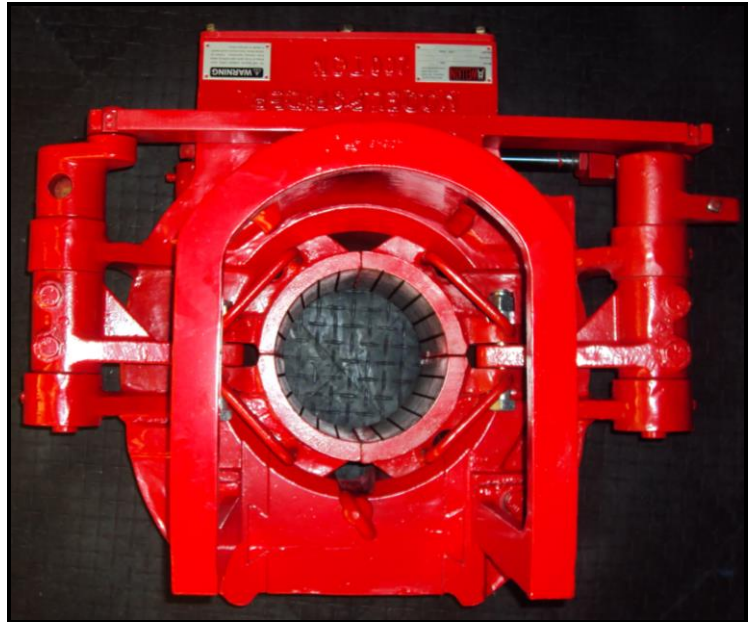
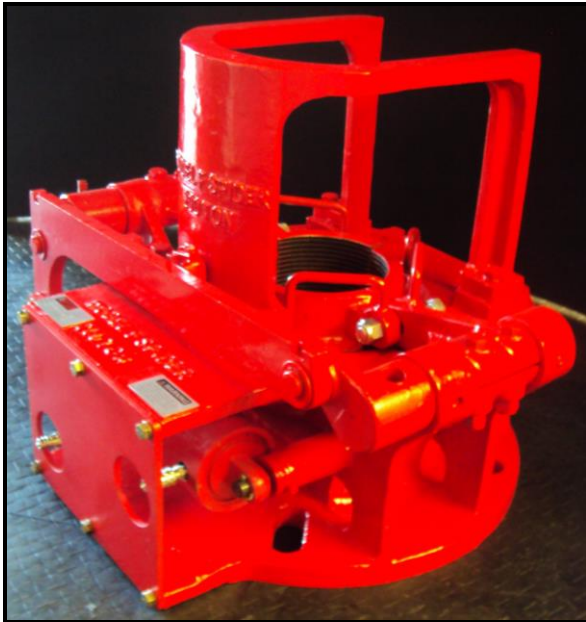




Model F Spider
Installation, Operation, Service and Parts Book Manual



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Terms and Conditions

1. All WPI WELLKIN packing slips and invoices must show Buyer's purchase order number.
2. All shipments MUST contain packing slips.
3. **CONTRACT:** This order will become a binding contract upon receipt by WPI WELLKIN of Buyer's PO, receipt by Buyer of a written acknowledgement by WPI WELLKIN and receipt by WPI WELLKIN of a down payment in the amount specified in the contract.
4. This contract may be modified as mutually agreed by the Buyer and WPI WELLKIN.
5. **PAYMENT TERMS:** The payment terms are specified on the commercial offer from WPI WELLKIN. The Buyer agrees to the payment terms by acceptance of the bid.
6. **DELIVERY:** Time is of the essence. WPI WELLKIN will attempt to deliver the material early if possible. WPI WELLKIN will make best efforts to supply all material on a timely basis. If the delivery will run over the contract delivery date, WPI WELLKIN will notify the Buyer giving reason for delay. The current delivery estimate is specified on the commercial offer. The Buyer agrees to the delivery terms by acceptance of the bid.

When necessary, WPI WELLKIN will notify the Buyer in advance of completion of the order and Buyer will appoint an authorized representative or employee to inspect the material on a date and site as designated by WPI WELLKIN. Transportation, lodging and all other expenses portal to portal for Buyer representative or employee to witness and accept the material is the expense of the Buyer.

