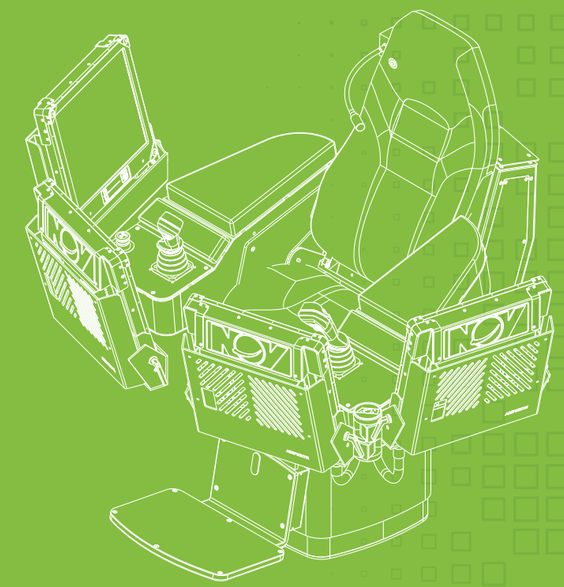
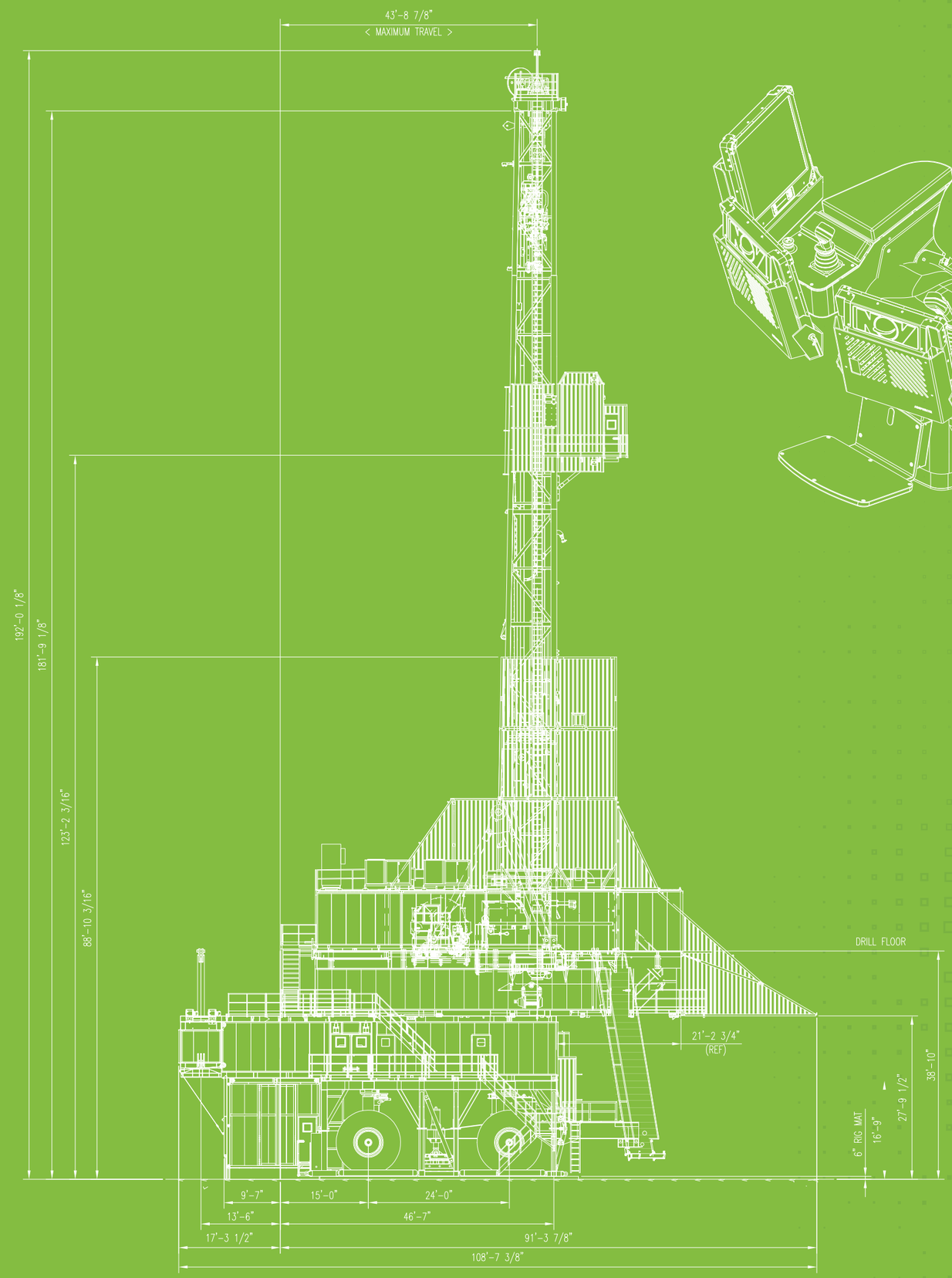
Product Reference Guide

2018 Rev.1





NOV Rig Technologies

Onshore Technical Marketing

MASTS AND SUBSTRUCTURES

4. Masts and Substructures - Ideal Series
5. Masts and Substructures - Signature Series
6. Masts and Substructures - Velocity Series
7. Masts and Substructures - Custom Terrain Series
8. Steel Toe Walking System

DRILL FLOOR EQUIPMENT

10. Onshore Top Drives
11. BX-Elevators
12. X-Series Manual Side Door Elevators
13. Manual Single Joint Elevators
14. Elevator/Spider and FMS Flush Mounted Slips
15. Power Slips
16. Rotary Support Table
17. High Pressure Manifolds
18. Onshore Roughnecks
19. Stand Transfer Vehicle (STV) & PipeCat

DRAWWORKS

22. ADS Drawworks
23. DSGD-375 & SSGD-250

POWER GENERATION

26. Compact Drive Systems

DRILLING CONTROLS AND INSTRUMENTATION

30. Pharos™ sheet 1 & 2
32. Amphion™

PRESSURE CONTROL EQUIPMENT

34. 6012 BOP
35. LXT BOP
36. SBOP

PUMPING AND CIRCULATION

38. 12-P-160 Triplex Mud Pump
39. Brandt Centrifuges
40. Brandt Shakers
41. Brandt Shaker screens
42. Brandt Agitators

REFERENCE

43. Engineering Tables

NOV Rig Technologies

rig@nov.com | www.nov.com

Masts and Substructures

4. Masts and Substructures - Ideal Series
5. Masts and Substructures - Signature Series
6. Masts and Substructures - Velocity Series
7. Masts and Substructures - Terrain Series
8. Steel Toe Walking system

NOV Rig Technologies

*For reference only, please contact your local sales contact for more information.

The Ideal™ Series

The Ideal™ Rig Series defines reliability and versatility. This versatile series with straight-leg mast design includes some of our most popular, field-proven rigs. Comprised of the Ideal, Ideal Prime, Drake and Ideal Box Rigs, the Ideal™ Series has evolved alongside the drilling industry to accommodate a wide array of your drilling demands, integrating improvements in technology and engineering with proven designs and equipment.

Notes

- Ideal Rig base box measurement excludes attached Drawworks Skid Base and pin-on Steel Toe™ walking foot, pinned to V-door side of substructure base box.
- The Ideal Prime base box measurement excludes pin-on Steel Toe™ walking foot, pinned to V-door side of substructure base box.

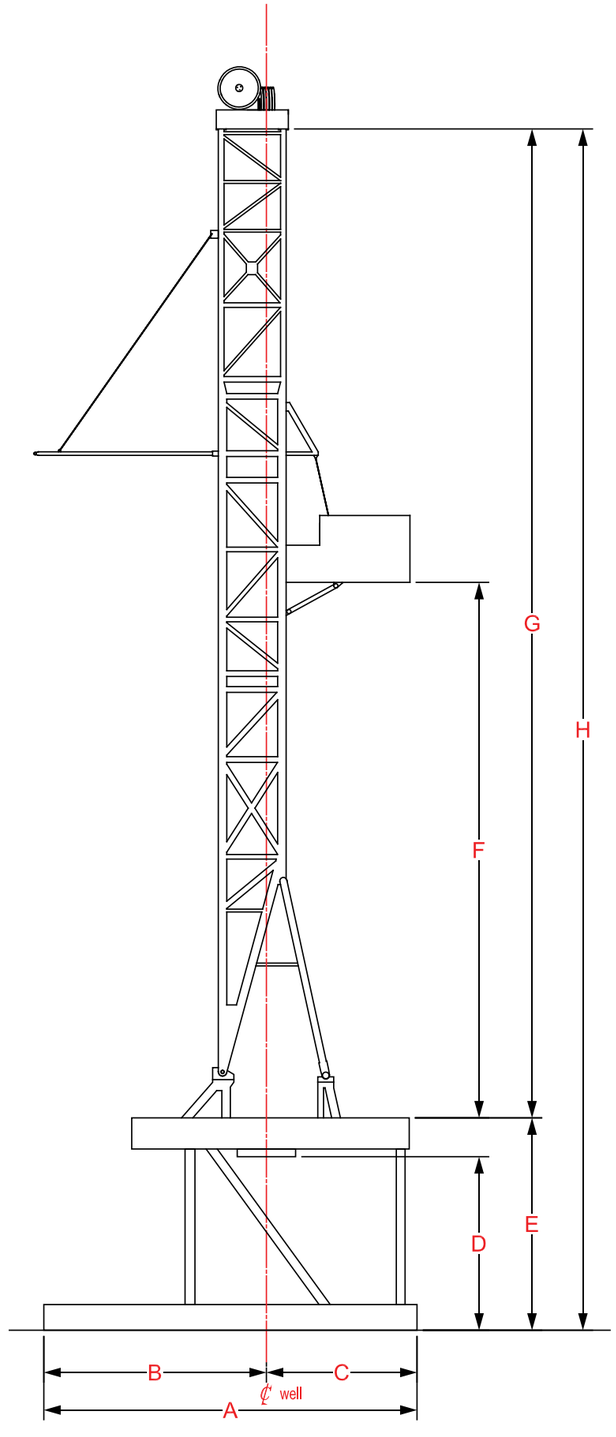
Dimensions

Ideal Series	units	A	B	C	D	E	F	G	H
Ideal Rig	ft/in	52'-5"	34'-3"	18'-2"	21'-8"	25'-0"	85'-0"	142'-0"	167'-0"
	meters	15.97	10.44	5.53	6.6	7.62	25.91	43.28	50.9
Ideal Box	ft/in	55'-0"	36'-0"	19'-0"	21'-8" to 31'-8"	25'-0" to 35'-0"	85'-0"	142'-0"	167'-0" to 177'-0"
	meters	16.76	10.97	5.79	6.6	7.62 to 10.67	25.91	43.28	50.90 to 53.95
Ideal Prime	ft/in	62'-11"	42'-5"	20'-6"	23'-0"	28'-0"	85'-0"	142'-0"	170'-0"
	meters	19.17	12.92	6.25	7.01	8.53	25.91	43.28	51.81
Drake Rig	ft/in	46'-8"	34'-2	12'-6"	18'-0"	22'-0"	85'-0"	136'-0"	158'-0"
	meters	14.22	10.41	3.81	5.49	6.71	25.91	41.45	48.16

Conventional Substructures and Drilling Masts — Ideal™ Series

Rig Model	units	AC Ideal Rig	Ideal Box	Ideal Prime	Drake Rig
Hook Capacity	ton	375	375	375	250
	metric ton	340.2	340.2	340.2	226.8
Mast	type	Cantilever (Straight Leg)	Cantilever (Straight Leg)	Cantilever (Straight Leg)	Cantilever (Straight Leg)
Mast Height	ft/in	142'-0"	142'-0"	142'-0"	136'-0"
	m	43.3	43.3	43.3	41.5
Base Width	ft/in	12'-0"	12'-0"	21'-0"	20'-0"
	m	3.66	3.66	6.4	6.1
Raising Method	type	Cylinder Raised	Cylinder Raised	Cylinder Raised	Cylinder Raised
Drawworks	model (# of lines)	ADS-10SD (12)	ADS-10SD (12)	DSGD-375 (12)	DSGS-375 (8)
Substructure	type	Slingshot Cylinder	Box-on-Box	Slingshot Cylinder	Slingshot Cylinder
Pipe Set-Back Capacity	lb	500,000	500,000	575,000	350,000
	ton	250	250	287.5	175
	metric ton	226.8	226.8	260.8	158.8
Casing Capacity	lb	750,000	750,000	750,000	500,000
	ton	375	375	375	250
	metric ton	340	340	340	226.8
Pipe Racking Capacity (Stands)	stands	5" DP: (208) 8" DC: (8)	5" DP : (208) 8" DC: (8)	5" DP: (224) 8" DC: (6)	5" DP: (144) 8" DC: (6)
Floor Height	ft/in	25	25, 28, 30, or 35	28	22
	m	7.6	7.6, 8.5, 9.1 or 10.6	8.5	6.7
Cellar/Clearance Height	ft/in	21'-8"	24'-0" (based on 28' drill floor)	24'-0"	18'-0"
	m	6.6	7.3	7.3	5.4
Rotary Table Opening	in	37½"	37½"	37½"	37½"
Standard Crown Sheave Groove	in	1⅜"	1⅜"	1⅜"	1¼"
Sheaves on Cluster *	#	5	5	5	3

**Fastline and Deadline sheaves not included*



rig@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

The Signature Series

The Signature Series Rigs are built to specific market requirements and your unique needs. Products of many engineering hours, these rigs are configured to operate optimally in geographic arenas with stringent regulations or unrelenting, rugged environments. Examples include the European, Middle East, Mono-Transit, and SEAM rigs.

Notes

- Racking board height can be adjusted within a range of dimension **F** so as to accommodate varying stand heights.

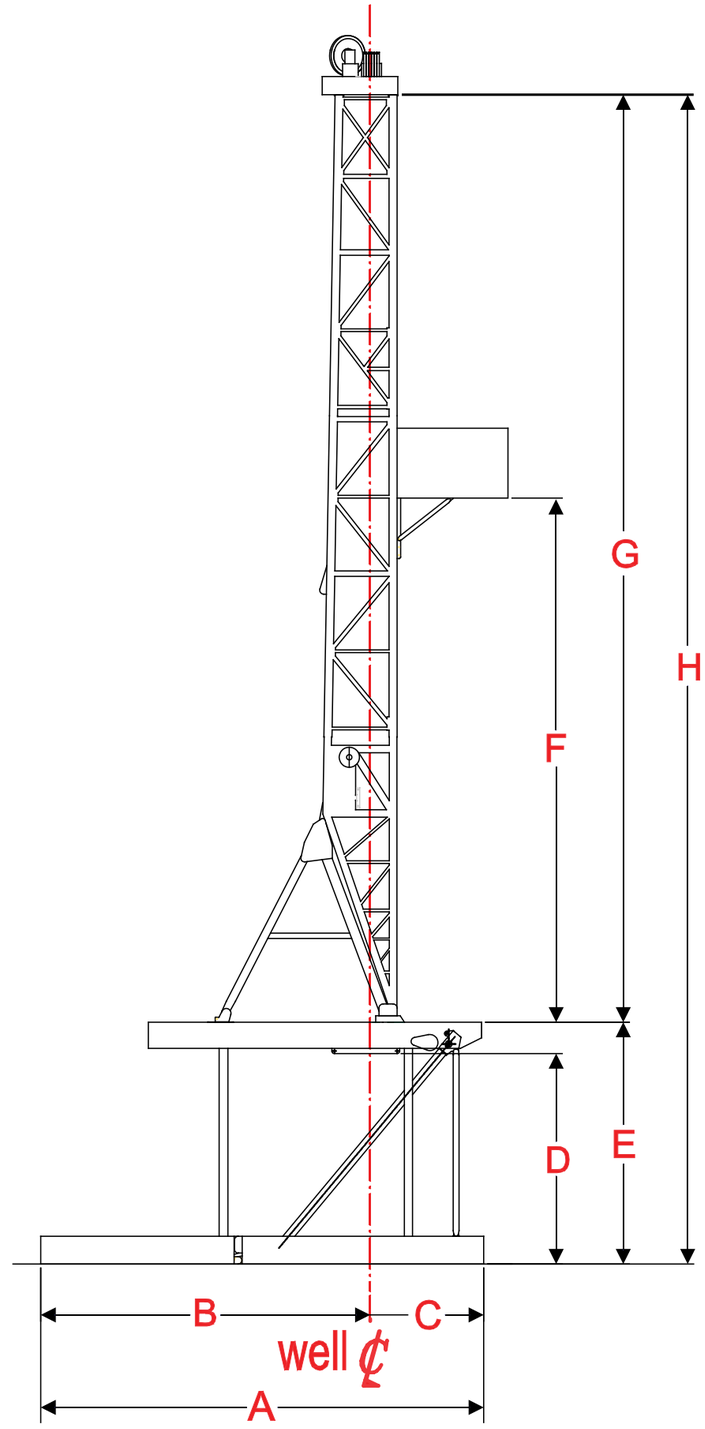
Dimensions

Signature Series	units	A	B	C	D	E	F	G	H
SEAM 1000	ft/in	49'-6"	37'-2"	12'4"	21'-8"	25'-0"	85'-0"	142'-0"	167'-0"
	meters	15.09	11.33	3.76	6.60	7.62	25.91	43.28	50.90
SEAM 1500	ft/in	57'-4"	29'-7"	27'-9"	26'-8"	30'-0"	85'-0"	142'-0"	172'-0"
	meters	17.48	9.02	8.46	8.13	9.14	25.91	43.28	52.42
SEAM 2000	ft/in	54'-7"	42'-2"	12'-5"	26'-8"	30'-0"	85'-0"	142'-0"	172'-0"
	meters	16.63	12.85	3.78	8.13	9.14	25.91	43.28	52.42
European 1500	ft/in	57'-4"	29'-7"	27'-9"	26'-8"	30'-0"	85'-0"	142'-0"	172'-0"
	meters	17.48	9.02	8.46	8.13	9.14	25.91	43.28	52.42
European 2000	ft/in	54'-7"	42'-2"	12'-5"	26'-8"	30'-0"	85'-0"	142'-0"	172'-0"
	meters	16.63	12.85	3.78	8.13	9.14	25.91	43.28	52.42
ME 1500	ft/in	62'-6"	42'-0"	20'-6"	25'-0"	30'-0"	85'-0"	152'-0"	182'-0"
	meters	19.05	12.80	6.25	7.62	9.14	25.91	46.33	55.47
ME 2000 DC	ft/in	60'-0"	46'-8"	13'-4"	30'-0"	35'-0"	86'-4"	156'-0"	191'-0"
	meters	18.28	14.22	4.06	9.14	10.67	26.31	47.55	58.22
ME 2000 AC	ft/in	60'-0"	46'-8"	13'-4"	30'-0"	35'-0"	86'-4"	156'-0"	191'-0"
	meters	18.28	14.22	4.06	9.14	10.67	26.31	47.55	58.22
ME 2000	ft/in	74'-2"	49'-8"	24'-6"	39'-10"	45'-0"	87'-6"	160'-0"	205'-0"
	meters	22.61	15.14	7.47	12.14	13.72	26.67	48.77	62.49
Mono Transit	ft/in	61'-2"	30'-10"	30'-4"	16'-0"	20'-0"	85'-0"	142'-0"	162'-0"
	meters	18.65	9.40	9.25	4.88	6.10	25.91	43.28	49.38

Conventional Substructures and Drilling Masts — Signature Series

Rig Model	units	SEAM 1000	SEAM 1500	SEAM 2000	European 1500	European 2000	ME 1500	ME 2000 DC	ME 2000 AC	ME 3000	Mono-Transit
Hook Capacity	ton	250	350	500	350	500	412.5	500	500	777.5	375
	metric ton	226.8	317.5	453.6	317.5	453.6	374.2	453.6	453.6	705.3	340.2
Mast	type	Cantilever	Cantilever	Cantilever	Cantilever	Cantilever	Cantilever	Cantilever	Cantilever	Cantilever	Cantilever
Mast Height	ft/in	142'-0"	142'-0"	142'-0"	142'-0"	142'-0"	152'-0"	157'-0	157'-0"	160'-0"	142'-0"
	m	43.3	43.3	43.3	43.3	43.3	46.3	47.85	47.85	47.9	43.3
Base Width	ft/in	21'-0"	21'-0"	25'-0"	21'-0"	25'-0"	25'-0"	30'-0"	30'-0"	30'-0"	12'-6"
	m	6.40	6.40	7.62	6.40	7.62	7.62	9.14	9.14	9.14	3.81
Raising Method	type	Sling-Line	Sling-Line	Sling-Line	Sling-Line	Sling-Line	Cylinder Raised	Cylinder Raised	Cylinder Raised	Sling-Line	Cylinder Raised
Drawworks	model (# of lines)	DSGD-250 (8)	DSGS-375 (8, 10, 12)	DSGS-500 (8, 10, 12)	DSGS-375 (8, 10, 12)	DSGD-500 (8, 10, 12)	110-UDBE (12)	1320-UDBE (12)	ADS-10SD (12)	ADS-30D (14)	DSGD-375L (8, 10, 12)
Substructure	type	Slingshot Winch	Slingshot Winch	Slingshot Winch	Slingshot Winch	Slingshot Winch	Slingshot Cylinder	Slingshot Cylinder	Slingshot Cylinder	Slingshot Winch	1 Piece Telescoping
Pipe Set-Back Capacity	lb	325,000	500,000	500,000	500,000	600,000	550,000	800,000	800,000	1,000,000	460,000
	ton	162.5	250	250	250	300	275	400	400	500	230
	metric ton	147.4	226.8	226.8	226.8	330.7	294.4	362.9	362.9	453.6	208.7
Casing Capacity	lb	450,000	700,000	950,000	700,000	950,000	750,000	1,000,000	1,000,000	1,500,000	700,000
	ton	225	350	475	350	475	375	500	500	750	350
	metric ton	204.1	317.5	430.9	317.5	430.9	340.1	453.5	453.5	680.3	317.5
Pipe Racking Capacity	stands	5" DP: (180) 6½" DC: (8)	4½" DP: (132) 6½" DC: (8)	5" DP: (196) 8¼" DC: (8) 10" DC: (2)	5" DP: (180) 6½" DC: (8)	4½" DP: (132) 6½" DC: (8)	5" DP: (190) 6½" DC: (8) 8¼"DC: (6) 10" DC: (2)	5/5½" DP: (285) 8" DC: (8) 9½" DC: (4)	5/5½" DP: (285) 8" DC: (8) 9½" DC: (4)	5½" DP: (264) 10" DC: (9) 14" DC: (1)	5" DP: (196) 8" DC: (8)
Floor Height	ft/in	25'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	35'-0"	35'-0"	45'-0"	30'-0"
	m	7.62	9.14	9.14	9.14	9.14	9.1	10.6	10.6	13.7	9.1
Cellar/Clearance Height	ft/in	21'-0	26'-0	26'-1	n.a.	n.a.	25'-0"	30'-0"	30'-0"	35'-0"	17'-7"
	m	6.4	7.92	8.92	n.a.	n.a.	7.6	9.1	9.1	10.6	5.3
Rotary Table Opening	in	37½"	37½"	37½"	37½"	37½"	37½"	37½"	37½"	47½"	37½"
Standard Crown Sheave Groove	in	1¼"	1⅜"	1½"	1⅜"	1½"	1⅜"	1½"	1½"	1⅝"	1¼"
Sheaves on Cluster*	#	5	6	6	6	6	6	6	6	7	6

**Fastline and Deadline sheaves not included*



rig@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

Custom Terrain Series

The Custom Terrain Series Rigs are purpose-built to perform in demanding terrains and extreme temperature environments. With designs ranging from arctic, desert, heli, and train applications, these rigs continue drilling downhole no matter the conditions above ground.

