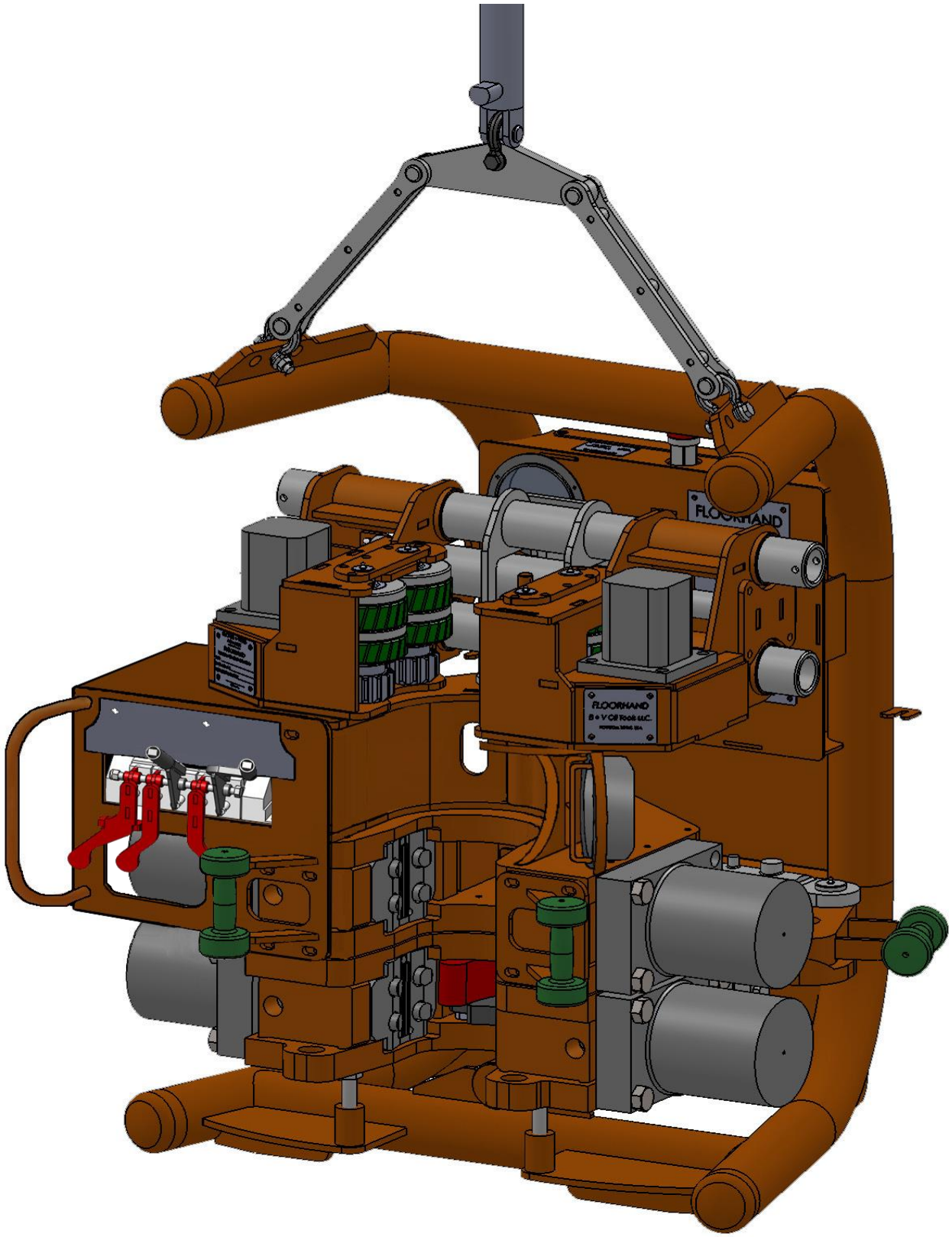
Blohm + Voss Oil Tools, LLC

9GF-8002 PIPE FRAME FLOORHAND FH-70

Technical Documentation



Manual to be used with Generation II FloorHand Serial Numbers 200+

GENERAL INFORMATION

Warnings and Notes

WARNING: A "WARNING" INDICATES A DEFINITE RISK OF EQUIPMENT DAMAGE OR DANGER TO PERSONNEL. FAILURE TO OBSERVE AND FOLLOW PROPER PROCEDURES
COULD RESULT IN SERIOUS OR FATAL INJURY TO PERSONNEL, SIGNIFICANT PROPERTY LOSS, OR SIGNIFICANT EQUIPMENT DAMAGE.
NOTE: A "*NOTE*" indicates that additional information is provided about the current topics.

Intended use of this manual

WARNING: THIS TECHNICAL DOCUMENTATION CONTAINS INSTRUCTIONS ON SAFETY, INSTALLATION, OPERATION AND MAINTENANCE. IT MUST BE STUDIED BEFORE WORKING WITH THE TOOL.

This manual is intended for use by field service, engineering, installation, operation, and repair personnel. Every effort has been made to ensure the accuracy of the information contained herein. Blohm + Voss Oil Tools, LLC, will not be held liable for errors in this material, or for consequences arising from misuse of this material.
Anyone using service procedures or tools, whether or not recommended by Blohm + Voss Oil Tools, LLC, must be satisfied that neither personal safety nor equipment safety will be jeopardized.

Intellectual property

All information contained in this manual is based upon the latest product information available at the time of printing.
Dependent on ongoing technical improvements (ISO 9001) "Blohm + Voss Oil Tools, LLC" reserves the right to change the design and specifications without announcement.
The values specified in this manual represent the nominal values of a unit produced in series. Slight deviations in the case of the individual devices are possible.
NOTE: In the event of problems that cannot be solved with the aid of this manual, please contact one of the addresses listed below.

General remarks

As with all rig equipment, the FloorHand Cantilever must be operated in accordance with accepted rig safety practices and procedures. All operators should be familiar with all safety precautions and recommended installation and operating procedures, including the information provided in this manual and any other safety publications by Blohm + Voss Oil Tools, LLC
Listed on the next page are safety considerations and warnings found throughout this manual:

CE Marking

The tool complies with the Machinery Directive 2006/42/EC and the Directive 2014/34/EU "Equipment and protective systems in potentially explosive atmospheres" The marking is as follows: CE Ex II 2G T5

Patents

The following patent numbers apply:
U.S. 11/404,317 U.S. 11/890,582 U.S. 11/732,813

Limited Warranty

The warranty provided will be void if the FloorHand or cantilever is either:

1. Repaired or serviced by a service facility which was not authorized by Blohm + Voss Oil Tools, LLC.
2. Replacement parts not manufactured by Blohm + Voss Oil Tools, LLC are used.
3. Modifications were made to the FloorHand which were not approved by Blohm + Voss Oil Tools, LLC.

Safety issues

WARNING: ONE SHOULD AVOID CREATING IGNITION SOURCES, LIKE HEAT, AS A RESULT OF THE USE OF THE TOOL WITH OTHER TOOLS OR EQUIPMENT.
WARNING: THE WARNING PLATES, SIGNS AND LABELS MUST BE PRESENT ON THE TOOL. DO NOT REMOVE THE LABELS. IF THEY ARE MISSING, REPLACING IS MANDATORY.
WARNING: ALL WARNING PLATES, SIGNS AND LABELS ATTACHED TO THE EQUIPMENT MUST BE OBSERVED.
WARNING: DO NOT USE THE TOOL FOR ANY OTHER PURPOSE THAN MAKING UP AND BRAKING OUT WITHIN ITS SPECIFICATION.

WARNING: FAILURE TO CONDUCT ROUTINE MAINTENANCE COULD RESULT IN EQUIPMENT DAMAGE OR INJURY TO PERSONNEL.
WARNING: THE TOOL MUST ONLY BE SERVICED BY TRAINED B+V PERSONNEL OR BY AUTHORIZED PERSONNEL.
WARNING: WHILE WORKING WITH THE EQUIPMENT, WEAR PERSONAL PROTECTION EQUIPMENT.

WARNING: IF ANY SAFETY ELEMENTS (LIKE SAFETY ROPES, WIRE, SAFETY SHEETS, PLATES OR WASHERS) WERE DISASSEMBLED DUE TO MAINTENANCE WORK, DO NOT RE-USE THEM. ALWAYS REPLACE THEM WITH NEW SAFETY ELEMENTS.

WARNING: KEEP HANDS AND ARMS CLEAR OF ALL MOVING PARTS WHEN CONNECTING, DISCONNECTING OR OPERATING THE UNIT.

WARNING: ALWAYS WEAR PROTECTIVE GEAR FOR EYES, HEAD, HANDS AND FEET.

WARNING: WHEN SERVICING UNIT, BE SURE ALL POWER IS OFF AND SUPPLY LINES ARE DISCONNECTED AND INTERNAL PRESSURE IS BLED FROM THE TOOL.

WARNING: LUBRICATE UNIT ONLY WHEN SUPPLY LINES ARE DISCONNECTED AND H.P.U IS OFF AND TAGGED OUT. VERIFY THAT SYSTEM PRESSURE IS -0- PSI.

WARNING: ALWAYS USE LIFTING APPARATUS (SLINGS, CABLES, SHACKLES AND THE LIKE) THAT HAVE BEEN INSPECTED AND ARE IN GOOD CONDITION AND ARE PROPERLY SIZED. ENSURE THAT ALL RIGGING AND LIFTING PROCEDURES ARE IN ACCORDANCE WITH ACCEPTED OILFIELD PRACTICES AND STANDARDS.

WARNING: ALWAYS CHECK THE UNIT FOR LOOSE FASTENERS AND HYDRAULIC CONNECTIONS AS WELL AS ANY OTHER DAMAGE PRIOR TO TURNING ON THE POWER UNIT.

Revision History Table

REV.	SECTION	SUB-SEC.	PARA.	CHANGE REQUEST #	DATE	AUTHORIZED BY
Draft	All	All	All	N/A	10/01/10	KJ
0	All	All	All	N/A	03/19/12	KJ

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General Components

The Blohm + Voss Oil Tools, LLC FloorHand is a combination torquing and spinning tool designed for quick installation on a variety of drilling rigs. This manual covers the basic FloorHand 9GF-8002.

The FloorHand can make and break all tool connections from 3 1/2" to 7 1/2" outside diameter, and can handle nominal drill pipe from 3 1/2" up to 6 5/8" without any modification. (To handle 2 7/8" drill pipe, Blohm + Voss is able to provide an optional adapter kit assembly. Please contact Blohm + Voss Oil Tools, LLC for prices on the 9FH-10703 adapter kit.

The FloorHand can also make and brake stabilizers, spiral colors and other bottom hole assembly (BHA) components with sufficient connection length.

DESCRIPTION

Wrenches

The FloorHand utilizes an upper and a lower wrench designed to apply torque when making up or breaking out tool joint connections. Each wrench contains an opposing set of clamp cylinders and Die Block assemblies that self adjust to varying pipe sizes. The FloorHand is capable of 50,000 ft/lb (67,790.9 Nm) of make up torque and 70,000 ft/lb (94,907.27 Nm) of break out torque.

Spinner

The FloorHand is equipped with a spinner that consists of two halves, a right and a left hand assembly each containing a set of urethane drive rollers. The spinner uses direct drive gears, eliminating the need for expensive transmissions. The FloorHand spinner is designed to be field serviceable and easily maintained by rig personnel.

Frame

The pipe frame is designed to support and house the wrench and spinner assemblies

Controls

The all-hydraulic controls for the FloorHand is mounted conveniently on the front of the unit for easy access as well as maximum visibility for the operator.

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Specifications

Hydraulic Requirements

Hydraulic supply pressure (min.) 2,500 PSI *(17.23 MPa)* - 172 bar
Hydraulic supply pressure (max.) 3,000 PSI *(19.30 MPa)* - 206 bar
Hydraulic flowrate required 23 - 35 gpm *(87 - 132l/pm)*

Supply conn... end
Return conn... end
The FloorHa... should only
be operated i... ent Hydraulic
Power Sour...

Wrench A...

Motor spinni...
Spin speed (...
Spin speed (...
Make up torq...
Break out to...

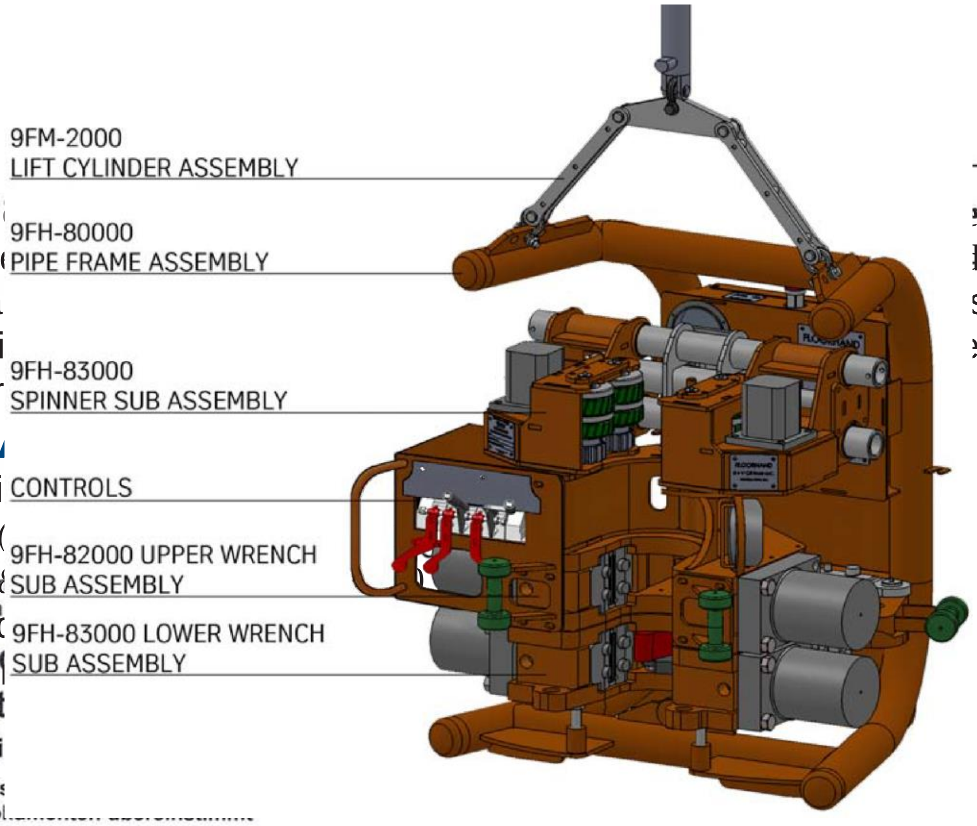

Figure 1

Shipping Data

Length	42.0 inches (1,066.8 mm)
Width	58.5 inches (1,485.9 mm)
Height	60.0 inches (1,524 mm)
Weight	4,020.0 lbs (1,823.44 kg)

Figure 2

Declaration of Conformity

Blohm...

Erklärung der ...
hereby declare in ...

BVOT hy...
combinat...
2-7/8" DP (mi...

auf das sich dies...
normativen Dok... übereinstimmt

which is the subject of this declaration, is in conformity with the following standard(s) or normative documents

Bestimmungen der Richtlinie: terms of the directive:	Title and/or No. and date of issue of the standard
Richtlinie 2006/42/EG des Europäischen Parlaments und des Rates vom 17 Mai 2006 über die Angleichung der Rechtsvorschriften von 2006 die Mitgliedstaaten für Maschinen.	Maschinenrichtlinie 2006/42/EG 17 Mai 2006
Directive 2006/42/EG of the European Parlament and of the Council of 17 May 2006 on the approximation of the laws of 2006. The Member States relating to machinery.	Machinery Directive 2006/42/EG 17 May 2006
Sicherheit von Maschinen. - Teil 1 und 2 Safety of machinery, part 1 and 2	DIN EN ISO 12100:2009.10 DS EN ISO 12100:2009.07
Sicherheit von Maschinen - Leitsätze zur Safety of machinery, Risk assessment	DIN EN ISO 14121-1:2007.12 DS EN ISO 14121-1:2007.12
Ausrüstung für Bohr- und Bohrlocharbeiten Petroleum and natural gas industries-Drilling and well-servicing equipment	DIN EN ISO 14693:2005.07 ISO 14693 / API 7K 5th Edition:2010.06
Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen	EG Richtlinie 94/9/EG (ATEX 95)
Devices and protection systems fot intended use in explosive	EG Richtlinie 94/9/EG (ATEX 95)
Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen	DIN EN 13463-1:2009-07
Non–electrical equipment for use in potentially explosive atmospheres	DIN EN 13463-1:2009-07

Das Gerät „FLOORHAND hydraulisch betrieben" erfüllt die Maschinenrichtlinie 2006/42/EC und erfüllt die EG Richlinie 94/9/EG.

The product „FLOORHAND hydraulic operated" complies with the Machinery Directive 2006/42/EC and complies with the EC Guideline 94/9/EG.

Kennzeichnung:
Mark: CE Ex II 2G T5

Willis, Texas 12/2/10
Location and Date

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COMMISSIONING

Document Front Page

	11/04/2010	FloorHand Shop Test/Commisioning Procedure	DT	CT	MT
	10/28/1020	Issued	DT	CH	MT
us	Date	Description	Made by	Checked By:	Approved:

Suppiler References:

Procurement References:

TAG NO:

Date:	Signature:	SDRL Code:	Area:	System:	Pages:	Encl:

Company:	Document Title/ Equipment: Commissioning Check Sheet for FloorHand (Iron Roughneck)
Rig/Vessle/Customer Order:	Equipment Serial No:
Supplier: Blohm + Voss Oil Tools, LLC	Document No:

FloorHand Commissioning Procedure

This test procedure is to be performed by authorized B+V personnel only!

Note: When performing the following steps, appropriate PPE will be used and standard safety practices must be followed at all times.
Note: When commissioning, HPU Commissioning must be completed prior to FloorHand commissioning. If installing FloorHand to

customer supplied hydraulics, hoses must be flushed completely before connecting to FloorHand.

1. ___ Connect FloorHand (using flow meter) to Hydraulic power source of 2,500 - 3,000 PSI and 25-35 Gpm. If pressure is above 3,000 PSI, a Pressure Release Valve (PRV) should be used. _____If flow rate is above 35 gpm, a pressure compen- sated flow control should be used._____
2. ___ HPU should be powered up a minimum of 20 minutes before moving to next step, to bring all oil to required operating oil temperature, record oil temp._____

Note: Throughout entire test, observe FloorHand for leaks, and or malfunctions, repair as necessary.

3. ___ Run spinner motors in make direction for 20 seconds, check that rotation of all four rollers are correct, check for leaks. Monitor flow meter, record max flow. _____ See step 1.
4. ___ Run spinner motors in break direction for 20 seconds, check for leaks.

After making fresh hydraulic connections, or a rig move, it is best to always run the spinner before anything else. The spinner is the only system that is close to a direct system. For example, there are no PRV's, check valves, shuttle valves, diverter valves, pilot operated check valves, etc in the spinner motor system, only a flow divider. This means, by running the spinner first, any small trash or contaminates that may be in the lines, will be flushed through with minimal to no damage. If there were trash in the lines, and the torque, or clamp system were operated first, there is a chance of contaminants getting lodged in a small orifice, in one or more of the many valves in the other systems.

5. ___ Without pipe, clamp and unclamp lower wrench 10 times, check that die blocks extend and retract evenly, check for leaks.

Note: This helps to remove air from the lower clamp system so that the flow divider may work correctly.

6. ___ Without pipe, clamp lower wrench.
7. ___ Clamp and unclamp upper wrench 10 times, check that die blocks extend and retract evenly, check for leaks.
8. ___ Unclamp lower wrench.
9. ___ Without pipe, clamp and unclamp spinner 10 times, check for leaks.

Note: spinner may, or may not close evenly, this is normal.

10. ___ Back torque adjustment knob out completely, then turn in (clockwise) 4 turns, Blohm + Voss Oil Tools, LLC.
11. ___ Actuate torque cylinder 10 complete strokes in each direction, check for leaks.
12. ___ Adjust make up speed flow control for a 5 second stroke. Verify during commis- sioning.
13. ___ Install test gauge on lower clamp cylinder outboard test port.
14. ___ Clamp lower wrench.
15. ___ Observe test gauge on lower wrench clamp cylinder, and Pressure Release Valve (PRV) if applicable.

16. ___ Set Pressure Release Valve (PRV) output to obtain 600 PSI at lower clamp cylinder. Verify during commissioning.
17. ___ Clamp upper wrench, ensure that system pressure is now present on lower clamp cylinders also (PRV reading should not change), unclamp upper wrench, unclamp lower wrench.
18. ___ Mock up test pipe, with torque, at end of stroke, check that gauge dump valve functions correctly.
19. ___ Stall spinner in make direction and hold for 5 seconds, check for leaks.
20. ___ Stall spinner in break direction and hold for 5 seconds, check for leaks.
21. ___ Operate manipulator / lift cylinder full up & down 10 times to remove all air from

cylinder and counterbalance valve, check for leaks. If commissioning, inform rig crew that this should be done after every rig-up.

22. ___ Raise manipulator / lift cylinder to mid stroke, check that counterbalance valve holds.
23. ___ If applicable, extend and retract manipulator full out and in 5 times, check for proper function, check for leaks.
24. ___ WARNING: Clamp lower wrench, verify that manipulator functions do not operate.
25. ___ Unclamp lower wrench.
26. ___ Connect test gauge to return system test port, run spinner motors and hold while checking pressure filter bypass indicator (if applicable), and monitoring system back pressure, not to exceed 250 PSI. Record back pressure _____
27. ___ If applicable, check shutoff valve for proper function.
28. ___ Remove test gauges, and reattach cap ports.
29. ___ Install any panels / covers removed for test.
30. ___ Ensure rig personnel fully understand all functions and basic maintenance of the FloorHand, including but not limited to: Importance of keeping fresh dies installed, prop- er make up torque adjustment, proper breakout procedure. Demonstrate how to remove and install the following: Dies, die blocks, and drive rollers.

Tech: _____
Signature: _____
Date: _____

Technician: _____
Signature: _____
Date: _____

Record of Training

Name:	Areas of Training: (Lubrication/Frequency/PM,etc.)	Signature:	Date:

My signature above indicates that I have read and understand the opening instructions and have been trained to use the above machine by Blohm+VOss Oil Tools, LLC. Technicians.			

owledgement of Rig Superintendant / Tool Pusher Date Name

Signature

gnature above indicates acceptance of commissioning and the above personnel training.		

INSTALLATION

Lifting

The FloorHand 9GF-8002 frame incorporates lifting eyes on the uppermost portion. Each of the brackets has three shackle holes, two of which are used for suspension of the unit from the lift cylinder. The other holes are for attaching lifting shackles.

The unit should always be lifted using a two part bridle, one leg of each bridle attached to one of the lifting eyes. Never lift the unit by a single leg.

Attaching to the Lift Cylinder

The FloorHand is suspended by the lift cylinder (and an optional wench) by a suspension assembly and gimbal. This configuration allows the unit to float as well as swivel for maximum floor flexibility and performance. The suspension assembly and gimbal should always be left attached to the unit. The unit is delivered from the factory

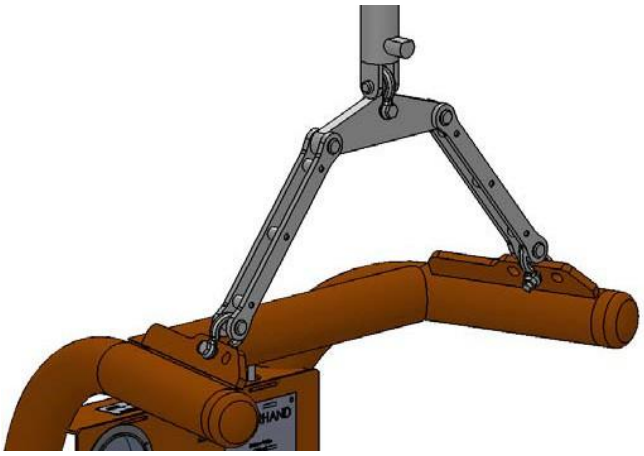


Figure 3

WARNING: NEVER ALLOW PERSONNEL TO BE IN THE DIRECTION THAT THE EQUIPMENT MAY SWING WHEN BEING INSTALLED OR REMOVED. FAILURE TO DO SO MAY CAUSE INJURY TO PERSONNEL OR DAMAGE TO THE EQUIPMENT.
WARNING: ALWAYS USE LIFTING APPARATUS (SLINGS, CABLES, SHACKLES AND THE LIKE) THAT HAVE BEEN INSPECTED AND ARE IN GOOD CONDITION AND ARE PROPERLY SIZED. ENSURE THAT ALL RIGGING AND LIFTING PROCEDURES ARE IN ACCORDANCE WITH ACCEPTED INDUSTRY PRACTICES AND STANDARDS.
WARNING: NEVER STAND UNDER A LOAD BEING LIFTED.

with the suspension shackles attached to the center holes of each frame bracket. This position is usually satisfactory, however the unit should be checked for level and adjust if required.