All costs associated with preparation, crating, insurance and ocean freight of the goods to the final destination to be at Buyer's expense.

7. **CANCELLATION:** This contract is considered to be special order and not subject to cancellation. Both parties hereto shall be given consideration in case of delays in delivery caused by fire, strike, riot, war, act of God, delay of carriers, governmental order or regulation, complete or partial shutdown of plant by reason of inability to obtain sufficient raw materials or power or any other similar or different contingency beyond the reasonable control of the respective parties.
8. **WARRANTIES AND REMEDIES:** WPI WELLKIN expressly warrants that all supplies, materials and parts covered by this contract will conform to the specifications in the contract as applicable and will meet or exceed industry standards for such equipment. WPI WELLKIN will supply Buyer with operations manuals and parts books for the material where applicable. Certificates of Compliance are available upon request.

MANUFACTURED ITEMS: WPI WELLKIN manufactured items must be free of material and workmanship defects for a period of 6 months from the date of delivery. If any items fail because of a manufacturing defect within that period of time, then that item will be replaced by WPI WELLKIN. Expendable / wear items are not covered under warranty. Examples of such items include, but are not limited to, the following - dies, inserts, brake bands, rollers, gears, chains, filters, belts, flexible couplings, slip bodies, spider bowls.

Replacement of parts will be accomplished at WPI WELLKIN's facility or at a designated service point. WPI WELLKIN's liability is limited to replacement of defective parts only and does not include the cost of labor, communications, transportation or handling connected to the replacement of these parts. WPI WELLKIN will in no event be liable for consequential damages or contingent liabilities arising out of the failure of any parts to operate properly. No expressed, implied or statutory guarantee other than herein set forth is made or authorized to be made by WPI WELLKIN.

DISTRIBUTED ITEMS: Items distributed by WPI WELLKIN are subject to the warranty provided by the Original Equipment Manufacturer (OEM). Upon request, WPI WELLKIN will furnish Buyer with a warranty statement from the OEM for the applicable material. The OEM warranty will start on the items' delivery date.

9. **COMMISSIONING:** On request, WPI WELLKIN can supply a representative for material commissioning. The Buyer is responsible for portal to portal transportation costs and the current WPI WELLKIN day rate.

10. **BUYER'S PROPERTY:** All equipment or material furnished by WPI WELLKIN shall be the property of the Buyer after the WPI WELLKIN invoice is paid in full.

11. **PATENTS:** WPI WELLKIN holds the Buyer harmless from all claims, for infringement or alleged infringement of any patents arising out of the sale or use of the goods furnished pursuant to this contract.

12. **INDEPENDENT CONTRACT:** In the event that any goods ordered hereunder require in connection with the installation thereof, the services of a contractor engaged by WPI WELLKIN or a supervisor, engineer, or other employee connected with or employed by WPI WELLKIN, and WPI WELLKIN agrees to furnish same, either with or without charge, such contractor, supervisor, engineer, or other employee in performing such services shall not be deemed to be the agent or employee of the Buyer.

13. **INSURANCE:** WPI WELLKIN agrees to carry General Operations and Liability Insurance and other coverage as required in accordance with applicable state and federal laws of the U.S.A.

14. **COMPLIANCE WITH LAWS:** WPI WELLKIN warrants that in its performance of this contract it will comply with all applicable Federal, State and Local laws, regulations, rulings and orders of the U.S.A.

15. **ASSIGNMENT:** This contract may not be assigned without the written consent of the Buyer and any attempted assignment thereof shall be void.

16. **PROPRIETARY INFORMATION:** All plans, drawings, specification and the subject matter contained therein and all other information given to WPI WELLKIN in connection with performance on this Purchase Order involve valuable property rights of the Buyer and shall be held confidential by WPI WELLKIN, shall remain the property of the Buyer and shall not be used by WPI WELLKIN for any purpose other than those for which they have been prepared or supplied. WPI WELLKIN agrees that, as far as possible, it will keep confidential the making of this order and the terms hereof. WPI WELLKIN agrees not to use for publicity purposes any information as to notice of receipt of order, photographs, drawings and/or materials in connection with performance of the Order without obtaining the prior written consent of the Buyer.

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Spider Warnings

The spider design integrates several safety features. However, the spider is only as safe as the operator using the unit. It is imperative that the operator and all other workers around the spider observe the warnings below. Failure to follow the instructions could result in **death, serious injury or equipment damage**.