Notes

- Dimensions represent our standard offering. Contact our sales team for more information.

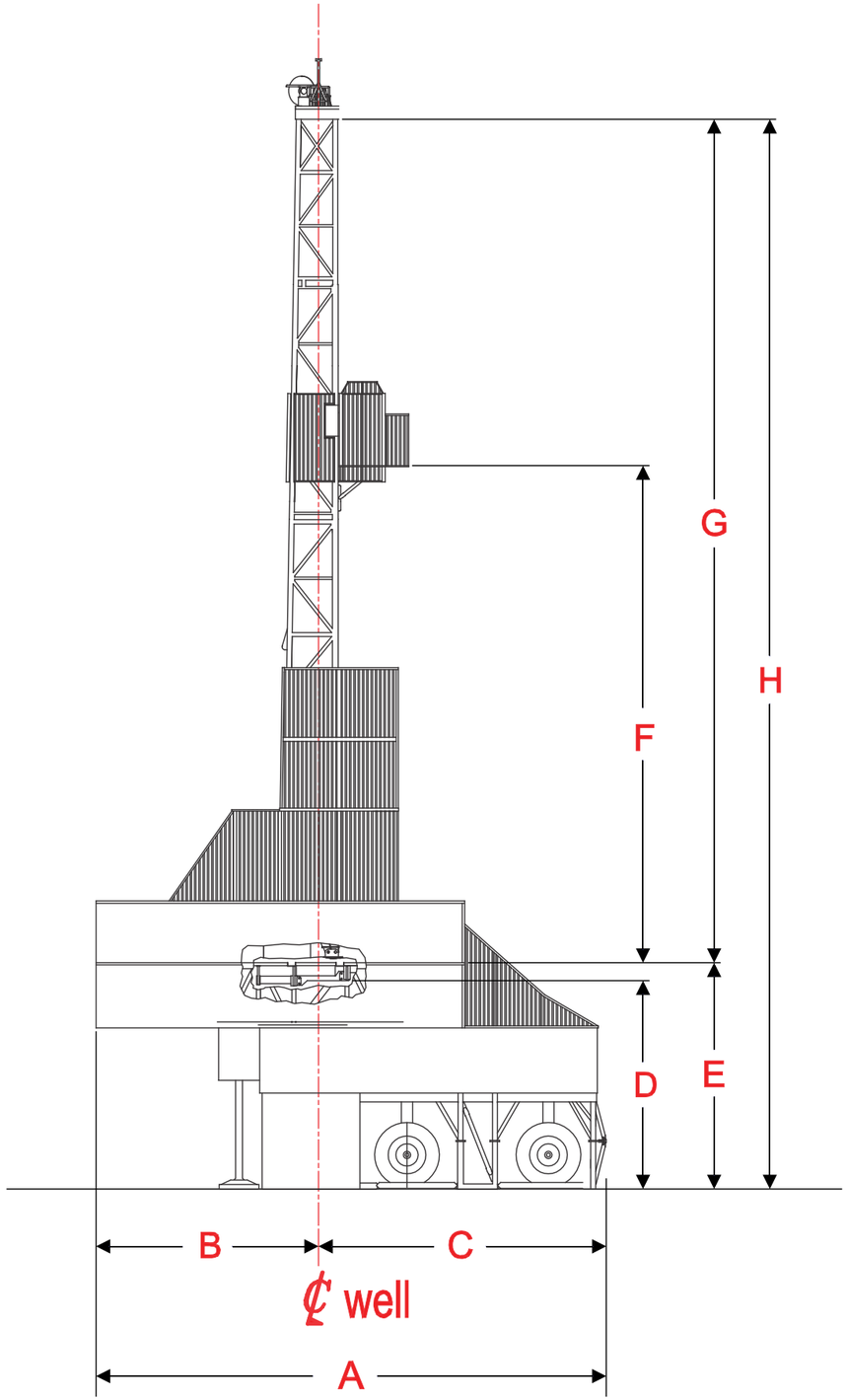
Dimensions

Terrain Series	units	A	B	C	D	E	F	G	H
Desert Rig	ft/in	62'-6"	42'-0"	20'-6"	25'-0"	30'-0"	85'-0"	152'-0"	182'-0"
	meters	19.05	12.80	6.25	7.62	9.14	25.91	46.33	55.47
Arctic Box	ft/in	86'-9"	37'-10"	48'-11"	26'-8"	30'-0"	85'-0"	142'-0"	172'-0"
	meters	26.44	11.53	14.91	8.13	9.14	25.91	43.28	52.42
Train Prime	ft/in	57'-1"	39'-0"	18'-1"	31'-10"	36'-0"	85'-0"	142'-0"	178'-0"
	meters	17.40	11.89	5.51	9.70	10.97	25.91	43.28	54.25
Heli Rig	ft/in	61'-2"	39'-7"	21'-7"	20'-4"	25'-0"	85'-0"	142'-0"	167'-0"
	meters	18.64	12.06	6.58	6.20	7.62	25.91	43.28	50.90

Conventional Substructures and Drilling Masts — Terrain Series

Rig Model	units	Desert Rig	Arctic Rig	Train Rig	Heli Rig
Hook Capacity	ton	250 to 750+	250, 350, or 500	250 to 750+	250
	metric ton	226.79 to 680.38+	226.79, 317.5, or 453.5	226.79 to 680.38+	226.79
Mast	type	Telescopic or Cantilever	Telescopic or Cantilever	Cantilever	Cantilever
Mast Height	ft/in	127'-0"+	120'-0"+	127'-0"+	142'-0"
	m	38.71+	36.58+	38.71+	43.28
Base Width	ft/in	15'-0" to 33'-0"	25'-0" (based on 350 and 375 ton)	25'-0" (based on 350 ton)	21'-0"
	m	4.57 to 10.06	7.62 (based on 350 and 375 ton)	7.62 (based on 350 ton)	6.4
Raising Method	type	Cylinder/Sling-line	Cylinder/Sling-line	Cylinder/Sling-line	Cylinder/Sling-line
Drawworks	model (# of lines)	1320-UDBE (10 to 14)	SSGD-360 (12)	DSGS-375 (12)	D700 (12)
Substructure	type	Slingshot-Cylinder/Winch/Drawworks	Slingshot-Cylinder/Winch	Slingshot-Cylinder/Winch	Slingshot-Cylinder/Winch/Drawworks
Pipe Set-Back Capacity	lb	250,000 to 700,000	250,000 to 600,000	350,000 or 575,000	-
	ton	125 to 350	125 to 300	175 or 287.5	-
	metric ton	113.4 to 317.5	113.4 to 272.1	158.7 or 260.8	-
Casing Capacity	lb	400,000 to 1,500,000	750,000	700,000	600,000
	ton	200 to 750	375	350	300
	metric ton	226.7 to 680.3	340.1	323.8	272.1
Pipe Racking Capacity	stands	3½ to 5½" DP: (140-270) 8½ to 9½" DC: (up to 9)	5" DP: (200) 6¾" DC: (22)	5" DP: (180) 7" DC: (12) 8" DC: (8)	5" DP: (178) 10" DC: (8)
Floor Height	ft/in	20'-0" to 30'-0"	20'-0" or 35'-0"	25'-0" or 30'-0"	20'-0" or 25'-0"
	m	6.1 to 9.1	6.1 or 10.6	7.6 or 9.1	7.6 or 9.1
Cellar/Clearance Height	ft/in	19'-0" to 38'-0"	25'-6"	22'-0"	Up to 20'-4"
	m	5.7 to 11.5	7.7	6.7	6.1
Rotary Table Opening	in	27½"	37½"	37½"	27½"
Standard Crown Sheave Groove	in	1⅛" to 1¾"	1¼" to 1⅜"	1⅜" (based on 350 ton)	1⅛"
Sheaves on Cluster*	#	5 to 7	6	6 (based on 350 ton)	6

Fastline and Deadline sheaves not included



rig@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

The Velocity™ Series

NOV's Velocity Rig Series offers fast-moving "super singles" rigs designed with fewer transport loads, allowing for quick transport between rig sites. The Velocity Series sets the standard for speed.

Notes

- All Velocity Series rigs are equipped with pipe handling systems which eliminate the need for a racking board and setback area.

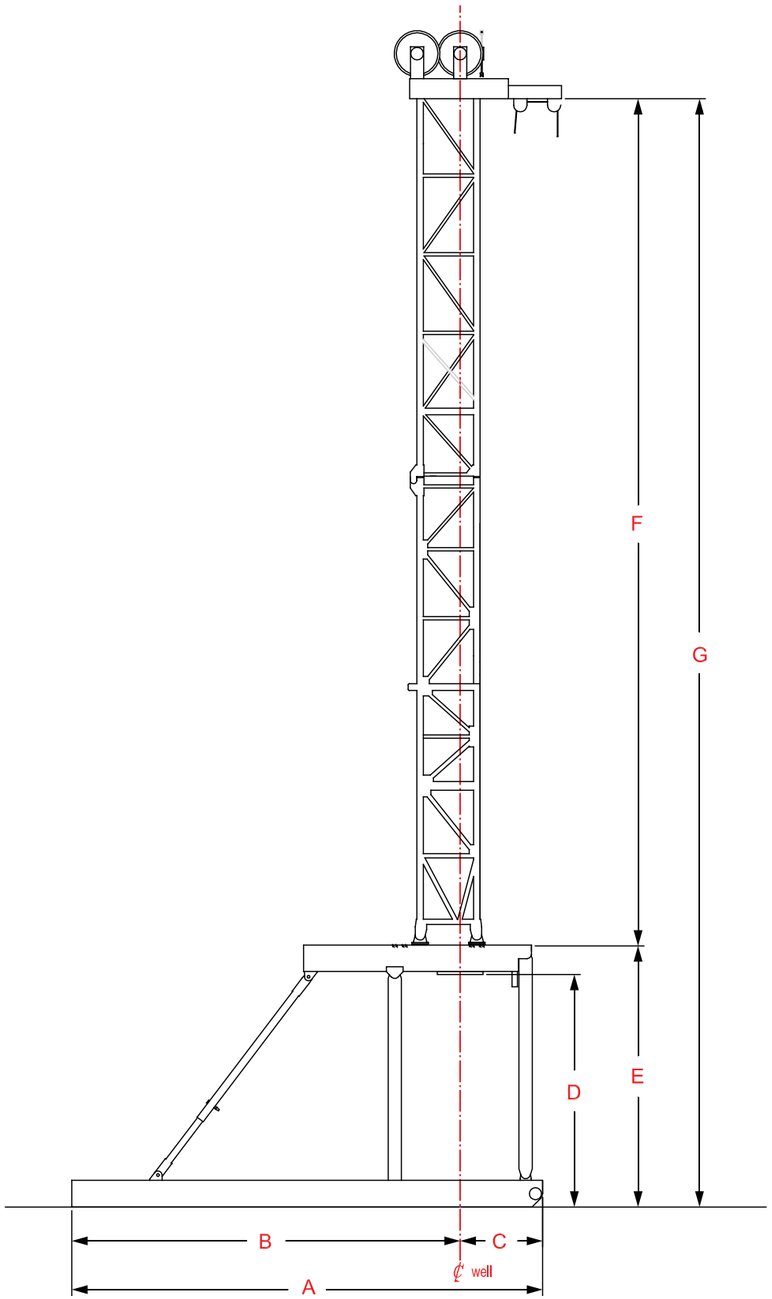
Dimensions

Velocity Series	units	A	B	C	D
Rapid Rig	ft/in	36'-10"	30'-06"	6'-4"	18'-0"
	meters	11.23	9.30	1.93	5.49
Vertical Slant (VSR)	ft/in	20'-6"	19'-4"	1'-2"	12'-6"
	meters	14.22	10.41	3.81	5.49
	units	**E**	**F**	**G**	**H**
Rapid Rig	ft/in	20'-0"	80'-0"	100'-0"	167'-0"
	meters	6.10	24.38	30.48	50.9
Vertical Slant (VSR)	ft/in	14'-0" or 20'-0"	76'-0"	90'-0" or 96'-0"	167'-0" to 177'-0"
	meters	6.71	25.91	41.45	48.16

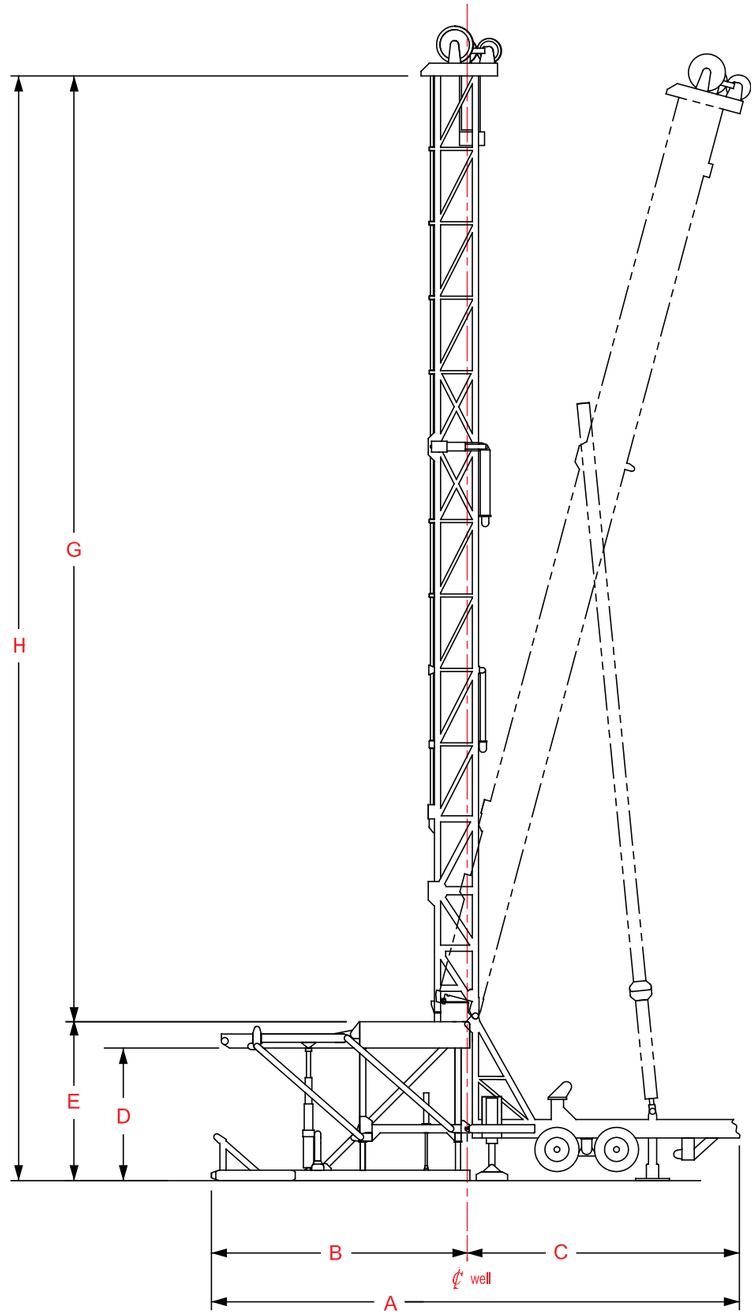
Conventional Substructures and Drilling Masts — Velocity Series

Rig Model	units	Rapid Rig	Vertical Slant (VSR)
Hook Capacity	ton	250	100 or 150
	metric ton	226.79	90.71 or 136.07
Mast	type	Telescopic	Telescopic
Mast Height	ft/in	80'-0"	75'-4
	m	24.38	23.16
Base Width	ft/in	7'-0"	6'-4"
	m	2.13	1.93
Raising Method	type	Cylinder Raised	Cylinder Raised
Drawworks	model (# of lines)	SSGD-250 (8)	D700AC (6)
Substructure	type	Slingshot Cylinder	Swing-up, Box-in-Box
Casing Capacity	lb	500000	280000
	ton	250	140
	metric ton	226	127
Floor Height	ft/in	20'-0"	14'-0" or 20'-0"
	m	6.1	4.2 or 6.1
Cellar/Clearance Height	ft/in	18'-0"	12'-6" or 18'-0"
	m	5.4	3.8
Drill Floor Opening	in	37½"	27½"
Standard Crown Sheave Groove	in	1¼"	1⅛"
Sheaves on Cluster*	#	3	2

Fastline and Deadline sheaves not included



Rapid Rig



Slant Rig

rig@nov.com
nov.com

Steel Toe™ Walking System

*For reference only, please contact your local sales contact for more information.

Description

Spend less time rigging up and down by simply, and safely, walking to your next well. Our innovative Steel Toe™ walking system moves your rig while keeping critical equipment stationary or mounted in place and ready for the next well. Wireless controls ensure safe operations by allowing your personnel to stay at safe distances during moves. We configure the system, maximizing the effectiveness of your operations. The system consists of four (4) lift and slide walking feet, modifications to the substructure and system controls. The integrated cable management system, gravity mud return, high pressure piping extensions and choke reconfigurations integrate your backyard for full functionality.

Value Added Benefits

- Reduced release-to-spud and required crane time
- Customized installation and product offerings
- Ability to walk with a full-rated setback
- Capability to change direction and walk along the X or Y axis
- Allows rig to walk in 45° increments and spin
- Ability to leave rig walkers installed in the Ideal™ Rig substructure base boxes during pad-to-pad rig moves

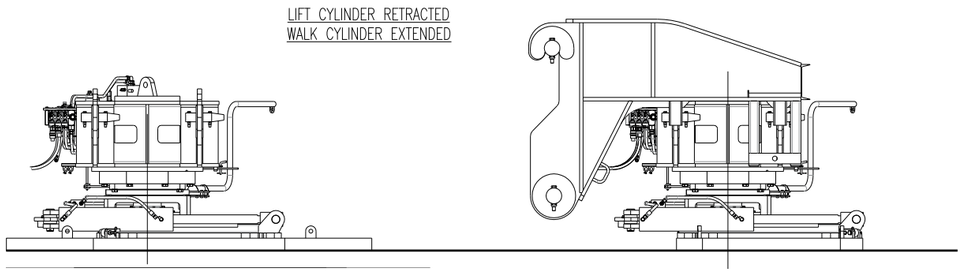
Key Components

- Steel Toe 1000 walking feet
- BOP beams and hoists to support
- BOP stack while walking
- Flowline manifold or catch and scalping tank
- High pressure piping for mud
- Festoon cable management system
- System controls options: wireless, remote, tethered back-up power or manual hydraulic controls
- Structural modifications
- Powered by rig HPU

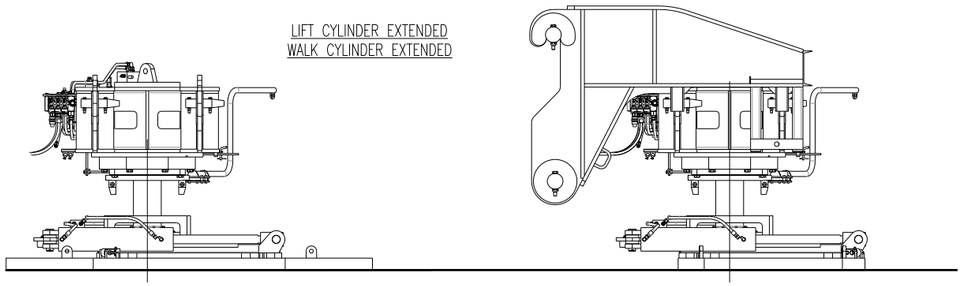
Technical Specifications	
Horizontal system total stroke	24 inches
Effective vertical lifting stroke	7 inches
Clearance under substructure*	3 inches
Clearance under foot**	3 inches
Number of skidding cylinders	48
Number of lifting cylinders	4
Number of bearing pads	4
Maximum walking distance	120 feet

*when fully extended and includes substructure deflection
**when fully retracted

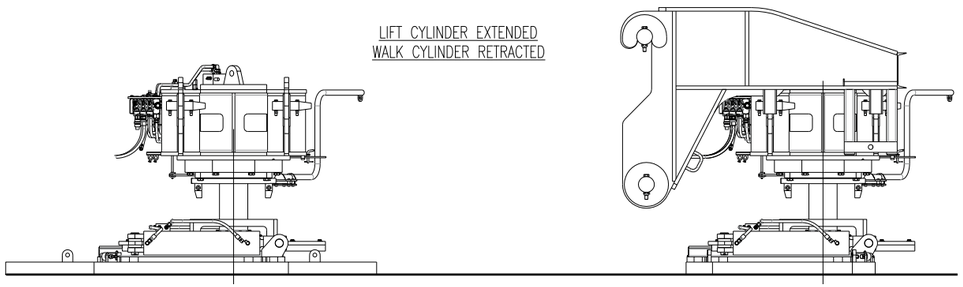
Starting Position



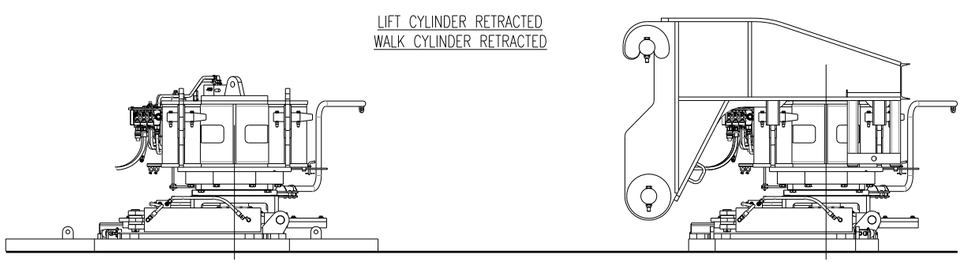
Substructure Raised



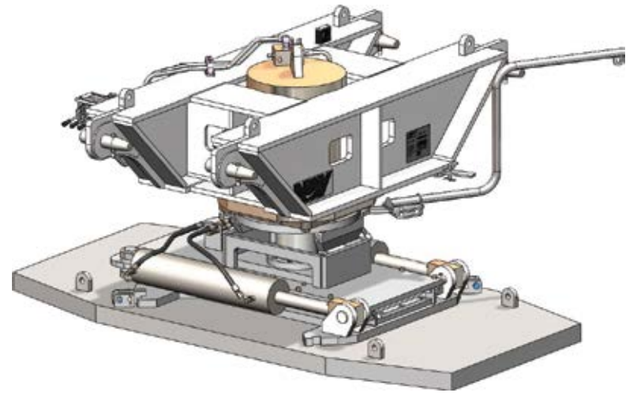
Travel Along Rollers



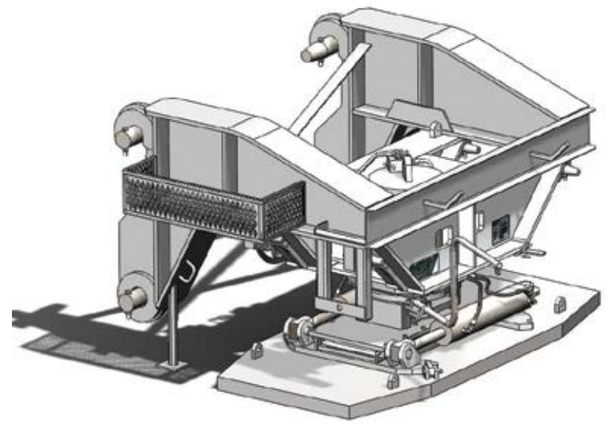
Substructure Lowered



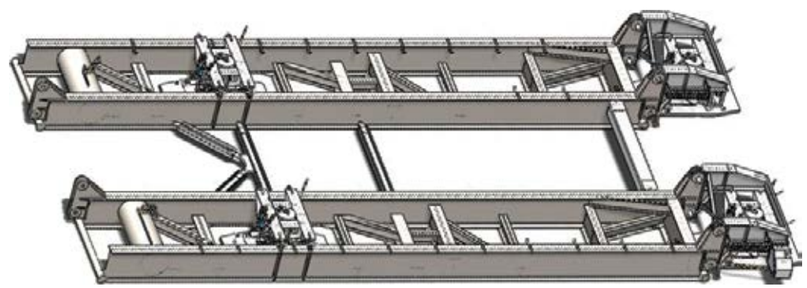
Rear Steel Toe



Front Steel Toe



Ideal™ Rig Application



rig@nov.com nov.com

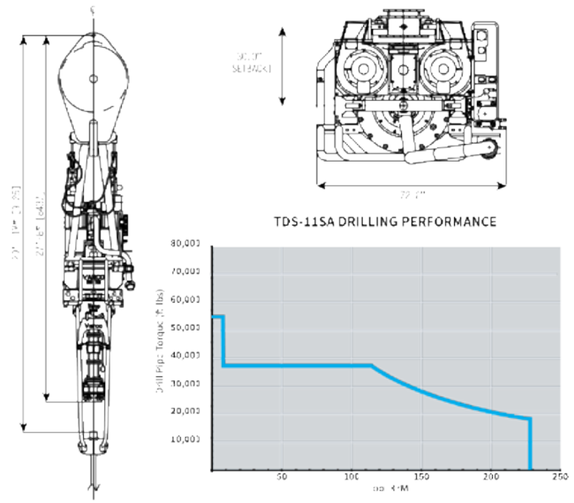
Drill Floor Equipment

10. Onshore Top Drives
11. BX-Elevators
12. X-Series Manual Side Door Elevators
13. Manual Single Joint Elevators
14. Elevator Spider and FMS Tool
15. Power Slips
16. Rotary Tables
17. High Pressure Manifolds
18. Onshore Iron Roughnecks
19. Stand Transfer Vehicle (STV) & Pipecat

NOV Rig Technologies

*For reference only, please contact your local sales contact for more information.