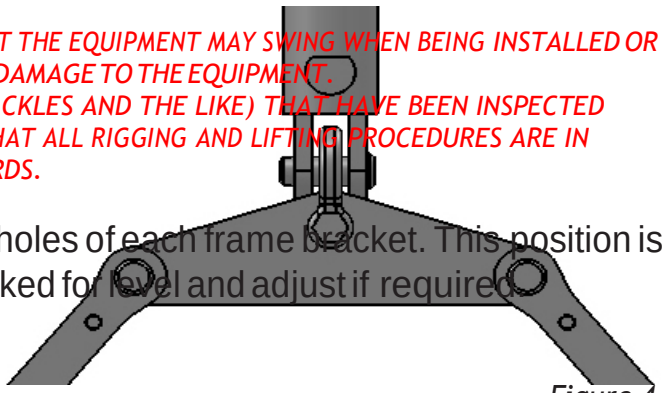


Figure 4

Locating the HPU and attaching the Hydraulic Lines

The Hydraulic Power Unit *(HPU)* may be located some distance away from the rig floor and, unless the electric components on the HPU are explosion proof, MUST be located off of the rig floor and away from the danger zone. The supply and return hoses from the HPU are normally run up through the rig floor near the socket. The optional supply and return hoses are equipped with self-closing quick disconnect fittings. They attach to the mating quick disconnect fittings mounted on the back of the manipulator. Care must be taken during installation to minimize chafing of the hoses during rig up/rig down as well as during operation of the FloorHand. If the hoses chafe against the rig structure when the FloorHand is moved, chafe protection should be used. The remote start stop switch included with
the Blohm + Voss 9PU-7200 HPU is explosion proof and may be located anywhere that is convenient to the Driller.

Attaching the Hydraulic Lines

When replacing these fittings, it is imperative to use exactly the same fitting in exactly the same orientation consistent with the factory installation. Always ensure that the quick disconnect fittings are fully engaged and locked (if appropriate to the type of fitting used).

1. Attach the pressure line quick disconnect fitting from the HPU to the pressure line fitting (the top fitting with the ball valve) at the top of the unit.
2. Attach the return line from the HPU to the fitting (the lower fitting) at the top of the unit.
3. Bleeding the system prior to use Procedure:

1. Operate all handles for a number of times; allow the tool to move completely to its hard stops.
2. Spin and torque a piece of pipe

Figure 5

WARNING: THE QUICK DISCONNECT FITTINGS ARE CONFIGURED BY THE SIZE SO THERE IS NO POSSIBILITY OF ATTACHING THE LINES INCORRECTLY.
WARNING: ALWAYS MAKE SURE THAT ALL OF THE CONTROL VALVE HANDLES FOR CLAMP (LOWER WRENCH, UPPER WRENCH AND SPINNER CLAMP) FUNCTIONS ARE IN THE FULLY RETRACTED POSITION PRIOR TO TURNING ON THE POWER UNIT.
WARNING: PRIOR TO USE OF FLOORHAND AND THE LIFT CYLINDER ALWAYS ENSURE NO AIR IS EXISTING IN THE HYDRAULIC CIRCUITS. HAVING AIR IN THE LINES CAN CAUSE UNEXPECTED MOVEMENTS OF FLOORHAND AND THE LIFT CYLINDER.

Make Up Torque Adjustment

To make up a connection for the first time, it is necessary to set the make up torque to the proper setting for the given tool joint, as per appropriate specifications from either the well plan or from the drill pipe manufacturer. Referring to normal make up procedures, it is assumed that the unit is engaged with the lower wrench clamped on the box and the pin has been spun up and shouldered. The make up torque adjustment is as follows:

Figure 6

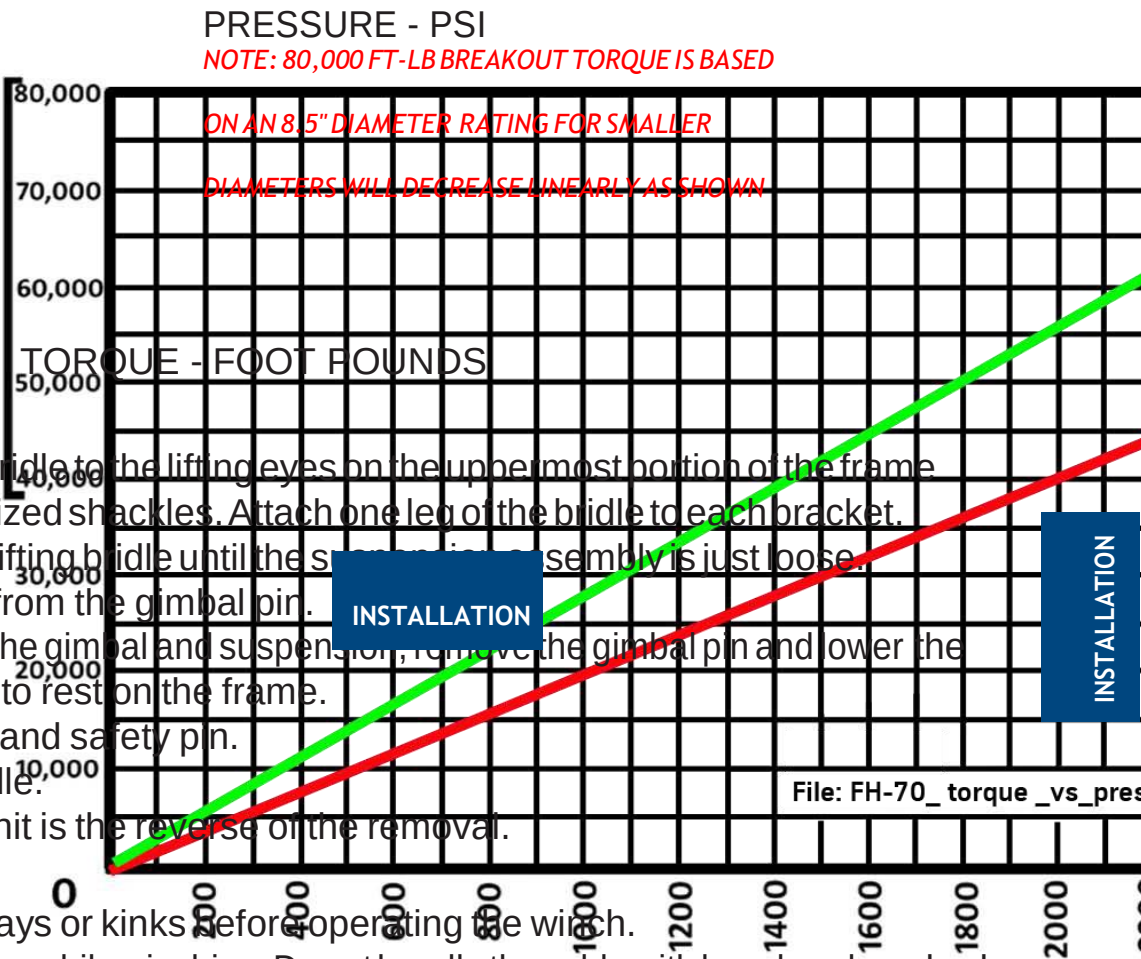
1. Locate the "Torque Adjustment" control knob on the control panel below the torque gauge and break free the lock knob. Then rotate the adjustment knob counterclockwise until it stops. This decreases the available pressure in the torque circuit to a minimum.
2. With the upper wrench unclamped, move the "torque" handle on the main control valve to rotate the upper wrench fully to the break out position (that is, where the torque cylinder is fully extended).
3. Push the "upper clamp" handle on the main control valve to clamp the upper wrench on the pin end of the tool joint.
4. Pull and hold the "torque" handle on the main control valve. The upper wrench may or may not begin to move in the direction of make up. While holding the "torque" handle, rotate the "Torque Adjustment" control knob on the control panel clockwise to increase the torque until the reading on the torque gauge reaches the desired setting and stops moving. Hold for 3 seconds. Do not over torque the joint.

Figure 7

5. Lock in torque adjustment by gently tightening the locking knob. Do not over tighten. Once the unit has been properly adjusted, it is usually not necessary to re-adjust under normal conditions. At each connection, the operator should verify that the torque gauge stops at the proper setting for the particular tool joint. If it does not, the unit must be re-adjusted.

NOTE:
IF, AT ANY TIME, THE TORQUE PRESSURE DROPS DURING THE MAKE UP PROCEDURE, THIS MEANS THAT THE CYLINDER IS OUT OF STROKE. THE UPPER WRENCH SHOULD BE UNCLAMPED AND ANOTHER BITE SHOULD BE TAKEN.
NOTE: MAKE SURE TO ALLOW THE UPPER WRENCH SUFFICIENT TIME TO FULLY CLOSE AND GRIP THE TOOL JOINT. THIS CAN BE VERIFIED BY WATCHING THE "SYSTEM PRESSURE" GAUGE ON THE CONTROL PANEL. WHEN FULLY CLAMPED, THE SYSTEM PRESSURE SHOULD BE STEADY AT 2,500 PSI.

FloorHand Wrench Torque Chart



Rig-Up / Rig-Down

1. Attach a two part lifting bridle to the lifting eyes on the uppermost portion of the frame bracket using properly sized shackles. Attach one leg of the bridle to each bracket.
2. Take up the slack in the lifting bridle until the suspension assembly is just loose.
3. Remove the safety pin from the gimbal pin.
4. Supporting the weight of the gimbal and suspension, remove the gimbal pin and lower the gimbal and suspension to rest on the frame.
5. Replace the gimbal pin and safety pin.
6. Lift the unit with the bridle.
7. The installation of the unit is the reverse of the removal.

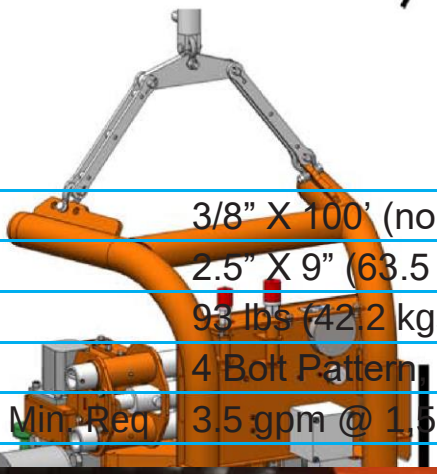
Winch Operation

1. Inspect your cable for frays or kinks before operating the winch.
2. Always wear leather gloves while winching. Do not handle the cable with bare hands as broken wires can cause injuries.
3. Make sure that you have anchor points suitable for the weight of the suspended FloorHand.
4. When fully extending the winch cable, make sure that five wraps of winch cable remain on drums at all times. Failure to do this may cause serious injury.
5. Ensure that all personnel stand clear of the winch cable and load during winch operations. If a cable pulls loose or breaks under load, it can lash back and cause serious personal injury or death.
6. Raise the FloorHand to the approximate height for the tool joint.
7. When you are ready to move the FloorHand, simply pull the extend handle to move the FloorHand into a safe position away from the work area.
8. Push the Extend handle to reposition the FloorHand back into the work area.

Winch Rating and Specification

1. The winch cable must not exceed:
2. A 15° angle up or down.
3. A 45° angle left or right.
4. A total weight of 9,000 lbs.

Gear Train	Planetary
Gear Ratio	6:1
Motor	14 cubic inch



Cable	3/8” X 100’ (nominal 14,400 lbs) (9.53 mm X 30.5 m)
Drum Size	2.5” X 9” (63.5 mm X 228.6 mm)
Net weight	93 lbs (42.2 kgs)
Bolt Pattern	4 Bolt Pattern, 4.5” X 10” (114.3 mm X 254 mm)
Power Steering Min. Req.	3.5 gpm @ 1,500 psi (13.25 l/m @ 103.4 bars)

Winch Angles

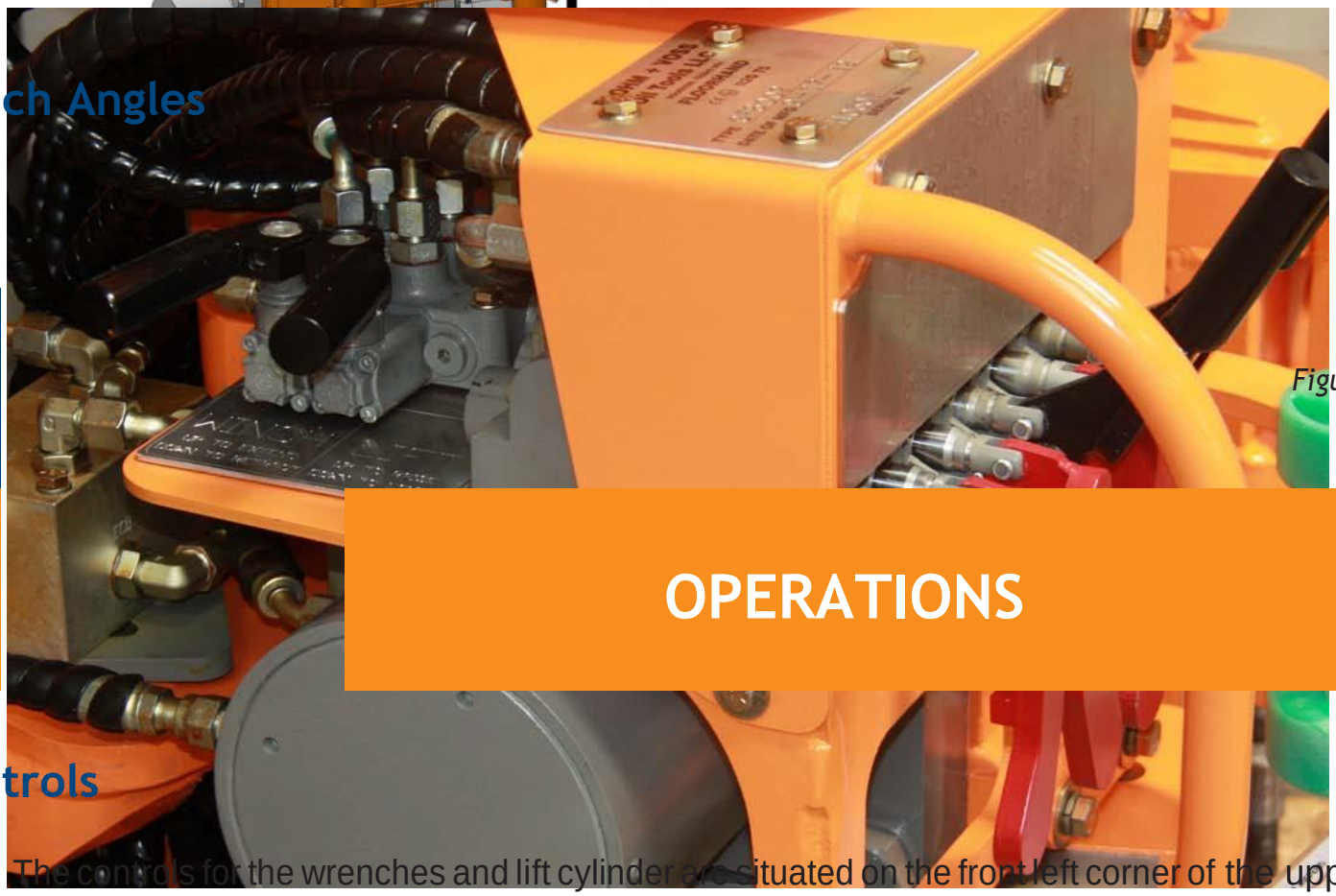


Figure 9

OPERATIONS

Controls

The controls for the wrenches and lift cylinder are situated on the front left corner of the upper wrench.

Figure 10

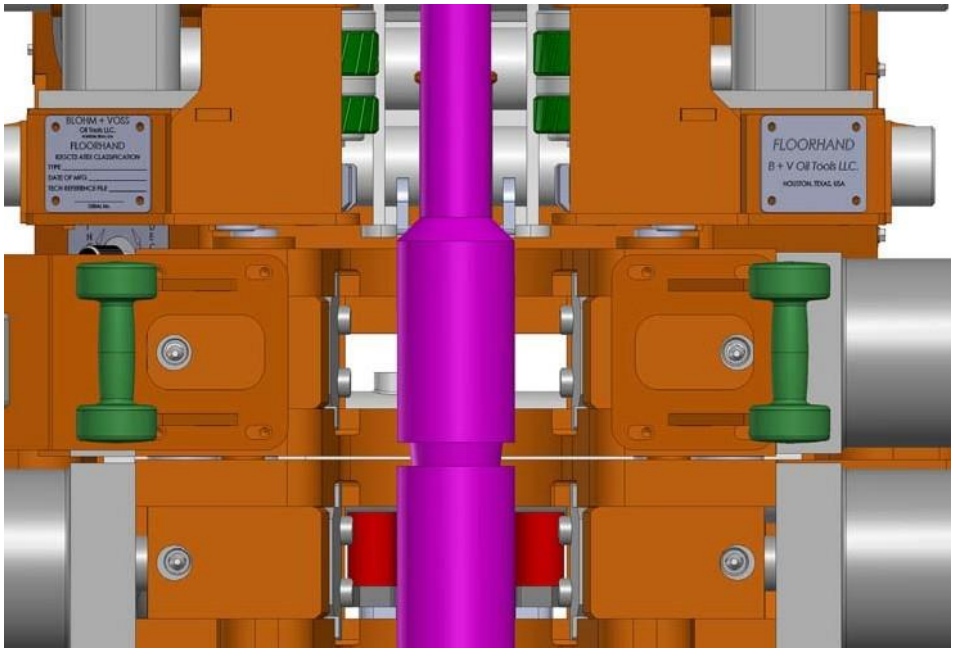


Figure 11

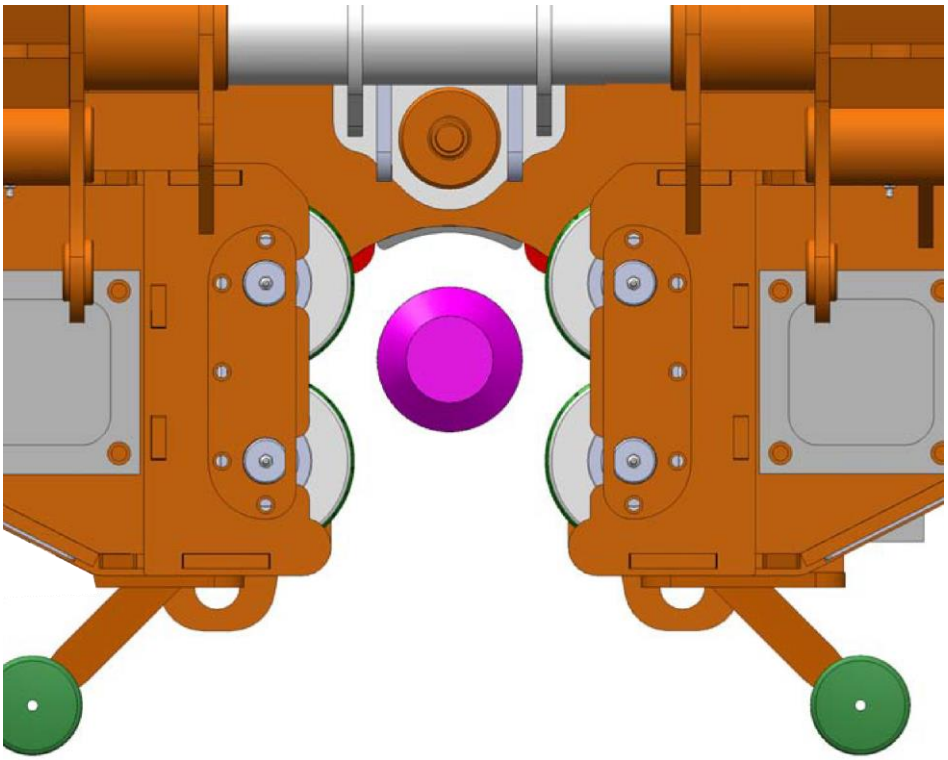


Figure 12

These two images show where the pipe needs to be positioned within the FloorHand.

Making a Connection

WARNING: BEFORE OPERATING THE UNIT, MAKE SURE THAT YOU HAVE READ AND UNDERSTAND THIS ENTIRE MANUAL AND HAVE BEEN PROPERLY TRAINED IN THE OPERATION OF THE UNIT. ALSO VERIFY THAT THE UNIT HAS BEEN PROPERLY INSPECTED, ADJUSTED AND LUBRICATED BEFORE EACH USE.
WARNING: ALWAYS CLAMP THE LOWER WRENCH BEFORE CLAMPING THE UPPER WRENCH OR SPINNER. WARNING: DO

NOT CLAMP THE FLOORHAND ONTO THE PIPE BEFORE THE PIN HAS BEEN STABBED.

1. Slowly pull the "Lift" handle to raise the

FloorHand approximately two to three feet from the rig floor.

Figure 13

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

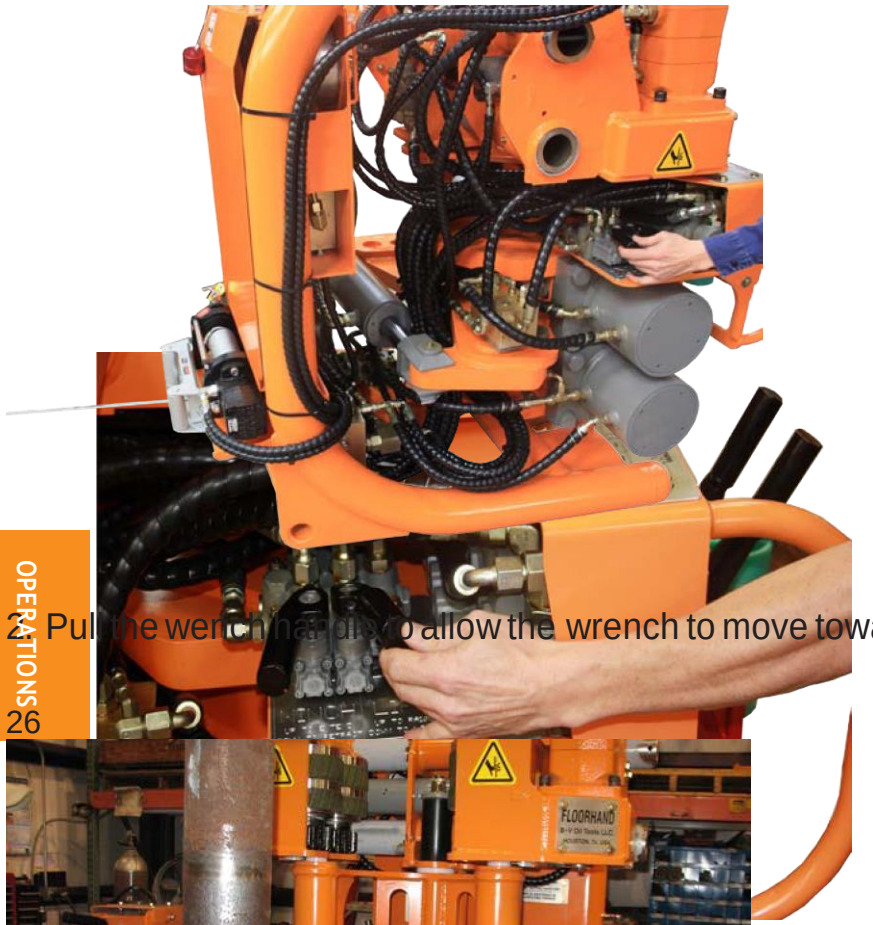


Figure 14

2. Pull the wrench handle to allow the wrench to move toward the tool joint.

Figure 15

3. Guide the FloorHand and release the "Wench" handle when the tool approaches the pipe center.
If not equipped with a winch, manually move the tool to the tool joint.