- Observe, understand and follow all safety warnings.
- Never operate the spider above the rated design load.
- Never use the spider as a rotating device or as a stationary back-up for torque devices.
- Use the correct size slip and insert. If the size does not match the tubular string, then the spider will not hold the tubular string.
- Do not operate without the gate installed and secured.
- Keep all body parts and clothing away from moving machinery.
- Only trained personnel should operate, adjust or repair this equipment. Heat treated alloy steels are used in the construction of the spider. No weld repair on any components is allowed. Any attempts to repair these items by welding will void all warranties and liability.
- Turn off all power and disconnect the hydraulic/pneumatic connections from the equipment before performing any of the following. Also, relocate the spider to a work area to avoid dropping items down the well when disassembly will take place.
 - Performing repairs
 - Making adjustments
 - Lubricating the equipment
 - Changing slip inserts
- When the spider is used to hold the tubular string for extended periods of time, engage the safety latch. This feature prevents the accidental opening of the slips from the controls by stopping the link. Ensure the safety latch functions correctly before starting a job. Replace if damaged or missing.
- Lift the spider only by the top guard that is bolted on top of the spider body.

Spider General Information

Description

The purpose of a spider is to hold the load of the tubular or casing string as it is lowered or raised from the well. The spider is made up of 3 principal assemblies: the base, the slip and the actuator.

The base of the spider contains a machined taper that matches the slip bodies. It also has all of the mounts for the linkages that operate the slips. Installed on the slips are the inserts. The size of insert and slip matches the tubular string. During operation, a control valve is used to actuate a cylinder that opens or closes the slips. This actuator can be hydraulic or pneumatic.

Specifications

Load rating	400000 lbs (181437 Kg)
Size range	2-3/8" to 8-5/8" (60.3 to 219.1 mm)
Material	Heat treated alloy steel
Pressure requirements	
Hydraulic	275 to 300 PSI (19.0 to 20.7 bar)
Pneumatic	90 to 120 PSI (6.2 to 8.3 bar)
Weight (without slips)	1150 lbs (521.6 Kg)
Dimensions	
Gate opening	9" (228.6 mm)
Bowl opening	10-1/8" (257.2 mm)
Base	28" diameter (711.2 mm)
Overall dimensions	
Height	27-1/2" (698.5 mm)
Width	37" (939.8 mm)
Depth	31" (787.4 mm)
Base bolt slot	
Slot width	1-3/4" (44.5 mm)
Slot centers	19" to 24-1/2" (482.6 to 622.3 mm)

Installation

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

Control Valve

The spider control valve is connected to the spider by a set of hoses. Always place this valve in a location that is easily accessed by the rig crew operator.

Hoses

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 spider.

Mount

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.