TDS-11SA

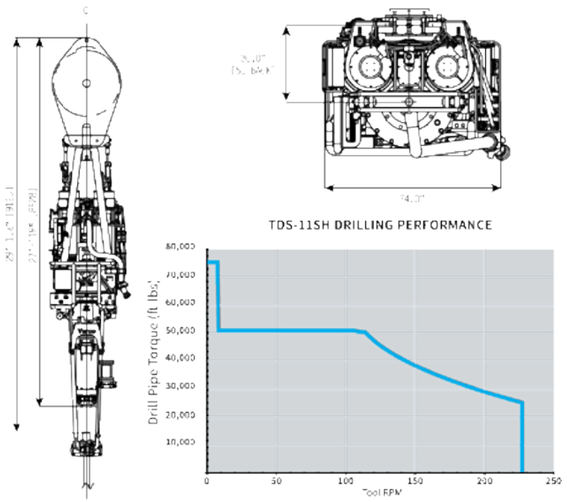


The TDS-11SA sets the standard for dependability, performance and quality. Delivering 500 tons of hoisting capacity, 800 horsepower and 37,100 ft-lbs of continuous drilling torque, the effectiveness and established reputation of the top drive is unmatched within the industry. Rooted in the expertise of Varco, Hydralift, and National Oilwell, the TDS-11SA is the largest-selling single design in the history of top drives since their introduction in 1997.

Technical Specifications	
Motor Type	Baldor Reliance AC Induction Motors
Horsepower Rating	2 x 400 HP
TDS Working Height	19 ft (5,791 mm)
Weight	28,000 lb (12,700 kg)
TRANSMISSION	
Gear Ratio	10.5:1
DRILLING PARAMETERS	
Max Speed	228 RPM
Max Cont. Torque	37,100 ft-lb (50,301 N-m)
Speed @ Max Cont. Torque	110 rpm
Max Breakout Torque	Maximum Makeup Torque
Max Makeup Torque	55,000 ft-lb (74,570 N-m)
Static Lock Brake	39,000 ft-lb (52,877 N-m)
RATING CAPACITIES	
Hoisting and Rotating	500 ton (453,592 kg)
Water Course	3 in (76.2 mm)
Washpipe Packing	7,500 psi (517 bar)
Pipe Handler	PH-75
Breakout Torque Capacity	75,000 ft-lb (101,686 N-m)
Drill Pipe Range	3½ in – 6⅝ in (88.9 mm – 168.2 mm)
Connection OD	4 in – 8½ in (101.6 mm – 215.9 mm)
IBOP Pressure Rating	15,000 psi (1,034 bar)
Upper IBOP	6⅝ in API Reg. RH Box (remote operated)
Lower IBOP	6⅝ in API Reg. RH Pin/Box (manual)
Rotation/Orientation	360°/Unlimited
OTHER	
Cooling System	Local Blower
Hydraulic Power	Onboard
Temperature Range	-40°C to +55°C (-40°F to +131°F)*
Casing Running Tool Ready	Optional
Elevator Links	250, 350 and 500 ton API

- 800 HP
- 500 ton API-8C rated hoisting capacity
- 37,100 ft-lb continuous drilling torque at 110 RPM
- 55,000 ft-lb makeup torque
- Temperature range: -40°C to 55°C
- Available software enhancements:
- SoftSpeed II™
- Twister™
- Monkey Board Collision Warning System

TDS-11SH

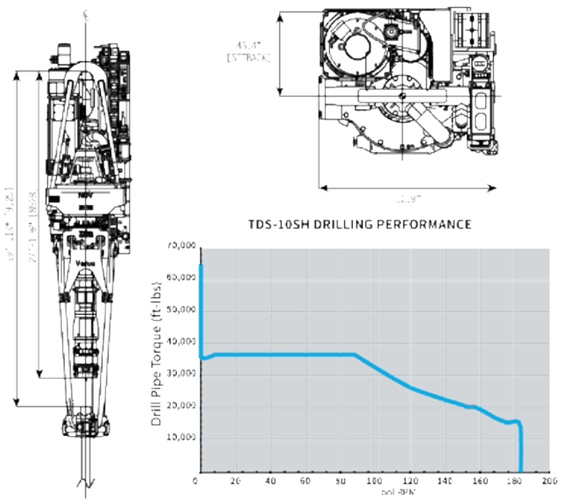


Combining the TDS-11SA top drive design, which is the largest-selling single design in the history of top drives, with added power density and torque, the TDS-11SH is the most powerful top drive of its size. This means faster and deeper drilling, both vertically and horizontally, to help you reach your payload in even the most demanding formations. With the ability to interface with automatic control systems and various software enhancement options, the TDS-11SH also puts safety and efficiency at the forefront of your operations.

Technical Specifications	
Motor Type	Baldor Reliance AC Permanent Magnet Motors
Horsepower Rating	2 x 550 HP
TDS Working Height	19 ft (5,791 mm)
Weight	28,000 lb (12,700 kg)
TRANSMISSION	
Gear Ratio	10.6:1
DRILLING PARAMETERS	
Max Speed	228 RPM
Max Cont. Torque	51,000 ft-lb (69,146 N-m)
Speed @ Max Cont. Torque	125 RPM
Max Breakout Torque	75,000 ft-lb (101,686 N-m)
Max Makeup Torque	62,500 ft-lb (84,738 N-m)
Static Lock Brake	50,000 ft-lb (67,790 N-m)
RATING CAPACITIES	
Hoisting and Rotating	500 ton (453,592 kg)
Water Course	3 in (76.2 mm)
Washpipe Packing	7,500 psi (517 bar)
Pipe Handler	PH-75
Breakout Torque Capacity	75,000 ft-lb (101,686 N-m)
Drill Pipe Range	3½ in – 6⅝ in (88.9 mm – 168.2 mm)
Connection OD	4 in – 8½ in (101.6 mm – 215.9 mm)
IBOP Pressure Rating	15,000 psi (1,034 bar)
Upper IBOP	6⅝ in API Reg. RH Box (remote operated)
Lower IBOP	6⅝ in API Reg. RH Pin/Box (manual)
Rotation/Orientation	360°/Unlimited
OTHER	
Cooling System	Local Blower
Hydraulic Power	Onboard
Temperature Range	-40°C to +55°C (-40°F to +131°F)
Casing Running Tool Ready	Yes
Elevator Links	250, 350 and 500 ton API

- 1,100 HP
- 500 tons rotating and hoisting capacity
- 51,000 ft-lb continuous drilling torque at 125 RPM
- 75,000 ft-lb breakout torque
- Temperature range: -40°C to 55°C
- Available software enhancements: SoftSpeed II™ , Twister™, Monkey Board Collision Warning System

TDS-10SH

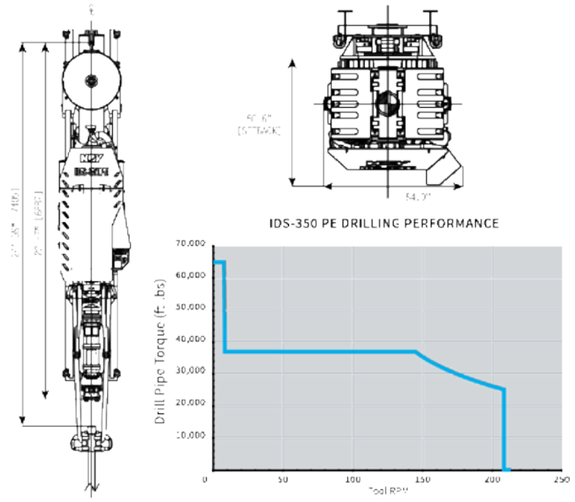


The CE-compliant TDS-10SH is a portable top drive designed for land-based drilling operations. It is compact enough to operate safely in a standard 136-ft mast while also providing 250 tons of hoisting capacity. The portable design means that rig-up and rig-down operations take only a few hours. The top drive can also easily integrate into existing rigs with minimal cost and rig modification.

Technical Specifications	
Motor Type	Baldor Reliance AC Induction Motors
Horsepower Rating	1 x 400 HP
TDS Working Height	15.3 ft (4,663)
Weight	18,000 lb (8,164 kg)
TRANSMISSION	
Gear Ratio	13:1:1
DRILLING PARAMETERS	
Max Speed	182 RPM
Max Cont. Torque	22,288 ft-lb (30,218 N-m)
Speed @ Max Cont. Torque	85 rpm
Max Breakout Torque	55,000 ft-lb (74,569 N-m)
Max Makeup Torque	42,680 ft-lb (57,866 N-m)
Static Lock Brake	50,000 ft-lb (67,790 N-m)
RATING CAPACITIES	
Hoisting and Rotating	250 ton (226,796 kg)
Water Course	3 in (76.2 mm)
Washpipe Packing	7,500 psi (517 bar)
Pipe Handler	PH-55
Breakout Torque Capacity	55,000 ft-lb (74,569 N-m)
Drill Pipe Range	2⅞ in – 5 in (73 mm – 127 mm)
Connection OD	4 in – 6⅝ in (101.6 mm – 168.2 mm)
IBOP Pressure Rating	15,000 psi (1,034 bar)
Upper IBOP	6⅝ in API Reg. RH Box (remote operated)
Lower IBOP	6⅝ in API Reg. RH Pin/Box (manual)
Rotation/Orientation	360°/Unlimited
OTHER	
Cooling System	Local Blower
Hydraulic Power	Onboard
Temperature Range	-40°C to +40°C (-40°F to +104°F)
Casing Running Tool Ready	Optional
Elevator Links	250 ton API

- 400 HP
- 2500 tons rotating and hoisting capacity
- 22,288 ft-lb continuous drilling torque at 85 RPM
- 55,000 ft-lb breakout torque
- Temperature range: -40°C to +40°C

IDS-350PE



The IDS-350PE (Portable Enhanced) integrated drilling system is the first permanent magnet motor top drive from NOV. The machine incorporates a modular design, durability, and ease of operation designed to greatly enhance drilling performance. The permanent magnet's high power density coupled with proven advantages in AC drilling technology allow for drilling rigs to incorporate this improved performance into smaller profile rigs with minimal or no impact.

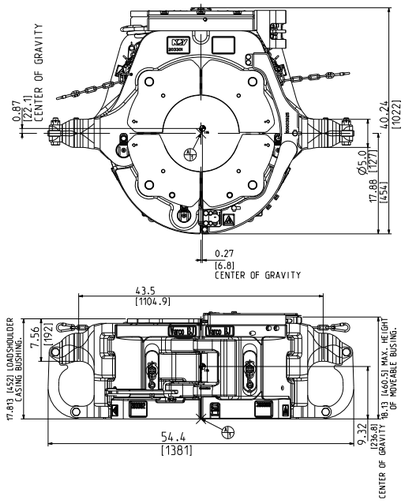
Technical Specifications	
Motor Type	Baldor Reliance AC Permanent Magnet Motors
Horsepower Rating	1 x 1,000 HP
TDS Working Height	20.8 ft (6,339 mm)
Weight	33,000 lb (14,968 kg)
TRANSMISSION	
Gear Ratio	12.6:1
DRILLING PARAMETERS	
Max Speed	212 RPM
Max Cont. Torque	37,000 ft-lb (50,165 N-m)
Speed @ Max Cont. Torque	145 RPM
Max Breakout Torque	65,000 ft-lb (88,128 N-m)
Max Makeup Torque	60,000 ft-lb (81,349 N-m)
Static Lock Brake	55,000 ft-lb (74,569 N-m)
RATING CAPACITIES	
Hoisting and Rotating	350 ton (317,514 kg)
Water Course	3 in (76.2 mm)
Washpipe Packing	7,500 psi (517 bar)
Pipe Handler	PH-65
Breakout Torque Capacity	65,000 ft-lb (88,128 N-m)
Drill Pipe Range	3½ in – 6⅝ in (88.9 mm – 168.2 mm)
Connection OD	4 in – 8½ in (101.6 mm – 215.9 mm)
IBOP Pressure Rating	15,000 psi (1,034 bar)
Upper IBOP	6⅝ in API Reg. RH Box (remote operated)
Lower IBOP	6⅝ in API Reg. RH Pin/Box (manual)
Rotation/Orientation	360°/Unlimited
OTHER	
Cooling System	Remote Water Cooling
Hydraulic Power	HPU Required
Temperature Range	-40°C to +55°C (-40°F to +131°F)
Casing Running Tool Ready	Yes
Elevator Links	250 and 350 ton API

- 1,000 HP
- 350 tons rotating and hoisting capacity
- 33,000 ft-lb continuous drilling torque at 145 RPM
- 65,000 ft-lb breakout torque
- Temperature range: -40°C to +55°C

rig@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

BX3™

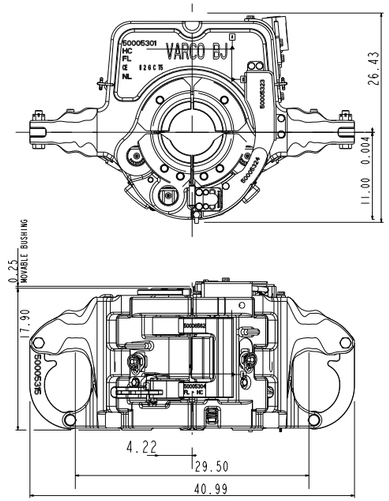


The BX 3, 4, and 5 elevators improve both rig safety and efficiency. Since the introduction of the BX 1 and 2 elevators in 1996, our engineers have continuously strived to improve the operations reliability and safety of its design, resulting in the present BX 3, 4, and 5 design.

- One door bushing is spring loaded with linkage connecting it to a lockin pin
- Rotator for easier handling
- Hydraulically actuated elevator
- Hydraulic cylinders
- Quick and easy change of changeable bushings
- Trigger mechanism

Technical specifications	
Actuation	Hydraulic
Control system	Automatic remote controlled (stand-alone control panel or driller)
Dimension LxWxH	40.24" x 54.40" x 18.06"
Weight	2,445 lbs
Tubular types	Casing, drill collar (plain)
Tubular size range (slips)	9⅝" to 20"
Changing slips	Manually
Load rating	Up to 350 sTon
Power down force	N/A
Req. pressure	2,000 - 2,500 psi (hydraulic)
Flow rate	5 to 7 gpm
Ambient temp. range	-4°F up to 131°F (-20°C up to +55°C)
Req. crew to operate	1
Manpower interfering	No
Interlocking	Yes
Greasing	Hand
BX-closed signal confirmation	Yes
Link size	2¼", 3½"
Use of rotator	Yes
API	8C
CE	Yes
ATEX	Yes

BX4-35™

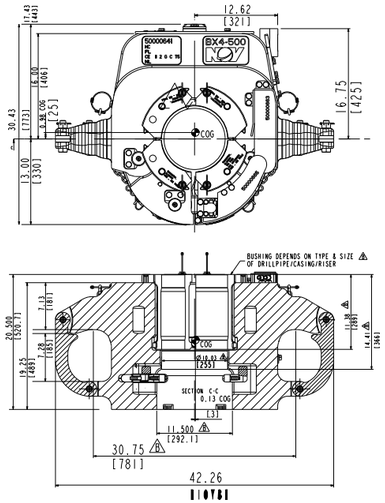


The BX 3, 4, and 5 elevators improve both rig safety and efficiency. Since the introduction of the BX 1 and 2 elevators in 1996, our engineers have continuously strived to improve the operations reliability and safety of its design, resulting in the present BX 3, 4, and 5 design.

- Rotator for easier handling
- Hydraulically actuated elevator
- Hydraulic cylinders
- Quick and easy change of changeable bushings
- Trigger mechanism

Technical specifications	
Actuation	Hydraulic
Control system	Automatic remote controlled (stand-alone control panel or driller)
Dimension LxWxH	26.43" x 40.99" x 17.90"
Weight	1,600 lbs
Tubular types	Drill pipe, casing, drill collar (plain & zip lift), tubing, square shoulder, riser
Tubular size range (slips)	2⅜" to 7¼"
Changing slips	Manually
Load rating	Up to 350 sTon
Power down force	N/A
Req. Pressure	2,000 - 2,500 psi (hydraulic)
Flow rate	5 to 7 gpm
Ambient temp. range	-4°F up to 131°F (-20°C up to +55°C)
Req. crew to operate	1
Manpower interfering	No
Interlocking	Yes
Greasing	Hand
BX-closed signal confirmation	Yes
Link size	2¼", 3½"
Use of rotator	Yes
API	8C
CE	Yes
ATEX	Yes

BX4-50™



The BX 3, 4, and 5 elevators improve both rig safety and efficiency. Since the introduction of the BX 1 and 2 elevators in 1996, our engineers have continuously strived to improve the operations reliability and safety of its design, resulting in the present BX 3, 4, and 5 design.

- One door bushing is spring loaded with linkage connecting it to a locking pin
- Rotator for easier handling
- Hydraulically actuated elevator
- Hydraulic cylinders
- Quick and easy change of changeable bushings
- Trigger mechanism

Technical specifications	
Actuation	Hydraulic
Control system	Automatic remote controlled (stand-alone control panel or driller)
Dimension LxWxH	30.43" x 42.26" x 20.50"
Weight	2,278 lbs
Tubular types	Drill pipe, casing, drill collar (plain & zip lift), tubing, square shoulder, riser
Tubular size range (slips)	2⅜" to 9¾"
Changing slips	Manually
Load rating	Up to 500 sTon
Power down force	N/A
Req. pressure	2,000 - 2,500 psi (hydraulic)
Flow rate	5 to 7 gpm
Ambient temp. range	-4°F up to 131°F (-20°C up to +55°C)
Req. crew to operate	1
Manpower interfering	No
Interlocking	Yes
Greasing	Hand
BX-closed signal confirmation	Yes
Link size	2¾", 4¾"
Use of rotator	Yes
API	8C
CE	Yes
ATEX	Yes

rig@nov.com
nov.com

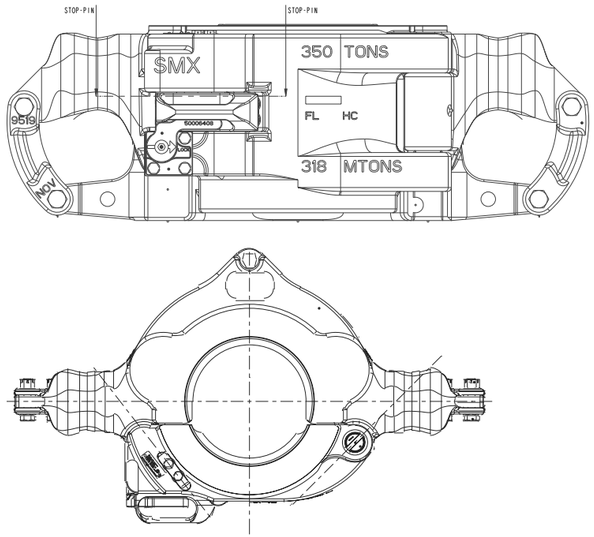
X-Series Manual Side Door Elevators

*For reference only, please contact your local sales contact for more information.

SMX

The X-series elevators handle all sizes of collar-type tubing, drill pipe and casing. The SMX has a patented latch & lock arrangement mounted on the elevator door. The handle protects the latch from accidental opening. Both latched operate from a single handle.