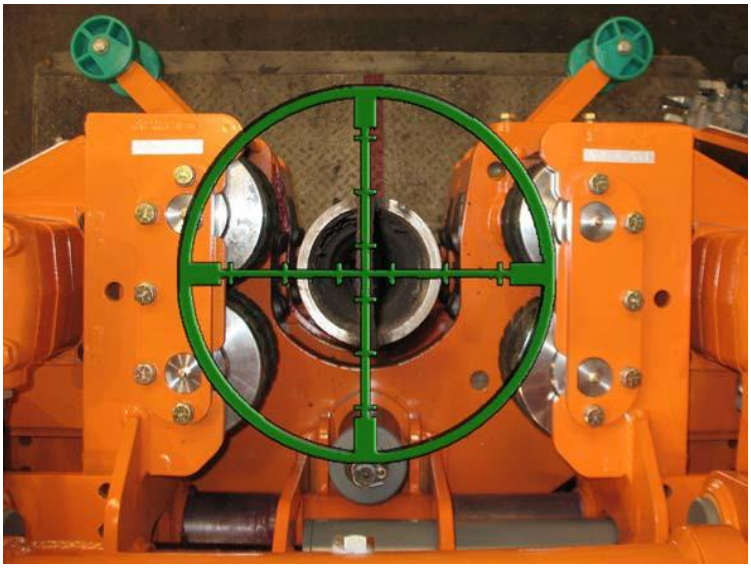


Figure 16

4. Center the tool In and Out first.

NOTE:
ALWAYS CENTER BY EXTENDING FIRST AND THEN CENTER BY MOVING UP AND DOWN!

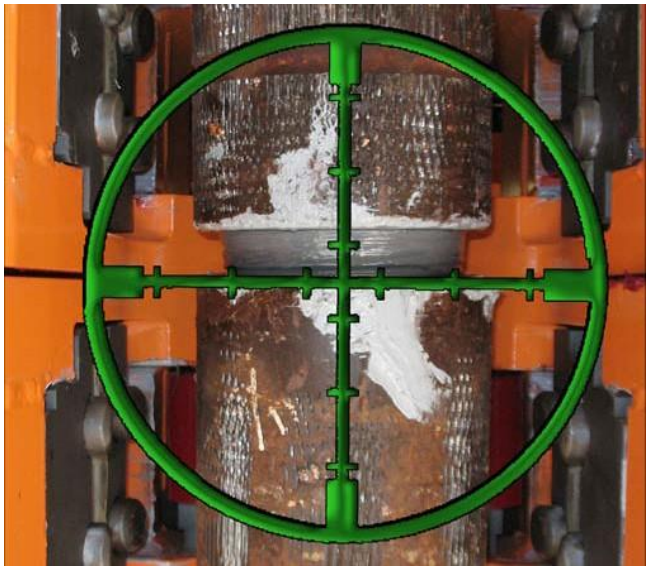


Figure 17

5. Next center the tool up and down.

Figure 18

6. Once the FloorHand is centered on the Tool Joint, clamp the lower wrench onto the box.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

NOTE:
STAY CLEAR OF HARDBAND!

7. TECHNICAL NOTE: When clamped alone, the lower wrench clamps at roughly 600 PSI. This is done to prevent the box from becoming deformed before the pin is spun in.

Figure 19

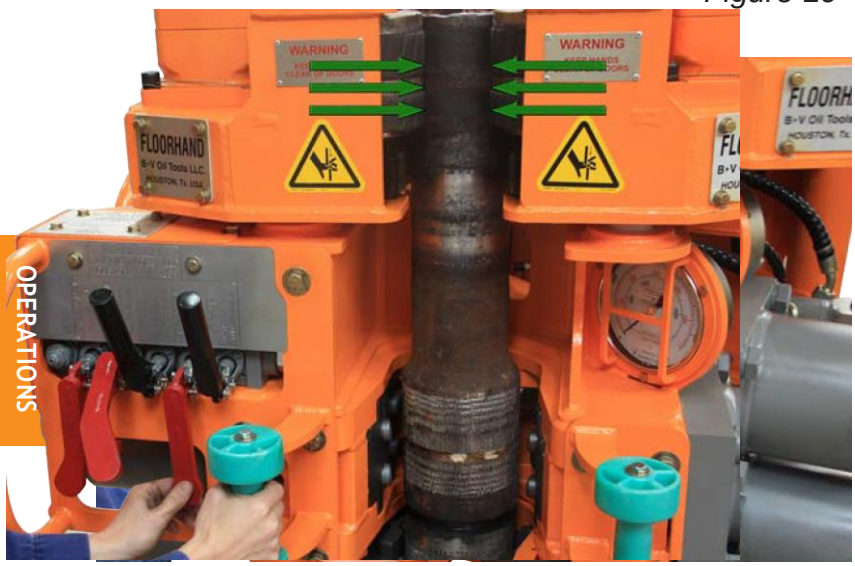


Figure 20

8. Clamp the spinner on the pipe by pushing the clamp handle. Be sure not to clamp on the upset and/or the tool joint taper.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

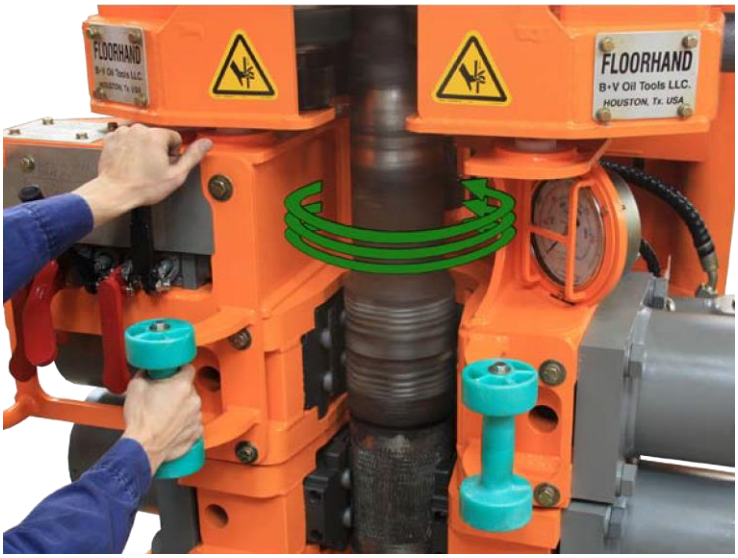


Figure 21

9. Pull the spin motor handle to spin in the pin.

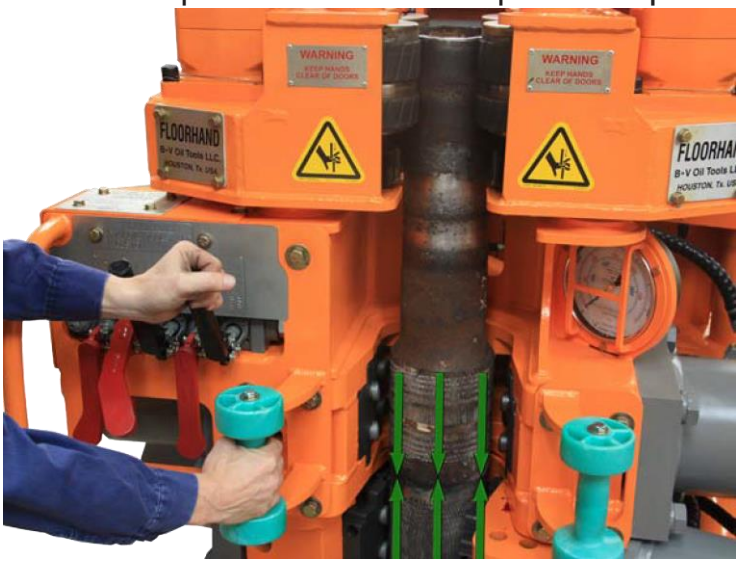


Figure 22

10. Shoulder up pin with spinner.

Figure 23

11. Pull the spinner clamp handle to unclamp the spinner.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

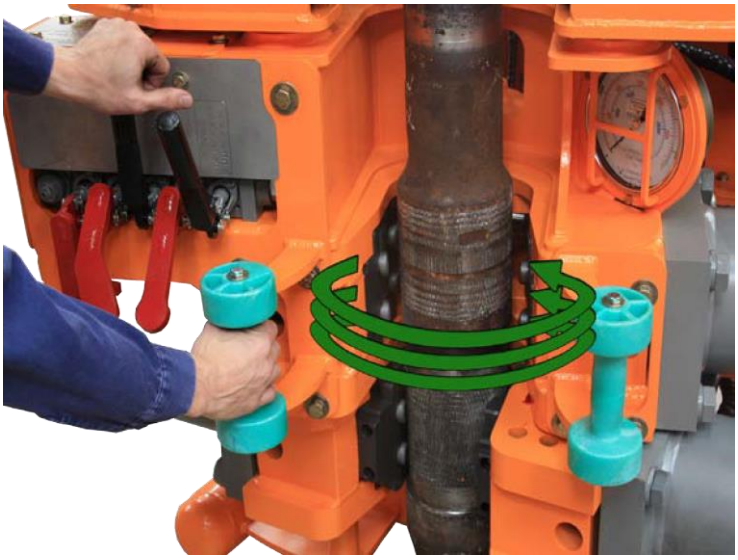


Figure 24

12. Push the torque handle to lock the upper wrench to the full break out position (counter clockwise) to ready the wrench for a full make up stroke.

13. Clamp the upper wrench on the tool joint by pushing the upper wrench clamp handle.

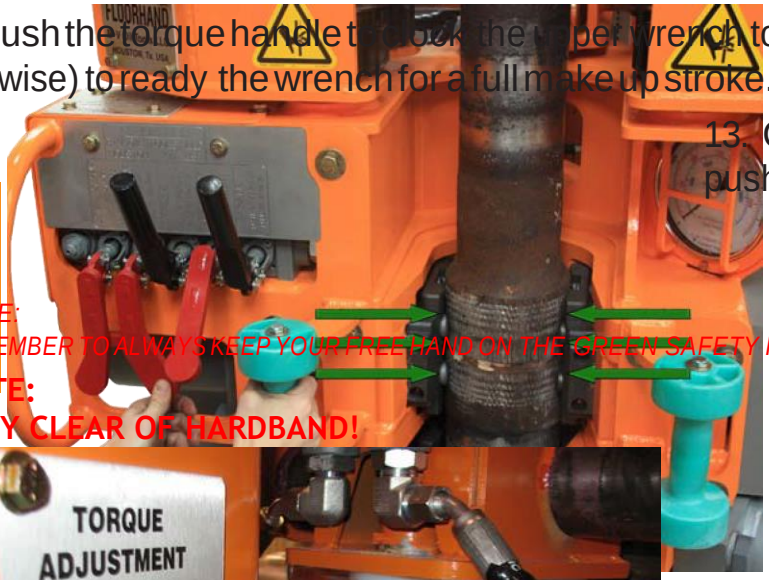


Figure 25

OPERATIONS

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

NOTE:
STAY CLEAR OF HARDBAND!

Figure 26

14. Break loose the torque adjustment locking knob.

NOTE:
TORQUE ADJUSTMENT IS ONLY NECESSARY ON THE FIRST CONNECTION OF A GIVEN PIPE SIZE/TORQUE. NO OTHER ADJUSTMENT SHOULD BE NECESSARY UNLESS THE PIPE SIZE OR SPECIFIED TORQUE CHANGES. HOWEVER, TORQUE SHOULD BE MONITORED ON EVERY CONNECTION.

Figure 27

15. Rotate the torque adjustment knob full counter clockwise.

NOTE:
THIS IS THE ABSOLUTE MINIMUM SETTING, AND SHOULD ALWAYS BE USED AS THE STARTING POINT WHEN ADJUSTING THE TORQUE.

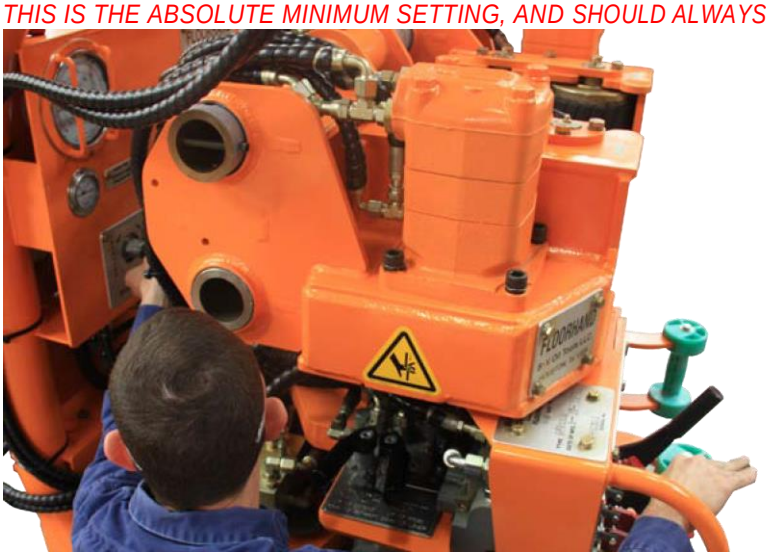


Figure 28

16. Pull and hold the torque handle in the make direction.

NOTE:
TOOL WILL NOT MOVE MUCH IF ANY, AS MINIMUM PRESSURE IS BEING SENT TO THE TORQUE CYLINDER.

While holding the torque handle fully in the
ke direction, slowly turn the torque
istment knob clockwise until the desired
ue (marked in black on the gauge) is
ched. When torque is reached, hold for
e seconds; tighten the torque adjustment lock
b to hold the torque setting. (DO NOT
ER TIGHTEN) The goal is to keep the knob
n vibrating lose and ultimately changing the
ue setting. So it is not necessary to lock it
n with a death lock.

NOTE: THERE ARE APPROXIMATELY TWO TURNS OF DEAD SPACE IN THE TORQUE ADJUSTMENT KNOB. IF THE TORQUE NEEDLE FALLS OFF, THE CYLINDER IS AT THE END OF ITS STROKE. IT IS NOW NECESSARY TO UNCLAMP THE UPPER WRENCH AND TAKE ANOTHER BITE. (REPEAT TORQUE CYCLE).
TORQUE ON ALL CONNECTIONS SHOULD BE HELD AND VERIFIED FOR A MINIMUM OF 3 SECONDS.

Figure 30

18. Unclamp the upper wrench by pulling the upper wrench unclamp handle.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

Figure 31

19. Unclamp the lower wrench by pulling the lower wrench unclamp handle.

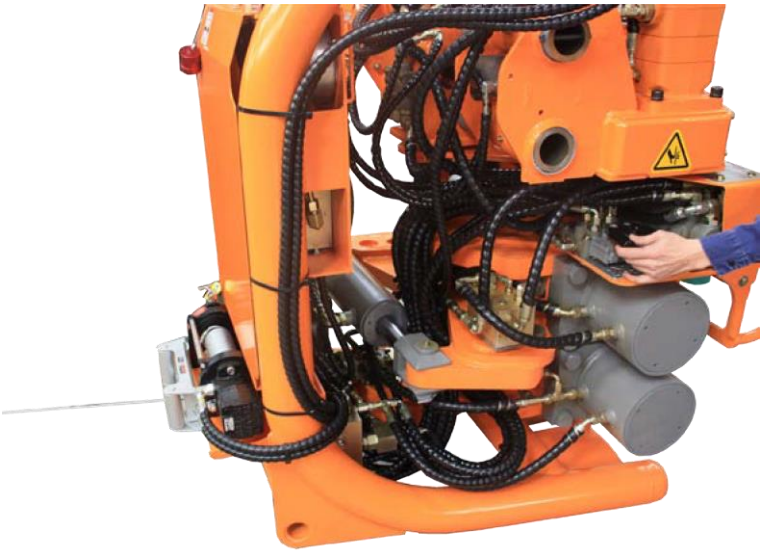


Figure 32

20. Ensure all is clear and move the tool away from the pipe to the full retracted position.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

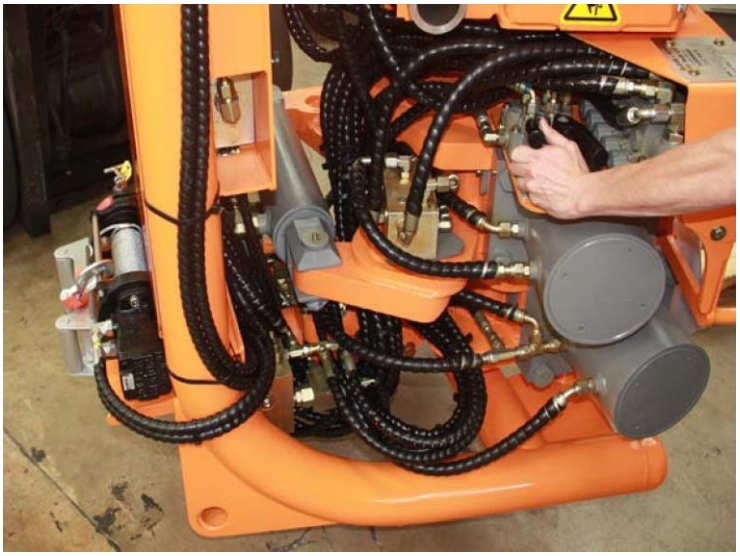


Figure 33

21. Lower the FloorHand to its full seated position.

NOTE:
IT IS GOOD PRACTICE TO LOWER THE TOOL COMPLETELY AFTER EVERY CYCLE TO REDUCE INTERFERENCE WITH TOP DRIVE SERVICE LOOP AND/ OR KELLY HOSE.

Breaking a Connection

WARNING: BEFORE OPERATING THE UNIT, MAKE SURE THAT YOU HAVE READ AND UNDERSTAND THIS ENTIRE MANUAL AND HAVE BEEN PROPERLY TRAINED IN THE OPERATION OF THE UNIT. ALSO VERIFY THAT THE UNIT HAS BEEN PROPERLY INSPECTED, ADJUSTED AND LUBRICATED BEFORE EACH USE.
WARNING: ALWAYS CLAMP THE LOWER WRENCH BEFORE CLAMPING THE UPPER WRENCH OR SPINNER. WARNING: DO

NOT CLAMP THE FLOORHAND ONTO THE PIPE BEFORE THE PIN HAS BEEN STABBED.

1. Ensure the operating area Is clear, then pull the “Extend” handle to move the tool out to the pipe. Release the “Extend” handle when the tool approaches the pipe center.

Figure 34

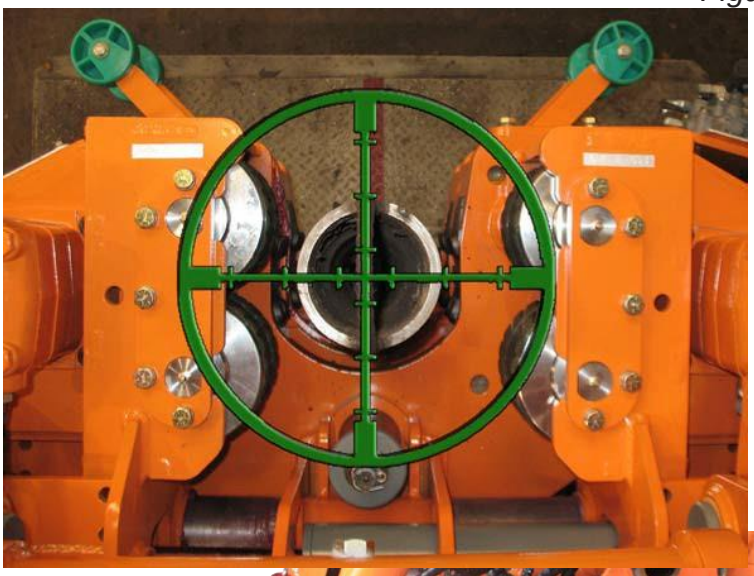


Figure 35

2. Use the “Extend” handle to center the tool In and Out first

NOTE:
ALWAYS CENTER BY EXTENDING FIRST AND THEN CENTER BY MOVING UP AND DOWN!

Figure 36

3. Next center the tool up and down.

Figure 37

4. Once the FloorHand is centered on the Tool Joint, clamp the lower wrench onto the box by pushing the lower wrench clamp handle.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

NOTE:
STAY CLEAR OF HARDBAND!

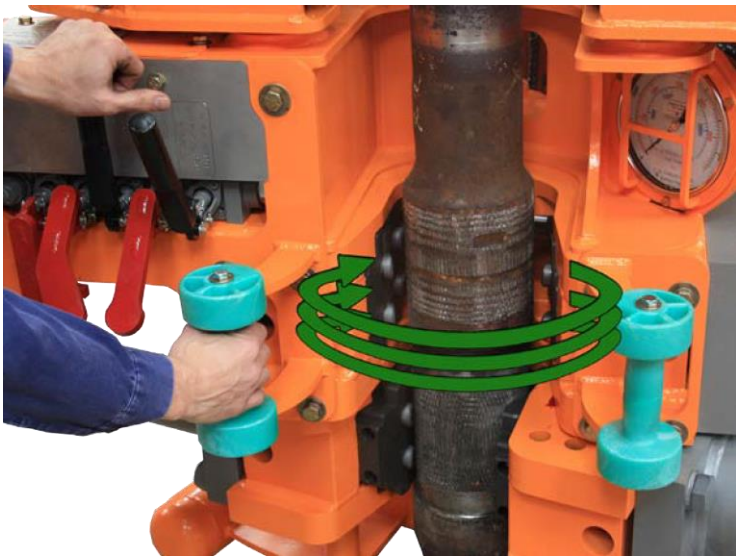


Figure 38

5. Pull the torque handle to clock the wrench to full make up position (clockwise) to ready the wrench for a full breakout stroke.

Figure 39

6. Clamp upper wrench by pushing upper wrench clamp handle.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

NOTE:
STAY CLEAR OF HARDBAND!

8. Gently move the torque handle to the right to slowly break the connection.

NOTE:
THERE IS NO ADJUSTMENT FOR BREAK OUT TORQUE PRESSURE. THEREFORE, THE BREAKOUT CYLINDER GETS FULL PRESSURE AND FLOW.

Figure 40

NOTE:
IN HIGH TORQUE SITUATIONS, IF THE BREAKOUT HANDLE IS SHIFTED FULLY, THE DIES MAY BREAK AND/OR THE UPPER WRENCH COULD SLIP, THUS DAMAGING THE TOOL JOINT.

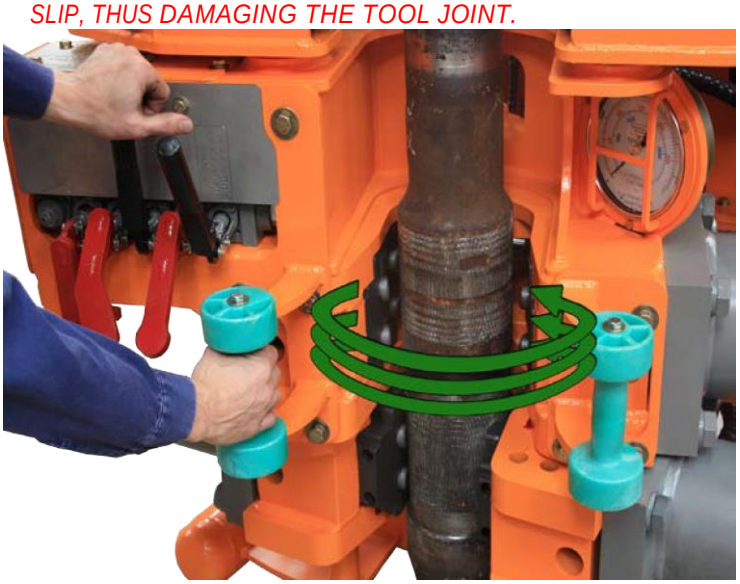


Figure 41

9. Once the connection breaks, the handle may be shifted fully to the right to finish the breakout stroke at full speed.

NOTE:
IT WILL SOMETIMES BE NECESSARY TO BREAKOUT TWICE BEFORE THE SPINNER CAN TAKE OVER.

Figure 42

10. After the breakout is complete, unclamp the upper wrench.

NOTE:
YOU MAY NOW CENTER THE UPPER WRENCH HOWEVER THIS IS NOT NECESSARY.