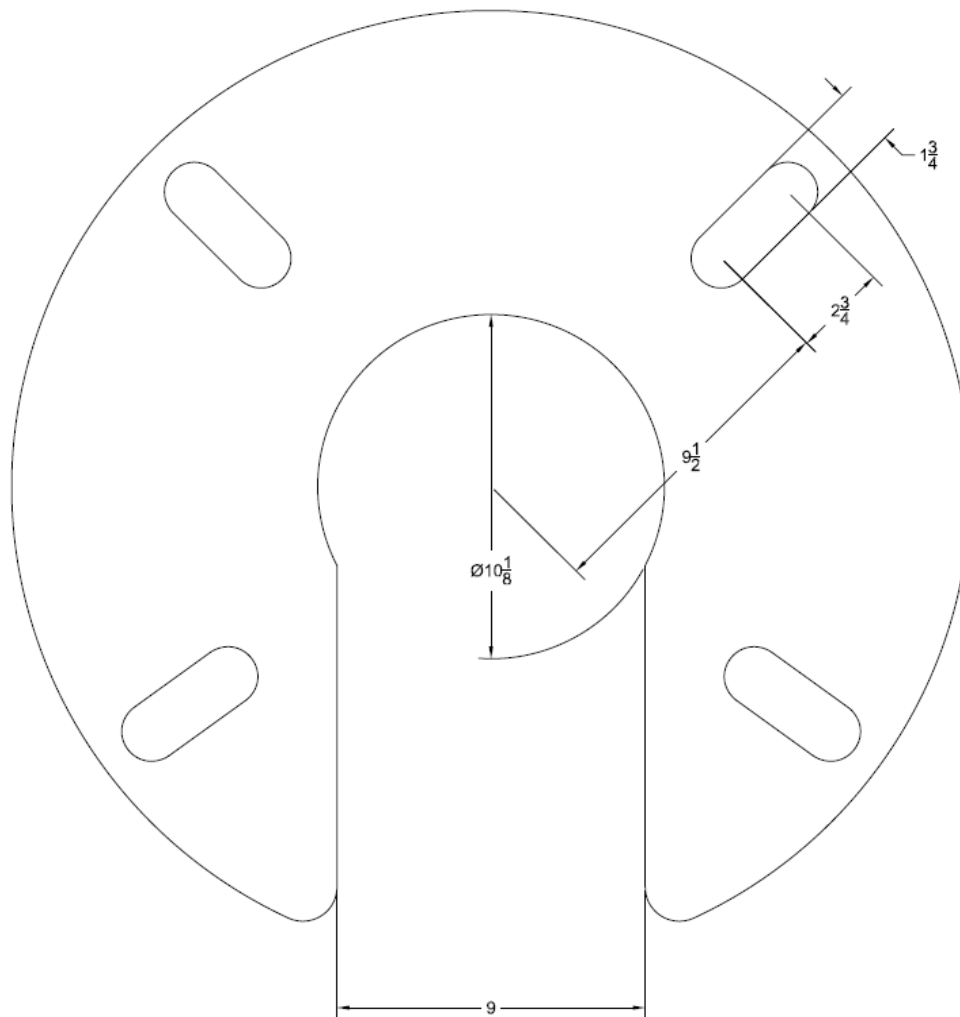


Figure 1: Base Dimensions

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 bushings via the grease fittings found along the linkage assembly.

Depending on the operation 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, crank shafts and links. Adjustments could be required to the pressure source regulator or the cylinder flow control to make sure the slip does not open or close too abruptly or with excess force and slam into the pipe.

Opening the Slips

Retracting the cylinder prevents the insert teeth from engaging and supporting the tubular string by moving the slip up and out of the way. Verify that the string weight is supported by the overhead lifting device prior to fully opening the slips.

Closing the Slips

To engage the insert teeth on the tubular string, the cylinder is extended. Then, the load of the tubular string can be held if it is lowered slightly thereby transferring the load from the overhead lifting device to the spider. Do not set the slips on tool joints, upsets or couplings.

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 spider has to be removed. Ensure the weight of the tubular 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 spider over the well. Install the gate back onto the spider and bolt it in place.

Slip Assembly

The slip assembly must correlate with the size of tubular 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 or hydraulic system to hold the slip body in the raised position. Rotate the safety latch so it locks the slips in the up 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 assembly 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 or hydraulic system to hold the slip bodies in the raised position. Rotate the safety latch so it locks the slips in the up position.
2. Remove the four cotter pins.
3. Using a pin or punch, 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.

Troubleshooting

The following table addresses possible solutions to problems that may occur during operation.

Table 1: Troubleshooting the Spider

Problem	Solution
Slip insert teeth are not gripping tubular	1) Clean the teeth. Verify they are clean from built up debris such as dirt, mud, grease, sand, etc. 2) Inspect the teeth for damage. Replace inserts if any of the teeth are worn, broken or chipped. 3) Verify the insert is not too loose in the slip body. If the insert can move vertically 1/10" or more, then it is too loose. Replace the slip body assembly. 4) Verify the correct size slip assembly and inserts are being used for the diameter of the tubular string. 5) Inspect the spider bowl and back of the slip body segments for excessive wear or damage. Repair the spider as required. 6) The components used to open the slip (cranks, lift arms, link, bushings, etc.) are affecting the slip timing because they are

	worn. Repair the spider as required. 7) Verify the travel stop screw is adjusted properly.
Spider lift arms contact the spider body when the tubular is engaged	1) Inspect the bottom of the spider assembly. If the slip assembly extends past the bottom of the bowl, then replace the slip assembly. If the arms still contact the body, then inspect the bottom of the spider again. If the new slip extends below the bowl, then the spider base needs to be replaced.
Actuating cylinder does not function properly	1) Verify the pressure to the cylinder meets system requirements. 2) Check any regulators or flow control valves in line with the pressure to ensure correct adjustment. 3) The seals could be worn inside the cylinder. Replace with new seals or replace the entire cylinder.