- 8C qualified
- For handling collar type casing, collary type tubing, and drill collars
- Tool is fit for manual operation
- Lock and unlock one-hand operation
- Latching/locking by closing door
- Latched and locked verification; separate action and incorporated in design
- Round ears for easy rotating in links
- Easy to rig up
- Hinge up bushings
- Lower link ears are 8C rated for 5 ton slings
- Handling grup on elevator back for easy handling
- Handling handle for link mount is avilable (part number 50006435); (optional; can also be used for other applications)
- SMX series (8 frames) replaces SLX, SSD and SX type elevators (15 frames)



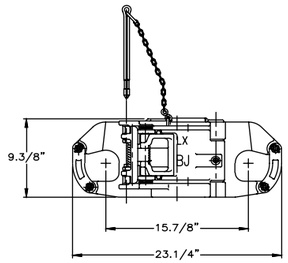
Technical Specfications

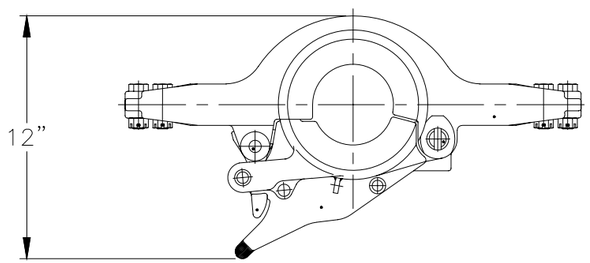
Load Rating	Size inches (mm)	Max. Weight lbs. (kg)	Link Size Min. In. (mm)	Link Size Max. In. (mm)
150 / 136	3.1/2 - 5.3/4 (88.9-146.1)	278 (126)	2.1/4 (57)	2.3/4(70)
250 / 227	6 - 13 (152.4-330.2)	563 (255)	2.1/4(57)	3.1/2(89)
350 / 318	9- 13.3/8(228.6- 339.7)	563 (255)	2.1/4(57)	3.1/2(89)
250 / 227	13.1/2 - 17.7/8(342.9-454.1)	679 (308)	2.1/4(57)	3.1/2(89)
250 / 227	18 - 24.1/2 (457.2-622.3)	902 (409)	2.1/4(57)	3.1/2(89)

SLX

The X-series elevators handle all sizes of collar-type tubing, drill pipe and casing. The SMX has a patented latch & lock arrangement mounted on the elevator door. The handle protects the latch from accidental opening. Both latched operate from a single handle.

- 8C qualified
- For handling collar type casing, collary type tubing, and drill collars
- Tool is fit for manual operation
- Lock and unlock one-hand operation
- Latching/locking by closing door
- Latched and locked verification; separate action and incorporated in design
- Round ears for easy rotating in links
- Easy to rig up
- Hinge up bushings
- Lower link ears are 8C rated for 5 ton slings
- Handling grup on elevator back for easy handling
- Handling handle for link mount is avilable (part number 50006435); (optional; can also be used for other applications)
- SMX series (8 frames) replaces SLX, SSD and SX type elevators (15 frames)





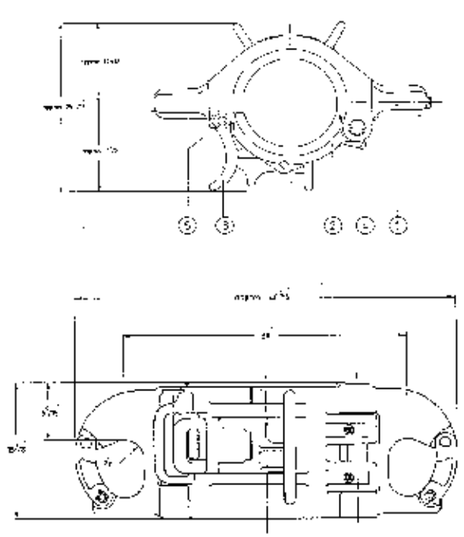
Technical Specifications

Load Rating	Size inches (mm)	Max. Weight lbs. (kg)	Link Size Min. In. (mm)	Link Size Max. In. (mm)
65/59	1.66 - 3.1/8 (42.2-79.4)	50 (23)	1.3/4 (44)	2.1/4 (57)
100/90	2.3/8- 6 (60.3-152.4)	145 (66)	1.3/4 (44)	2.3/4(70)
150 / 136	5.1/2 - 18.5/8 (139.7-473.1)	705 (320)	1.3/4 (44)	3.1/2 (89)
250 / 227	21.1/2-24.1/2 (546.1-622.3)	1208 (548)	1.3/4 (44)	3.1/2 (89)

SX

The X-series elevators handle all sizes of collar-type tubing, drill pipe and casing. The SMX has a patented latch & lock arrangement mounted on the elevator door. The handle protects the latch from accidental opening. Both latched operate from a single handle.

- 8C qualified
- For handling collar type casing, collary type tubing, and drill collars
- Tool is fit for manual operation
- Lock and unlock one-hand operation
- Latching/locking by closing door
- Latched and locked verification; separate action and incorporated in design
- Round ears for easy rotating in links
- Easy to rig up
- Hinge up bushings
- Lower link ears are 8C rated for 5 ton slings
- Handling grup on elevator back for easy handling
- Handling handle for link mount is avilable (part number 50006435); (optional; can also be used for other applications)
- SMX series (8 frames) replaces SLX, SSD and SX type elevators (15 frames)



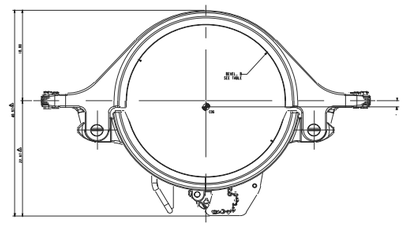
Technical Specifications

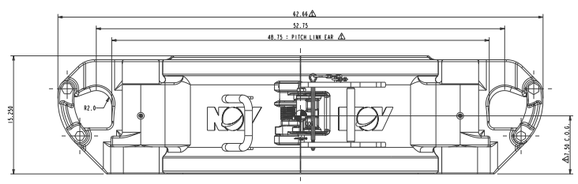
Load Rating	Size inches (mm)	Max. Weight lbs. (kg)	Link Size min in. (mm)	Link Size Max. in. (mm)
350/317	9.5/8- 16.3/4 (244.5-425.5	1200 (544)	2.1/4(57)	3.1/2 (89)
500/454	9.5/8-13.5/8 (244.5-346.1	1235(560)	2.3/4(70)	3.1/2(89)

SLX-DD

The X-series elevators handle all sizes of collar-type tubing, drill pipe and casing. The SMX has a patented latch & lock arrangement mounted on the elevator door. The handle protects the latch from accidental opening. Both latched operate from a single handle.

- 8C qualified
- For handling collar type casing, collary type tubing, and drill collars
- Tool is fit for manual operation
- Lock and unlock one-hand operation
- Latching/locking by closing door
- Latched and locked verification; separate action and incorporated in design
- Round ears for easy rotating in links
- Easy to rig up
- Hinge up bushings
- Lower link ears are 8C rated for 5 ton slings
- Handling grup on elevator back for easy handling
- Handling handle for link mount is avilable (part number 50006435); (optional; can also be used for other applications)
- SMX series (8 frames) replaces SLX, SSD and SX type elevators (15 frames)





Technical Specifications

Load Rating	Size inches (mm)	Max. Weight lbs. (kg)	Link Size min in. (mm)	Link Size Max. in. (mm)
220/225	18-30 (457.2-792)	1820 (826)	1.3/4(44)	3.1/2 (89)

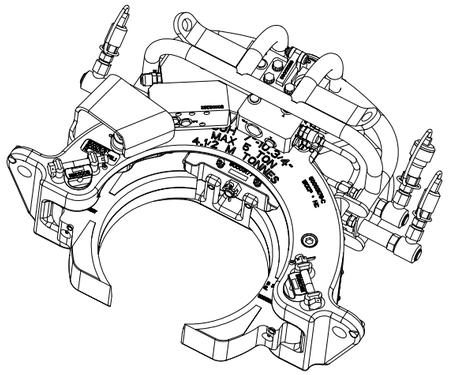
rig@nov.com

nov.com

Manual Single Joint Elevators

*For reference only, please contact your local sales contact for more information.

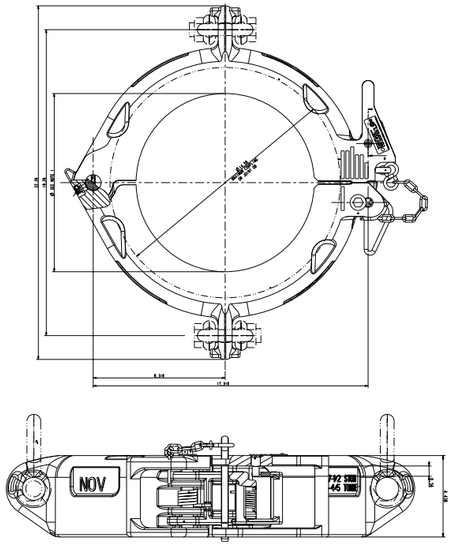
SJH



The SJH horizontal pick up elevator is designed to pick up tubulars lying flat on a surface without having to lift the tubulars prior to closing the elevator. The elevator is capable of lifting drill pipe, recessed/zip lift drill collars and casing. It will handle single joints of pipe straight from cantilever to off -line stand building systems.

Load Rating (sTon/ Tonne)	Size inches (mm)	Pipe type	Appr. weight (lbs/kg) (incl. jaws)
5 / 4.5	2.3/8 – 4.1/2 (60.3-114.3)	Tbg & Dp	100 / 45
5 / 4.5	4.1/2 – 7.5/8 (114.3-193.7)	Tbg & Dp	111 / 51
5 / 4.5	7 – 10.3/4 (177.8-273.1)	Csg	132 / 60

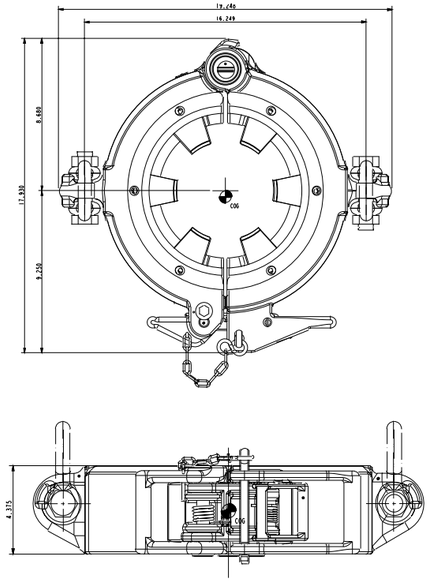
SJL



SJL and SPL single-joint, center-latch elevators are designed to replace unsafe rope slings for hoisting collar-type pipe into position. The SJL 90° elevator enables the crew to handle pipe properly, help avoid damage to pipe threads and reduce the chances of accident or injury. The SPL elevator is the same as the SJL elevator except that the SPL elevator is designed for use on tapered pipe, conforming to API specifications for extreme line casing.

Load Rating (sTon/ Tonne)	Size Range inches (mm)	Max. Weight Range lbs. (kg.)
5 / 4.5	2.7/8- 13.1/2 (60.3 - 114.3)	45-342.9 (20-55)
7.5/ 6.8	12.7/8 – 30 (355.6 - 762)	121-404 (55-183.3)

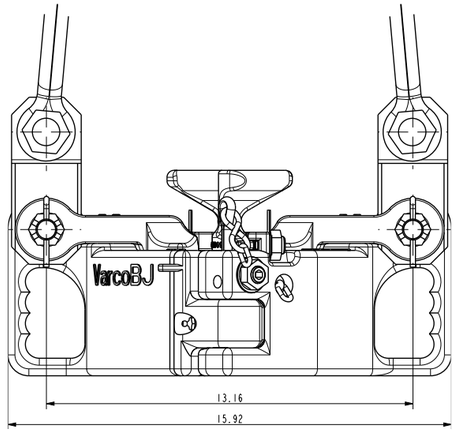
SPL

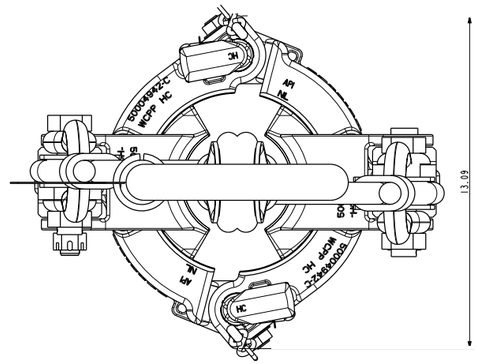


SJL and SPL single-joint, center-latch elevators are designed to replace unsafe rope slings for hoisting collar-type pipe into position. The SJL 90° elevator enables the crew to handle pipe properly, help avoid damage to pipe threads and reduce the chances of accident or injury. The SPL elevator is the same as the SJL elevator except that the SPL elevator is designed for use on tapered pipe, conforming to API specifications for extreme line casing.

Type	Load Rating (sTon/ Tonne)	Size Range inches (mm)	Max. Weight Range lbs. (kg.)
SPL 5	5 / 4.5	2.7/8- 7.5/8 (60.3 - 114.3)	77-108 (35-49)
SPL 12	5 / 4.5	2.3/8-5 (60.3-127)	86 (39)
SPL 18	5 / 4.5	2.3/8-6.5/8 (60.3-168.3)	79-94 (36-49)

DSJX Heavy Duty



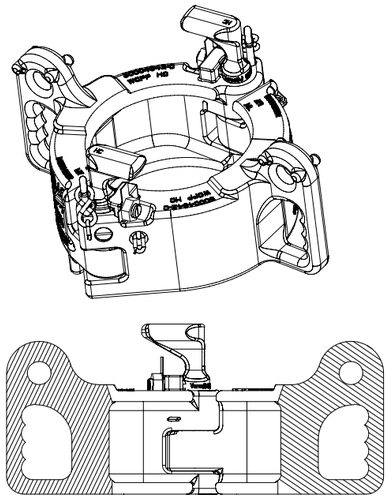


The D-SJX is the heavy duty version of the SJX, capable of handling doubles and triples up to 12 STon / 10.9 Tonne.

- High capacity single joint - 12 sTons (106 kN) API rating
- DSJX is designed for running doubles or triples during off-line standbuilding
- DSJX used special inserts to handle a range of pipe types
- Elevator can handle drill pipe and square shoulder pipe

Load Rating (sTon/Tonne)	Size Range Inches (mm)	Max. Weight Range lbs. (kg.)
12/11	3.1/2-7.1/2 (88.9-190.5)	79-89 (36-40)

SJX



The SJX single joint elevator is designed for running single joints of tubing and casing from V-door to well center. It is double hinged for use with the CRT Casing Running Tool, or any other stabberless operation. Ergonomically designed handles with cast on stop pins prevent the lifting sling shackles from pinching hands. Suitable for loads up to 5 sTon / 4.5 Tonne.

- Designed for pick-up and running single joints of tubing and casing from v-door to well center
- 2-way access due to double hinge pin arrangement
- Double hinged for use with CRT Casing Running Tool
- No loose parts, as hinge pins are contained within the body halves
- Clear visual gripping points for safe operation
- Ergonomically deisnged handles, with cast on stop pins, prevent the lifting sling shackles from pinching hands and prevent shackles from getting stuck underneath the casing coupling while hoisting.
- The positon of lifting ears prevents lifting tubing and casing with the SJX upside down.
- Verification "latched-and-locked" safety pin
- Lightweight for easy manual handling; on the average, 45% lighter than other single joints
- Designed and qualified accoring to API 8C rules
- Rubular sizes from 2 3/8'' to 14''; information on larger sizes is avialable upon request
- Rating of 5 tons

Load Rating (sTon/ Tonne)	Size Range Inches (mm)	Max. Weight Range lbs. (kg.)	Max. Weight Range (kg.)
5/4.5	4.1/2-10.3/4 (100.8-323.9)	37-67 (17-30)	17-30

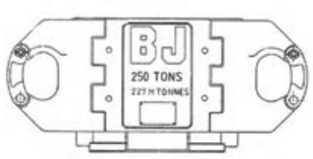
rig@nov.com

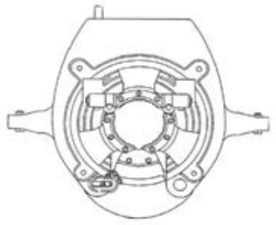
nov.com

Elevator/Spider and FMS Flush Mounted Slips

*For reference only, please contact your local sales contact for more information.

BJ-250



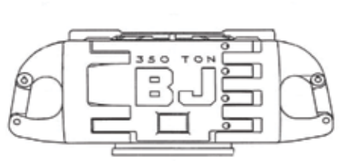


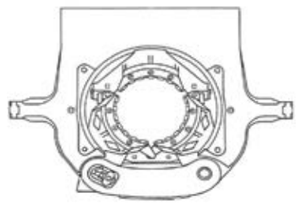
Description

The BJ-250 elevator/spider tool is designed for lifting and suspending tubular goods, from light tubing to heavy wall pipe and drill collars. The 250 sTon model is designed for medium to long strings of smaller casing. The main body of these units can be dressed as a casing elevator or as a spider. The upper unit is dressed as an elevator, using a bottom guide and a bell guide. The lower unit is dressed as a spider, using a top guide to aid in centering the casing. The unitized design of the slip assembly allows the tool to grip casing with uniform circumferential pressure, ensuring a safe hold while minimizing the possibility to damage the pipe. The unit is either manual or air operated. A double hinged door permits the unit to be rapidly installed on the casing or removed.

Technical Specifications	
Weight without slip assembly (lbs/kg)	2,043 / 927
Max weight slips set w/inserts (lbs/kg)	550 / 250
Casing size ranges (inches)	2⅜ up to 7⅝
Load rating (sTon/Tonne)	250 / 226
Normal operating pressure (psi/kPa)	85 / 585
Max. operating pressure (psi/kPa)	125 / 861
Min. allowed ambient temperature	-4°F / -20°C
Max. allowed ambient temperature	131°F / 55°C

BJ-350



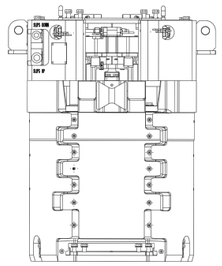


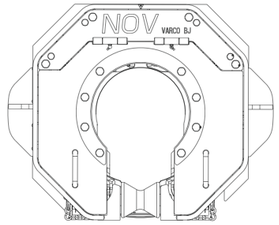
Description

The BJ-350 elevator/spider tool is designed for lifting and suspending tubular goods, from light tubing to heavy wall pipe and drill collars. The main body of these units can be dressed as a casing elevator or a spider. The upper unit is dressed as an elevator, using a bottom guide and a bell guide. The lower unit is dressed as a spider, using a top guide to aid in centering the casing. The unitized design of the slip assembly allows the tool to grip casing with uniform circumferential pressure, ensuring a safe hold while minimizing the possibility to damage the pipe. The unit is either manual or air operated. A double hinged door permits the unit to be rapidly installed on the casing or removed.

Technical Specifications	
Weight without slip assembly (lbs/kg)	3,500 / 1,587
Max weight slips set w/inserts (lbs/kg)	650 / 295
Casing size ranges (inches)	4½ up to 13⅝
Load rating (sTon/Tonne)	350 / 317
Normal operating pressure (psi/kPa)	85 / 585
Max. operating pressure (psi/kPa)	125 / 861
Min. allowed ambient temperature	-4°F / -20°C
Max. allowed ambient temperature	131°F / 55°C

FMS275



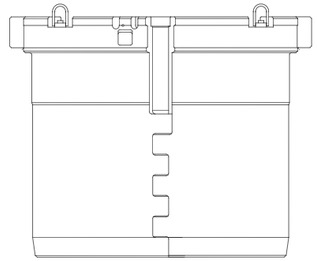


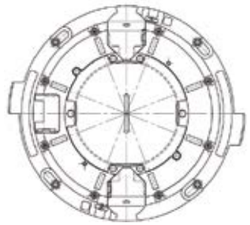
Description

The FMS275 is a hydraulic operated near-flush mounted slip for running completion strings eliminating the need for scaffolding. It enables rigs to handle completion strings and casing up to 7⅝" in diameter with large umbilicals or control lines. The unit is a companion tool to the "BJ" style 250 sTon elevator/spider. The slip power down force generated allows the FMS to take the torque reaction of the tong when the string weight is not sufficient to resist rotating, and it eliminates the need for a manual tong. The powered down slips allow the first joint of casing to be run with the FMS. The replaceable slip and insert carriers are set/raised by the operator using remote controls.

Technical Specifications	
Weight without slip assembly (lbs/kg)	2,755 / 1,250
Weight FMS with slips and guides (lbs/kg)	3,300 / 1,497
Pipe size ranges (inches)	2⅜ up to 7⅝
Load rating (sTon/Tonne)	250 / 226
Rotary size (inches)	27.5 (or reduced from 37.5)
Min. inlet pressure (psi/kPa)	1,500 / 10,342
Normal operating pressure (psi/kPa)	2,000 / 13,790
Max. operating pressure (psi/kPa)	2,500 / 17,237
Recommended inlet pressure slips up (psi/kPa)	500 - 750 / 3,447 - 5,171
Max pressure slips up (psi/kPa)	1,000 / 6,895
Min. pressure differential between pressure line and return line (psi/kPa)	200 / 1,378
Max allowed pressure in return line (psi/kPa)	200 / 1,378
Applied max. back-up torque @ 2,500 psi / 17,237 kPa (ft/lbs/Nm)	14,370 / 19,483

FMS375



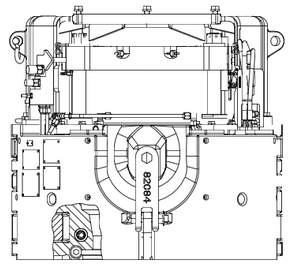


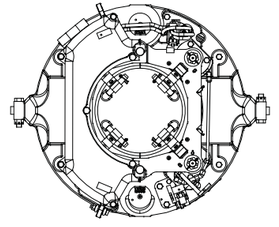
Description

The FMS375 is mounted flush with the rig floor, allowing the casing connection height to be lowered 1 meter (3 ft.), thus eliminating the need for scaffolding. This gives the rig crew more room to work by removing the spider body from the top of the rig floor. The unit is designed to fit standard 37" rotary tables and can be used in combination with the 500 sTon 14" Varco type elevator spider. The slip power down force generated allows the FMS to take the torque reaction of the tong when the string weight is not sufficient to resist rotating, and it eliminates the need for a manual tong. The powered down slips allow the first joint of casing to be run with the FMS. The replaceable slip and insert carriers are set/raised by the operator using remote controls.

Technical Specifications	
Weight without slip assembly (lbs/kg)	5,392 / 2,446
Weight FMS with slips and guides (lbs/kg)	6,992 / 3,171
Pipe size ranges (inches)	4½ up to 14
Load rating (sTon/Tonne)	500 / 454
Rotary size (inches)	37.5
Min. inlet pressure (psi/kPa)	1,500 / 10,342
Normal operating pressure (psi/kPa)	2,000 / 13,790
Max. operating pressure (psi/kPa)	2,500 / 17,237
Recommended inlet pressure slips up (psi/kPa)	500 - 750 / 3,447 - 5,171
Max pressure slips up (psi/kPa)	1,000 / 6,895
Min. pressure differential between pressure line and return line (psi/kPa)	200 / 1,378
Max allowed pressure in return line (psi/kPa)	200 / 1,378
Applied max. back-up torque @ 2,500 psi / 17,237 kPa (ft/lbs/Nm)	40,000 / 54,232

Varco-500 14"



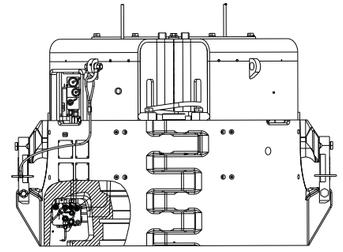


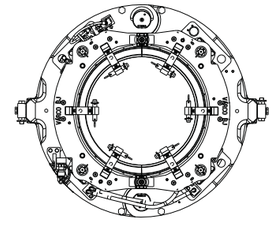
Description

The elevator/spider tool is designed for lifting and suspending tubular goods, from light tubing to heavy wall pipe and drill collars. The main body of these units can be dressed as a casing elevator or as a spider. The upper unit is dressed as an elevator, using a bottom guide and bell guide. The lower unit is dressed as a spider, using a top guide to aid in centering casing.

