

# POWER SLIPS

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## PS21/30 HYDRAULIC POWER SLIP

### Installs flush with the drill floor

The PS21/30 improve both safety and rig efficiency as proven with the FMS Flush Mounted Casing Slip. Proven technology gives optimal performance, high safety operation, allowing to run the whole string with one tool: Centralizers, Couplings etc, due to enlarged throat opening.

Eliminates work platforms for stabbing and operating power tongs during casing running operations.

- Power down slips reacts up to 45,000 (PS21) on 14" casing or 55,000 ft.lbs (PS30) of torque, on 20" casing with sufficient string weight.
- Insert carriers make this a universal tool, not just another power slip
- Allows the PS21 to handle all pipe types and sizes, including BHA's, collars, drill pipe, casing and tubing from 2.3/8" to 14" and PS 30 from 2.3/8" to 20"
- Quick changeover from BHA's to collars to drill pipe allows the PS21/30 to trip the entire string.
- Insert carriers can be changed with pipe in the hole.
- Carrier change can be done in 5 minutes or less.
- Special "drop and lock, pull and release" design eliminates loose pieces such as bolts and pins.
- The PS21/30 can be fitted with insert bowls should it become necessary to use hand slips.
- Reliable slips-set signal
- Corrosion resistant nickel plated manifold blocks
- Integrated pressure relief valve in slip actuators
- Umbilical operations possible (optional guides available)

### Like the insert carriers, the slips also have a rapid change system

- Two handles on the middle slip segment retract and lock the springloaded slip retaining pin.
- No loose parts.

### Centering device

- The PS21/30 is standard equipped with a centering device incorporated in the top cover.
- Ram inserts up to 7.5/8" available in Stainless Steel (DP only) or Mild Steel

### Slip set-back designed to pass tool joints, BHAs and casing centralizers

- The slip set back allows tool joints and drill pipe protectors to pass without dragging on the inserts, even when drilling with 6.5/8" drill pipe.
- The PS21/30 will pass: BHA's when tripping; Centralizers when running casing.

### Hook Up Kit

- A control panel, which can be located in the driller's console,
- Hook Up Kit with integrated flushing system, greasing pump, pressure switches, dependent on customer requirements, ready for plug and play.

### Control panel

- Stand alone control panels enables the driller to operate the slips. See chapter Power Tools.



## TECHNICAL SPECIFICATIONS

	PS21	PS30
For rotary size	37.1/2"	49.1/2"
Pipe size range	2.3/8" to 14"	2.3/8" to 20"
Load rating	500 sTon	750 sTon
Maximum torque	45,000 ft.lbs	55,000 ft.lbs
Hydraulic requirements	PS21	PS30
Pressure*	2,300 - 2,500 psi	2,300 - 2,500 psi
Flow rate	10 gpm	10 gpm

\* Pressure in return line not to exceed 200 psi.

## MAIN PART NUMBERS

PS21 [p/n]	PS30 [p/n]
202200*	202400*
	202400*-10 (umbilical option)

\* Depending on configuration. Standard delivery includes bit breaker adapter plate, centering device and lifting sling PN 200982-1

## OPTIONAL EQUIPMENT PART NUMBERS

	PS21 [p/n]	PS30 [p/n]
Hand slip bowl # 3: 10.3/4" slip	202361	202361
Hand slip bowl # 3: 16" slip	--	202364
Hand slip bowl # 2: 16" slip	--	202363
Hand slip bowl # 1: 16" slip	--	202362
Hand slip bowl # 3: 10.3/4" removal tool	50004550-21	50004550-21
Hand slip bowl # 1: 16" removal tool	--	50004550-30
Insert carrier removal tool (Pogo stick)	50004600-1	50004600-1
Slip removal tool	50004551	50004551
Slip handle operating tool	50004552	50004552
Extension kit for SD-slip handles	50004604-1	50004604-1
Extension kit for CMS-slip handles	50004604-2	50004604-2