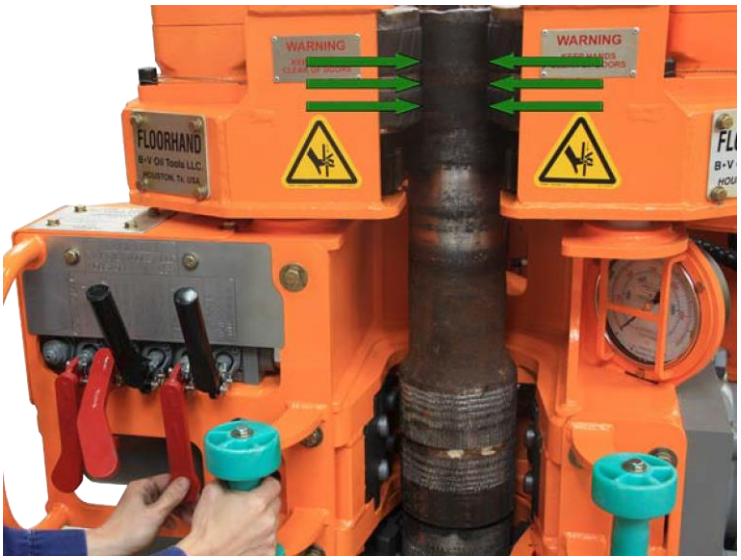


Figure 43

11. Clamp the spinner by pushing the spin clamp handle. Stay clear of the upset and/or tool joint tapper.

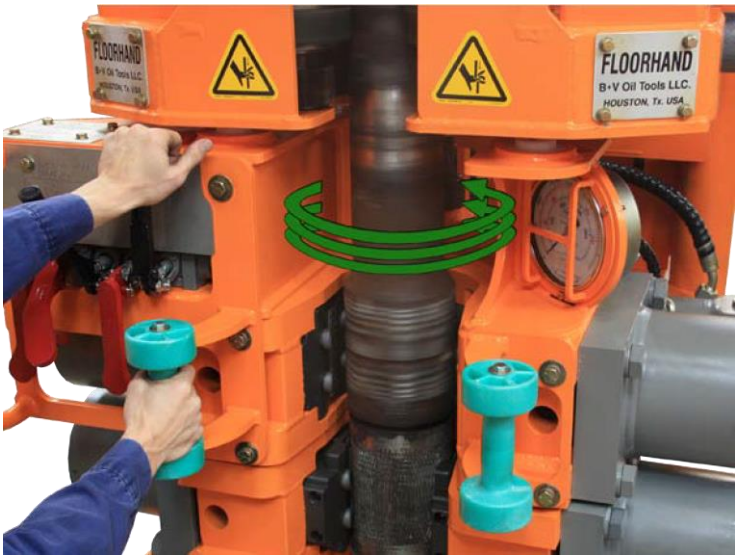


Figure 44

12. Push the spin motor handle to the right, fully, to spin out the pin.

Figure 45

19. Unclamp the upper wrench by pulling the upper wrench unclamp handle.

NOTE:
REMEMBER TO ALWAYS KEEP YOUR FREE HAND ON THE GREEN SAFETY HANDLE.

20. Unclamp the lower wrench by pulling the lower wrench unclamp handle.

Figure 46

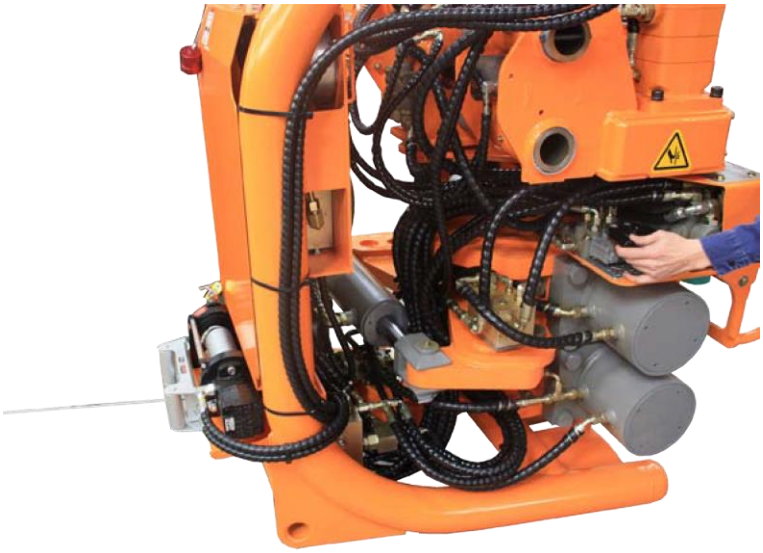


Figure 47

15. Ensure all is clear and move the tool away from the pipe to the full retracted position

OPERATIONS

Figure 48

16. Lower the FloorHand to its full seated position.

NOTE:
IT IS GOOD PRACTICE TO LOWER TOOL COMPLETELY AFTER EVERY CYCLE TO REDUCE INTERFERENCE WITH TOP DRIVE SERVICE LOOP AND OR KELLY HOSE.

Troubleshooting

Problem: Upper wrench slips when making or breaking a connection.

START

Is there 2,500 psi system pressure gauge?

Yes

present at the wrench

Yes

Are the tong dies in good _____ condition?

Is the operator allowing time for the dies to bite into the tool joint before operating torque cycle?

Change dies, stay clear of the hardband.

Allow a good bite prior to making up or breaking out.

No No No Yes

Yes

Is there 2,500 psi present at H.P.U output? _____

Check that quick disconnects. Are other tools connected to the hydraulic system?

When breaking out, the operator should manually start break out slowly and when connection breaks, finish at full break out speed.

Good

No Yes

No

Adjust/Repair HPU for 2,500 psi output.

Other tools in the system can cause intermittent loss of pressure resulting in slippage.

Does the problem persist?

No

Make sure all operators understand correct operation of FloorHand.

Note: It is required that the FloorHand have an independent HPU for proper operation.

Contact Blohm + Voss Service.

Problem: Lower wrench slips when making or breaking connections.

Is there 2,500 psi

START

Yes

Yes

Allow time for good die penetration.

No

Is operator allowing time for dies present at wrench system pressure gauge?

When breaking out, operator should manually start break out slowly. When connection breaks, finish at full break out speed.

Are tong dies in good condition? ___

to bite into the tool joint before operating torque cycle?

Yes

No

No

Replace Dies

Contact Blohm + Voss Service.

Yes

Is there 2,500 psi present ___

at H.P.U output?

No

Check quick connections. Are there other tools connected

to the hydraulic system?

Continue with the operation. Make sure all operators understand the correct operation of the FloorHand.

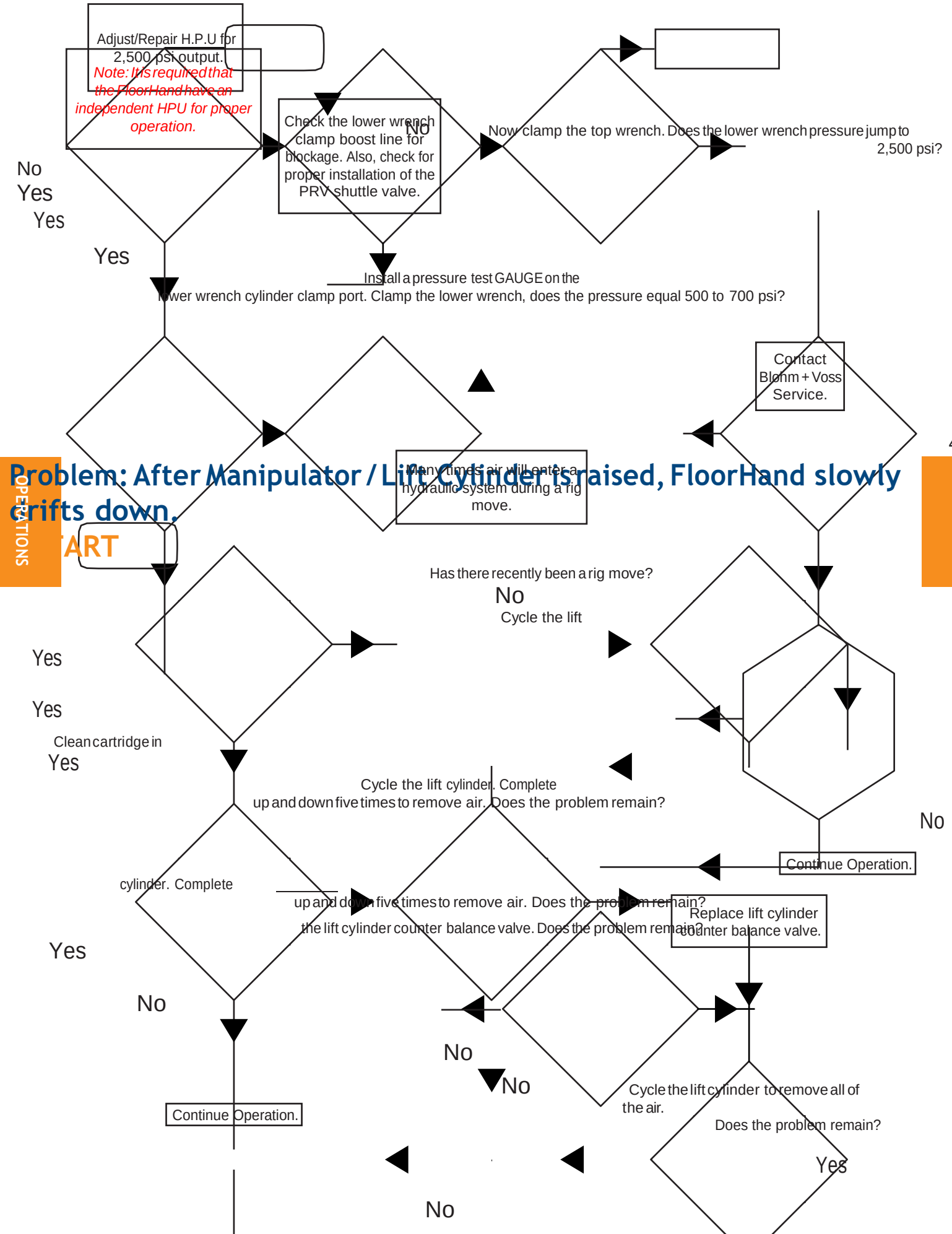
No

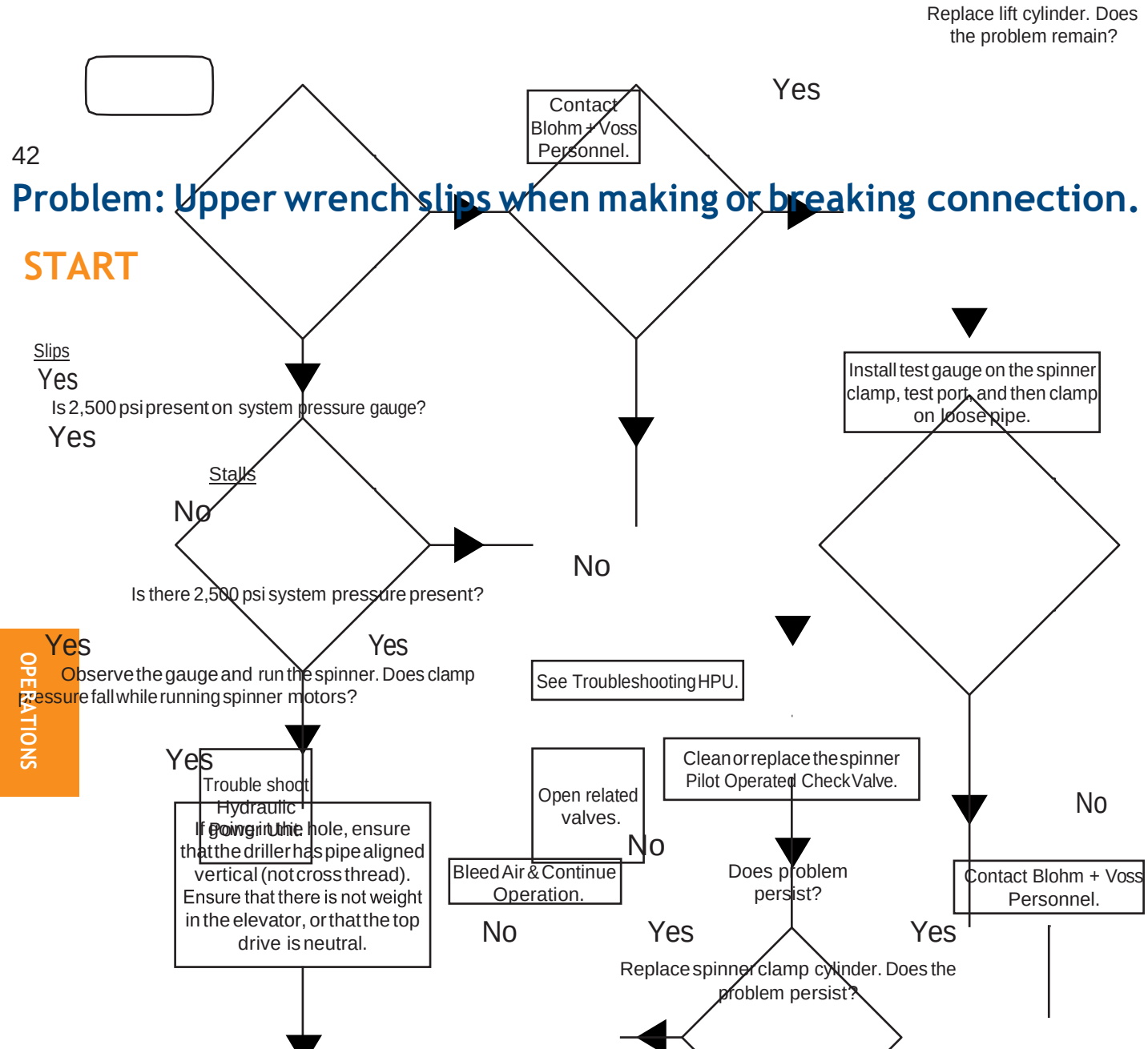
Does the problem persist?

No

Yes

Problem: After Manipulator / Lift Cylinder is raised, FloorHand slowly drifts down.

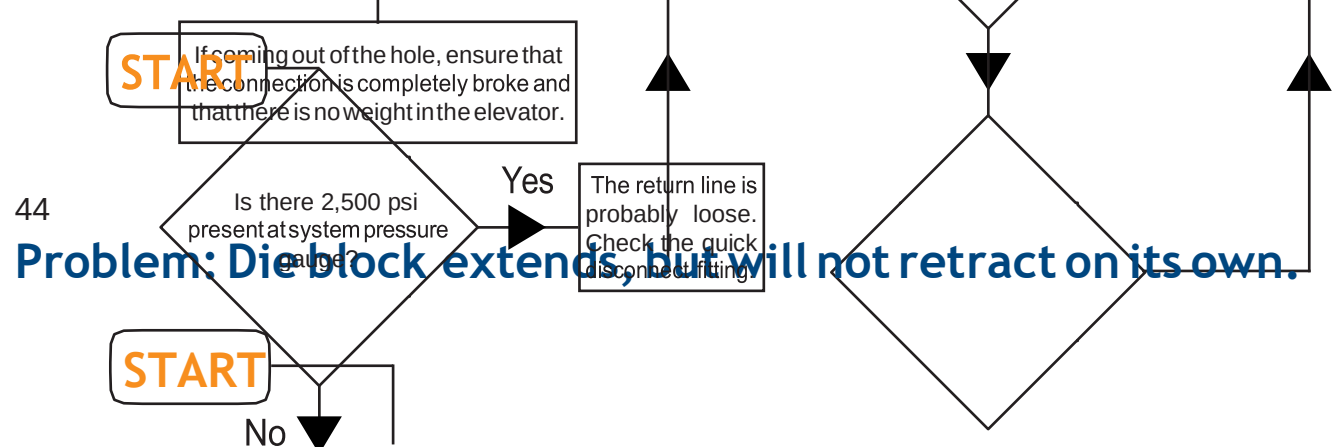




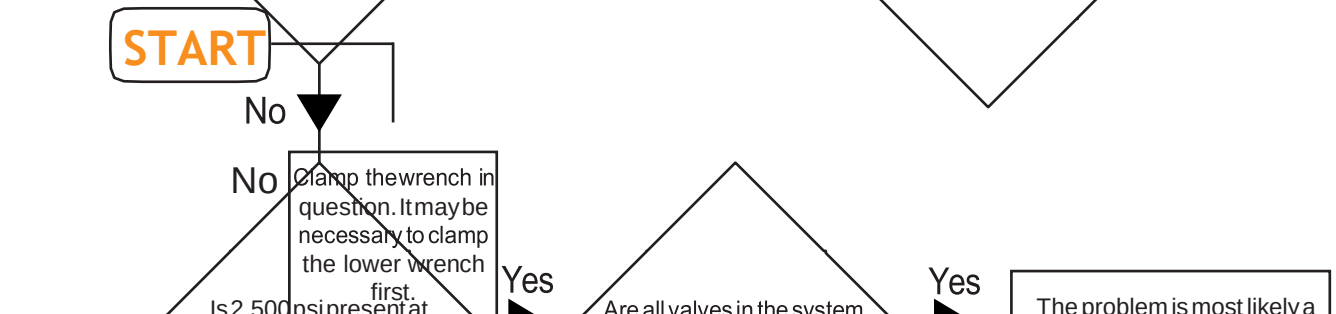
Problem: Upper wrench slips when making or breaking connection.

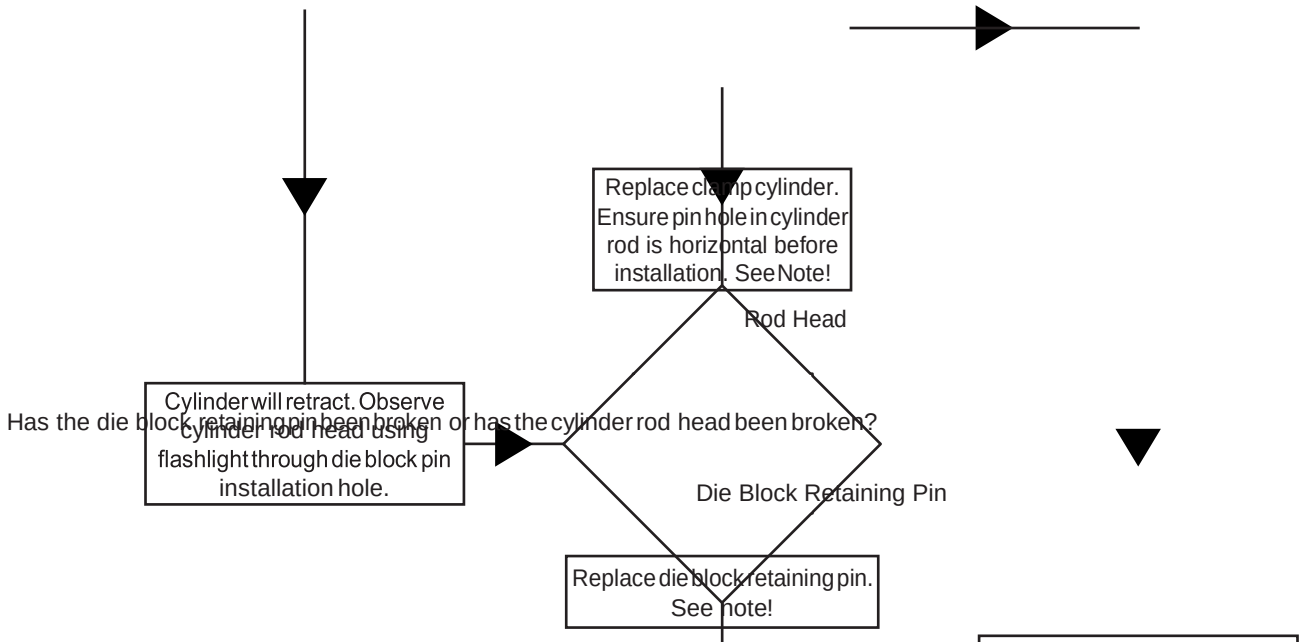
START

Problem: All wrench & manipulator functions are inoperative.

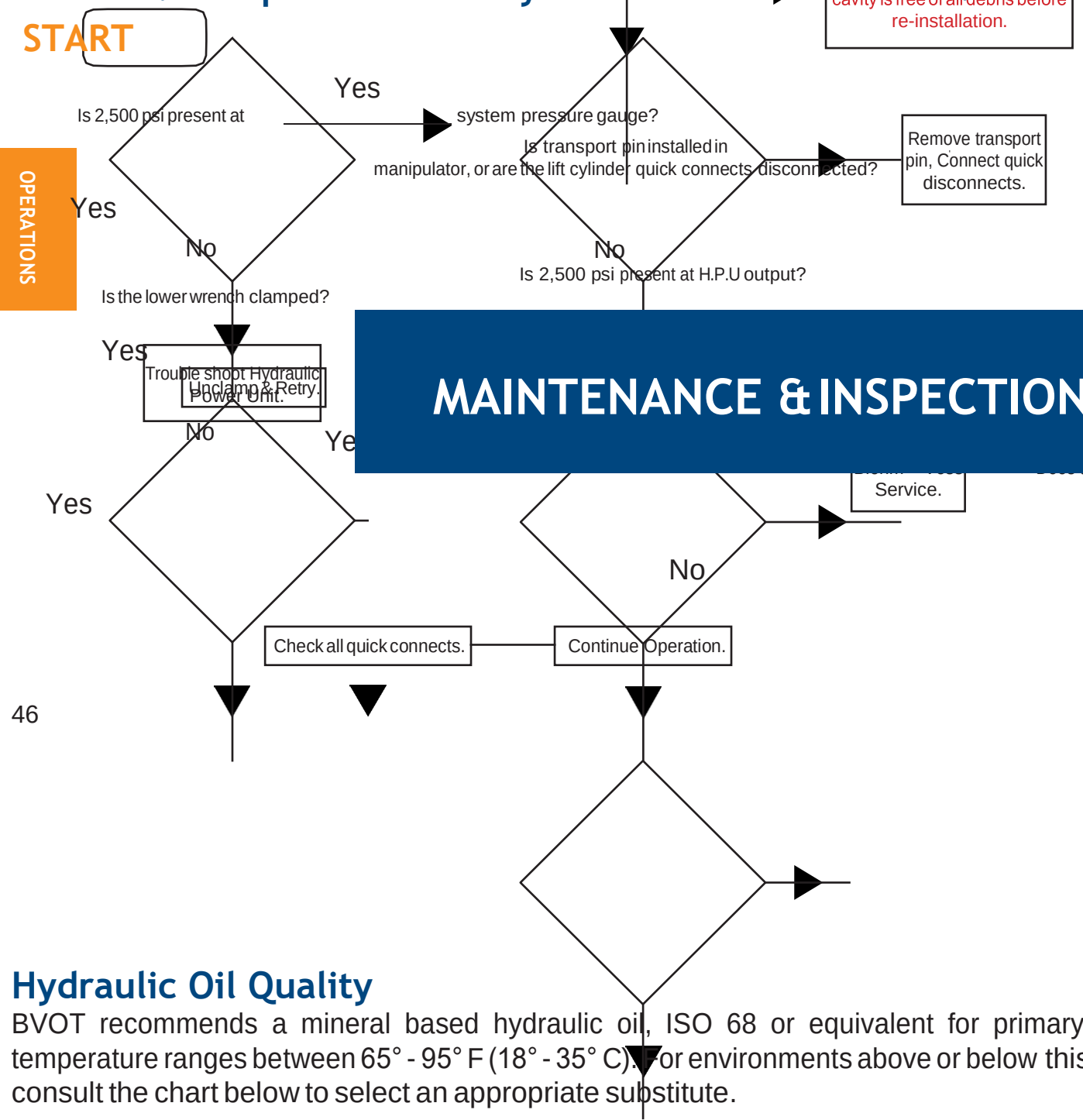


Problem: Die block extends, but will not retract on its own.





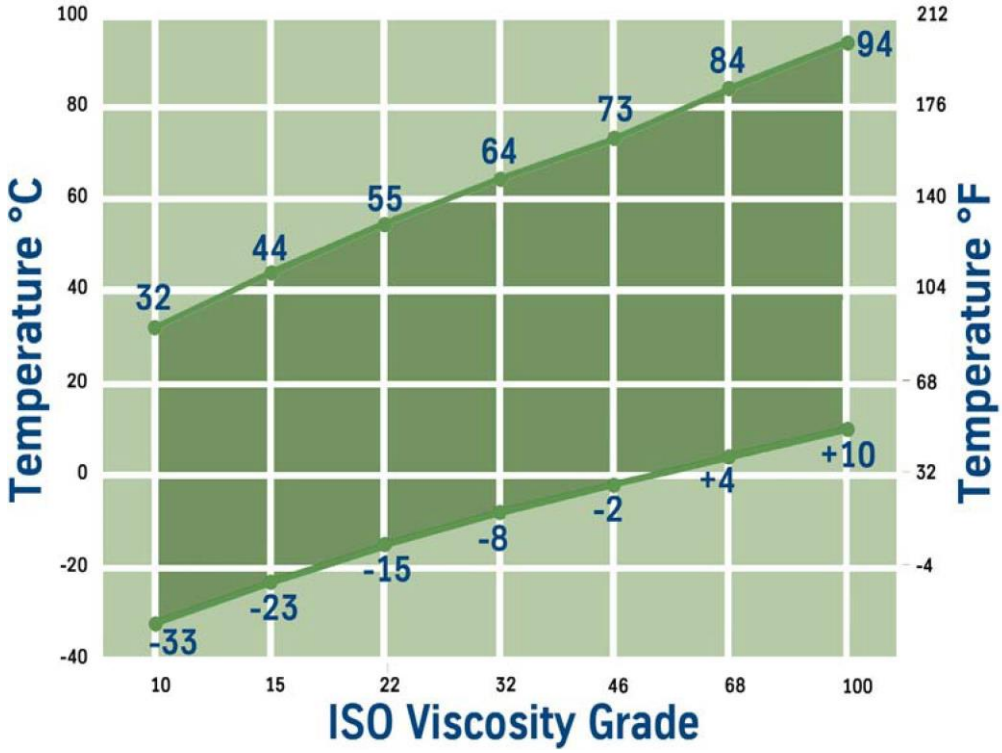
Problem: Manipulator / Lift Cylinder does not function



MAINTENANCE & INSPECTION

Hydraulic Oil Quality

BVOT recommends a mineral based hydraulic oil, ISO 68 or equivalent for primary use in temperature ranges between 65° - 95° F (18° - 35° C). For environments above or below this range, consult the chart below to select an appropriate substitute.