Technical Specifications	
Max weight slips set w/inserts (lbs/kg)	600 / 272
Load rating (sTon /Tonne)	500 / 454
Casing size range (inches)	4½ up to 14
MANUAL & PNEUMATIC ELEVATORS	
Weight without slip assembly (lbs/kg)	5,000 / 2,268
Normal operating pressure (psi/kPa)	85 / 585
Max. operating pressure (psi/kPa)	125 / 861
HYDRAULIC ELEVATORS	
Weight without slip assembly (lbs/kg)	5,392 / 2,446
Min. inlet pressure (psi/kPa)	1,500 / 10,342
Normal operating pressure (psi/kPa)	2,000 / 13,790
Max. inlet pressure (psi/kpa)	2,500 / 17,237
Recommended inlet pressure slips up (psi/kPa)	500 - 750 / 3,447 - 5,171
Max. pressure slips up (psi/kPa)	1,000 / 6,895
Max. pressure slips down (psi/kPa)	2,500 / 13,790
Min. pressure differential between pressure line and return line (psi/kPa)	200 / 1,378
Max. allowed pressure in return line (psi/kPa)	200 / 1,378

Varco-500 24½"





Description

The elevator/spider tool is designed for lifting and suspending tubular goods, from light tubing to heavy wall pipe and drill collars. The main body of these units can be dressed as a casing elevator or as a spider. The upper unit is dressed as an elevator, using a bottom guide and bell guide. The lower unit is dressed as a spider, using a top guide to aid in centering casing.

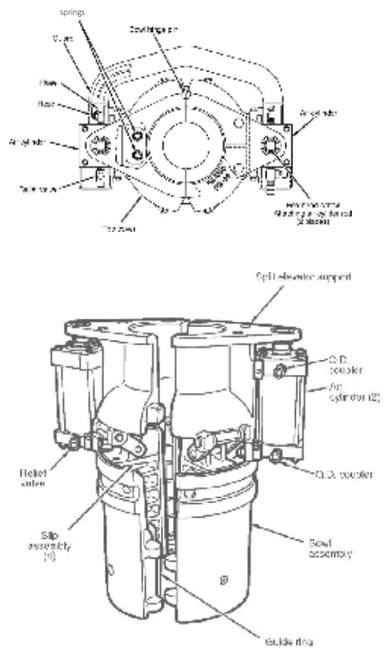
Technical Specifications	
Max weight slips set w/inserts (lbs/kg)	600 / 272
Load rating (sTon /Tonne)	500 / 454
Casing size range (inches)	16 up to 24½
MANUAL & PNEUMATIC ELEVATORS	
Weight without slip assembly (lbs/kg)	7,950 / 3,606
Normal operating pressure (psi/kPa)	85 / 585
Max. operating pressure (psi/kPa)	125 / 861
HYDRAULIC ELEVATORS	
Weight without slip assembly (lbs/kg)	9,500 / 4,275
Min. inlet pressure (psi/kPa)	1,500 / 10,342
Normal operating pressure (psi/kPa)	2,000 / 13,790
Max. inlet pressure (psi/kpa)	2,500 / 17,237
Recommended inlet pressure slips up (psi/kPa)	500 - 750 / 3,447 - 5,171
Max. pressure slips up (psi/kPa)	1,000 / 6,895
Max. pressure slips down (psi/kPa)	2,500 / 13,790
Min. pressure differential between pressure line and return line (psi/kPa)	200 / 1,378
Max. allowed pressure in return line (psi/kPa)	200 / 1,378

rig@nov.com

nov.com

*For reference only, please contact your local sales contact for more information.

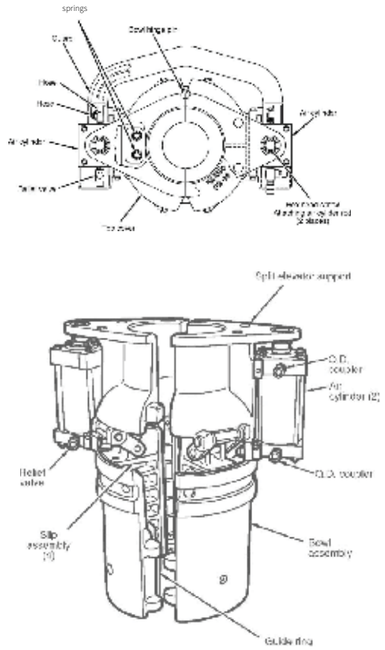
PS-15



*Model shown above is the PS-16 with air cylinders on the side. These are not found on the actual PS-15 model

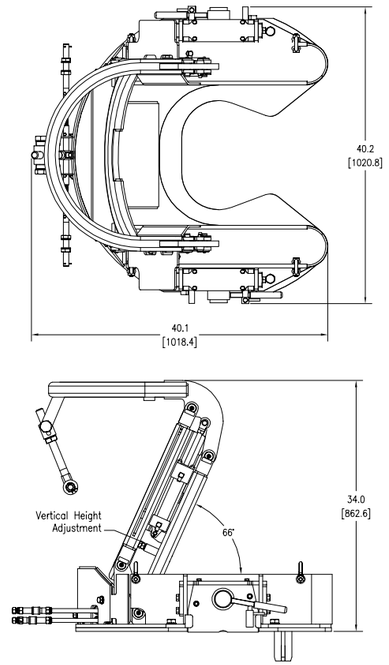
Technical Specifications	
Actuation	Spring
Control system	Manual
Dimension LxWxH	33" x 41.5"
Weight	1,040 lbs
Rotary size	Fits in NOV Pin Drive Master Bushing sizes: 27½", 37½", 49½"
Rotary configuration	Fits in Master Bushing
Tubular type	Drill pipe
Tubular size range (slips)	3½" to 5⅞"
Changing slips	Manually
Load rating	Up to 750 sTon
Backup torque	--
Centering device	--
Slip set back	--
Throat opening w/o slips	15"
Height above rig floor	Set: 11" Released: 19"
Required pressure	--
Flow rate	--
Ambient temperature range	-4°F up to 104°F (-20°C up to 45°C)
Required crew to operate	2-3
Manpower interfering	Yes
Interlocking	No
Greasing	Hand
Slip-set signal confirmation	No
Slip-up signal confirmation	No
Top cover	No
API	7K
CE	Yes
ATEX	N/A

PS-16



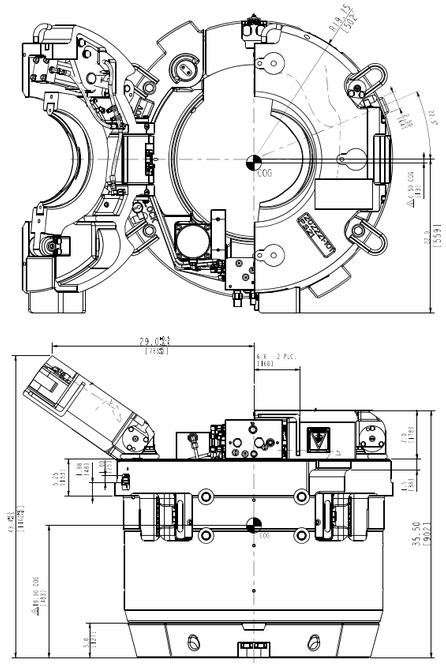
Technical Specifications	
Actuation	Air
Control system	Automatic remote controlled (hand or foot controlled)
Dimension LxWxH	32" x 48.4"
Weight	1,600 lbs
Rotary size	Fits in NOV Pin Drive Master Bushing sizes: 27½", 37½", 49½"
Rotary configuration	Fits in Master Bushing
Tubular types	Drill pipe
Tubular size range (slips)	3½" to 6⅞"
Changing slips	Manually
Load rating	Up to 750 sTon
Backup torque	--
Centering device	--
Slip set back	--
Throat opening w/o slips	16"
Height above rig floor	Set: 17.5" Released: 26"
Required pressure	90 psi (air)
Flow rate	--
Ambient temperature range	-4°F up to 104°F (-20°C up to 45°C)
Required crew to operate	1
Manpower interfering	No
Interlocking	Yes
Greasing	Hand
Slip-set signal confirmation	Yes
Slip-up signal confirmation	No
Top cover	No
API	7K
CE	Yes
ATEX	Yes

PSF



Technical Specifications	
Actuation	Electro-hydraulic
Control system	Automatic remote controlled (hand or foot controlled)
Dimension LxWxH	36.6" x 27.5"
Weight	365 lbs
Rotary size	Pin drive: 20½", 27½", 37½", (20" upon request) Square drive RT: 17½", 27½"
Rotary configuration	Fits in Master Bushing
Tubular types	Drill pipe
Tubular size range (slips)	2⅜" to 7"
Changing slips	Manually
Load rating	--
Backup torque	--
Centering device	--
Slip set back	--
Throat opening w/o slips	Depending on size bushing bowl
Height above rig floor	Set: 11.3" Released: 27.5"
Required pressure	600 psi (hydraulic)
Flow rate	3 gpm
Ambient temperature range	-4°F up to 104°F (-20°C up to 45°C)
Required crew to operate	1
Manpower interfering	No
Interlocking	No
Greasing	Hand
Slip-set signal confirmation	No
Slip-up signal confirmation	No
Top cover	No
API	N/A
CE	No
ATEX	No

PS-21



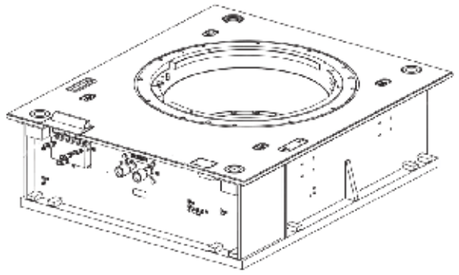
Technical Specifications	
Actuation	Hydraulic
Control system	Automatic remote controlled (control panel)
Dimension LxWxH	Ø 39.88" x 35.5"
Weight	5,600 lbs
Rotary size	Fits directly in rotary table, rotary size: 37½"
Rotary configuration	Fits in Oilwell/Wirth/Gardner Denver, Emsco, Ideco, Varco/National
Tubular type	Drill pipe, casing, drill collar, tubing
Tubular size range (slips)	2⅜" to 14"
Changing slips	Using a special tool to insure
Load rating	350 sTon
Backup torque	45,000 ft.lbs
Centering device	Comply
Slip set back	Comply
Throat opening w/o slips	21"
Height above rig floor	7"
Required pressure	2,300 - 2,500 psi (hydraulic)
Flow rate	10 gpm
Ambient temperature range	-4°F up to 104°F (-20°C up to 45°C)
Required crew to operate	1
Manpower interfering	No
Interlocking	Yes
Greasing	Automated
Slip-set signal confirmation	Yes
Slip-up signal confirmation	No
Top cover	Yes
API	7K
CE	Yes
ATEX	Yes

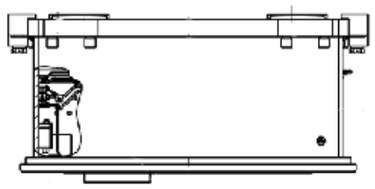
rig@nov.com
nov.com

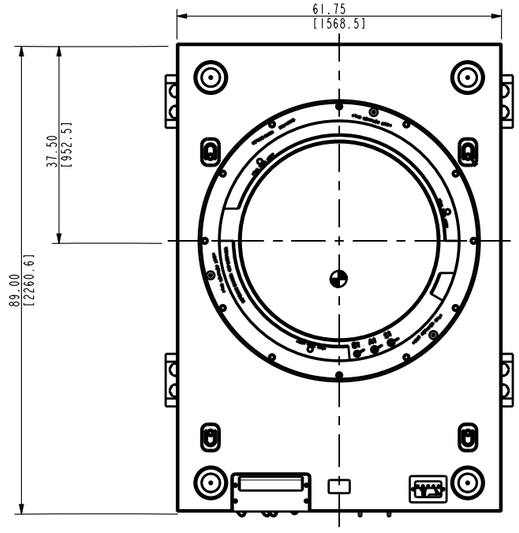
Rotary Support Table

*For reference only, please contact your local sales contact for more information.

RST-375

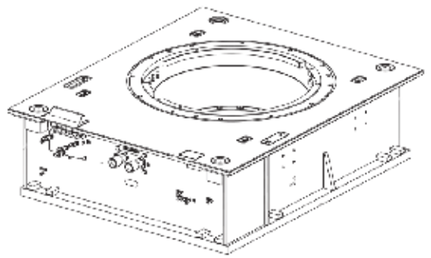


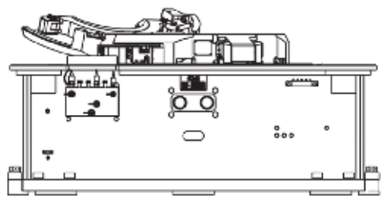


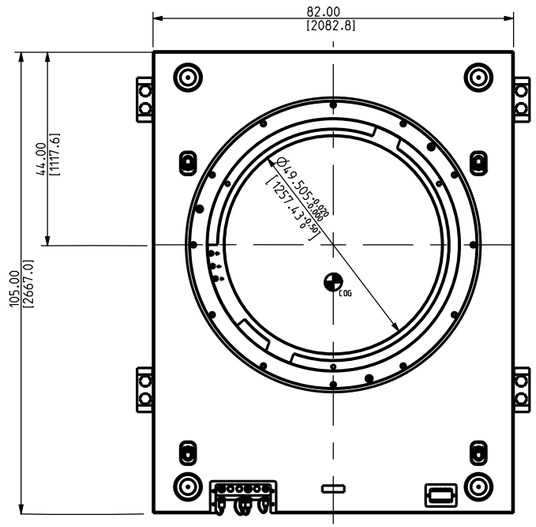


Technical Specifications			
Table size	37½"	**Required crew to operate**	1
Actuation	Hydraulic	**Manpower interfering**	No
Control system	Automatic remote controlled (control panel)	**Interlocking**	Yes
Dimension L x W x H	89" x 61.75" x 28.2"	**Control station**	Yes
Weight (depends on size topcover)	Appr. 14,102 lbs	**PS compatibility**	PS21
Load rating (static)	750 sTon	**Greasing**	Automated and manual
Torque max	30,000 ft.lbs	**Flushing kit**	Yes / flushiung PS
Max. back-up torque	80,000 ft.lbs	**API**	7K
Speed max (intermittent)	15 RPM	**CE**	Yes
Max. operational speed (continously)	5 RPM	**ATEX**	Yes
Max. working pressure	3,000 psi (hydraulic)	**IECEX**	Yes
Max. flow rate	75 gpm	**DSB**	Yes
Ambient temperature range	4°F up to 131°F (-20°C up to 55°C)		

RST-495





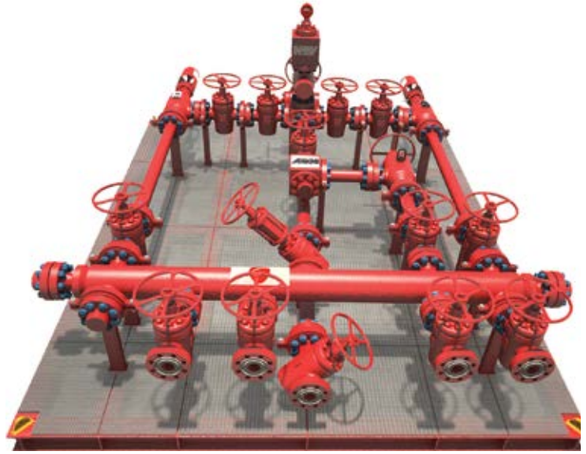


Technical Specifications			
Table size	49½"	**Required crew to operate**	1
Actuation	Hydraulic	**Manpower interfering**	No
Control system	Automatic remote controlled (control panel)	**Interlocking**	Yes
Dimension L x W x H	105" x 82" x 30.42"	**Control station**	Yes
Weight (depends on size topcover)	Appr. 22,175 lbs	**PS compatibility**	PS21/30/495
Load rating (static)	1,000 sTon	**Greasing**	Automated and manual
Torque max	45,000 ft.lbs	**Flushing kit**	Yes / flushing PS
Max. back-up torque	120,000 ft.lbs	**API**	7K
Speed max (intermittent)	15 RPM	**CE**	Yes
Max. operational speed (continously)	5 RPM	**ATEX**	Yes
Max. working pressure	3,000 psi (hydraulic)	**IECEX**	Yes
Max. flow rate	115 gpm	**DSB**	Yes
Ambient temperature range	-4°F up to 131°F (-20°C up to 55°C)		

rig@nov.com nov.com

*For reference only, please contact your local sales contact for more information.

Choke & Kill 3” 5K

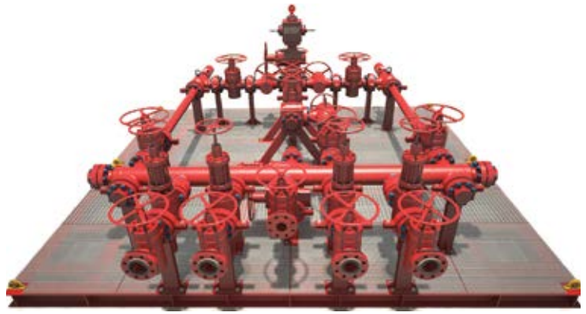


Features and Benefits

- Saudi Aramco Drilling workover well-control manual (Vol. 1 5th edition 2014) - designed and supplied in accordance with Saudi Aramco specification
- Complete manifold packages available for delivery from 3 weeks
- Forged steel body and bonnet, single-seat assembly design, bidirectional sealing, low operating torque, manual operated (non-rising stem)
- Reduced weight and footprint to allow for standard freight options
- Flexible to customer valve preference
- Manual and/or hydraulic actuator options
- Bolted-design modular skid frame designed for safe lifting, compact transport, and low maintenance
- Standard local control panel is universal function LCP tested and delivered with manifold
- Double Isolation valves with suitable pressure rating
- Corrosion resistence using inconel nickel-chromium alloy 625
- Lightweight pipex grating system with anti-slip coating

Technical Specifications	
Working pressure	5,000psi
Upstream/downstream	API 3-1/8”
Service	EE/NL/SourNACE MR0175
API standards	API 6A / 16C & STD 53
Ring groove inlay	CRA 625
Temp class	‘P-X’ (-29°C – 177 °C)
Choke model	NOV MPX-40D
Choke actuator	Hydraulic
Choke size	3”
Choke transmitter sensor	4-20 mA
Local pressure transmitter	4-20 mA
Isolation valves	NOV API 6A Gate Valves
Product Specification Level	PSL3 (Gas-Tested Valves & Chokes)
Performance requirement	PR-2
Dimensions (L x W x H)	3.9m x 4.7m x 2m
Transport dimensions (L x W x H)	3.9m x 2.9m x 2m + 3.9m x 1.8m x1m
Weight	22,000kg
Verified skid structural analysis	Yes
Manufacturing certification	ISO 9001-2008

Choke & Kill 4” 10K / 4” 5K



Features and Benefits

- Saudi Aramco Drilling workover well-control manual (Vol. 1 5th edition 2014) - designed and supplied in accordance with Saudi Aramco specification
- Complete manifold packages available for delivery from 3 weeks
- Forged steel body and bonnet, single-seat assembly design, bidirectional sealing, low operating torque, manual operated (non-rising stem)
- Reduced weight and footprint to allow for standard freight options
- Flexible to customer valve preference
- Manual and/or hydraulic actuator options
- Bolted-design modular skid frame designed for safe lifting, compact transport, and low maintenance
- Standard local control panel is universal function LCP tested and delivered with manifold
- Double Isolation valves with suitable pressure rating
- Corrosion resistence using inconel nickel-chromium alloy 625
- Lightweight pipex grating system with anti-slip coating

Technical Specifications	
Working pressure	10,000psi /5,000psi
Upstream/downstream	API 4-1/16” / 4-1/16”
Service	EE/NL/SourNACE MR0175
API standards	API 6A / 16C & STD 53
Ring groove inlay	CRA 625
Temp class	‘P-X’ (-29°C – 177 °C)
Choke model	NOV MPX-40D
Choke actuator	Hydraulic
Choke size	4”
Choke transmitter sensor	4-20mA
Local pressure transmitter	4-20mA
Isolation valves	NOV API 6A Gate Valves
Product Specification Level	PSL3 (Gas-Tested Valves & Chokes)
Performance requirement	PR-2
Dimensions (L x W x H)	6.3m x 5.5m x 2.2m
Transport dimensions (L x W x H)	6.3m x 2.7m x 2.2.m + 6.3m x 2.8m x 1.8m
Weight	22,000kg
Verified skid structural analysis	Yes
Manufacturing certification	ISO 9001-2008

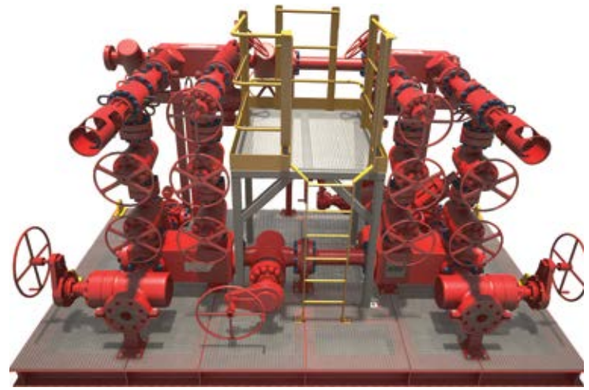
Choke & Kill 4” 10K

Features and Benefits

- 1000HP Guidance specification for choke manifolds - designed and supplied in accordance with NDC operational requirements
- Complete manifold packages available for delivery from 3 weeks
- Forged steel body and bonnet, single-seat assembly design, bidirectional sealing, low operating torque, manual operated (non-rising stem)
- Reduced weight and footprint to allow for standard freight options
- Flexible to customer valve preference
- Manual and/or hydraulic actuator options
- Bolted-design modular skid frame designed for safe lifting, compact transport, and low maintenance
- Standard local control panel is universal function LCP tested and delivered with manifold
- Double Isolation valves with suitable pressure rating
- Corrosion resistence using inconel nickel-chromium alloy 625
- Lightweight pipex grating system with anti-slip coating

Technical Specifications	
Working pressure	10,000psi
Upstream/downstream	API 4-1/16”
Service	EE/NL/SourNACE MR0175
API standards	API 6A / 16C & STD 53
Ring groove inlay	CRA 625
Temp class	‘P-X’ (-29°C – 177 °C)
Choke model	NOV MPX-40D
Choke actuator	Hydraulic
Choke size	4”
Choke transmitter sensor	4-20mA
Local pressure transmitter	4-20mA
Isolation valves	NOV API 6A Gate Valves
Product Specification Level	PSL3
Performance requirement	PR-2
Dimensions (L x W x H)	6.3m x 5.5m x 1.9m
Transport dimensions (L x W x H)	6.3m x 2.7m x 1.9m + 6.3m x 2.8m x 1.5m
Weight	23,000kg
Verified skid structural analysis	Yes
Manufacturing certification	ISO 9001-2008