## PS21 SIZE COMPONENTS

Slip [p/n]	Clamping diameter [inches]	Pipe type	Zip DC [inches]	Plain DC [inches]	Rating [sTons]	Slip assy [p/n]	Inserts [p/n]	Ram [p/n]	Throat opening (slips up) [inches]
Inserts directly in slip	14	Csg	--	--	500	202250-1400	2635	202347-1400	18
	13.5/8	Csg	--	--	500	202250-1363	2653	202347-1363	17.5/8
	13.1/2	Csg	--	--	500	202250-1350	2652	202347-1350	17.1/2
	13.3/8	Csg	--	--	500	202250-1338	2636	202347-1338	17.3/8
	13	Csg	--	--	500	202250-1300	2640	202347-1300	17
	12.3/4	Csg	--	--	500	202250-1275	2657	202347-1275	16.3/4
	11.7/8	Csg	--	--	500	202253-1188	2651	202347-1188	15.7/16
11.3/4	Csg	--	--	500	202253-1175	2637	202347-1175	15.5/16	
							Insert Carrier [p/n]	Ram-inserts [p/n]	
202250-5	**11.1/8	Csg	--	--	500	202270-1113	2651	202346-1113	15.3/4
	**11	Csg	--	--	500	202270-1100	2637	202346-1100	15.1/2
	10.7/8	Csg	--	--	500	202270-1088	2651	202346-1088	15.1/2
	10.3/4	Csg	--	--	500	202270-1075	2637	202346-1075	15.3/8
	10	Csg	--	--	500	202270-1000	2638	202346-1000	14.3/4
	9.7/8	Csg	--	--	500	202270-988	2650	202346-988	14.9/16
	9.5/8	Csg	--	--	500	202270-963	2656	202346-963	14.5/16
	9.1/2	Csg	--	--	500	202270-950	2657	202346-950	14.1/4
	9.1/8	Csg	--	--	500	202279-913	2637	202346-913	14.1/4
	8.5/8	Csg	--	--	500	202279-863	2652	202346-863	13.1/2
	7.3/4	Csg	--	--	500	202279-775	17080	202346-775	13
	7.5/8	Csg	--	--	500	202273-763	2633	202346-763	12.1/2
	7	Csg	--	--	500	202273-700	2623	202346-700	11.7/8
	6.7/8	Csg/DP	--	--	500	202273-688	2638	202346-688	11.3/4
	6.5/8	Csg/DP	--	--	500	202273-663	2632	202346-663	11.5/8
	6.1/2	Csg	--	--	500	202369-650	2173	202346-650	11.1/2
	6.9/64	Csg/DP	--	--	500	202369-614	2172	202346-614	11.1/8
	6	Csg/DP	--	--	500	202369-600	2169	202346-600	11
	5.7/8	DP	--	--	500	202369-588	2623	202346-588	11
	5.11/16	Csg/DP	--	--	500	202369-568	2650	202346-568	10.7/8
	5.1/2	Csg/DP	--	--	500	202274-550	2170	202346-550	10.3/4
	5	Csg/DP	--	--	500	202274-500	2169	202346-500	11.1/4
	4.1/2	Tbg/DP	--	--	500	202274-450	2168	202346-450	9.3/4
	4**	Tbg/DP	--	--	500	202278-400	2165	202346-400	9.3/8
	9.1/2**	DC	10	9.1/2	350	202271-950	2633	--	14.3/16
	9.1/4**	DC	9.3/4	9.1/4	350	202271-925	2655	--	13.15/16
	9	DC	9.1/2	9	350	202271-900	2633	--	13.11/16
	8.3/4	DC	9.1/4	8.3/4	350	202271-875	2655	--	13.9/16
	8.5/8	DC	9.1/8	8.5/8	350	202271-863	2653	--	13.1/2
	8.1/2	DC	9	8.1/2	350	202271-850	2652	--	13.7/16
	8.1/4	DC	8.3/4	8.1/4	350	202271-825	2638	--	12.7/8
	8.1/8	DC	8.5/8	8.1/8	350	202271-813	2650	--	12.3/4
	8	DC	8.1/2	8	350	202272-800	2633	--	13.1/4
	7.3/4	DC	8.1/4	7.3/4	350	202272-775	2655	--	13
	7.5/8	DC	8.1/8	7.5/8	350	202272-763	2172	--	12.1/2
	7.1/2	DC	8	7.1/2	350	202272-750	2652	--	12.3/4
	7.3/8	DC	7.7/8	7.3/8	350	202272-738	2636	--	12.1/2
	7.1/4	DC	7.3/4	7.1/4	350	202272-725	2638	--	12.1/2
	6.3/4**	DC	7.1/4	6.3/4	350	202275-675	2633	--	11.1/4
	6.1/2	DC	7	6.1/2	350	202275-650	2633	--	11
	6.1/4	DC	6.3/4	6.1/4	350	202275-625	2655	--	10.7/8
	6	DC	6-1/2	6	350	202275-600	2652	--	10.7/8
	5.3/4	DC	6.1/4	5.3/4	350	202275-575	2638	--	10.5/8
	5.5/8	DC	6.1/8	5.5/8	350	202275-563	2650	--	10.1/2
	3.1/2	Tbg/DP	--	--	350	202277-350	2162	202346-350	8.7/8
3.1/8	Tbg/DP	--	--	350	202277-313	2172	202346-313	8.7/8	
2.7/8	Tbg/DP	--	--	350	202277-288	2161	202346-288	8.1/2	
2.3/8	Tbg/DP	--	--	350	202277-238	2160	202346-238	8.1/8	
4.3/4	DC	5.1/4	4.3/4	225	202276-475	2165	--	10	
4.5/8	DC	--	4.5/8	225	202276-463	2655	--	9.7/8	
4.3/8	DC	4.3/4	4.3/8	225	202276-438	2172	--	9.3/4	
4.1/4	DC	--	4.1/4	225	202276-425	2166	--	9.5/8	
4	DC	--	4	225	202276-400	2638	--	9.3/8	