Primary Hydraulic Oil

Chevron Regal® R&O ISO 220-ISO 680 Shell Tellus®
Oil Premium 68
Multipurpose grease, e.g.:
Retinax Grease LX2 Shell
Alvania RL 3 Aviaticon XRF
NLGI 0
Alternatively; use EP gear lubricating grease for greasing ”non-oil tight gear trains” NESSOS SFC
NLGI 0
DIN 51 826 GPOF-25
DIN 51 502 GPOF-25

WARNING: ALWAYS TURN OFF THE HYDRAULIC POWER UNIT, DISCONNECT THE HYDRAULIC LINES AND TAG OUT THE HPU CONTROL BEFORE LUBRICATING THE FLOORHAND. FAILURE TO DO SO MAY CAUSE INJURY TO PERSONNEL OR DAMAGE TO THE EQUIPMENT.

MAINTENANCE & INSPECTION

Lubrication

The FloorHand should be inspected and greased each week. For higher ambient tempera- ture up to 86° Fahrenheit (30° Celsius) we recommend to use NLGI grade 2. The grease points are:
The grease points are:

- Die Blocks - Actuate both lower wrench clamp and upper wrench clamp to expose the grease fittings before turning off the hydraulic power unit. Use a grease gun on each of the 4 fittings (Front and back) on each die block to lubricate the centering buttons.
- Die Blocks - With the Die Blocks extended, brush grease on the top, bottom and sides of each die block.
- Spinner gears - Brush grease onto the drive gear teeth. Take care to keep grease off of the drive rollers.
- Torque cylinder pins - Use a grease gun on the fitting on the top of each torque cylinder

pin.

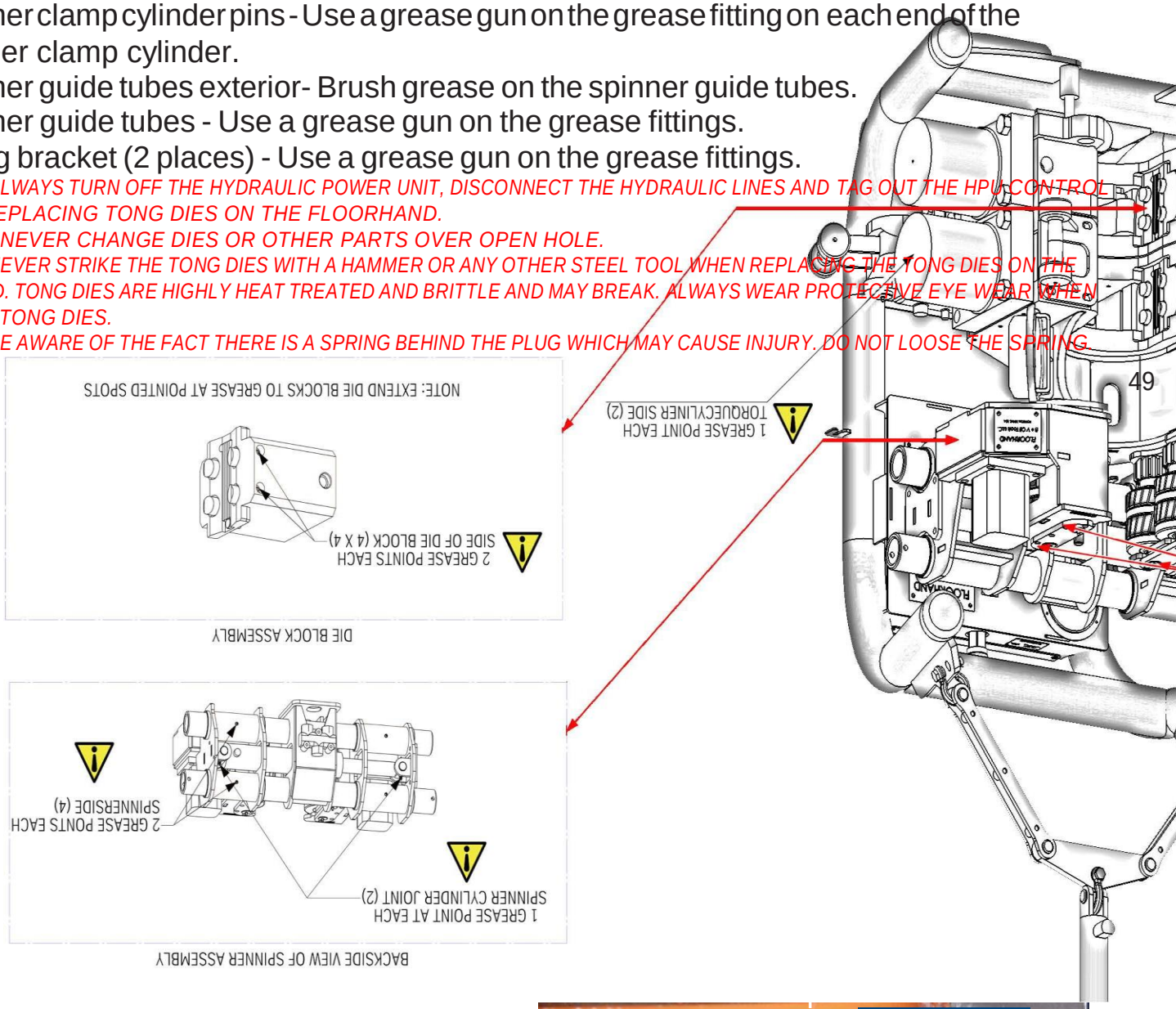
- Spinner clamp cylinder pins - Use a grease gun on the grease fitting on each end of the spinner clamp cylinder.
- Spinner guide tubes exterior- Brush grease on the spinner guide tubes.
- Spinner guide tubes - Use a grease gun on the grease fittings.
- Lifting bracket (2 places) - Use a grease gun on the grease fittings.

WARNING: ALWAYS TURN OFF THE HYDRAULIC POWER UNIT, DISCONNECT THE HYDRAULIC LINES AND TAG OUT THE HPU CONTROL BEFORE REPLACING TONG DIES ON THE FLOORHAND.

WARNING: NEVER CHANGE DIES OR OTHER PARTS OVER OPEN HOLE.

WARNING: NEVER STRIKE THE TONG DIES WITH A HAMMER OR ANY OTHER STEEL TOOL WHEN REPLACING THE TONG DIES ON THE FLOORHAND. TONG DIES ARE HIGHLY HEAT TREATED AND BRITTLE AND MAY BREAK. ALWAYS WEAR PROTECTIVE EYE WEAR WHEN CHANGING TONG DIES.

WARNING: BE AWARE OF THE FACT THERE IS A SPRING BEHIND THE PLUG WHICH MAY CAUSE INJURY. DO NOT LOOSE THE SPRING.



- Stabber (optional; no stabber avail- able when welded frame in use) - Brush grease on the stabber guide rails and adjusting gear.
- Stabber (optional) - Use a grease gun on the grease fitting on the bottom of each stabber locking arm.
- Spinner clamp cylinder pins - Use a grease gun on the grease fitting on each end of the spinner clamp cylinder.
- Die dove tails groove - Brush grease in the grooves.

Removal of Die-block

Procedure:

1. Remove the bolt. Number 1
2. Remove retainer. Number 2
3. Remove the retainer pin. Using the opening on the front on the wrench, push the pin

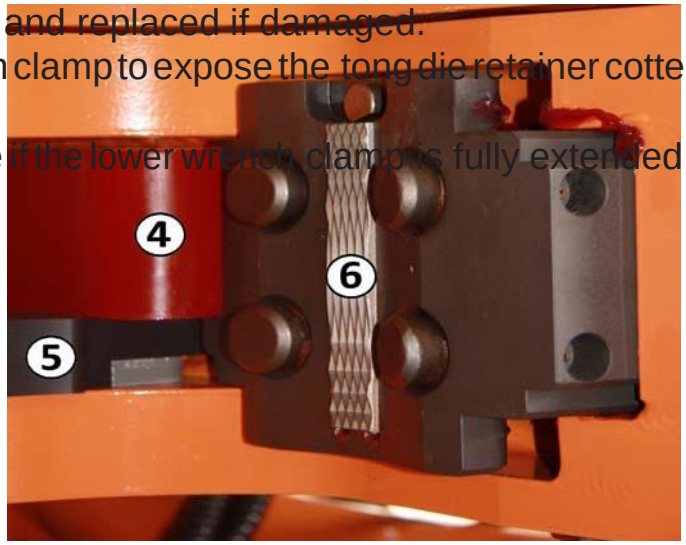
through the opening on the back of the wrench. (Not shown)
4. Remove pipe stop. (Lower wrench only) Number 4
5. Remove pipe stop base. (Lower wrench only) Number 5
6. Slide out the Die Block. Number 6

Figure 50

Figure 51

Replacement of Tong Dies

The tong dies should be inspected on a daily basis and replaced if damaged.
Actuate both lower wrench clamp and upper wrench clamp to expose the tong die retainer cotter pins before turning off the hydraulic power unit.
All four tong dies may be replaced at the same time if the lower wrench clamp is fully extended and the upper wrench clamp is only partially extended.



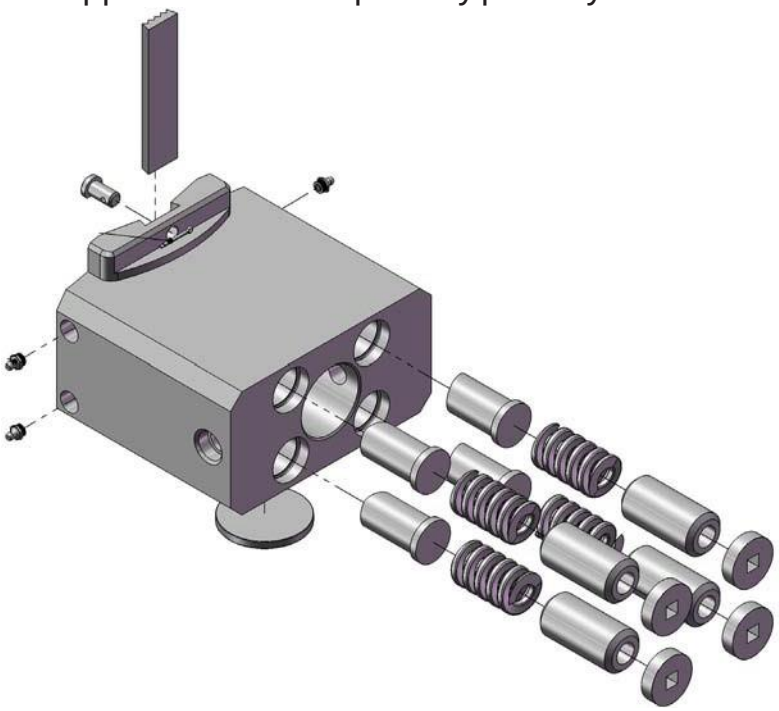


Figure 52

1. Remove the cotter pin securing the tong die retainer.
2. Remove the tong die retainer.
3. Slide the tong die upwards to disengage from the slot in the jaw. If the die is difficult to remove, use a brass drift to tap it out from the bottom.
4. Discard old tong dies and cotter pins.
5. Clean and grease the die slot.
6. Slide in new tong dies.
7. Replace tong die retainers.
8. Insert new cotter pins and bend legs to secure.

Replacement of Centering Buttons

1. Remove the die block.

2. Using a 1/2" drive ratchet, remove the spring retainer plug, the spring spacer and the spring.
3. Now use a mallet to drive the button back through and out of the housing.
4. Remove all debris.
5. Apply lubricant and reinstall components.
6. Replace the button and assemble in reverse order.

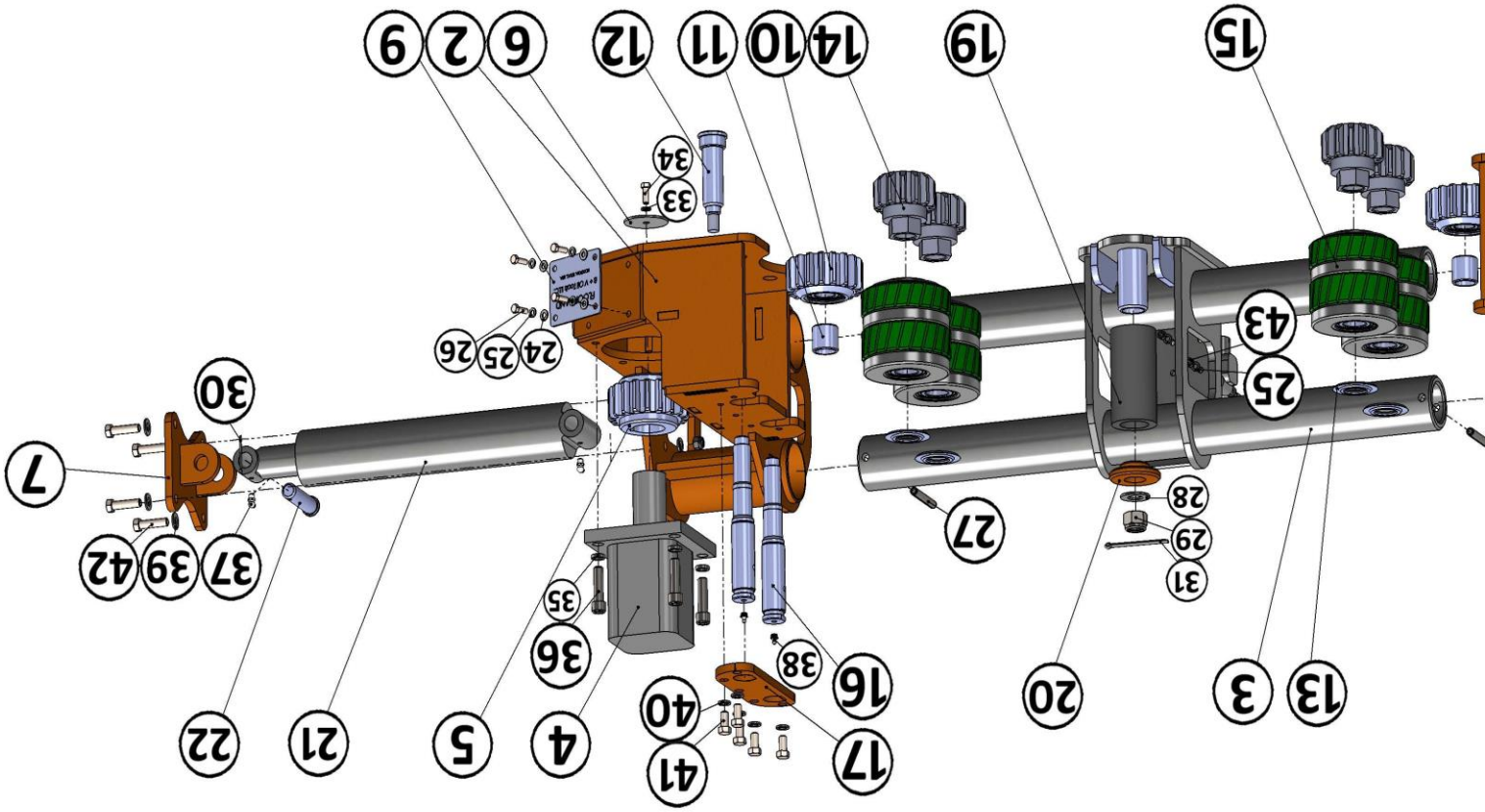
WARNING: ALWAYS TURN OFF THE HYDRAULIC POWER UNIT AND DISCONNECT THE HYDRAULIC LINES BEFORE REPLACING SPINNER DRIVE ROLLERS ON THE FLOORHAND.
WARNING: DO NOT ATTEMPT THIS PROCEDURE OVER OPEN HOLE.
WARNING: THE BLOCK IS HEAVY
WARNING: ENSURE THE WEIGHT OF THE SPINNER HOUSING IS SUPPORTED BY A TUGGER OR CRANE (HEAVY).

Replacing Spinner Drive Rollers

The spinner drive rollers should be inspected after each trip and replaced if they show signs of deterioration or cracking. To replace the spinner drive rollers refer to "Figure 53" on page 54 and follow the procedure. For additional help refer to the full size image and explanation of parts in the Drawings section of this manual, page 68:

1. Remove the five bolts securing the drive roller shaft retainer plate. (Items 40 and 41)
2. Remove the drive roller shaft retainer plate. (Item 17)
3. Pull the drive roller shaft (Item 16) upwards approximately 3/4" so that the bottom end of the drive roller shaft clears the bottom plate of the spinner frame.
4. Withdraw the entire assembly from the spinner frame. Hold together the gear, roller and shaft as to not drop the parts. (Items 14, 15 and 16 respectively)
5. Remove and set aside the upper spacer for reuse. (Item 13)
6. Withdraw the drive roller shaft fully from the top of the drive roller and set aside for reuse.
7. Separate the drive roller away from the drive gear and set aside. (Items 15 and 14)
8. Clean the top of the drive roller gear to remove caked drilling mud and other debris that might keep the drive roller from fully seating in the case. ("Figure 59" on page 69)
9. Inspect the drive gear bearings and replace if they appear damaged or do not rotate smoothly.
10. Lubricate the top hex of the spinner drive gear.
11. Slide the new drive roller onto the hex portion until it seats fully.
12. Clean and lubricate the drive roller shaft. Slide it through the drive roller bearings and then through the drive gear bearings. Do not use force. If the drive roller shaft does not slide easily through the bearings with, **at most**, a light tap with a hammer handle, inspect the shaft for damage and, if necessary, replace the drive roller shaft.
13. Reposition the upper spacer (Item 13) on the assembly and position the lower end of the drive roller shaft flush with (or slightly inside) the face of the lower spacer.
    Slide the entire assembly back into the spinner frame until the drive roller shaft contacts the back of the slot in the top plate of the spinner frame.
14. Align holes, then lightly tap the drive roller shaft (Item 16) down to engage the lower end of the drive roller shaft with the bottom plate of the spinner frame. (Items 1 or 2)
15. Orient the flat on the top of the drive roller shaft (Item 16) to properly mate with the drive roller shaft retainer. (Item 17)
16. Replace the drive roller shaft retainer (Item 17) and, Install the bolts holding it to the spinner frame and tighten.

MAINTENANCE & INSPECTION



Frequency

Inspection

A thorough inspection should be carried out periodically (every 3 months) or as special circumstances may require. Before starting an inspection disconnect hydraulic system and remove all foreign materials (dirt, paint, grease, oil, scale, etc) from surface by a suitable method. After a field inspection, it is advisable to record the extent of testing and testing results. A periodic load inspection may be conducted in the fi
excessive wear etc are recognized, contact Blohm + Voss Oil Tools, LLC o d
service company.

MAINTENANCE & INSPECTION

Hydraulic System Inspection

Check for leakage every day. If an internal or external leakage reaches an unacceptable level, contact Blohm + Voss Oil Tools, LLC or an authorized service company.

Dismantling Inspection

Generally, when the equipment returns to base, warehouse, etc carry out the tool inspection immediately. Furthermore, repair it if necessary prior to it being sent on the next job. The tool should be dismantled and inspected in a suitably equipped facility for excessive wear, cracks, flaws or deformations. Corrections should be made in accordance with recommendations which can be obtained from Blohm + Voss Oil Tools, LLC.

Inspection Categories

This is Category III inspection plus further inspection for which the equipment is disassembled to the extent necessary to conduct NDT of all primary-load-carrying components.
Equipment shall be:

- Disassembled in a suitable-equipped facility to the extent necessary to permit full inspection of all primary-load-carrying components and other components that are critical to the equipment.
- Inspected for excessive wear, cracks, flaws and deformation.

Procedure:

- Corrections shall be made in accordance with the manufacturer's recommendations.
- Prior to inspection, all foreign material such as dirt, paint, grease, oil, scale, etc. shall be removed from the concerned parts by a suitable method (e.g. paint-stripping, steam-cleaning, grit-blasting)

Periodic Inspection

The recommended schedule for inspection of the FloorHand are as follows:

- Ongoing: Inspection category I
- Daily: Inspection category II
- Every 3 months: Inspection category III
- Every 1 year: Inspection category IV

The recommended frequencies apply for equipment in use during the specified period.

