instructed for safe use of the tool.

Recommended Spares

Table 1: Pneumatic Tubing Spider 1 year spares

Part Number	Description	Qty
16500-SP	Spare Parts Kit	-
65107	Yoke	1
65122-1	HD External Retaining Ring	2
65124	Crank Bushing	4
65125	Link Bushing	2
65136	Bolt for Safety Latch	2
65140K	Kit, Repair Pneumatic Cylinder	2
65140	Air Cylinder Assembly	1
65601	Retainer Pin (for Slips)	4
1410C-26-5	5/8-11 x 3-1/4 Bolt	2
1408C-20-5	½-13 x 2-1/2 Bolt	1
1408-16-5	½-13 x 2 Bolt	2
992012-44	Cotter Pin (for Slips)	12
940308-1	1/8” Grease Fitting	4
7006F-06-5	3/8-24 x ¾ Set Screw	4
601C-00-5	5/8-11 Nut	2
6008C-00-5	½-13 Nut	2
65119	Lifting Arm Tapered Pin	4

Table 2: Hydraulic Tubing Spider 1 year spares

Part Number	Description	Qty
16500-SP	Spare Parts Kit	-
65107	Yoke	1
65122-1	HD External Retaining Ring	2
65124	Crank Bushing	4
65125	Link Bushing	2
65136	Bolt for Safety Latch	2

65140H	Hydraulic Cylinder Assembly	1
65601	Retainer Pin (for Slips)	4
1410C-26-5	5/8-11 x 3-1/4 Bolt	2
1408C-20-5	½-13 x 2-1/2 Bolt	1
1408-16-5	½-13 x 2 Bolt	2
992012-44	Cotter Pin (for Slips)	12
940308-1	1/8” Grease Fitting	4
7006F-06-5	3/8-24 x ¾ Set Screw	4
601C-00-5	5/8-11 Nut	2
6008C-00-5	½-13 Nut	2
65119	Lifting Arm Tapered Pin	4

Assembly drawing and List of Parts

See data sheet at www.bvmcorp.com. See below for insert and accessory details.

Table 3: Slip Insert PN by Size

Slip Body Size	Insert Set PN	Size
3.5	565652-1.315	1.315
	565652-1.660	1.66
	565652-1.900	1.9
	565652-2.060	2.06
	565652-1	2-3/8
	565652-2	2-7/8
	565652-3	3-1/2
4.5	865653-1	3-1/2
	865653-2	4
	865653-3	4-1/2

Table 4: Slip Body PN by Size

Slip Body Size	Slip Body PN
3.5	565622-100
4.5	865623-100
4.75	865624-4
5	865624-1
5.5	865624-2

Note: insert sets are removable for sizes 3-1/2 and 4-1/2. Inserts are integrated into the body for other sizes. For removable inserts, 4x of PN 65601 (retainer pin) and 992012-44 (cotter pin) are required.

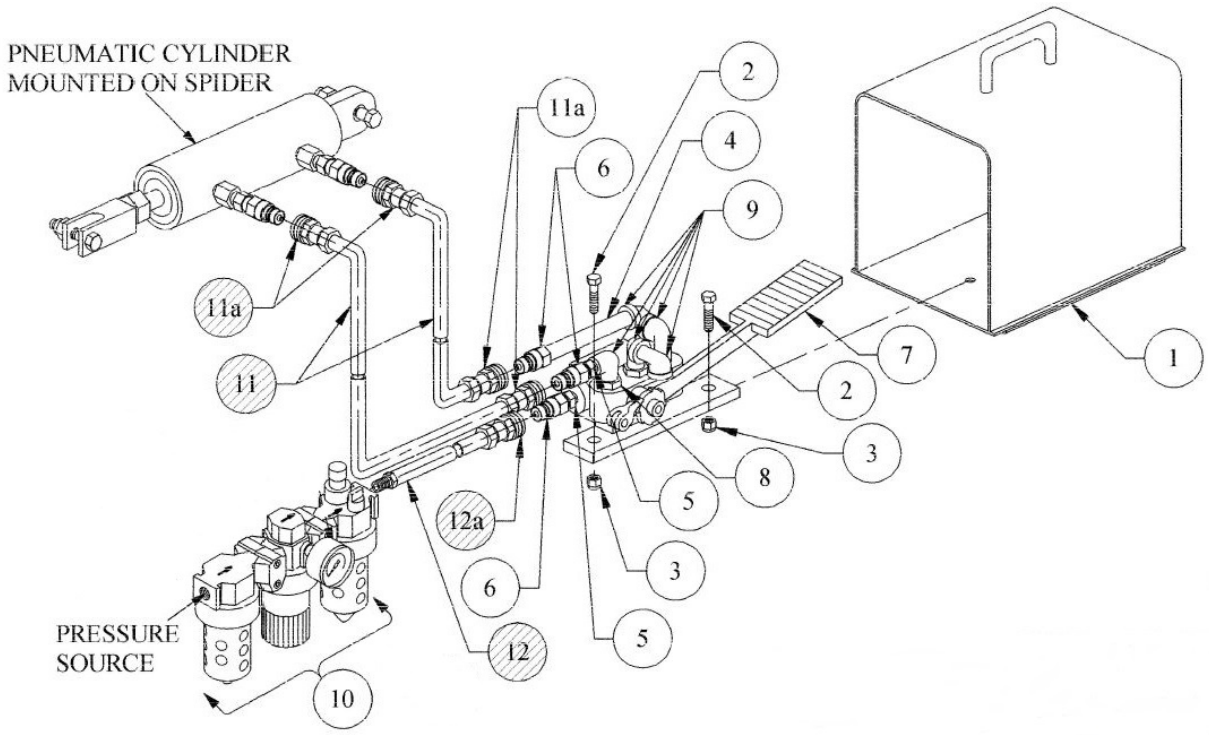


Figure 3: Foot Operated Pneumatic Control System Assembly

ITEM #	PART #	DESCRIPTION	QTY
-	65200	PNEUMATIC FOOT CONTROL VALVE ASSEMBLY	REF
-	65200-100	FOOT CONTROL VALVE LESS REGULATOR/HOSE	REF
-	65300	HOSE KIT FOR FOOT VALVE (2X #11 & 1X #12)	REF
1	65202	FOOT VALVE COVER	1
2	992003-07	HEX HEAD SCREW	2
3	992089-05	NY-LOC NUT	2
4	992122-22	LONG NIPPLE	1
5	992131-S-06-06	ADAPTER, 3/8" X 3/8"	2
6	992285-MH-6-6	MALE DISCONNECT	3
7	992278	PNEUMATIC FOOT VALVE	1
8	992137-S-08-06	ADAPTER, 1/2" X 3/8"	4
9	992481-06	ELBOW, 90°	5
10	992311	PNEUMATIC REGULATOR ASSEMBLY	1
11	701Q-06-180-02F	HOSE, 180', FEMALE QUICK DISCONNECTS	2
11a	992285-FH-6-6	FEMALE DISCONNECT	4
12	701Q-06-180-01F	HOSE, 300', FEMALE/MALE QUICK DISCONNECTS	1
12a	992285-FH-6-6	FEMALE DISCONNECT	1