Choke & Kill 4” 15K / 3” 15K



Features and Benefits

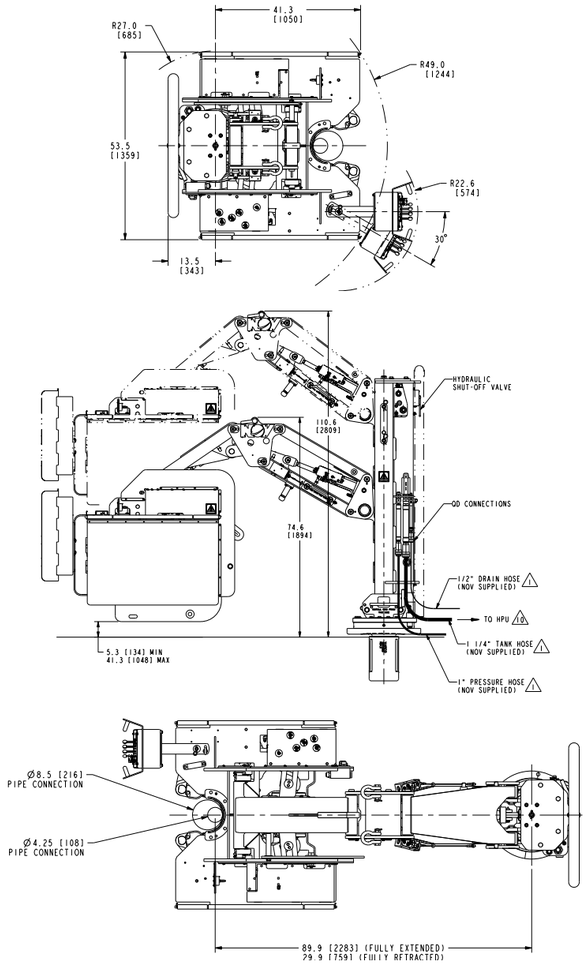
- Designed and supplied in accordance with KOC specification of contractors, rigs, and associated equipment
- Complete manifold packages available for delivery from 3 weeks
- Forged steel body and bonnet, single-seat assembly design, bidirectional sealing, low operating torque, manual operated (non-rising stem)
- Reduced weight and footprint to allow for standard freight options
- Flexible to customer valve preference
- Manual and/or hydraulic actuator options
- Raised access platform and bolted-design modular skid frame designed for safe lifting, compact transport, and low maintenance
- Standard local control panel is universal function LCP tested and delivered with manifold
- Double Isolation valves with suitable pressure rating
- Corrosion resistence using inconel nickel-chromium alloy 625
- Lightweight pipex grating system with anti-slip coating

Technical Specifications	
Working pressure	15,000psi
Upstream/downstream	API 4-1/16” / 3-1/16”
Service	EE/NL/SourNACE MR0175
API standards	API 6A / 16C & STD 53
Ring groove inlay	CRA 625
Temp class	‘P-X’ (-29°C – 177 °C)
Choke model	NOV MPX-40D
Choke actuator	Hydraulic
Choke size	3”
Choke transmitter sensor	4-20 mA
Local pressure transmitters	4-20 mA
Isolation valves	NOV API 6A Gate Valves
Product Specification Level	PSL3G (API 6A Components)
Performance requirement	PR-2
Dimensions (L x W x H)	5.1m x 3.3m x 2.9m
Transport dimensions (L x W x H)	5.1m x 2.8m x 2.9.m
Weight	22,000kg
Verified skid structural analysis	Yes
Manufacturing certification	ISO 9001-2008

rig@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

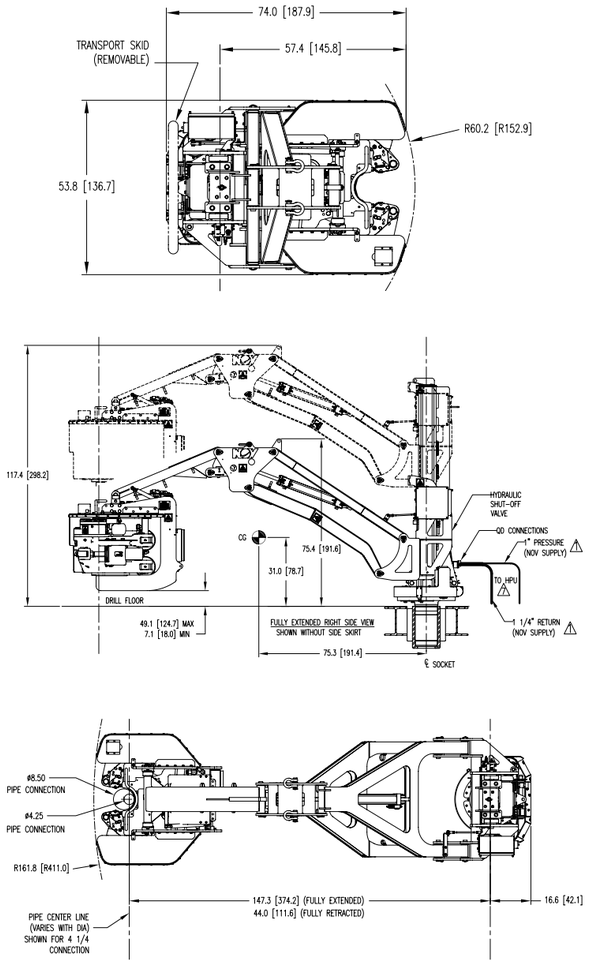
ST-80C²



Technical Specifications	
Controls	Local manual
Mount	Pedestal with floor mounted socket
Pedestal Rotation	±90° (manual)
Hydraulic Requirements (min)	28 GPM @ 2,100 psi (106 LPM @ 145 bar)
Hydraulic Requirements (max)	40 GPM @ 3,000 psi (151 LPM @ 207 bar)
Assembly Weight	7,800/8,320 lbs (3,538/3,773 kg)
Tool Joint Connection (OD) Range	*41/8" to 81/2"
Spin Speed	75 RPM with 5" DP, 35 GPM
Spin Torque	1,750 ft-lbs (2,373 N-m) with 5" DP, 35 GPM
Maximum Makeup Torque	60,000 ft-lb (81,349 N-m)
Maximum Breakout Torque	80,000 ft-lb (108,465 N-m)
Connection Height	23" to 59" (584 mm to 1,498 mm)
Horizontal Travel**	60" (1,524 mm) ***Optional 15" to 25" added reach
Vertical Adjustment	36" (914 mm) or 72" (1,828 mm)
Casing Ready	No
Torque Wrench Angle	30°

** ST-80 and ST-100 can make/break certain tool joints on 2 7/8" drill pipe*
*** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.*
**** Horizontal travel may be increased upon request with use of an extender plate.*

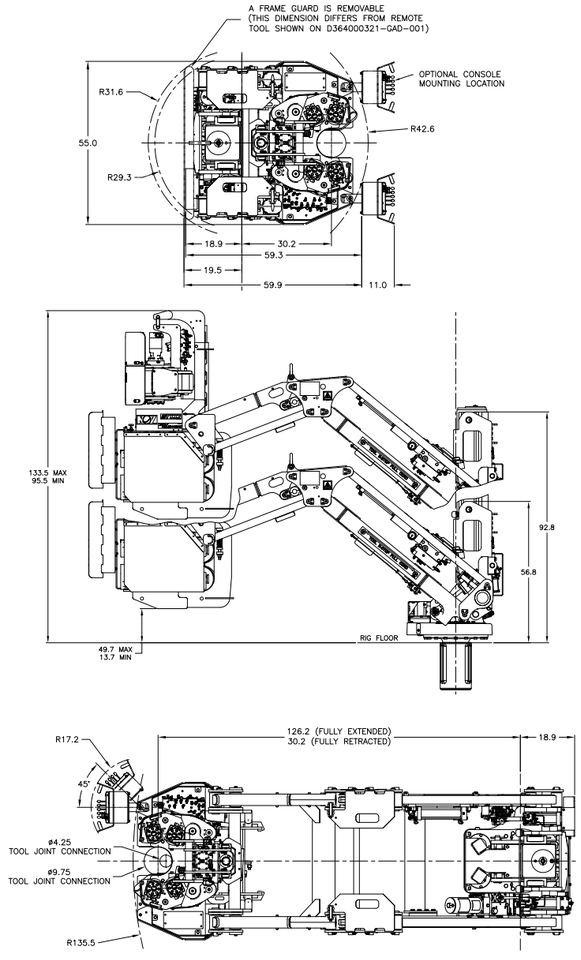
ST-80CL



Technical Specifications	
Controls	Local manual, Hard-wired remote console, Integrated NOV driller's control
Mount	Pedestal with floor mounted socket
Pedestal Rotation	±90° (manual and power slew)
Hydraulic Requirements (min)	28 GPM @ 2,100 psi (106 LPM @ 145 bar)
Hydraulic Requirements (max)	40 GPM @ 3,000 psi (151 LPM @ 207 bar)
Assembly Weight	Approximately 9,400 lbs (4,263 kg)
Tool Joint Connection (OD) Range	*4 1/8" to 8 1/2"
Spin Speed	75 RPM with 5" DP, 35 GPM
Spin Torque	1,750 ft-lbs (2,373 N-m) with 5" DP,35 GPM
Maximum Makeup Torque	60,000 ft-lb (81,349 N-m)
Maximum Breakout Torque	80,000 ft-lb (108,465 N-m)
Connection Height	23" to 65" (584 mm to 1,651 mm)
Horizontal Travel**	100" (2,540 mm)
Vertical Adjustment	42" (1,067 mm)
Casing Ready	No
Torque Wrench Angle	30°

** ST-80 and ST-100 can make/break certain tool joints on 2 7/8" drill pipe*
*** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.*

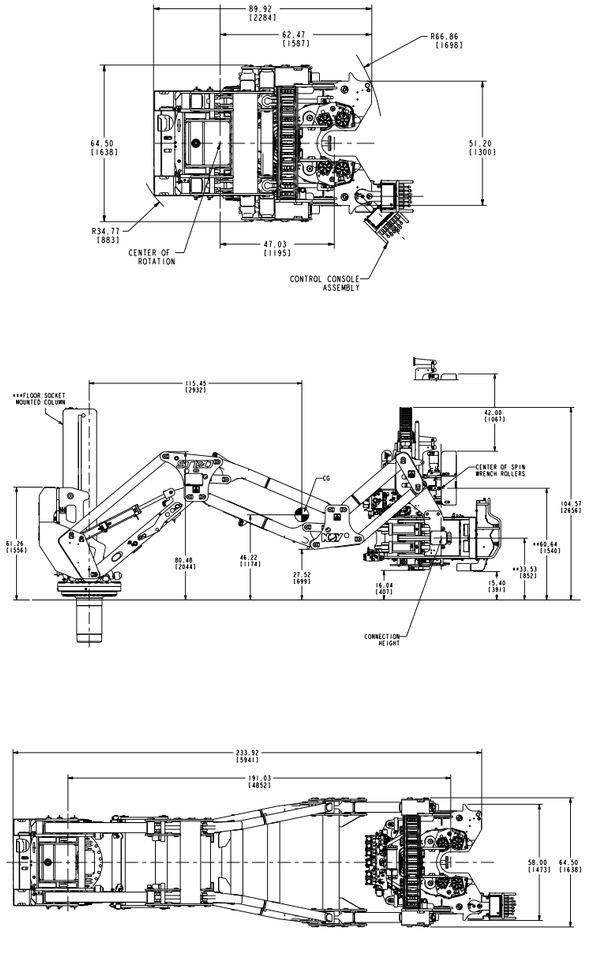
ST-100



Technical Specifications	
Controls	Local manual, Hard-wired remote console, Integrated NOV driller's control
Mount	Pedestal with floor mounted socket
Pedestal Rotation	±90° (power slew)
Hydraulic Requirements (min)	45 GPM @ 2,500 psi (170 LPM @ 172 bar)
Hydraulic Requirements (max)	55 GPM @ 3,000 psi (208 LPM @ 207 bar)
Assembly Weight	11,500 lbs (5,216 kg)
Tool Joint Connection (OD) Range	*31/2" to 9¾"
Spin Speed	80 RPM with 5" DP, 45 GPM
Spin Torque	3,000 ft-lbs (4,067 N-m) with 5" DP, 45 GPM
Maximum Makeup Torque	100,000 ft-lb (135,582 N-m)
Maximum Breakout Torque	120,000 ft-lb (162,698 N-m)
Connection Height	30" to 66" (762 mm to 1,676 mm)
Horizontal Travel**	60" (1,524 mm) or 96" (2,438 mm)
Vertical Adjustment	36" (914 mm)
Casing Ready	No
Torque Wrench Angle	60°

** ST-80 and ST-100 can make/break certain tool joints on 2 7/8" drill pipe*
*** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.*

ST-120



Technical Specifications	
Controls	Local manual, Hard-wired remote console, Integrated NOV driller's control
Mount	Pedestal with floor mounted socket
Pedestal Rotation	±90°
Hydraulic Requirements (min)	45 GPM @ 2,500 psi (170 LPM @ 172 bar)
Hydraulic Requirements (max)	65 GPM @ 3,000 psi (246 LPM @ 207 bar)
Assembly Weight	19,800 lbs (8,981 kg) installed weight
Tool Joint Connection (OD) Range	3 7/8" to 10"
Spin Speed	80 RPM (nominal on 5" DP)
Spin Torque	3,000 ft-lbs (4,067 N-m)
Maximum Makeup Torque	100,000 ft-lb (135,582 N-m)
Maximum Breakout Torque	120,000 ft-lb (162,698 N-m)
Connection Height	31.5" to 73.4" (800 mm to 1,864 mm)
Horizontal Travel*	144" (3,658 mm)
Vertical Adjustment	42" (1,067 mm)
Casing Ready	No
Torque Wrench Angle	60°

** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.*

rig@nov.com
nov.com

Stand Transfer Vehicle (STV) & PipeCat™

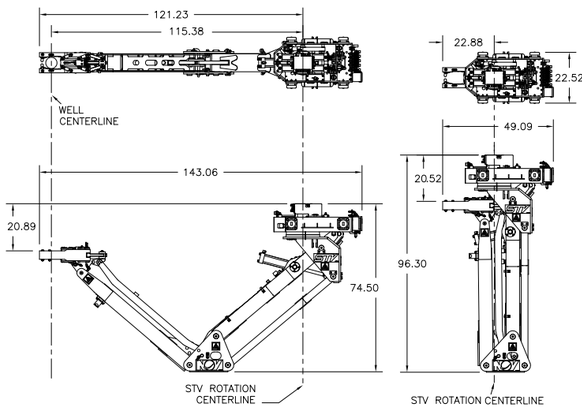
*For reference only, please contact your local sales contact for more information.

STV

The Stand Transfer Vehicle (STV) is a fingerboard-mounted system designed to perform the functions of a derrickman. It does not lift stands of tubulars, but guides the top of the stand between the elevators and the fingerboard.

The STV system includes the fingerboard and a carriage mounted arm which rides up and down rails which are integral to the diving board. The pipe handling head is designed to capture rather than grip the stand. This prevents adverse loading due to the lean of the stand present when the pin is in the setback and the box is at well center.

The pipe handling head consists primarily of two arms and a body. The two arms are connected to the body via parallel linkages and one hydraulic cylinder. The arm is a double parallelogram type modeled after those used on Iron Roughnecks.



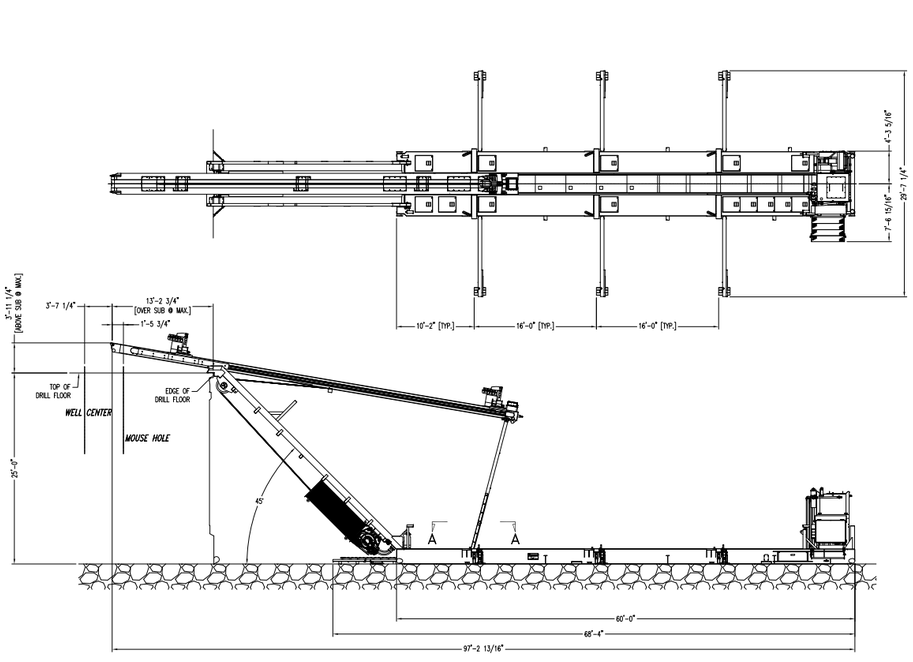
Technical Specifications	
Service	Upper guide arm
Area classification	Zone 1
Hydraulic requirements	15 GPM 2500 psi
Electrical	120 VAC
Compressed air	90 psi
Weight (guide arm only)	2500 lbs
Extension force	1800 lbs retracted, 2700 lbs extended
Retraction force	1800 lbs extended, 1200 lbs retracted
Max radial force at extension	1500 lbs
Max slew moment	2500 ft lbs
Tubular capacities	3 1/2" drill pipe to 10" collars
Extension speed	Up to 0.67 ft/sec
Retraction speed	Up to 0.67 ft/sec
Slew time	90 ° in 3.2 sec
Carriage travel	Up to 0.75 ft/sec

Pipecat

The function of the PipeCat laydown system is to move tubulars between the catwalk and drill floor. The primary moving component is the trough. The trough is used to lift and lower the tubulars and is driven by a winch mounted on the underside of the V-Door. When the trough is lowered into the catwalk, a system of pipe racks, indexer arms, and kicker arms are used to load tubulars to and from the trough. Pipe racks may be installed on one or both sides of the catwalk. A skate is used to position tubulars along the length of the trough.

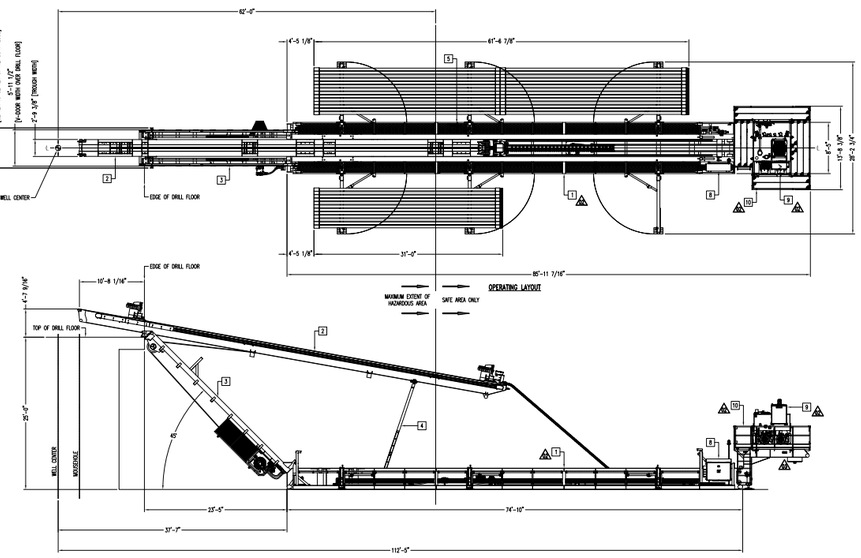
When the trough is raised to the drill floor, the skate is used to push tubulars to well center, and to receive tubulars as they are unloaded from the elevators. The PipeCat laydown system is operated using an Amphion™ control system and is powered by an external electrical power source and an external hydraulic power unit. The illustrations below show examples of laydown system layouts. Refer to the assembly drawings, schematics, and documentation supplied with this manual for exact configuration details.

PC-5-47



Technical Specifications	
Model	PC-5-47
Safe Working Load	10,000 lbs (4,536 kg)
Maximum Tubular Length	47' (14,326 mm)
Tubular Diameter Range	2 3/8" to 24" (60 mm to 610 mm)
Drill Floor Height	25' – 0" (7,620 mm)
Main Power	480/240/120 VAC ~ 50/60 Hz
Control Power	208/120 VAC ~ 50/60 Hz
Maximum Ambient Temperature	122°F (50°C)
Control System	Integrated Amphion Control System
Hydraulic Power Unit	Integrated
TUBULAR SPECIFICATIONS	
Drill Pipe and Tubing	2 3/8" to 6 5/8" (60 to 168mm) Range II and Range III
Drill Collar	3 1/2" to 11" (89 to 279mm) Range II
Casing	Up to 24" (610 mm) Range III, Max 10,000 lbs (4,536 kg)

PC-5-65



Technical Specifications	
Model	PC-5-65
Safe Working Load	10,000 lbs (4,536 kg)
Maximum Tubular Length	Maximum Length: 65' (19,812 mm)
Tubular Diameter Range	2 3/8" to 24" (60 mm to 610 mm)
Drill Floor Height	25' – 0" (7,620 mm)
Main Power	480/240/120 VAC ~ 50/60 Hz
Control Power	208/120 VAC ~ 50/60 Hz
Maximum Ambient Temperature	131 °F (55°C)
Control System	Integrated Amphion™ Control System
Hydraulic Power Unit	Integrated
TUBULAR SPECIFICATIONS	
Drill Pipe and Tubing	2 3/8" to 6 5/8" (60 to 168 mm) Range II Doubles & Range III Singles
Drill Collar	3 ½ to 11" (89 to 279 mm) up to maximum weight of 10,000 lbs/4,536 kg
Casing	Up to 24" (610 mm) Range II Doubles up to 65' & Range III Singles

rig@nov.com
nov.com

Drawworks

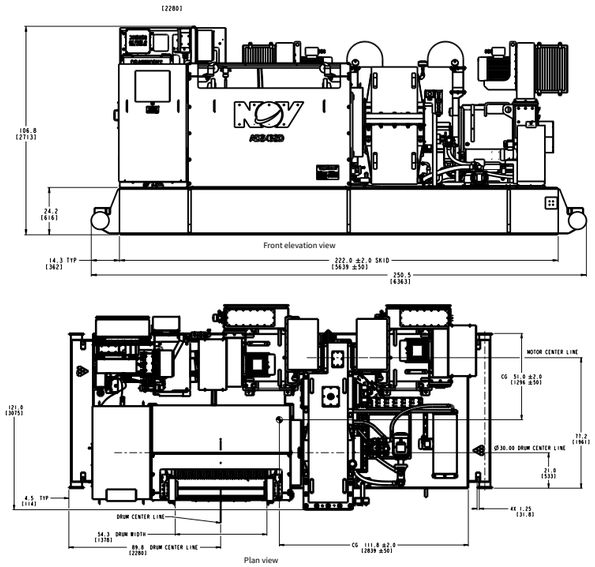
22. ADS Drawworks
23. DSGD-375 & SSGD-250

ADS Drawworks

*For reference only, please contact your local sales contact for more information.