Service

It is important to maintain the spider in a condition that will provide continued safe operation. The following sections highlight items that need to be addressed over the life of the unit.

Daily

1. Grease all fittings on the spider.
2. Lift the slip assembly and hold in place with the safety latch.
 - a. Inspect the contact areas of the slip body and bowl for damage or indications of excessive wear.
 - b. Grease the bowl.
 - c. Inspect inserts for debris or wear. Clean if necessary.
3. Ensure all fasteners are properly tightened.
4. Verify linkages operate properly.

Quarterly Maintenance

1. Perform all activities listed in the daily section.
2. Replace the crank and link bushings if the fit is loose.
3. Function test the spider to verify proper operation. Ensure the safety latch operates correctly.
4. Record the maintenance activities on a log or report that is kept on file and can be traced back to the serial number of the spider.

Annual Maintenance

1. Perform all activities listed in the daily section.
2. Completely disassemble the spider.
3. Perform NDE on all critical components such as slip assembly, lift arms, cranks, link, gate and attachment points on the spider base. Replace any worn or damaged parts.

-
4. Replace the crank shafts.
 5. Replace the crank and link bushings.
 6. Rebuild the cylinder with new seals.
 7. Assemble the spider with the good or replacement parts.
 8. Function test the spider to verify proper operation.
 9. Record the maintenance activities on a log or report that is kept on file and can be traced back to the serial number of the spider.

Instructions for replacing the crank shafts and bushings can be found in the following text.

Bushing Replacement

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

1. Use the pneumatic or hydraulic system to hold the slip bodies in the raised position. Rotate the safety latch so it locks the slips in the up position.
2. Remove the slip assembly 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. Remove the cotter and pin that attaches the cylinder yoke to the link. 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 with washers. Remove these items 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 bolts and taper pins are exposed. Remove the bolts and nuts, and drive out the taper pins and set the items aside.
8. Remove the crank shafts from the spider by lightly tapping the ends. Set these aside along with the lift arms and spacers.
9. 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.
10. Reassemble the spider.
11. Function test the slip to verify correct operation before usage.

Crank Shaft and Lift Arm Replacement

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

1. Disassemble the tubing spider per the bushing replacement instructions.
2. Replace the old crank shafts and lift arms with new ones.
3. Rotate the lift arms until the taper pin holes in the lift arm and crank shaft aligns. Drive in a new taper pin. Note: The replacement crank shafts and lift arms are pre-drilled for the taper pin.
4. Install the lift arm bolts and secure the nuts.
5. Reassemble the spider.
6. Function test the slip to verify correct operation before usage.

One Year Spares

Below is a list of recommended spares for one year of operation.

Table 2: Spider One Year Spares

Part Number	Qty.	Parts Description
TF140-1-N or TFH160	1	Cylinder
TF601	12	Insert Retainer Pin
992012-44	12	Cotter Pin
WF119-1	2	Lift Arm Taper Pin
WF123	12	Grease Fitting
WF122	2	Retaining Ring and Washer
WF124	2	Shaft Bushing, Large ID
WF125	2	Link Bushing
WF127	2	Shaft Bushing, Small ID
WF135	1	Safety Latch
WF136	1	Safety Latch Bolt
WF154	8	Slip Bolt, Large
WF155	8	Slip Bolt Nut, Large
WF152	8	Slip Bolt, Small
84044	8	Slip Bolt Nut, Small
WF176	1	Travel Stop Screw
992285-MH-6-6	2	Male Quick Connect Coupling

Parts Book

Below are parts lists for the spider and following are drawings with corresponding item numbers.