\*\* These insert carriers are size specific and cannot be redressed to another size

PS30 SIZE COMPONENTS

Slip [p/n]	Clamping diameter [inches]	Pipe type	Zip DC [inches]	Plain DC [inches]	Rating [sTons]	Slip assy [p/n]	Inserts [p/n]	Ram [p/n]	Throat opening (slips up) [inches]	
Inserts directly in slip	20	Csg	--	--	250	202430-2000	2635	202381-2000	24	
	18.5/8	Csg	--	--	250	202430-1863	17080	202381-1863	22-3/4	
	18	Csg	--	--	250	202430-1800	2635	202381-1800	22	
	17.7/8	Csg	--	--	250	202430-1788	V-2669	202381-1788	21.1/2	
202430-5						Insert Carrier [p/n]	Ram-inserts [p/n]			
	16	Csg	--	--	750	202440-1600	2635	202386-1600	20	
	14	Csg	--	--	750	202441-1400	2635	202386-1400	18	
	13.5/8	Csg	--	--	750	202441-1363	2653	202386-1363	17.5/8	
	13.3/8	Csg	--	--	750	202441-1338	2636	202386-1338	17.3/8	
	12.3/4	Csg	--	--	750	202441-1275	2657	202386-1275	17.1/4	
	11.7/8	Csg	--	--	750	202442-1188	2651	202386-1188	16.7/16	
	11.3/4	Csg	--	--	750	202442-1175	2637	202386-1175	16.5/16	
	10.3/4	Csg	--	--	750	202443-1075	2637	202386-1075	15.3/8	
	9.7/8	Csg	--	--	750	202443-988	2650	202386-988	14.7/16	
	9.5/8	Csg	--	--	750	202443-963	2656	202386-963	14.5/16	
	7.5/8	Csg	--	--	750	202445-763	2633	202386-763	14.1/2	
	7	Csg	--	--	750	202445-700	2623	202386-700	13.7/8	
	6.7/8	Csg	--	--	750	202445-668	2652	202386-668	13.5/16	
	6.5/8	Csg/DP	--	--	750	202445-663	2632	202386-663	13.1/2	
	6.1/2	Csg/DP	--	--	750	50004569-650	2173	202386-650	13.1/4	
	5.7/8	DP	--	--	750	50004569-588	2623	202386-588	13	
	5.1/2	Csg/DP	--	--	750	202446-550	2170	202386-550	10.3/4	
	5	Csg/DP	--	--	750	202446-500	2169	202386-500	10.1/4	
	4.1/2	Tbg/DP	--	--	750	202446-450	2168	202386-450	9.3/4	
	202433-5	** 11.1/8	Csg	--	--	500	202270-1113	2651	202386-1113	15.3/4
		** 11	Csg	--	--	500	202270-1100	2637	202386-1100	15.1/2
		10.7/8	Csg	--	--	500	202270-1088	2651	202386-1088	15.1/2
		10.3/4	Csg	--	--	500	202270-1075	2637	202386-1075	15.3/8
		10	Csg	--	--	500	202270-1000	2638	202386-1000	14.3/4
		9.7/8	Csg	--	--	500	202270-988	2650	202386-988	14.9/16
		9.5/8	Csg	--	--	500	202270-963	2656	202386-963	14.5/16
		9.1/2	Csg	--	--	500	202270-950	2657	202386-950	14.1/4
9.1/8		Csg	--	--	500	202279-913	2637	202386-913	14.1/4	
8.5/8		Csg	--	--	500	202279-863	2652	202386-863	13.1/2	
7.3/4		Csg	--	--	500	202279-775	17080	202386-775	13	
7.5/8		Csg	--	--	500	202273-763	2633	202386-763	12.1/2	
7		Csg	--	--	500	202273-700	2623	202386-700	11.7/8	
6.7/8		Csg/DP	--	--	500	202273-688	2638	202386-688	11.3/4	
6.5/8		Csg/DP	--	--	500	202273-663	2632	202386-663	11.5/8	
6.1/2		Csg	--	--	500	202369-650	2173	202386-650	11.1/2	
6.9/64		Csg/DP	--	--	500	202369-614	2172	202386-614	11.1/8	
6		Csg/DP	--	--	500	202369-600	2169	202386-600	11	
5.7/8		DP	--	--	500	202369-588	2623	202386-588	11	
5.11/16		Csg/DP	--	--	500	202369-568	2650	202386-568	10.7/8	
5.1/2		Csg/DP	--	--	500	202274-550	2170	202386-550	10.3/4	
5		Csg/DP	--	--	500	202274-500	2169	202386-500	11.1/4	
4.1/2		Tbg/DP	--	--	500	202274-450	2168	202386-450	9.3/4	
** 4		Tbg/DP	--	--	500	202278-400	2165	202386-400	9.3/8	