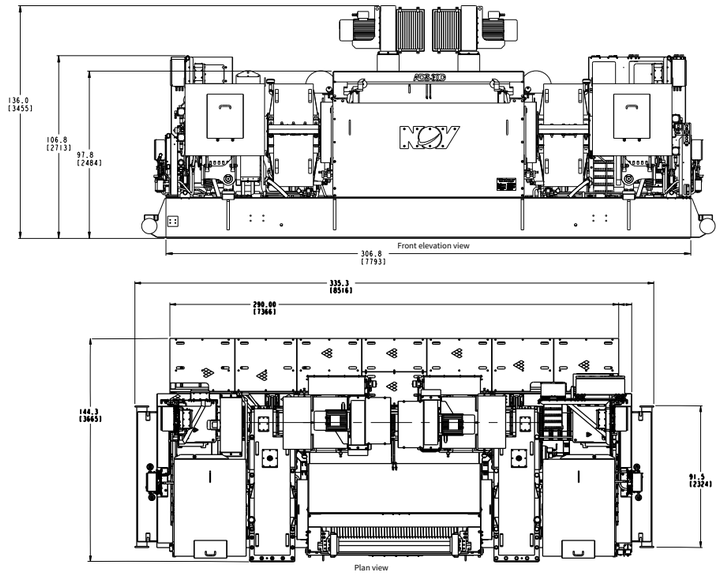
Our Automated Drawworks systems (ADS) provides drillers with enhanced hoisting control capabilities that increase the efficiency, productivity and safety of the drilling process. These drawworks are equipped with AC motors which provide significantly more performance and have made possible a machine that requires approximately half the space and weight with less maintenance than traditional drawworks.

ADS-10SD



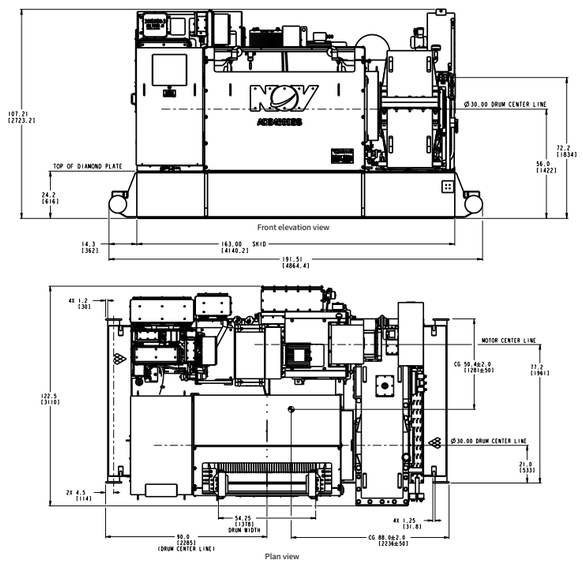
Technical Specifications	
DESIGN DATA	
Max hook load 12 lines	483.5 sT (438.6 mT)
Max hook load 10 lines	413.5 sT (375.1 mT)
Max hook load 8 lines	340 sT (308.4 mT)
Weight	64,325 lbs (39,177 kg)
Dimensions (LxWxH)	248" x 119" x 111.5" (630 cm x 302.3 cm x 283.2 cm)
Wire rope diameter	1 13/8"
Drum size	30" x 55" (76.2 cm x 139.7 cm)
Continuous power	1,800 Hp
Intermittent power	2,000 Hp
Skid dimensions (L x W)	247" x 108" (627.4 cm x 274.3 cm)
Brakes	1 x 36"
Brake disc cooling method	Air cooling
Gearbox	1 x GB-15
DRILLING MOTOR	
Type	NOV Dm-27
Number of motors	2
HP per motor	1,150 HP

ADS-30D



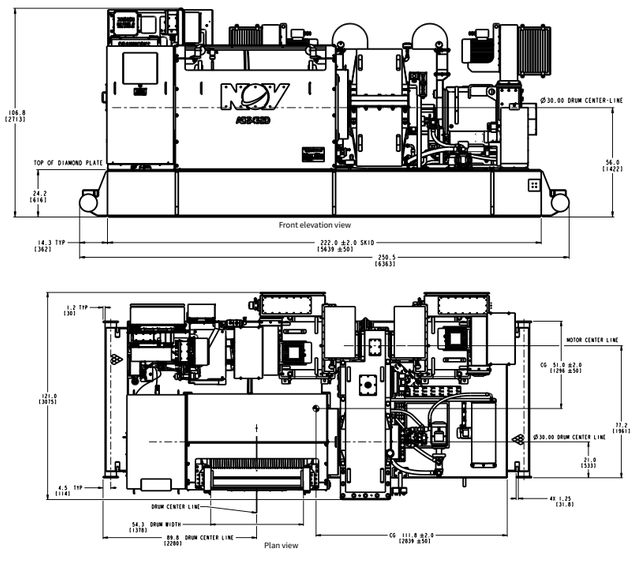
Technical Specifications	
DESIGN DATA	
Max hook load 14 lines	793 sT (719 mT)
Max hook load 12 lines	698 sT (633 mT)
Max hook load 10 lines	597.5 sT (542 mT)
Weight	100,200 lbs (47,718 kg)
Dimensions (LxWxH)	144.3" x 290" x 136" (366.5 cm x 736.6 cm x 345.4 cm)
Wire rope diameter	1 5/8", 1 3/4"
Drum size	36" x 71" (91.4 cm x 180.3 cm)
Continuous power	3,000 Hp
Intermittent power	3,600 Hp
Skid dimensions (L x W)	319" x 108" (910.3 cm x 274.3 cm)
Brakes	2 x 36"
Brake disc cooling method	Air cooling
Gearbox	2 x GB15
DRILLING MOTOR	
Type	NOV CM632UUT
Number of motors	2
HP per motor	1,500 HP

ADS-1500 SS



Technical Specifications	
DESIGN DATA	
Max hook load 12 lines	407.2 sT (369.4 mT)
Max hook load 10 lines	348.6 sT (316.3 mT)
Max hook load 8 lines	286.6 sT (260 mT)
Weight	53,000 lbs (24,040 kg)
Dimensions (LxWxH)	135.6" x 163" x 107.2" (344.4 cm x 414 cm x 272.3 cm)
Wire rope diameter	1 13/8", 1 ½"
Drum size	30" x 55" (76.2 cm x 139.7 cm)
Continuous power	1,500 Hp
Intermittent power	2,000 Hp
Skid dimensions (L x W)	91.5" x 191.5" (232.4 cm x 486.4 cm)
Brakes	1 x 36"
Brake disc cooling method	Air cooling
Gearbox	1 x GB-15
DRILLING MOTOR	
Type	NOV CM632UUT
Number of motors	1
HP per motor	1,500

ADS-2000SD



Technical Specifications	
DESIGN DATA	
Max hook load 12 lines	500 sT (454 mT)
Max hook load 10 lines	428 sT (388 mT)
Max hook load 8 lines	352 sT (319 mT)
Weight	63,500 lbs (28,803 kg)
Dimensions (LxWxH)	250.5" x 121" x 106.8" (636.3 cm x 307.3 cm x 271.3 cm)
Wire rope diameter	1 13/8", 1 ½"
Drum size	30" x 55" (76.2 cm x 139.7 cm)
Continuous power	2,000 Hp
Intermittent power	2,000 Hp
Skid dimensions (L x W)	247" x 108" (627.4 cm x 274.3 cm)
Brakes	1 x 36"
Brake disc cooling method	Air cooling
Gearbox	1 x GB-15
DRILLING MOTOR	
Type	NOV Dm-27
Number of motors	2
HP per motor	1,150 HP

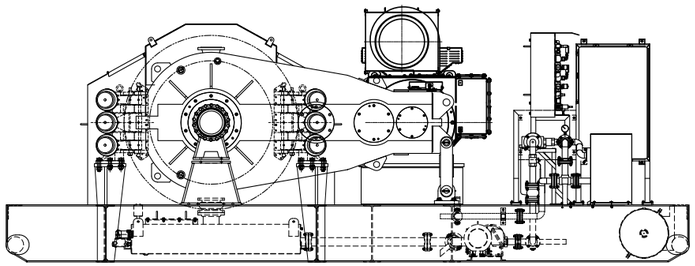
rig@nov.com nov.com

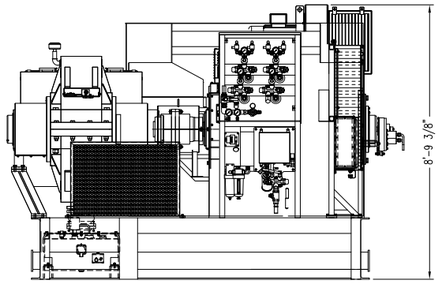
DSGD-375 & SSGD-250 Drawworks

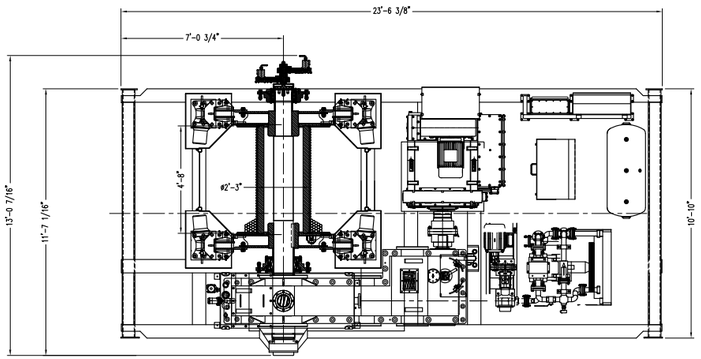
*For reference only, please contact your local sales contact for more information.

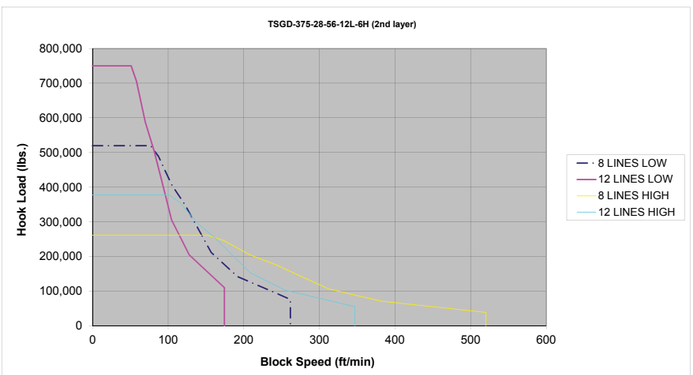
The DSGD-375 drawworks features a direct drive design ideal for rig applications where space, weight, and power are important considerations. Service braking is achieved using an AC motor, which is also the prime mover for the drawworks. Emergency brakes (2) are spring applied, pneumatic release calipers

DSGD-375





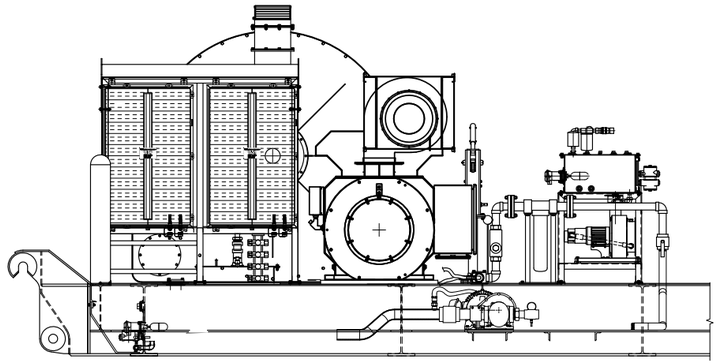


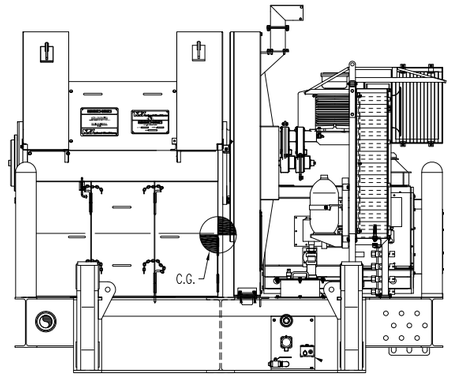


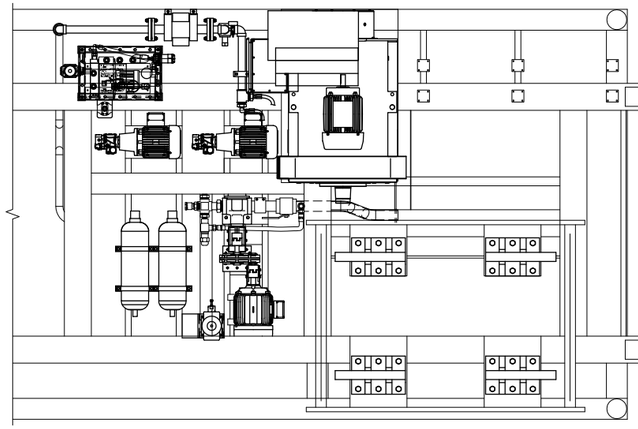
Technical Specifications	
DESIGN DATA	
Max hook load 12 lines	375 sT (340.2 mT)
Max hook load 10 lines	318.5 sT (288.9 mT)
Weight	68,746 lbs (31,183 kg)
Dimensions (LxWxH)	282.4" x 163.1" x 105.4" (717.3 cm x 414.3 cm x 267.7 cm)
Wireline size	1 ⅜"
Maximum ambient temperature	104°F (40°C)
Drum size	27" x 56" (68.6 cm x 142.2 cm)
Drum diameter @ root of grooving	28" (71.1 cm)
Continuous power	1,500 Hp
Intermittent power	1,800 Hp
Oil sump capacity	100 US Gal. (379 L)
Lube pump rating	19 gpm @ 250 psi (72L/min @ 1,724 kPa)
Skid dimensions (L x W)	282.4" x 130" (717.3 cm x 330.2 cm)
GEAR RATIO	
High gear	7.99:1
Low gear	11.95:1
BRAKES	
Number of brake discs	2
Brake disc cooling method	Air cooling
Brake disc diameter	72" (182.9 cm)
Brake disc thickness	4" (10.2 cm)
DRILLING MOTOR	
Type	NOV CM632UUT
Number of motors	1
HP per motor	1,500

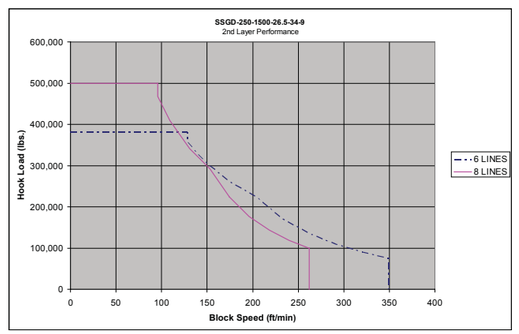
SSGD-250 drawworks is a single speed, gear driven drawworks rated at 1,500 HP driven by a single AC drilling motor. Because of its low weight and compact size, the SSGD-250 is easy to transport, making it ideal for land rigs. Service braking is achieved using the AC motor which is also the prime mover. Emergency brakes (2) are spring applied, hydraulic release calipers. The SSGD-250 is provided with a dedicated HPU for brake operation.

SSGD-250









Technical Specifications	
DESIGN DATA	
Max hook load 8 lines	250 sT (226.8 mT)
Max hook load 6 lines	191 sT (173.3 mT)
Max block speed 8 lines	305 fpm @ 60,000 lbs 1.55 m/s @ 725 kN)
Weight	71,309 lbs (32,345 kg)
Dimensions (LxWxH)	221.0" x 137" x 117.6" (561.3 cm x 348 cm x 298.7 cm)
Wire rope diameter	1 ¼"
Drum size	36" x 71" (91.4 cm x 180.3 cm)
Drum diameter @ root of grooving	26.5" (67.3 cm)
Continuous power	1,500 Hp
Intermittent power	1,800 HP
Lube pump rating	22 GPM @ 150 PSi
Oil slump capacity	226 US GAL. (857 L)
Skid dimensions (L x W)	221" x 108" (561.3 cm x 274.3 cm)
GEAR RATIO	
Overall gear ratios	9:1
BRAKES	
Number of brake discs	2
Brakes	2 x 36" (2 x 91.4 cm)
Brake disc cooling method	Air cooling
Brake disc diameter	76 ½"
DRILLING MOTOR	
Type	NOV CM632UUT
Number of motors	1
HP per motor	1,500

rig@nov.com nov.com

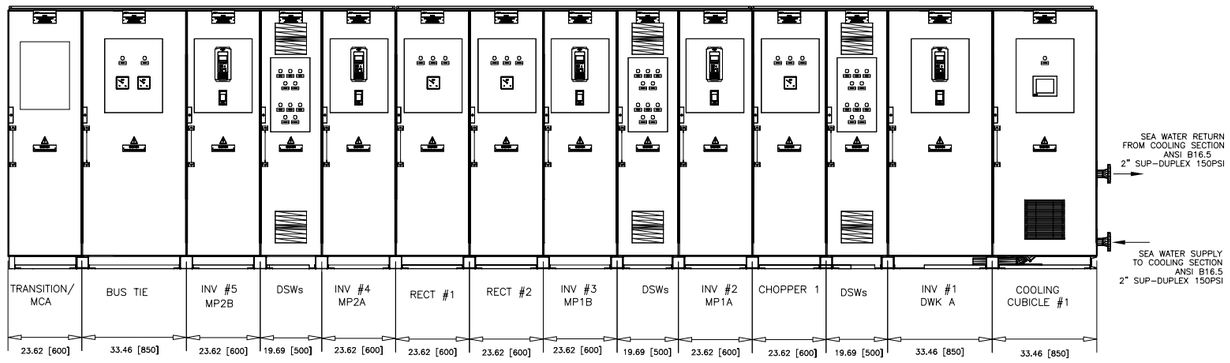
Power Generation

26. Compact Drive System

Rig Technologies

*For reference only, please contact your local sales contact for more information.

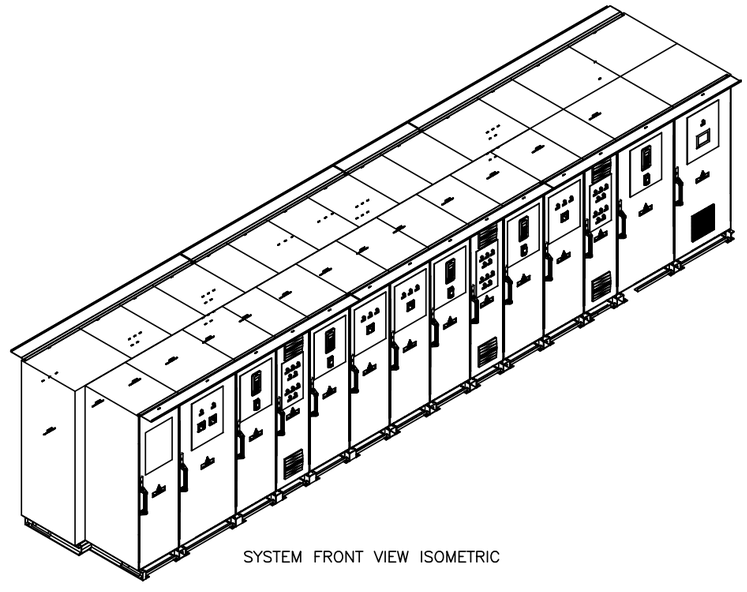
Compact Drive Systems - Liquid Cooled



SYSTEM FRONT VIEW (BUS A)

Compact Drive Liquid Cooled Specifications

DC Bus Rating	Rectifier Size	Output Power	Rated Temperature	Ex. Temp. Range	In. Max Press. Range	Compliance
4000 / 8000 A	3200 A	560/1120/1600 kW	40 / 45° C	35 / 75° C	20-60 psi	IEC 61439 - 1
Peak Fault Bracing	Chopper Voltage	Continuous Current	Output Frequency	Ex. Max Flow Range	In. Max Flow Range	IEC 61800 -1, -2, -3
220 kA	900/1000/1100V selectable	583/1143/1697 A	0-300 Hz	80-110 GPM	100-160 GPM	IEEE – 45
System IP Rating	Chopper Continuous Power	Overload Current	Cable Entry Options	Ex. Cooling Water Temp.	Maximum Thermal Dissipation	ABS MODU 2012
IP42 / IP 20	1200/2400 kW	872/1710/2538 A	Bottom/Top	5-38° C	225 kW / 765 Btu/hr	DNV



SYSTEM FRONT VIEW ISOMETRIC

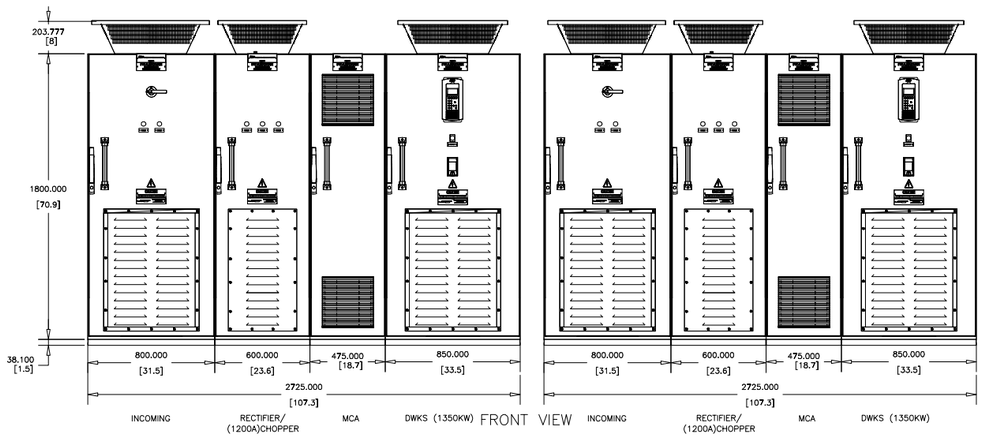
Compact Drive LC

The Compact Drive LC (Liquid Cooled) systems share all the features with Drill Force LC systems but with a reduced height and footprint. The System still offers the best reliability and seamless integration with NOV control systems and machinery. NOV proprietary liquid cooling design provides the best cooling capacity and redundancy. High thermal dissipation guarantees the continuous drilling and breaking operations without thermal failures.