Table 3: Spider Parts List

Item	Part Number	Qty.	Parts Description
1&2	TF100-S-100	1	Model F Spider Assembly, Pneumatic
	TF100-S-100-H	1	Model F Spider Assembly, Hydraulic
3	WF103	1	Link Assembly
4	WF104	1	Left Hand Crank Shaft
5	WF105	1	Right Hand Crank Shaft
6L	WF106L	1	Left Hand Lift Arm
6R	WF106R	1	Right Hand Lift Arm
7	WF107	1	Gate Eye Bolt
8	WF108	1	Cylinder Guard
9	WF109	1	Cylinder Support Pin
10	WF112	4	Hex Head Cap Screw and Lock Washer
11	WF113	6	Hex Head Cap Screw
12	WF114	1	Gate Bolt Nut and Lock Washer
13	WF115	1	Gate Bolt
14	WF116-1	4	Lift Arm Lock Nut
15	WF116-2	4	Lift Arm Bolt
16	WF119-1	2	Lift Arm Taper Pin
17	WF122	2	Retaining Ring and Washer

18	WF123	6	Grease Fitting
19	WF124	2	Shaft Bushing, Large ID
20	WF125	2	Link Bushing
21	WF126	3	Washer
22	WF127	2	Shaft Bushing, Small ID
23	WF135	1	Safety Latch
24	WF136	1	Safety Latch Bolt
25	TF140-1-N	1	Cylinder Subassembly, Air
	TFH160	1	Cylinder Subassembly, Hydraulic
26	WF111	1	Cylinder Yoke Pin
27	992285-MH-6-6	2	Male Quick Connect Coupling
	992131-S-06-06	2	Hex Nipple
28	WF130	1	Flow Control Valve
29	WF148	1	Cylinder Yoke Jam Nut
30	WF149	1	Cylinder Yoke
31	WF208	1	Elbow
32	WF210	1	Coupling
33	WF212	2	Nipple
34	WF602	3	Cotter Pin
35	WF176	1	Travel Stop Screw
36	WF177	2	Jam Nut
37	WF119-2	1	Cylinder Support Pin Taper Pin
38	WF154	2	Slip Bolt, Large (2 each required per slip body)
39	WF155	2	Slip Bolt Nut, Large (2 each required per slip body)
40	WF152	2	Slip Bolt, Small (2 each required per slip body) Note: Not required on 8-5/8" integral slip body.
41	84044	2	Slip Bolt Nut, Small (2 each required per slip body) Note: Not required on 8-5/8" integral slip body.
42	TF601	4	Insert Retainer Pin (4 each required per slip body) Note: Not required on 8-5/8" integral slip body.
43	992012-44	4	Cotter Pin (4 each required per slip body) Note: Not required on 8-5/8" integral slip body.
	Slip Bodies		
44	TF600-FCR-3.500	1	2-3/8" to 3-1/2" Slip Body Assembly
	TF600-FCR-5.500	1	3-3/4" to 5-1/2" Slip Body Assembly
	TF600-FCR-7.625	1	5-3/4" to 7" Slip Body Assembly
	TF150-R-8.625	1	8-5/8" Slip Body, Integral
	Standard Insert Sets (<i>Directional Tooth</i>) Note: Other sizes available upon request.		
45	TF651-3.500X2.375	1	3-1/2" x 2-3/8" Insert Set
	TF651-3.500X2.875	1	3-1/2" x 2-7/8" Insert Set
	TF650-3.500	1	3-1/2" x 3-1/2" Insert Set
	TF651-5.500X4.000	1	5-1/2" x 4" Insert Set
	TF651-5.500X4.500	1	5-1/2" x 4-1/2" Insert Set
	TF651-5.500X5.000	1	5-1/2" x 5" Insert Set
	TF650-5.500	1	5-1/2" x 5-1/2" Insert Set
	TF651-7.625X6.625	1	7-5/8" x 6-5/8" Insert Set
	TF651-7.625X7.000	1	7-5/8" x 7" Insert Set
	TF650-7.625	1	7-5/8" x 7-5/8" Insert Set

Optional Parts			
65200-100	1	Pneumatic Foot Control Valve Assembly	
65200H-100	1	Hydraulic Foot Control Valve Assembly	
65220-200	1	Pneumatic Hand Control Valve Assembly	
65241-200	1	Hydraulic Hand Control Valve Assembly with Relief Valve and Gauge	
992311	1	Filter/Regulator/Lubricator Assembly with Gauge	
65300	1	Set of Pneumatic Hoses (Three 180" with QDs)	
65300H	1	Set of Hydraulic Hoses (Four 180" with QDs)	
992285-FH-6-6	6	Quick Disconnect (QD), Female	

Figure 2: Spider Parts