Slip [p/n]	Clamping diameter [inches]	Pipe type	Zip DC [inches]	Plain DC [inches]	Rating [sTons]	Slip assy [p/n]	Inserts [p/n]	Ram [p/n]	Throat opening (slips up) [inches]
202433-5	** 9.1/2	DC	10	9-1/2	350	202271-950	2633	--	14.3/16
	** 9.1/4	DC	9-3/4	9-1/4	350	202271-925	2655	--	13.15/16
	9	DC	9-1/2	9	350	202271-900	2633	--	13.11/16
	8.3/4	DC	9-1/4	8-3/4	350	202271-875	2655	--	13.9/16
	8.5/8	DC	9-1/8	8-5/8	350	202271-863	2653	--	13.1/2
	8.1/2	DC	9	8-1/2	350	202271-850	2652	--	13.7/16
	8.1/4	DC	8-3/4	8-1/4	350	202271-825	2638	--	12.7/8
	8.1/8	DC	8-5/8	8-1/8	350	202271-813	2650	--	12.3/4
	8	DC	8-1/2	8	350	202272-800	2633	--	13.1/4
	7.3/4	DC	8-1/4	7-3/4	350	202272-775	2655	--	13
	7.5/8	DC	8-1/8	7-5/8	350	202272-763	2172	--	12.1/2
	7.1/2	DC	8	7-1/2	350	202272-750	2652	--	12.3/4
	7.3/8	DC	7-7/8	7 3/8	350	202272-738	2636	--	12.1/2
	7.1/4	DC	7-3/4	7-1/4	350	202272-725	2638	--	12.1/2
	** 6.3/4	DC	7-1/4	6-3/4	350	202275-675	2633	--	11.1/4
	6.1/2	DC	7	6-1/2	350	202275-650	2633	--	11
	6.1/4	DC	6-3/4	6-1/4	350	202275-625	2655	--	10.7/8
	6	DC	6-1/2	6	350	202275-600	2652	--	10.7/8
	5.3/4	DC	6-1/4	5-3/4	350	202275-575	2638	--	10.5/8
	5.5/8	DC	6-1/8	5-5/8	350	202275-563	2650	--	10.1/2
	3.1/2	Tbg/DP	--	--	350	202277-350	2162	202386-350	8.7/8
	3.1/8	Tbg/DP	--	--	350	202277-313	2172	202386-313	8.7/8
	2.7/8	Tbg/DP	--	--	350	202277-288	2161	202386-288	8.1/2
	2.3/8	Tbg/DP	--	--	350	202277-238	2160	202386-238	8.1/8
	4.3/4	DC	5-1/4	4-3/4	225	202276-475	2165	--	10
	4.5/8	DC	--	4-5/8	225	202276-463	2655	--	9.7/8
	4.3/8	DC	4-3/4	4-3/8	225	202276-438	2172	--	9.3/4
	4.1/4	DC	--	4-1/4	225	202276-425	2166	--	9.5/8
	4	DC	--	4	225	202276-400	2638	--	9.3/8