Check List

Category I (ONGOING OBSERVATION)

Observe during operation for inadequate performance

Category II (DAILY)

CHECK FOR THE FOLLOWING GENERAL ISSUES (but not limited to):

	DESCRIPTION	CHECKED	SIGNATURE
1.	Check state of lubrication		
2.	Check functioning of FloorHand as a whole remarks		
3.	Check for leakage		
4.	Check completeness and condition of warning plates and labels		

Remarks

CHECK FOR LOOSE ITEMS, ESPECIALLY FOR (but not limited to):

1.	Shafts, bolts and retainers		
2.	Assemblies		
3.	Screws, bolts, nuts, washers, retainers, springs and lock wire		

4. Check for presence of centering buttons and dies

Remarks

CHECK FOR CRACKS, ELONGATION, DAMAGE AND CORROSION, ESPECIALLY FOR (but not limited to):

1. Dies
2. Shafts, nuts, bolts
3. Drive rollers
4. Centring buttons

Remarks

SUPERVISOR DATE

Category III (EVERY 3 MONTHS)

GENERAL

PLACE OF INSPECTION

DESCRIPTION		CHECKED	SIGNATURE
1	Carry out a Category II inspection		
	Remarks		

Category IV (EVERY YEAR)

GENERAL

DESCRIPTION		CHECKED	SIGNATURE
1	Carry out inspection II & III		
	Remarks		

SUPERVISOR DATE

Inspection Check Lists

TYPE OF EQUIPMENT

SERIAL NUMBER

PART NUMBER

SUPERVISOR

DATE OF INSPECTION

INSPECTION CATEGORY

SPARE PARTS

60

Recommended Spare Parts for One Year Operation

Item	Part number	Description	Qty.
1	9FH-01407	DOUBLE DRIVE ROLLER ASSY	8
2	9FH-01408	DRIVE ROLLER GEAR ASSY	2
3	9FH-01315	UPPER SPACER (DR)	4
4	9FH-01287	IDLER GEAR ASSY	2
5	9FH-01384	DRIVE ROLLER SHAFT	4
6	9FH-01391	SPINNER IDLER SHAFT	2
7	9FH-01290	IDLER SHAFT SPACER	2
8	9FH-01216	DIE RETAINER WITH COTTER PIN	24
9	9FH-01055	DIE BLOCK RETAINING PINS	8
10	9FH-70622-1	BLUE DIAMOND TONG DIE	108
11	9FH-01023	SPINNER SLIDE BEARING	2
12	9FH-01050-1	DIE BLOCK / WRENCH SUPPORT BRG	8
13	9FH-01149-29	TORQUE CONTROL CARTRIDGE	1
14	9FH-01149-60	CONTROL VALVE SHORT CLEVIS	5
15	9BN66004	3/16 X 3/4 CLEVIS PIN	10
16	9BN65016	1/16 X 1 COTTER PIN	10
17	9FH-01152-2	TORQUE GAUGE W/ MOUNTING RING	1
18	9FH-5LEV105000	STANDARD LEVER BOX	2

19	9FH-10024	FRAME ASSY ORFS HOSE KIT	1
20	9FH-10124	LOWER WRENCH HOSE KIT ORFS	1
21	9FH-10224	UPPER WRENCH ORFS HOSE KIT	1
22	9FH-10324	SPINNER SUB ASSY HOSE KIT (ORFS)	1
23	9FH-10605	CONTROL VALVE HOSE KIT ORFS	1
24	9FH-10604	MISC HOSE KIT (ORFS)	1

DRAWINGS

62

PIPE FRAME FLOORHAND FH-70
9GF-8002

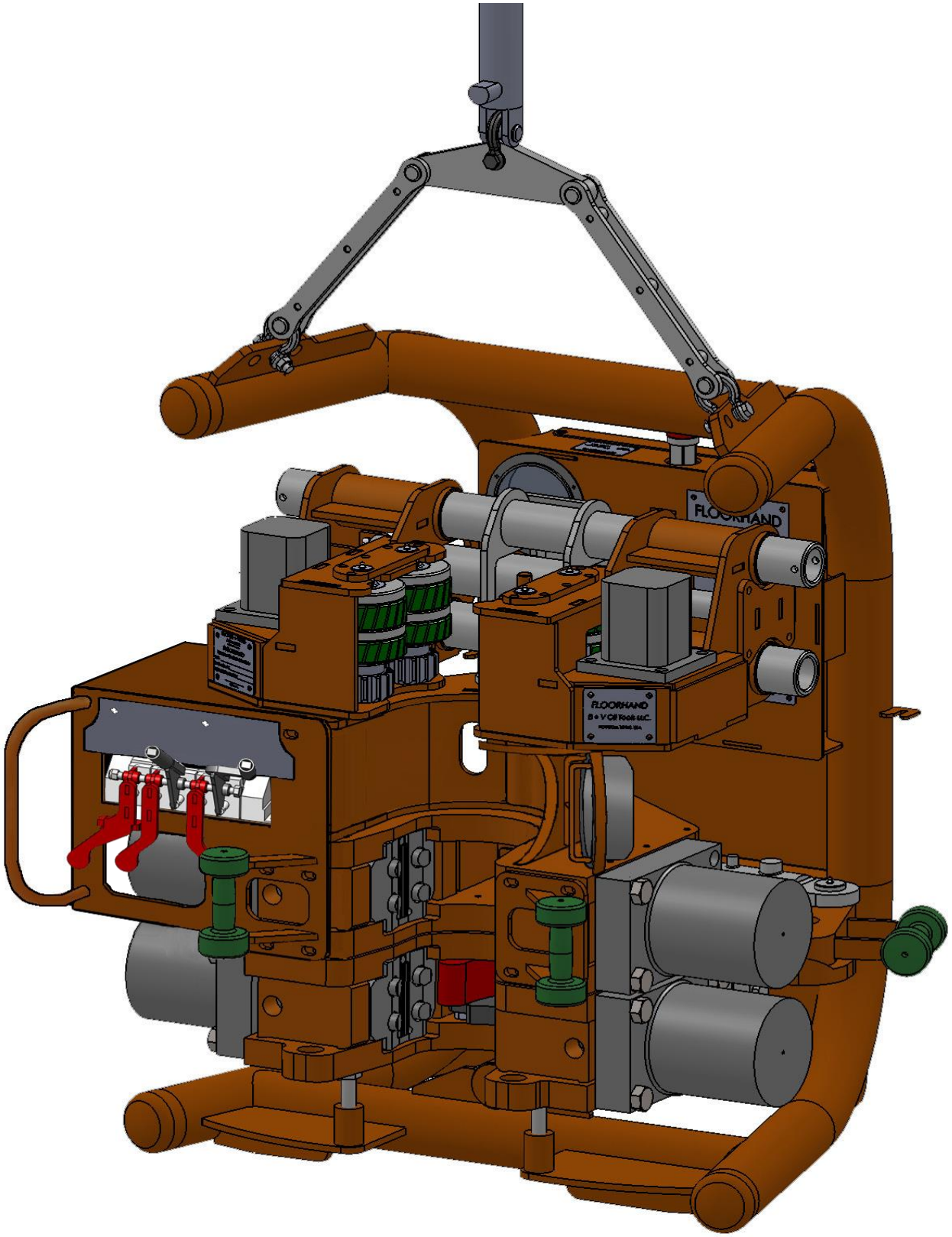


Figure 54

FLOORHAND COMPONENTS
9GF-8002

Item	
1	H-70
2	
3	MBLY ORFS
4	MBLY ORFS
5	ER
6	

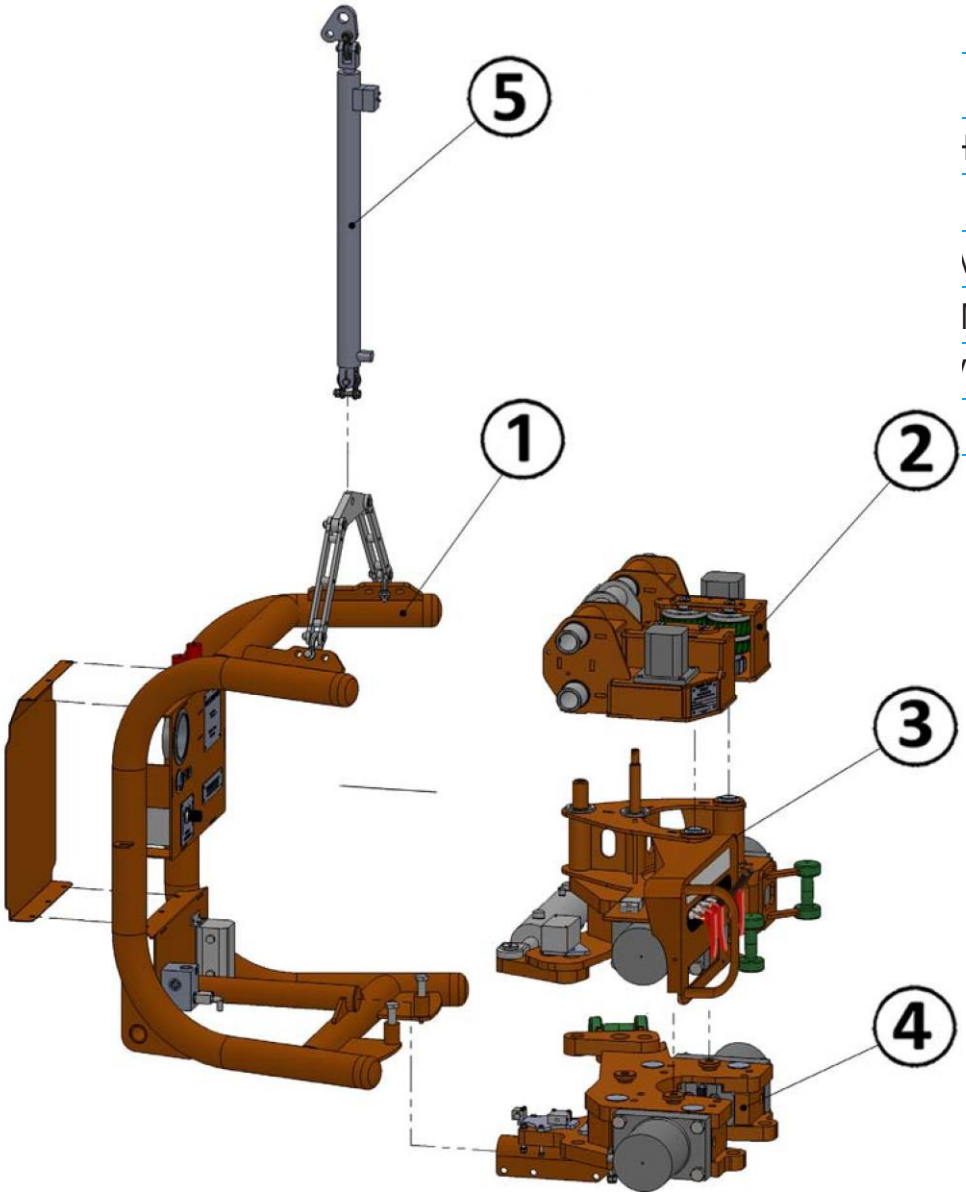


Figure 55

64

PIPE FRAME ASSEMBLY FH-70
9FH-80000

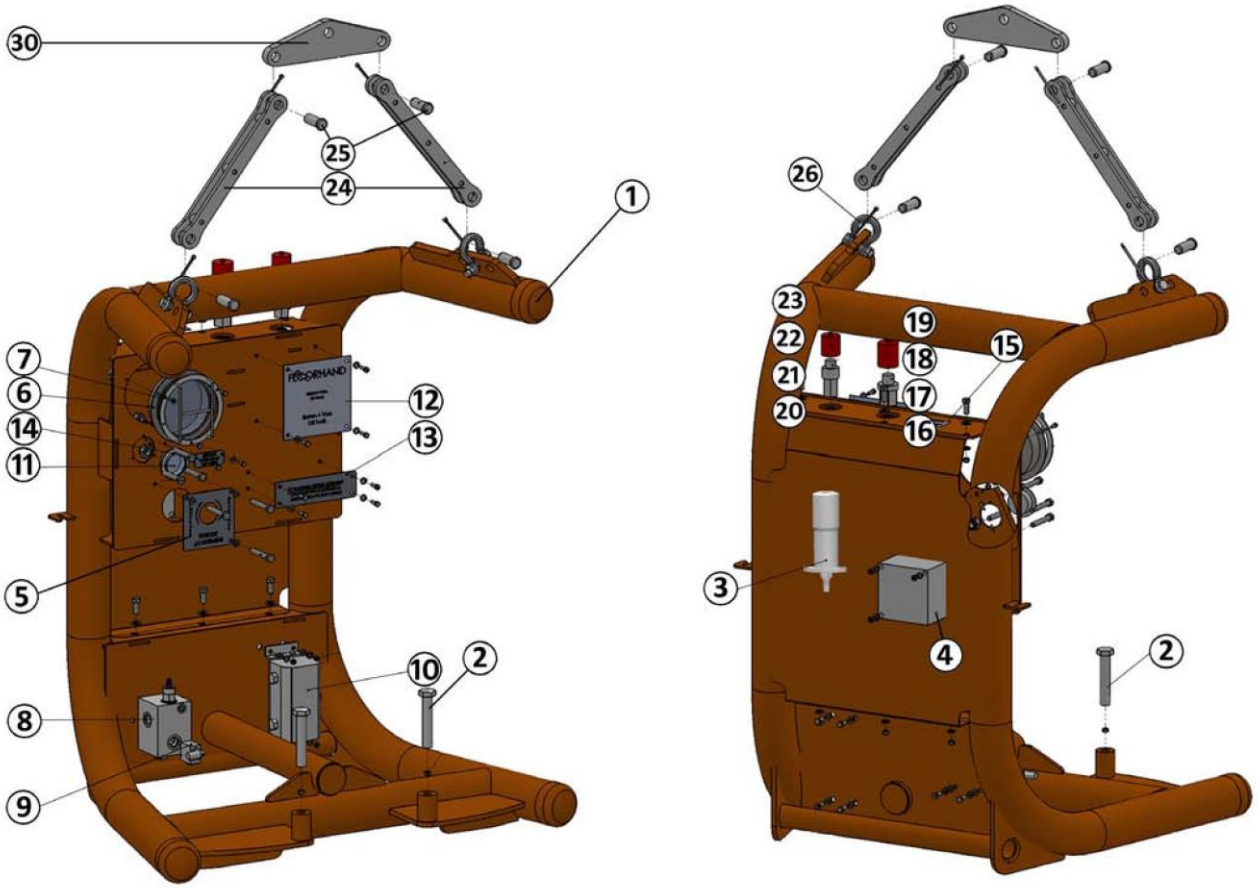


Figure 56

Item	Part number	Description	Qty.
1	9FH-01588	8002 PIPE FRAME	1
2	9FH-01089	JACK BOLT	2
3	9FH-01152-13	IN LINE PRESSURE FILTER ASSEMBLY	1
4	9FH-01151	TORQUE CYLINDER MANIFOLD ASSEMBLY	1
5	9FH-01018-5	8002 TORQUE MANIFOLD TAG	1
6	9FH-01152-2	TORQUE GAUGE W/ MOUNTING RING	1
7	9FH-01533	TORQUE GAUGE GUARD	1
8	9FH-01149-8	PRESSURE REDUCING VALVE ASSEMBLY	1
9	9FH-01149-9	PRV SHUTTLE VALVE	1
10	9FH-01152-1	LOWER WRENCH FLOW DIVIDER	1
11	9FH-01152-10	PRESSURE GAUGE	1
12	9FH-01018-12	LARGE 8X8 "FLOORHAND"TAG	1
13	9FH-01307-4	FLOORHAND READ MANUAL TAG	1

PIPE FRAME ASSEMBLY FH-70
9FH-80000

Item	Part number	Description	Qty.
14	9FH-01018-6	SYSTEM PRESSURE TAG	1
15	9FH-01018-11	FLOORHAND SN TAG	1
16	9HCMVEP17	1 FLAT FACE QDC NIPPLE	1
17	9HCFVEP17	1 FLAT FACE QDC COUPLER	1
18	9HCCVEP17	1 VEP ALUM CAP / CHAIN	1
19	9HCPVEP17	1 ALUM PLUG / CHAIN	1
20	9HCMVEP15	3/4 FLAT FACE QDC NIPPLE	1
21	9HCFVEP15	3/4 FLAT FACE QDC COUPLER	1
22	9HCCVEP15	3/4 VEP ALUM CAP / CHAIN	1
23	9HCPVEP15	3/4 ALUM PLUG / CHAIN	1
24	9FH-01143	SUSPENSION LINK	2
25	9FH-01185	PIN, LIFT CYLINDER ROD	4
26	9G2450-2	5/8 SHACKLE	2
27	9FH-10025	FRAME ASSEMBLY FINTING KIT	1
28	9FH-10027	FRAME ASSEMBLY HOSE KIT (ORFS)	1
29	9FH-10011	FRAME ASSEMBLY BOLT KIT	1
30	9FH-01319	LIFT CYLINDER ADAPTER (HANGER)	0
31	9HC444R6L0	1/4 ORFS X FORFS X ORFS RUN TEE	1
32	9HC444R6L0	1/4 ORFS X FORFS X ORFS RUN TEE	1

SPINNER SUB ASSEMBLY
9FH-83000

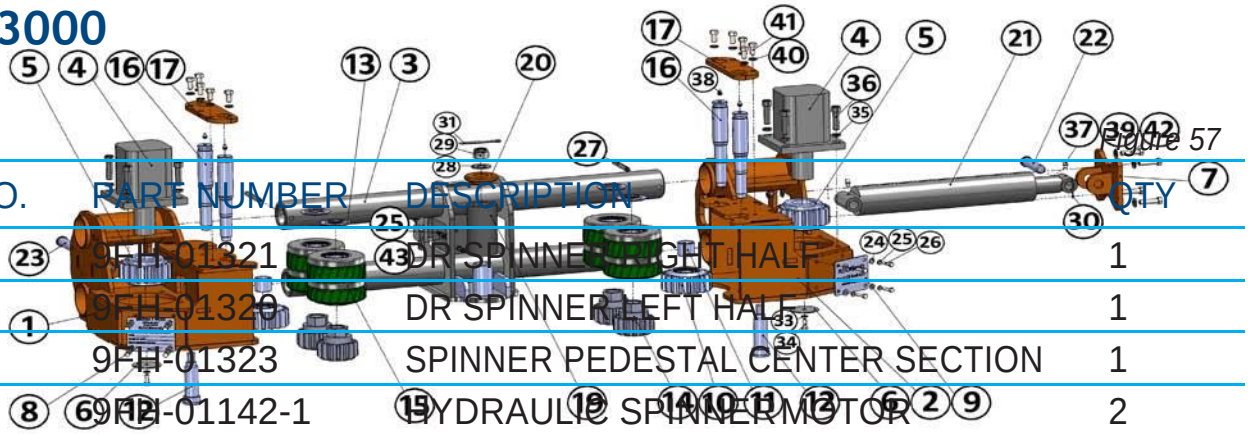


Figure 57

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	9FH-01321	DR SPINNER RIGHT HALF	1
2	9FH-01320	DR SPINNER LEFT HALF	1
3	9FH-01323	SPINNER PEDESTAL CENTER SECTION	1
4	9FH-01142-1	HYDRAULIC SPINNER MOTOR	2
5	9FH-01015	DRIVE MOTOR GEAR	2
6	9FH-01399	DRIVE MOTOR GEAR CAP	2
7	9FH-01016	SPINNER CYLINDER ROD MOUNT	1
8	9FH-01018-9	ATEX TAG	1
9	9FH-01018-8	FLOORHAND TAG	1
10	9FH-01287	IDLER GEAR ASSEMBLY	2

11	9FH-01290	IDLER SHAFT SPACER	2
12	9FH-01391	SPINNER IDLER SHAFT	2
13	9FH-01315	UPPER SPACER (DRIVE ROLLER)	4
14	9FH-01408	DRIVE ROLLER GEAR ASSEMBLY	4
15	9FH-01407	DRIVE ROLLER ASSEMBLY	4
16	9FH-01384	DRIVE ROLLER SHAFT	4
17	9FH-01017	DRIVE ROLLER SHAFT RETAINER	2
18	9FH-01149-46	SPINNER MOTOR FLOW DIVIDER	1
19	9FH-01045-5	URETHANE SPRING	1
20	9FH-01027	SPRING CAP	1
21	9FH-01074-1	SPIN CLAMP CYLINDER	1
22	9FH-01025	SHORT SPINNER CLEVIS PIN	1
23	9FH-01026	LONG SPINNER CLEVIS PIN	1
24	9BN1133814	5/16 SAE FLATWASHER	11
25	9BN133892	5/16 SPLIT LOCKWASHER	11
26	9BN0115055	5/16-18 X HHCS	8

SPINNER SUB ASSEMBLY
9FH-83000

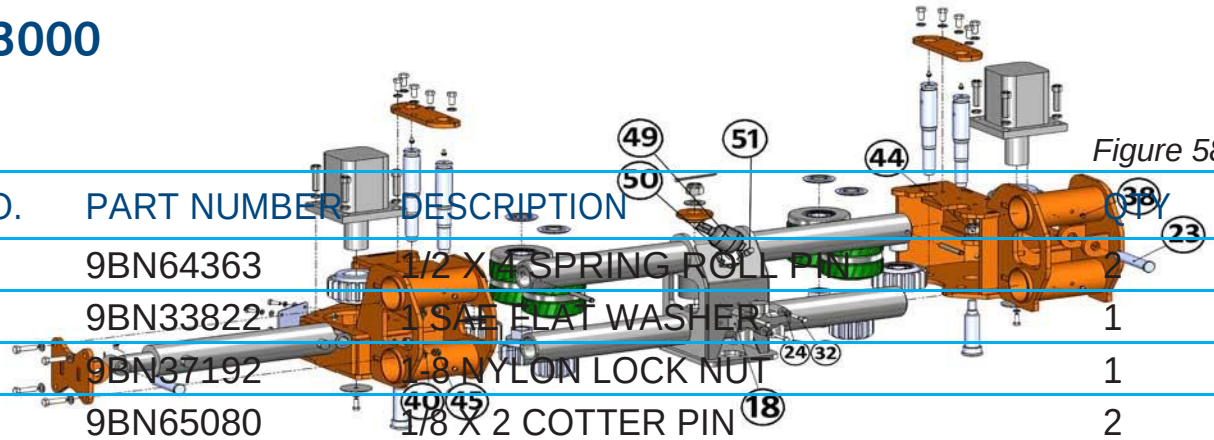


Figure 58

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
27	9BN64363	1/2 X 4 SPRING ROLL PIN	2
28	9BN33822	1 SAE FLAT WASHER	1
29	9BN37192	1-8 NYLON LOCK NUT	1
30	9BN65080	1/8 X 2 COTTER PIN	2
31	9BN65153	1/4 X 4 COTTER PIN	1
32	9BN0115062	5/16-18 X 2-1/4HHCS	3
33	9BN1133893	3/8 SPLIT LOCKWASHER	2
34	9BN0115105	3/8-16 X 1 HHCS	2
35	9BN1133692	5/8 HI COLLAR LOCKWASHER	8
36	9BN1123512	5/8-11 X 2-1/4 SHCS (DRILLED)	8
37	9BN60104	1/8 NPT 90 DEG GREASE ZERK	2
38	9BN60102	1/8 STRAIGHT GREASE ZERK	8
39	9BN1133817	1/2 SAE WASHER	4
40	9BN1133895	1/2 SPLIT LOCKWASHER	14
41	9BN0115205	1/2-13 X 1 HHCS	10
42	9BN0115211	1/2-13 X 2 HHCS	4

43	9BN1137262	5/16-8 TYPE-C LOCKNUT	3
44	9BN1137190	3/4-10 NYLON INSERTED LOCKNUT	2
45	9BN1137187	1/2-13 NYLON LOCKNUT	4
46	9FH-10503	SPINNER HOSE KIT (NOT SHOWN)	1
47	9FH-10513	SPINNER FITTING KIT NOT SHOWN)	1
48	9G1030-2	WARNING TAG "HANDS CLEAR"	2
49	9FH-01152-11	ACCUMULATOR	1
50	9FH-01149-19	CHECK VALVE CARTRIDGE	1
51	9FH-01149-20	CARTRIDGE BODY	1
52	9G1030-2	WARNING TAG "HANDS CLEAR"	2

DOUBLE DRIVE ROLLER ASSEMBLY
9FH-01407

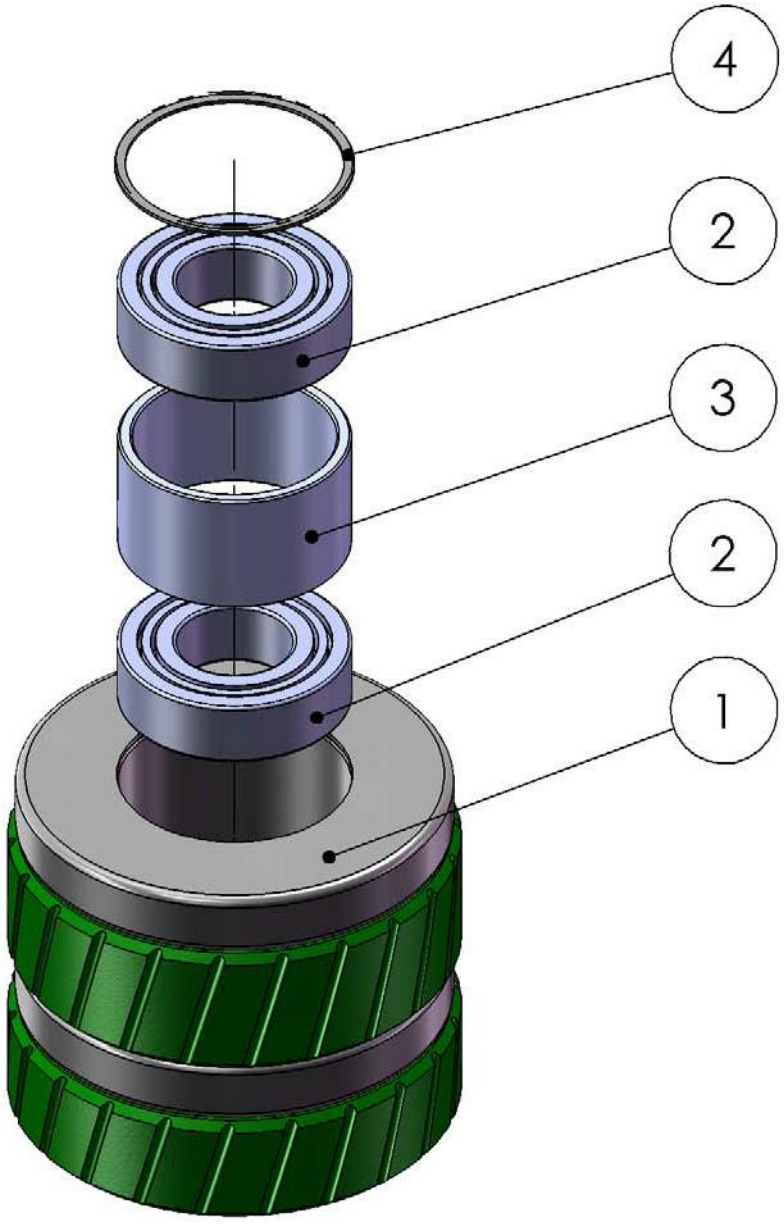


Figure 59

Item	Part number	Description	Qty.
1	9FH-01382	DOUBLE DRIVE ROLLER	1
2	9FH-22208	DRIVE ROLLER BEARING	2
3	9FH-01385	DRIVE ROLLER BEARING SPACER	1
4	9G2351-314	RETAINING RING	1

DRIVE ROLLER GEAR ASSEMBLY 9FH-01408

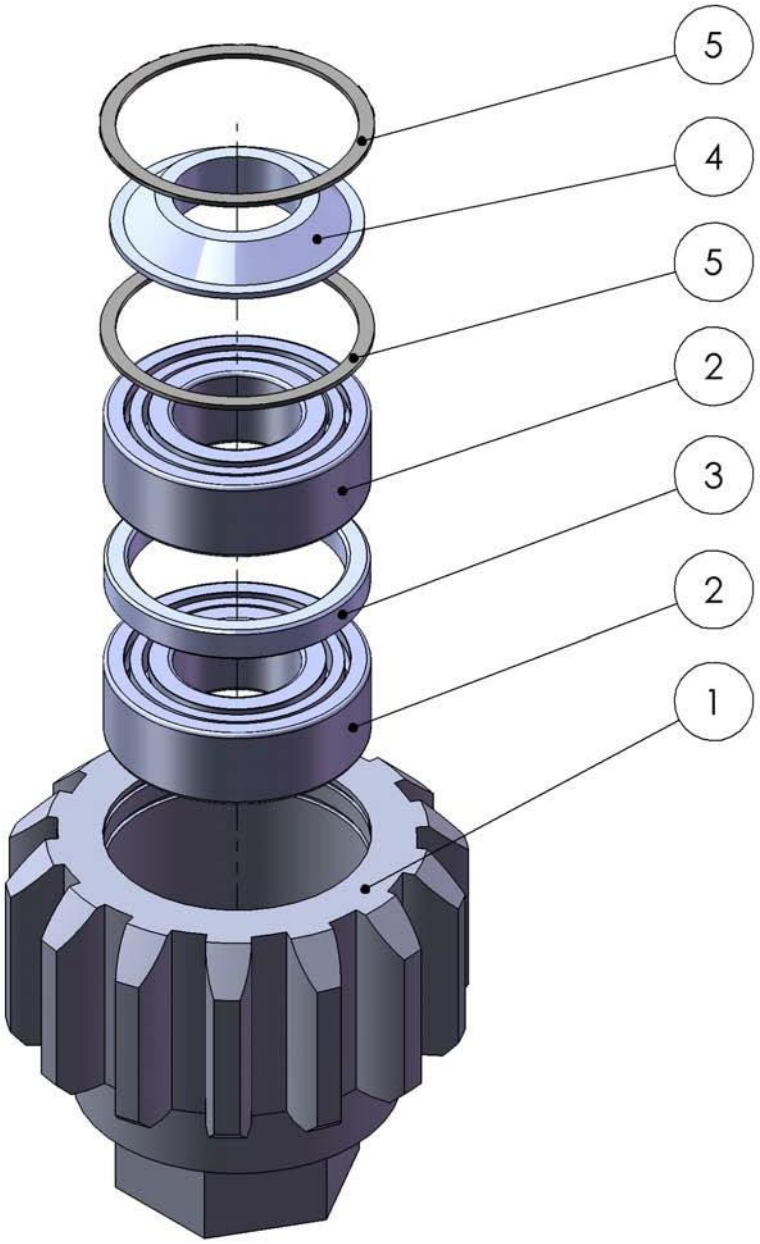


Figure 60

Item	Part number	Description	Qty.