\*\* These insert carriers are size specific and cannot be redressed to another size

## PS15 AND PS16 POWER SLIPS

NOV Power Slips are designed to eliminate the manual lifting and setting of slips. The PS15 use coil springs as a counterbalance to offset the weight of the slips when in upper, released position. Slips are set by standing on the slipset ring. The foot pedal is pressed to release the slips.

The PS16 is an air operated power slip controlled with a foot valve. The slips are set by gravity and released with air pressure much like NOV's casing elevator/spiders.

### PS15 and PS16 Power Slip Features:

- Fits directly into NOV pin drive master bushings.
- Fits 27.1/2" and 37.1/2" to 49.1/2" rotary tables using adapter rings
- Accommodates 3.1/2" to 6.5/8" OD Drill pipe



PS15 Spring Slip



PS16 Pneumatic Slip

Slip body size [inches]	Drill Pipe Size [inches]	PS15	PS16	Slip set Part No.	Insert set Part No.	Guide ring Part No.
		Complete with Guide and slip set Part No.	Compl. with air controls and hose guide and slip set Part No.			
4.1/2"	3.1/2"	18172-45-35	78181-45-35	7686	2163-16B-32	79011-1
4.1/2"	4	18172-45-40	78181-45-40	7685	2164-16B-32	79011-2
4.1/2"	4.1/2"	18172-45-45	78181-45-45	7684	2165-48	79011-2
5.1/2"	4.1/2"	18172-55-45	78181-55-45	7691	2168-16B-32	79011-2
5.1/2"	5"	18172-55-50	78181-55-50	7690	2169-16B-32	79011-3
5.1/2"	5.1/2"	18172-55-55	78181-55-55	7689	2170-48	79011-4
5.7/8"	5.7/8"	18172-57-57	78181-57-57	7689-57	2173	79011-4
*7.5/8"	6.5/8"		78181-76-66	7696	2632-24B-48	7799

\* tripping only!

## OPTIONAL EQUIPMENT PART NUMBERS

Part number	Description
7831	Foot pedal
11814	Connecting hoses (2 required)

## PSF HYDRAULIC POWER SLIP FRAME

The Power Slip Frame (PSF) improves drilling and tripping operations with simple, light weight, compact mechanical hydraulic slips. The slips may be operated from anywhere on the drill floor via electro - hydraulic remote control. In addition, the slips may be operated manually by foot pedal or hand operated control valve. This increases safety by moving personnel away from the hazards at well center during drilling operations. In addition, the design does not extend beyond the rotary table and thereby reduces trip hazards in the event of an accidental rotation of the rotary table.



## TECHNICAL SPECIFICATIONS

Description	
Weight w/o slips [lbs / kg]	365 / 166
Weight, with slips [lbs / kg]	515 / 234
Pipe Size Capacity [inches / mm]	2.3/8" to 7" / 60 - 178 (with simple adapters required for the range)
Operating pressure [psi / kPa]	≥600 / ≥4,137
Operators Control	Electro-hydraulic remote control or manually by foot pedal or hand operated control valve
Required ID Connection [inches / mm]	3/8 / 9.5
Required hydraulic flow [gpm / lpm]	3 / 11.4
Required pressure [psi / kPa]	≥600 / 4,137

## MAIN PART NUMBERS

Description	Part number
Power Slip Frame for 20.1/2" pin drive rotary table	1100070-501
Power Slip Frame for 17.1/2" - 27.1/2" square drive rotary table	1100070-502
Power Slip Frame for 27.1/2" & 37.1/2" pin drive rotary table	1100070-503