1	9FH-01383	DOUBLE DRIVE ROLLER GEAR	1
2	9FH-22206	DOUBLE DRIVE RLR GEAR BEARING	2
3	9FH-01397	D/R GEAR BEARING SPACER	1
4	9FH-01314	LOWER DRIVE ROLLER GEAR SPACER	1
5	9FH-WH244	DRIVE ROLLER GEAR RETAINING RING	2

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IDLER GEAR ASSEMBLY
9FH-01287

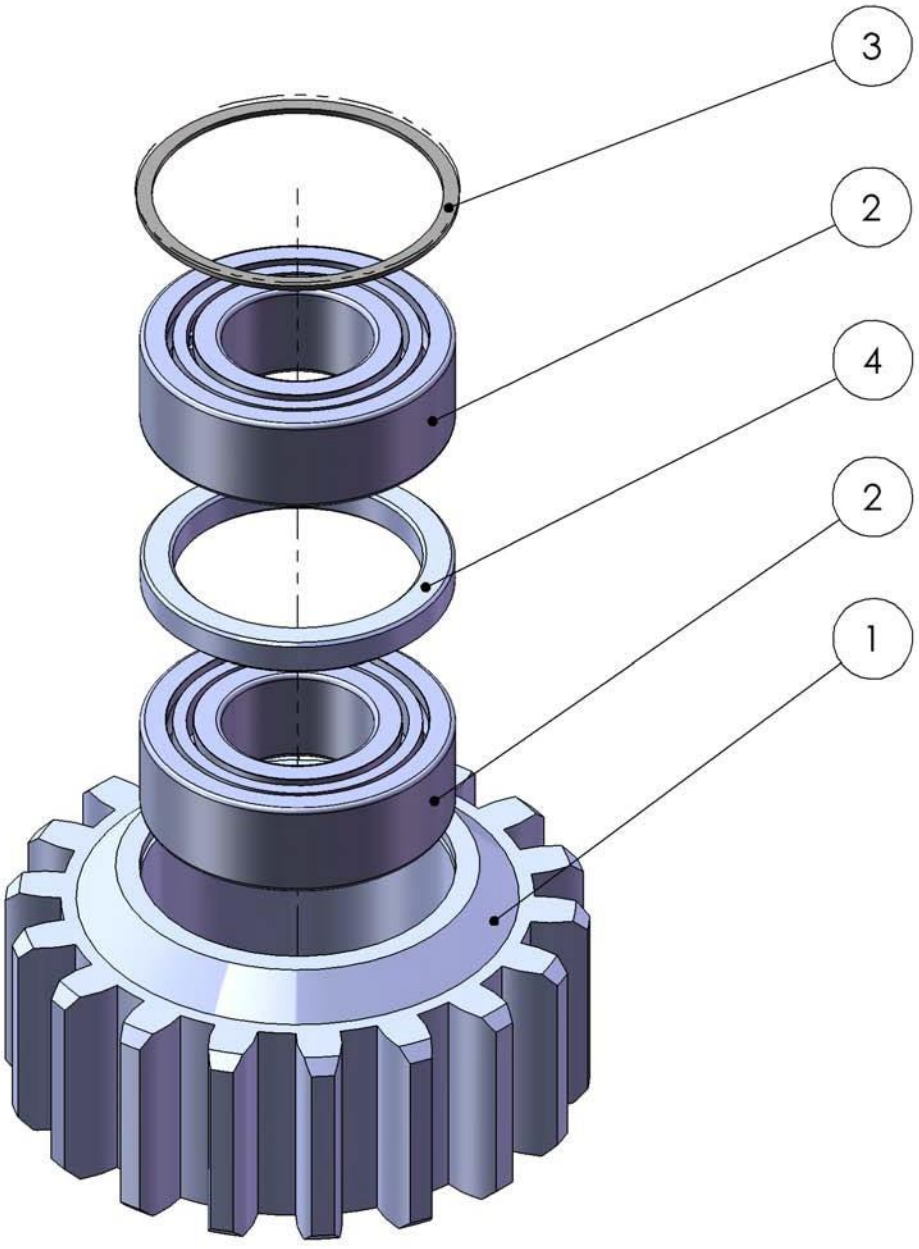

Figure 61

Item	Part number	Description	Qty.
1	9FH-01288	IDLER GEAR	1

2	9FH-22207	IDLER GEAR BEARING	2
3	9FH-WH283	IDLER GEAR RETAINING RING	1
4	9FH-01398	IDLER GEAR BEARING SPACER	1

UPPER WRENCH SUB ASSEMBLY ORFS 9FH-82000

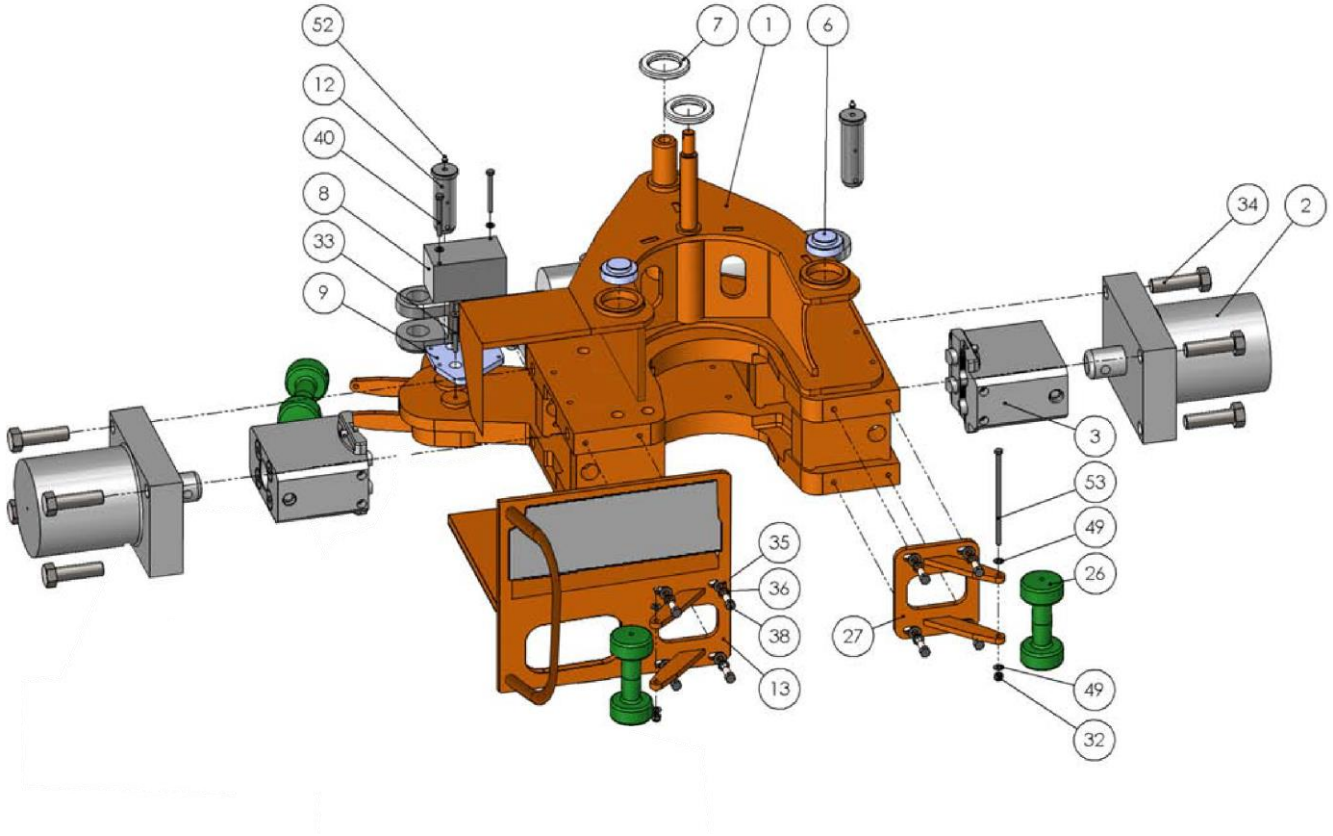

Figure 62

Item	Part number	Description	Qty.
1	9FH-01572	UPPER WRENCH WELDMENT	1
2	9FH-01584	DIE BLOCK ASSEMBLY	2
3	9FH-01055	DIE BLOCK RETAINING PINS	2
4	9FH-01056	DIE BLOCK PIN RETAINER	2
5	9FH-01023	SPINNER SLIDE BEARING	2
6	9FH-01022	POST WASHER	2
7	9FH-01150	UPPER CLAMP MANIFOLD ASSEMBLY	1
8	9FH-01058	UPPER MANIFOLD BRACKET	1
9	9FH-01074-18	CLAMP CYLINDER	2
10	9FH-01074-17	TORQUE CYLINDER	1
11	9FH-01051	LONG TORQUE CYLINDER PIN	1

12	9FH-01052	SHORT TORQUE CYLINDER PIN	1
13	9FH-10211	UPPER WRENCH BOLT KIT	1

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UPPER WRENCH SUB ASSEMBLY ORFS 9FH-82000

Item	Part number	Description	Qty.
14	9FH-01592	VALVE MOUNT	1
15	9FH-01149-73	5 STATION V20 CONTROL VALVE ASSEMBLY	1
16	9FH-01188-1	V20 2 POSITION DETENT	5
17	9FH-01596	VALVE COVER	1
18	9FH-01634	TORQUE/SPIN HANDLE "D"	2
19	9FH-01635	LOWER WRENCH HANDLE"E"	1
20	9FH-01636	UPPER WRENCH HANDLE "F"	1
21	9FH-01640	SAFETY HANDLE BRACKET	1
22	9FH-01637	SPIN CLAMP HANDLE "G"	1
23	9FH-01641	CONTROL TAG	1
24	9G6005-LK	HYDRAULIC VALVE LINKAGE KIT	5
25	9FH-01149-2	MANIPULATOR VALVE (2 BANK)	1
26	9FH-01069	MANIPULATOR VALVE HANDLE"F"	2
27	9FH-01645	MANIPULATOR TAG	1
28	9FH-01591	SPINNER RISER	1
29	9BV70751	SAFETY HANDLE	2
30	9FH-10226	UPPER WRNCH FITING KIT (ORFS)	1
31	9FH-10227	UPPER WRCH HOSE KIT (ORFS)	1
32	9FH-10626	CONTROL VALVE FITING KIT (ORFS	1
33	9FH-10627	CONTROL VALVE HOSE KIT	1
34	9FH-10628	MANIPULATOR VALVE FITING KIT	1
35	9FH-10629	MANIPULATOR VALVE HOSE KIT	1
36	9FH-01597	REAR POST -SPINNER	1
37	9FH-01152-17	TORQUE GAUGE L/ MNT RING F/ FH70	1
38	9FH-01533	TORQUE GAUGE GUARD	1

LOWER WRENCH SUB ASSEMBLY ORFS

9FH-81000

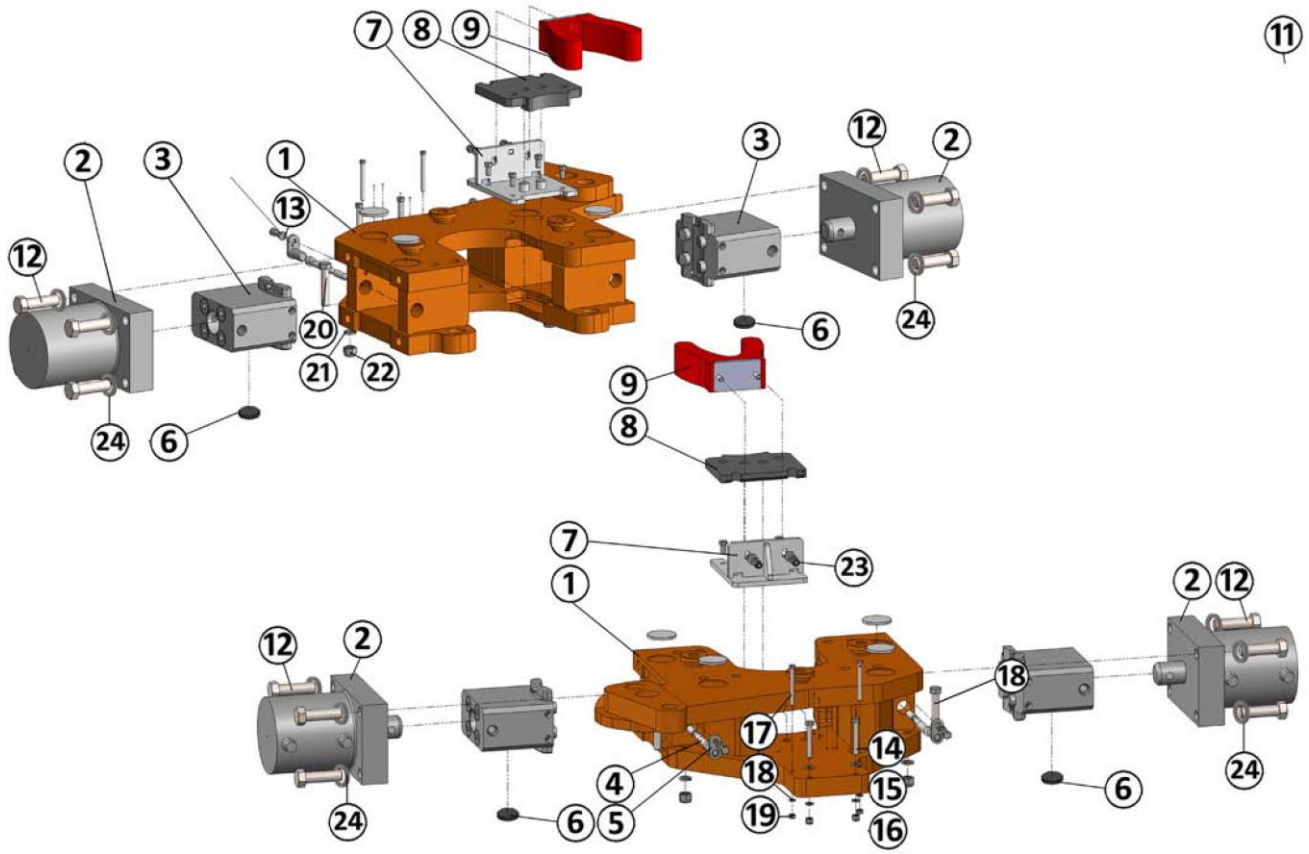


Figure 63

Item	Part number	Description	Qty.
1	9FH-01586	LOWER WRENCH WELDMENT FH-70	1
2	9FH-01074-18	CLAMP CYLINDER FOR FH-70	2
3	9FH-01584	DIE BLOCK ASSY FH-70	2
4	9FH-01055	DIE BLOCK RETAINING PINS	2
5	9FH-01056	DIE BLOCK PIN RETAINER	2
6	9FH-01050-1	DIE BLOCK / WRENCH SUPPORT BRG	4
7	9FH-01047	PIPE BUMPER BASE	1
8	9FH-01048	BUMPER	1
9	9FH-01644	FH-70 PIPE CLAW	1
10	9FH-01149-11	LOWER DIVERTER VALVE ASSEMBLY	1
11	9FH-01149-10	TORQUE MANIFOLD SHUTTLE VALVE	1
12	9BN18523	1-1/8-12 X 5 HHCS (CLAMP CYL)	8
13	9BN0115205	1/2-13 X 1 HHCS	4
14	9BN1133895	1/2 SPLIT LOCKWASHER	10

LOWER WRENCH SUB ASSEMBLY ORFS
9FH-81000

15	9BN0115115	3/8-16 X 3 HHCS	2
16	9BN1137264	3/8-16 TYPE-C LOCKNUT	2
17	9BN1133893	3/8 SPLIT LOCKWASHER	2
18	9BN0115009	1/4-20 X 1-1/2 HHCS	4
19	9BN1133891	1/4 SPLIT LOCKWASHER	4
20	9BN37130	1/2-20 NYLON INSERTED LOCK NUT	2
21	9BN11130	3/8-16 X 8-1/2 HHCS	1
22	9BN1133815	3/8 SAE WASHER	2
23	9BN1137185	3/8-16 NYLON LOCKNUT	2
24	9BN15376	3/4-10 X 6-1/2 HHCS	3
25	9BN1137190	3/4-10 NYLON INSERTED LOCKNUT	3
26	9BN1133898	3/4 SPLIT LOCKWASHER	6
27	9BN1133820	3/4 SAE FLATWASHER	4
28	9BN15230	1/2-13 X 8-1/2 HHCS	2
29	9BN1137187	1/2-13 NYLON LOCKNUT	2
30	9BN1133817	1/2 SAE WASHER	4
31	9FH-10127	GF8002 LWR WRENCH HOSE KIT (ORFS	1
32	9FH-10125	GF1002 LWR WRENCH FTG KIT (ORFS)	1
33	9FH-10111	GF1000 LOWER WRECH ASSY BOLT KIT	1

DIE BLOCK ASSEMBLY
9FH-01060

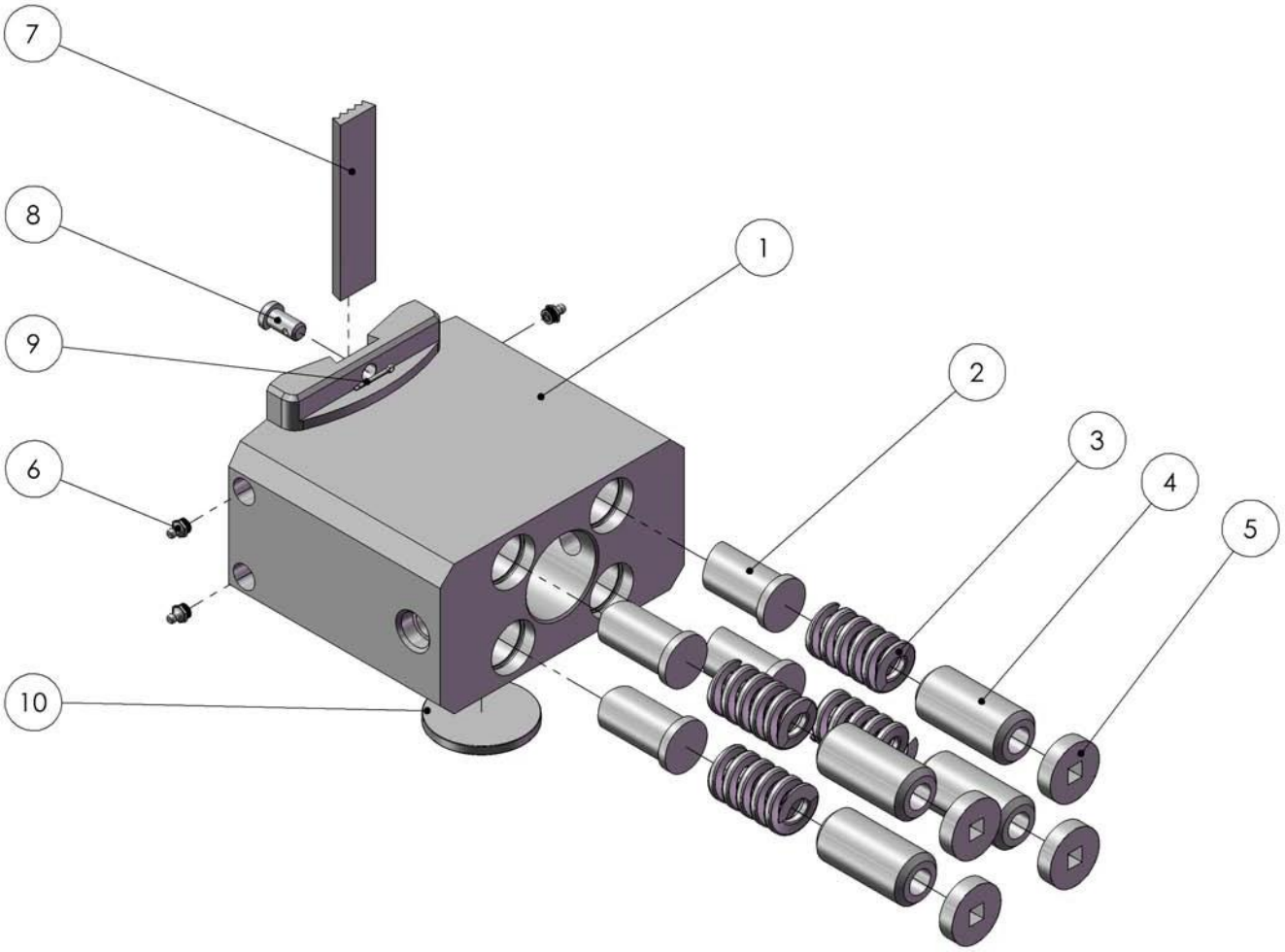


Figure 64

Item	Part number	Description	Qty.
1	9FH-01059	DIE BLOCK	1
2	9FH-01053	CENTERING BUTTON	4
3	9FH-01045-2	DIE BLOCK SPRING	4
4	9FH-01057	CENTERING BUTTON SPRING SPACER	4
5	9FH-01054	SPRING RETAINER PLUG	4
6	9BN60105	1/4-28 GREASE ZERK STRAIGHT	4
7	9FH-70622-1	BLUE DIAMOND TONG DIE	1
8	9FH-01216-1	DIE RETAINER PIN ONLY	1
9	9BN65076	1/8 X 1 COTTER PIN	1
10	9FH-01050-1	"DIE BLOCK / WRENCH SUPPORT BRG"	1

2-7/8 ADAPTER KIT ASSEMBLY
9FH-10703

Figure 65

Item	Part number	Description	Qty.
1	9FH-70622-2	BLUE DIAMOND TONG DIE	4
2	9FH-01445	2-7/8 ADAPTER ASSEMBLY	4
3	9FH-01074-15A	LOW RANGE TORQUE CYLINDER ASSEMBLY	1

2-7/8 DIE BLOCK ADAPTER ASSEMBLY 9FH-01445

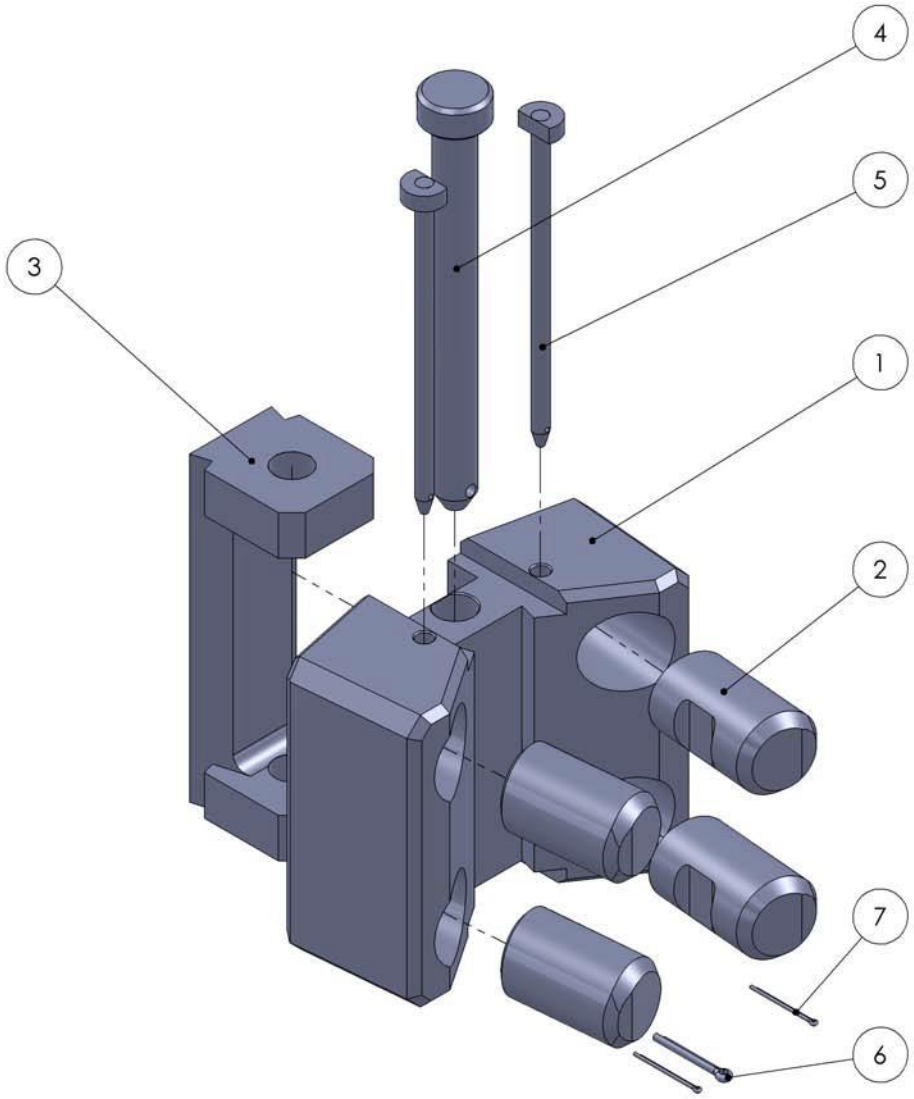


Figure 66

Item	Part number	Description	Qty.
1	9FH-01446	2-7/8 ADAPTER	1

2	9FH-01448	CENTERING BUTTON	4
3	9FH-01447	ADAPTER RETAINER	1
4	9FH-01449	2-7/8 ADAPTER PIN	1
5	9FH-01445-1	2-7/8 BUTTON RETAINING PIN	2
6	9BN65076	1/8 X 1 COTTER PIN	1
7	9BN65016	1/16 X 1 COTTER PIN	2

WINCH AND MOUNTING ASSEMBLY 9FH-10701

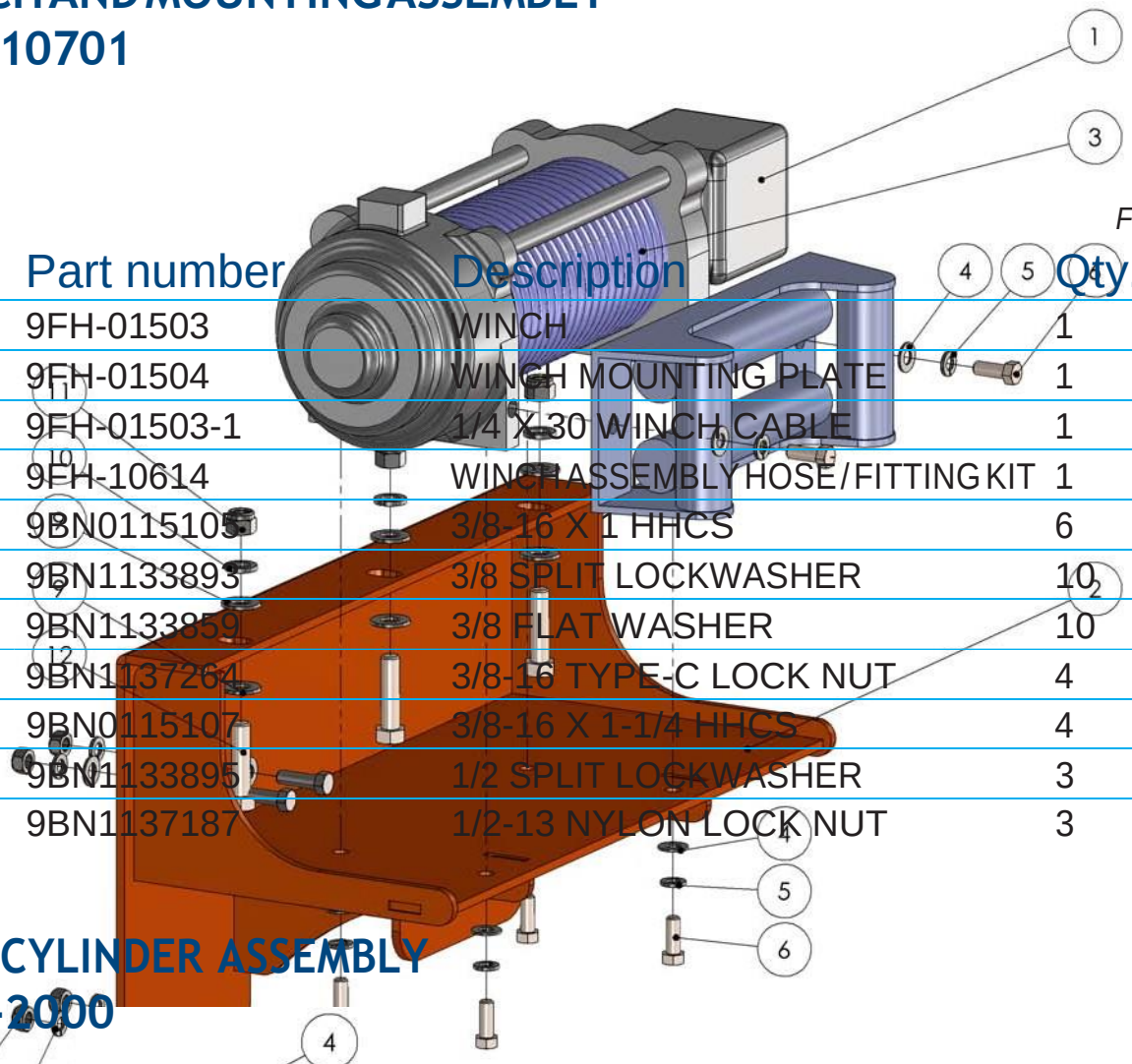


Figure 67

Item	Part number	Description	Qty.
1	9FH-01503	WINCH	1
2	9FH-01504	WINCH MOUNTING PLATE	1
3	9FH-01503-1	1/4 X 30 WINCH CABLE	1
4	9FH-10614	WINCH ASSEMBLY HOSE/FITTING KIT	1
5	9BN0115105	3/8-16 X 1 HHCS	6
6	9BN1133893	3/8 SPLIT LOCKWASHER	10
7	9BN1133859	3/8 FLAT WASHER	10
8	9BN1137264	3/8-16 TYPE-C LOCK NUT	4
9	9BN0115107	3/8-16 X 1-1/4 HHCS	4
10	9BN1133895	1/2 SPLIT LOCKWASHER	3
11	9BN1137187	1/2-13 NYLON LOCK NUT	3

LIFT CYLINDER ASSEMBLY 9FM-2000

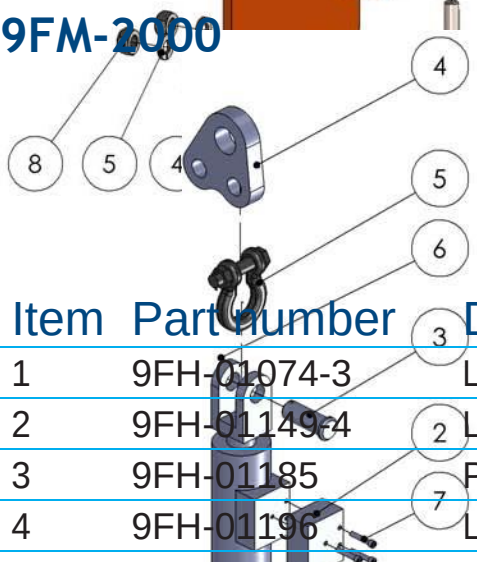


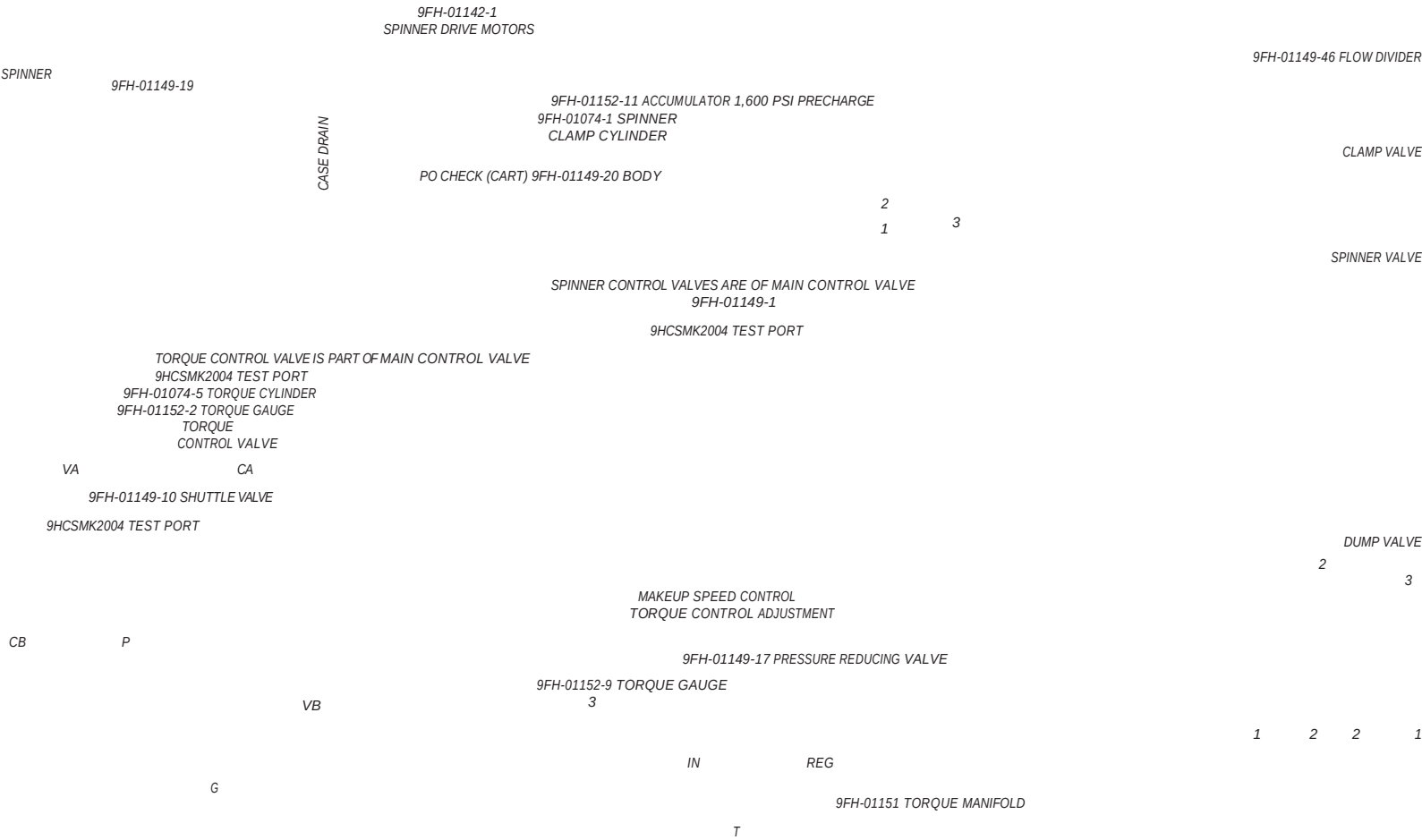
Figure 68

Item	Part number	Description	Qty.
1	9FH-01074-3	LIFT CYLINDER	1
2	9FH-01149-4	LIFT CYL COUNTER BALANCE VALVE	1
3	9FH-01185	PIN, LIFT CYLINDER ROD	2
4	9FH-01196	LIFT CYLINDER ADAPTER	1

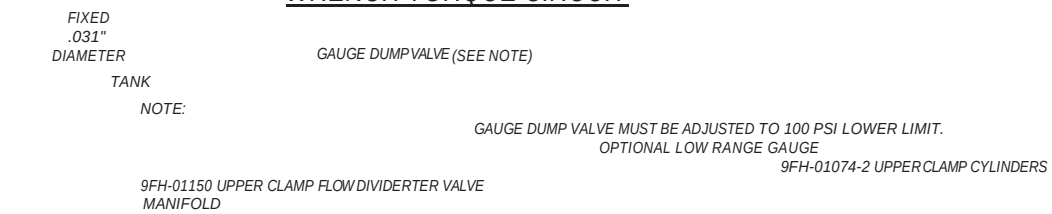
5	9G2450-2	5/8 SHACKLE	2
6	9BN65127	3/16 X 2 COTTER PIN	2
7	9FH-10651	HOSE/FITING KIT FOR LIFT CYLINDER	1
8	9BN1123808	1/4-28 X 1-1/2 SHCS	3

SPINNER CONTROL CIRCUIT

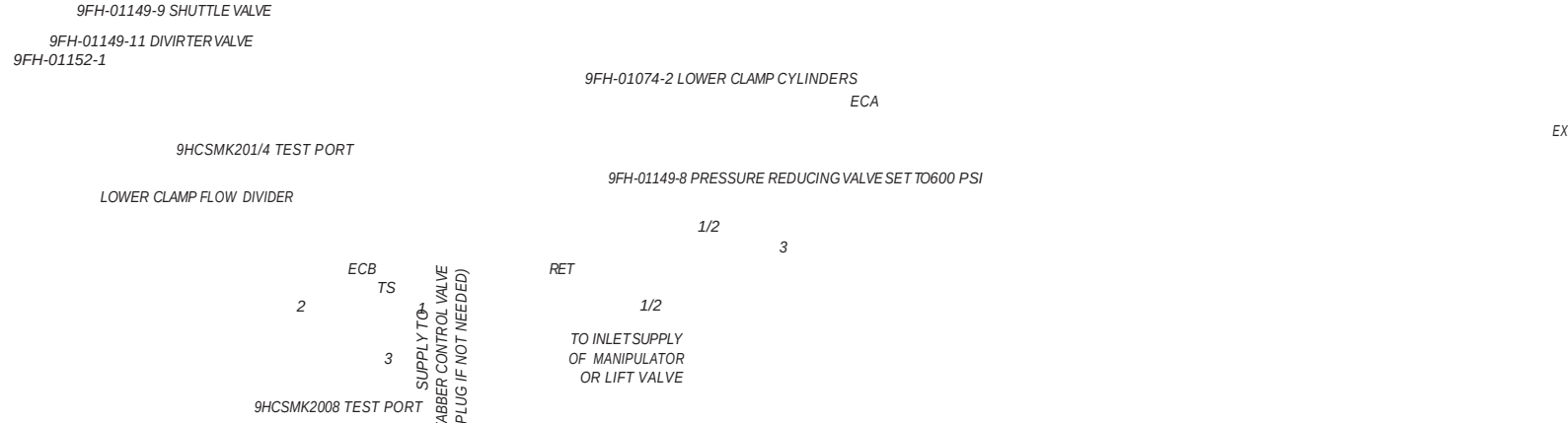
SPINNER CONTROL CIRCUIT

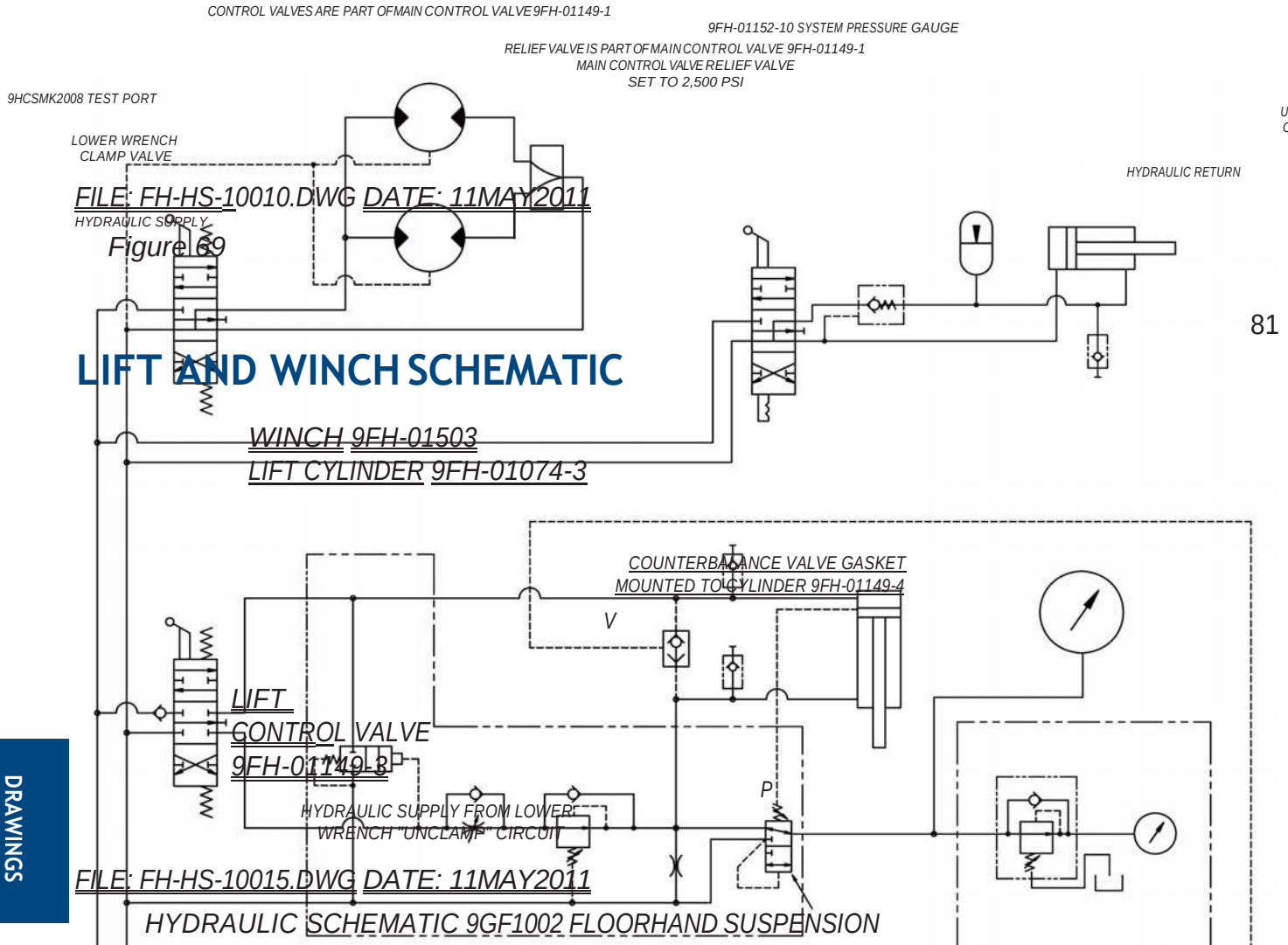


WRENCH TORQUE CIRCUIT



WRENCH CLAMP CIRCUIT





FILE: FH-HS-10010.DWG DATE: 11MAY2011

Figure 69

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LIFT AND WINCH SCHEMATIC

FILE: FH-HS-10015.DWG DATE: 11MAY2011

HYDRAULIC SCHEMATIC 9GF1002 FLOORHAND SUSPENSION

Figure 70

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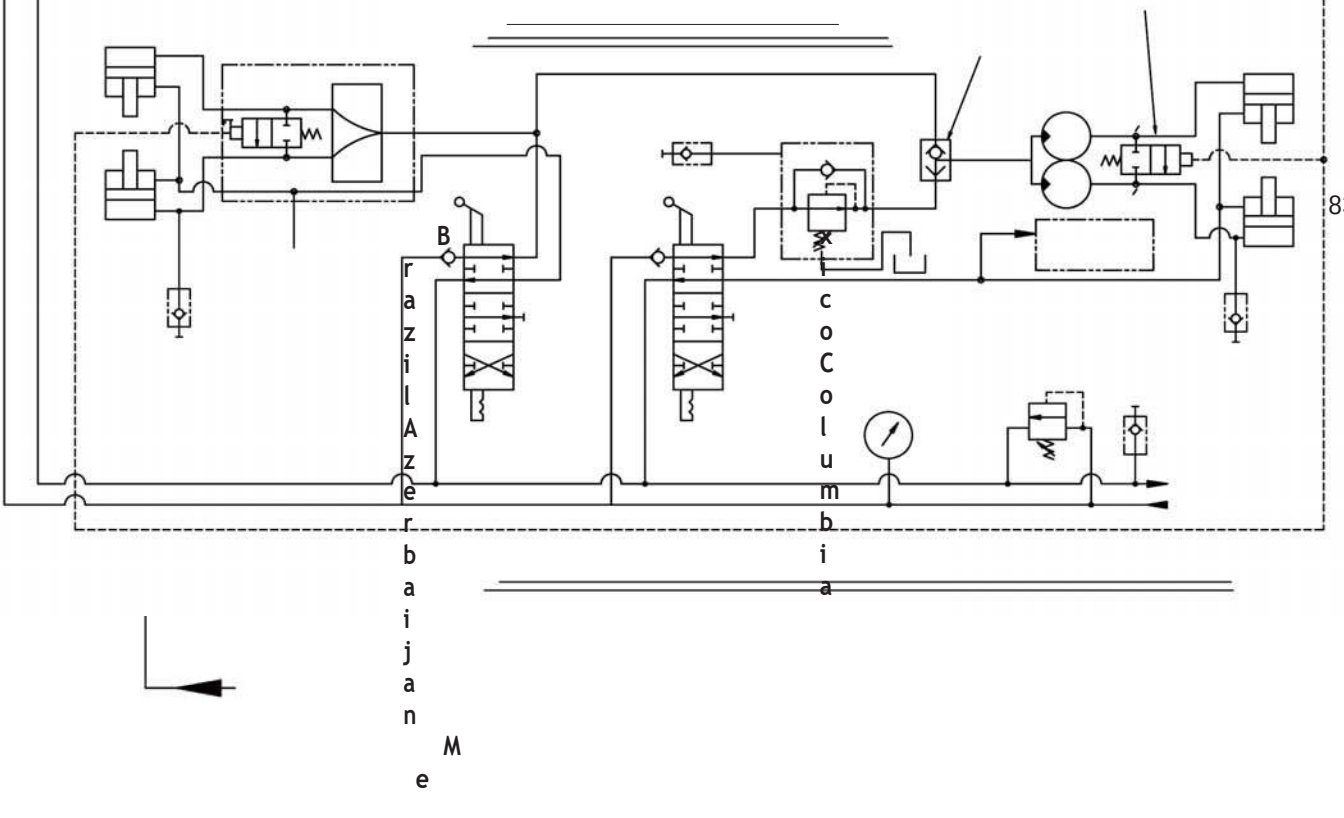

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