Features

- Onboard pre-charge circuitry
- 6/12/18/24 pulse configurable
- Reduced height and footprint to fit any tight space
- Reserve cooling tank
- Isolation between modules for easy diagnostics
- Induction / PM switchable firmware
- Modular design and configure flexibility
- Excellent serviceability and accessibility
- Proven interface with NOV control and machinery

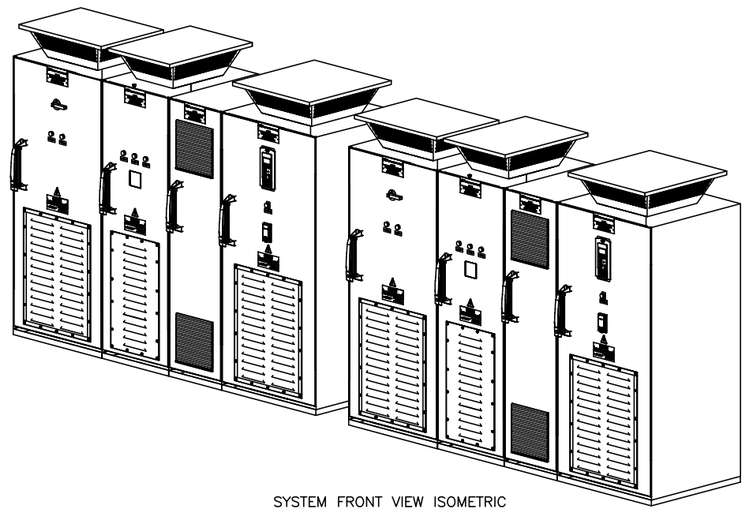
Compact Drive Systems - Air Cooled



FRONT VIEW

Compact Drive Air Cooled Specifications

DC Bus Rating	Rectifier Size	Output Power	Rated Temperature	Compliance
4000 / 8000 A	2500 A	450/900/1400 kW	40 / 45° C	IEC 61439 - 1
Peak Fault Bracing	Chopper Voltage	Continuous Current	Output Frequency	IEC 61800 -1, -2, -3
220 kA	900/1000/1100V selectable	486/953/1414 A	0-300 Hz	IEEE – 45
System IP Rating	Chopper Continuous Power	Overload Current	Cable Entry Options	ABS MODU 2012
IP42 / IP 20	1200/2400 kW	727/1425/2116 A	Bottom/Top	DNV



SYSTEM FRONT VIEW ISOMETRIC

Compact Drive AC

The Compact Drive AC (Air Cooled) Systems have reduced height and footprint to meet the most confined switchgear room design. With reduced size, the compact drives still keep the reliability and integration with NOV control systems and machinery. Dedicated VFD sections provide more configurable products and flexibility to arrange the VFD sections for different layouts.

Features

- Onboard pre-charge circuitry
- Dedicated VFD sections for each drilling equipment
- Reduced height and footprint to fit any tight space
- Induction / PM switchable firmware
- Modular design and configure flexibility
- Excellent serviceability and accessibility
- Proven interface with NOV control and machinery

rig@nov.com
nov.com

Drilling Controls and Instrumentation

30. Pharos sheet 1 & 2
31. Amphion

NOV Rig Technologies

Pharos™ - Intrinsically Safe Wireless Data Acquisition (DAQ) System - Sheet 1 of 2

*For reference only, please contact your local sales contact for more information.

Description

Effortlessly monitor your well site with one robust, low maintenance, and extensible wireless system. Pharos is an intrinsically safe, modular, low-power and efficient wireless data-acquisition (DAQ) system that monitors many applications, and is especially suited to those difficult-to-instrument regions and tools. Patent-pending technology optimizes battery life, with every bit of capacity going toward meaningful work and automatically entering sleep mode when not in use. The modular system approach separates out the power source, radio transceivers, and sensor bus through the use of connectorized, quick-disconnect cabling.

Features

- Wireless data acquisition
- Low power requirements
- Long battery life
- Quick start up in all temperatures
- Reliable long range signal
- Easy to incorporate new signals
- Intrinsically safe
- Modular
- Quick-disconnect cabling

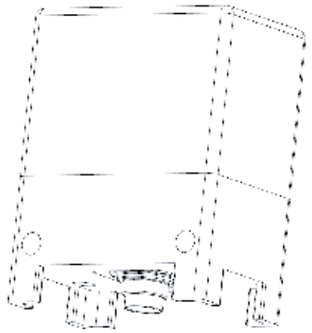
Applications

- Encoder position
- Inclination angle
- Proximity sensing
- Vibration monitoring
- Shock monitoring
- Torque/bending/hookload sensing
- Load-pin monitoring
- Pressure sensing

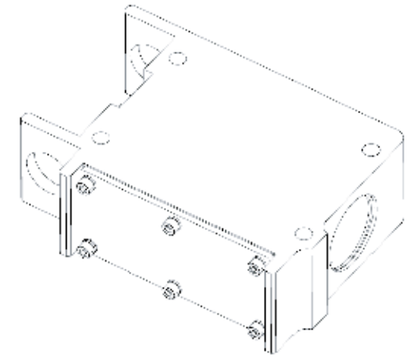
Radio Node

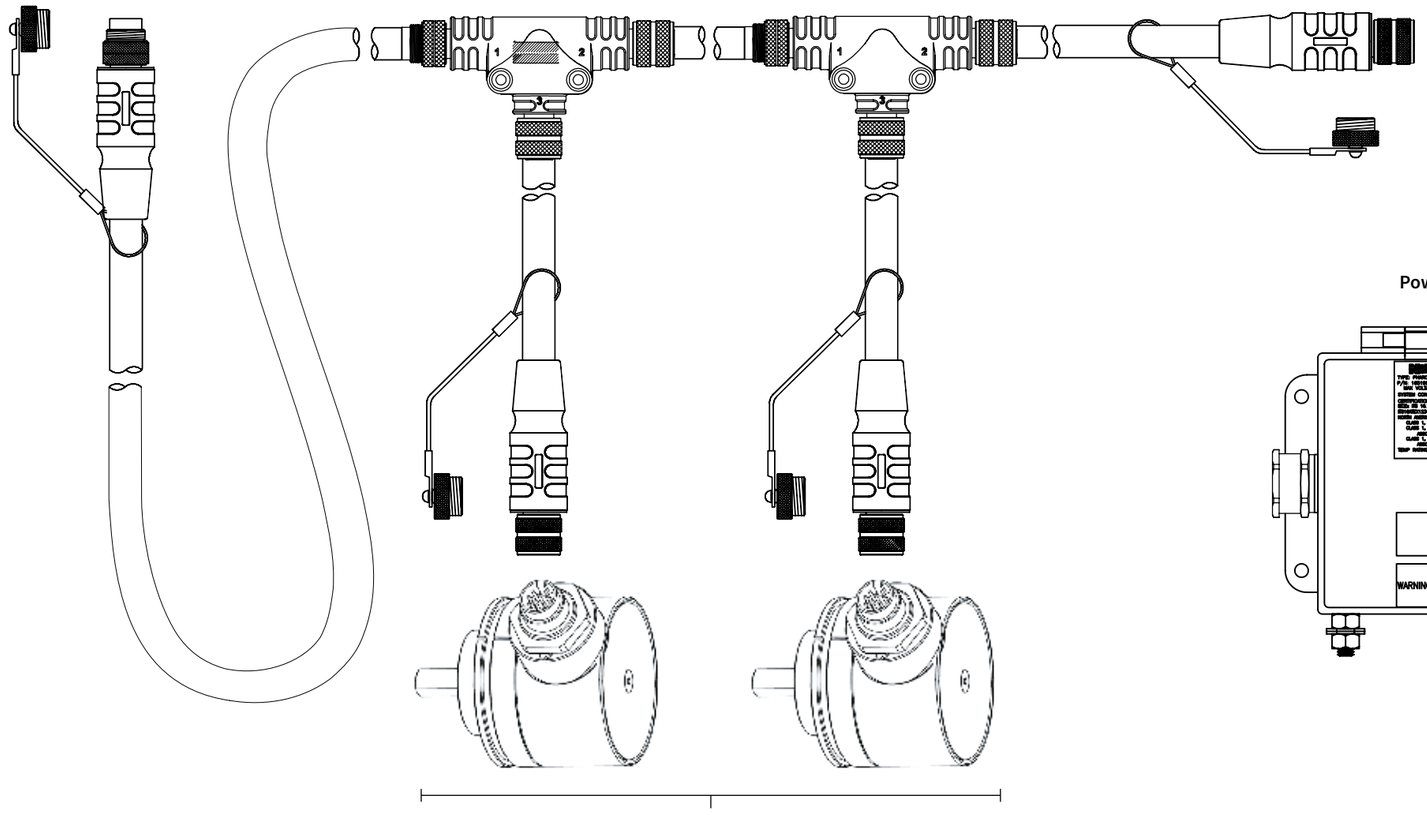
Each radio node comes equipped with one unamplified transceiver and one amplified transceiver for additional range. If even more range is needed, flash an additional radio node with Repeater™ software and insert as many repeaters as needed to make sure the signal is strong. Each radio node contains internal low-power sensors, including two 3-axis accelerometers, a 3-axis gyroscope, a temperature sensor, a primary battery fuel gauge, and a proximity sensor on each face of the device. It also has an external connector with a multi-functional GPIO and the ability to power and communicate with external sensors on the RS485 BUS.

Radio Node



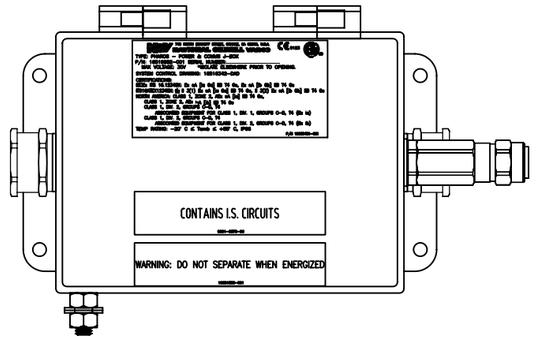
Battery Pack





OR

Power & Communications J-Box

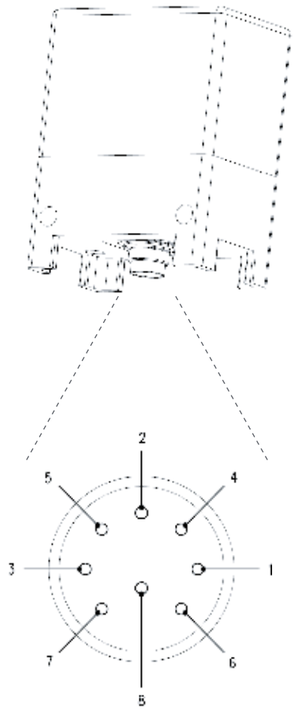


Sensor BUS

rig@nov.com nov.com

*For reference only, please contact your local sales contact for more information.

Radio Node



Pinout

1	Battery Return
2	GPIO
3	RS485 BUS HI
4	Battery Power (+3.6V)
5	Sensor Power (+5V)
6	Sleep
7	RS485 BUS LO
8	Shield

Technical Specifications

DEVICE	MIN	NOMINAL	MAX	UNITS	DESCRIPTION
BATTERY PACK	-	-	-	deg C	Intrinsically Safe Battery Pack, IP 67, -40 to +60 deg
Voltage Output	-	3.6	3.9	V	Voltage output of battery pack
Current Output	320	-	625	mA	Current trip value of active circuit. Min trip occurs @ 3.9V, max occurs @ 2V
Power Output	1.25	-	1.4	W	Power trip value of active circuit. Min trip occurs @ 2V, max occurs at 3V
Capacity	-	-	19	A-hr	Battery Pack Capacity. Max occurs @ 8 mA load, 23 degrees C. Consult NOV engineering for battery life calculations
RADIO NODE	-	-	-	deg C	Transceiver/Sensor Combination, IP67, -40 to +60
Voltage Input	2	3.6	5.5	V	Required input voltage to Radio Node
Voltage Output	4.82	5	5.13	V	Voltage output of TPS61222 on pin 5, used to power sensor BUS
Current Output	-	-	100	mA	Current output of TPS61222 on pin 5, used to power sensor BUS
ADXL362 Range	+/- 2	-	+/- 8	g	Range of ADXL362 digital MEMs 3-axis accelerometer, 12-bit resolution
ADXL362 Data Rate	12.5	-	400	Hz	Sample and data output rate of ADXL362
ADXL375 Range	-	+/- 200	-	g	Range of ADXL375 digital MEMs 3-axis accelerometer, 13-bit resolution
ADXL375 Data Rate	0.1	-	3200	Hz	Sample and data output rate of ADXL375
FXAS21002C Range	+/- 250	-	+/- 2000	deg/s	Range of FXAS2100C digital MEMs 3-axis gyroscope, 16-bit resolution
Temperature Sensor	-40	-	125		Range of temperature sensing
Transmit Frequency	2.405	-	2.48	GHz	Transmission frequencies of MRF24J40MA/D, 802.15.4, 16 channels, 5MHz BW
Transmit Power	-	0	-	dBm	Transmission power of MRF24J40MA
	-	19	-	dBm	Transmission power of MRF24J40MD
ENCODER	-	-	-	-	Low Power, Absolute, Multi-Turn Encoder
Voltage Input	3.3	5	6.5	V	Required input voltage to encoder
Current Input	-	10	-	mA	Typical supply current
Resolution	-	-	1024	ppr	Encoder angular resolution, 10-bit
Turns Rollover	-	-	65,536	revs	Total turns before rollover
POWER & COMMUNICATIONS J-BOX	-	-	-	-	-001 version contains power supply and GM International D1061 Barrier -002 version contains only power barrier
Voltage Input	20	24	40 (-001) 30 (-002)	V	Input Voltage to Power & Communications J-Box
Voltage Output	4.95	5	5.491	V	Output voltage of power barrier
Current Input	-	50	-	mA	Typical supply current
Current Output	-	342	-	mA	Trip current of power barrier
Power Output	-	1.2	-	W	Trip power of power barrier

Hazardous Location Specifications

DEVICE	ENTITY PARAMETERS	MARKINGS
RADIO NODE	For all configs: U_o = 6.51 V, P_i = P_o = 1.5 W, C_i = 130.93 uF, L_i = 17.11 uH When powered by Battery Pack: In Zone 0: U_i = 3.9 V, I_o = I_i = 5.046 A, C_o = 92.68 uF, L_o=18.29 uH In Zone 1: U_i = 3.9 V, I_o = I_i = 0.409 A, C_o = 353.18 uF, L_o=312.59 uH When powered by Power & Comms J-Box (-001) In Zone 0: U_i = 5.497 V, I_o = I_i = 1.306 A, C_o = 193.63 uF, L_o= 27.71 uH In Zone 1: U_i = 5.497 V, I_o = I_i = 0.567 A, C_o = 193.63 uF, L_o= 27.71 uH When powered by Power & Comms J-Box (-002) In Zone 0: U_i = 5.497 V, I_o = I_i = 1.081 A, C_o = 193.63 uF, L_o= 27.71 uH	IECEx: IECEx ETL 17.0002X: Ex ia [ia] IIB T4 Ga Ex ib [ib] IIB T4 Gb -40°C ≤ T_amb ≤ +60°C IP67 ATEX: ITS17ATEX201639X II 1 (1) G Ex ia [ia] IIB T4 Ga II 2 (2) G Ex ib [ib] IIB T4 Gb North America: Class 1, Zone 0, AEx ia IIB T4 Ga Class 1, Zone 1 AEx ib IIB T4 Gb Class 1, Division 1, Groups C-D, T4, Ex ia Class 1, Division 2, Groups C-D, T4, Ex ib
BATTERY PACK	When used in Zone 0: U_o = 3.9 V, I_o = 5.046 A, P_o = 1.45 W, C_o = 223.61 uF, L_o = 35.4 uH When used in Zone 1: U_o = 3.9 V, I_o = 0.409 A, P_o = 1.45 W, C_o = 484.11 uF, L_o = 329.7 uH	
ENCODER	U_i = 6.51 V, I_i = 5.046 A, P_i = 1.625 W, C_i = 34.45 uF, L_i = 0 uH	IECEx: IECEx ETL 17.0002X: Ex ia IIB T4 Ga -40°C ≤ T_amb ≤ +60°C IP67 ATEX: ITS17ATEX201639X II 1 G Ex ia IIB T4 Ga North America: Class 1, Zone 0, AEx ia IIB T4 Ga Class 1, Division 1, Groups C-D, T4, Ex ia

POWER & COMMUNICATIONS J-BOX	For (-001) when outputting to Zone 0:
	U_o = 5.497 V, I_o = 1.306 A, P_o = 1.5 W, C_o = 324.56 uF, L_o = 44.82 uH
	For (-001) when outputting to Zone 1:
	U_o = 5.497 V, I_o = 0.567 A, P_o = 1.5 W, C_o = 324.56 uF, L_o = 44.82 uH
	For (-002) when outputting to Zone 0:
	U_o = 5.497 V, I_o = 1.081 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH
	For (-002) when outputting to Zone 1:
	U_o = 5.497 V, I_o = 0.342 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH
		IECEx:
		IECEx ETL 17.0002X: Ex nA [ia Ga] IIB T4 Gc
		Ex nA [ib Gb] IIB T4 Gc
		-40°C≤T_amb≤+60°C(-002)
		-20°C≤T_amb≤+55°C (-001)
		IP67
		
		ATEX:
		ITS17ATEX201639X
		II 3 (1) G Ex nA [ia Ga] IIB T4 Gc
		II 3 (2) G Ex nA [ib Gb] IIB T4 Gc
		
		North America:
		Class 1, Zone 2, AEx nA [ia Ga] IIB T4 Gc
		Class 1, Zone 2, AEx nA [ib Gb] IIB T4 Gc
		Class 1, Div. 2, Groups C-D, T4
		Associated Equip. Class 1, Div 1, Groups C-D, T4, (Ex ia)
		Class 1, Div. 2, Groups C-D, T4
		Associated Equip. Class 1, Div 2, Groups C-D, T4, (Ex ib)

POWER BARRIER	When outputting to Zone 0: U_o = 5.497 V, I_o = 1.081 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH When outputting to Zone 1: U_o = 5.497 V, I_o = 0.342 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH	IECEx: IECEx ETL 17.0002X: Ex nA [ia Ga] IIB T4 Gc Ex nA [ib Gb] IIB T4 Gc -40°C≤T_amb≤+60°C(-002) ATEX: ITS17ATEX201639X II 3 (1) G Ex nA [ia Ga] IIB T4 Gc II 3 (2) G Ex nA [ib Gb] IIB T4 Gc North America: Class 1, Zone 2, AEx nA [ia Ga] IIB T4 Gc Class 1, Zone 2, AEx nA [ib Gb] IIB T4 Gc Class 1, Div. 2, Groups C-D, T4 Associated Equip. Class 1, Div 1, Groups C-D, T4, (Ex ia) Class 1, Div. 2, Groups C-D, T4 Associated Equip. Class 1, Div 2, Groups C-D, T4, (Ex ib)

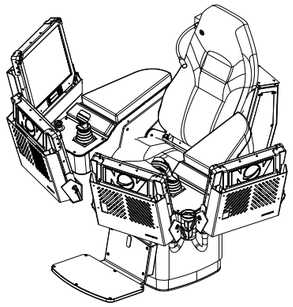
rig@nov.com nov.com

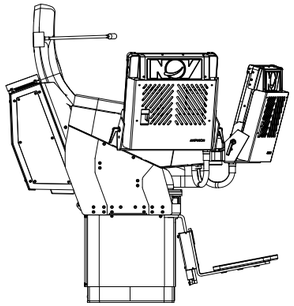
Amphion™

*For reference only, please contact your local sales contact for more information.

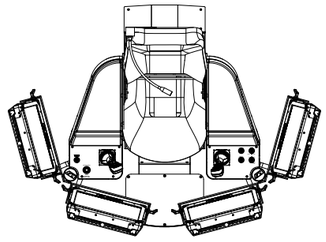
Amphion is National Oilwell Varco's modular, fully integrated, networked, and field-proven drilling control solution delivered in a compact, comfortable, and cost-effective package. Amphion manages, controls, and monitors rig floor equipment to ensure safe, efficient and seamless operations. Configurable, expandable and with a future-looking platform, the Amphion control system adds value to your operations.

Amphion-FE

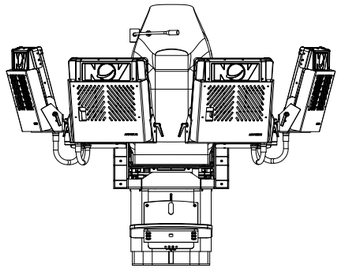




SIDE VIEW



TOP VIEW



FRONT VIEW

General Features:

- Integrated Talkback system
- Integrated CCTV system
- Optional cabin control integration (HVAC, wipers, lighting, etc.)
- Integrated drilling instrumentation through RigSense/MSI
- Up to four touchscreens for monitoring and control
- Adjustable touchscreen position

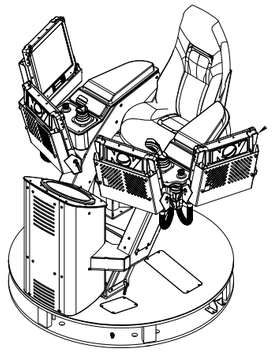
Chair Features:

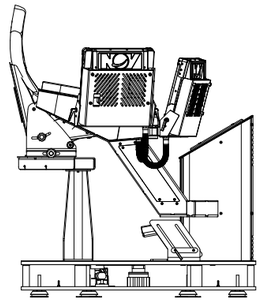
- Durable leather material
- Removable seat cover
- Adjustable pedestal support
- 7-position electric adjustments including height, rotation, setback angle and lumbar support

Control Features:

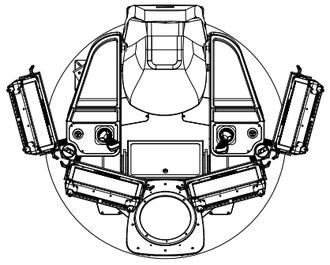
- Ergonomic joystick control
- Integrated control buttons and knobs
- Optional trackball for remote HMI control
- Emergency stop button(s)
- Multiple levels of redundancy
- Intuitive and user-friendly graphic interface
- Touchscreens with fast response time
- User selectable information displays
- Multiple language options
- Selectable units of measure
- Alarms and diagnostic screens

Amphion-WAW





SIDE VIEW



TOP VIEW

General Features:

- Integrated CCTV system
- Electric weight indicator
- Optional cabin control integration (HVAC, wipers, lighting, etc.)
- Integrated drilling instrumentation through RigSense/MSI
- Up to four touchscreens for monitoring and control
- Adjustable touchscreen position

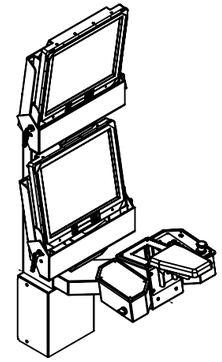
Chair Features:

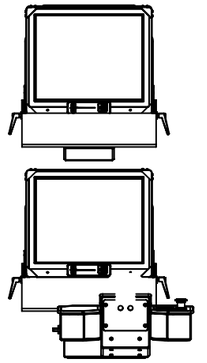
- Durable leather material
- Removable seat cover
- Pedestal support
- Swing chair for sit/stand operation
- 7 position adjustments including height, rotation, setback angle and lumbar support

Control Features:

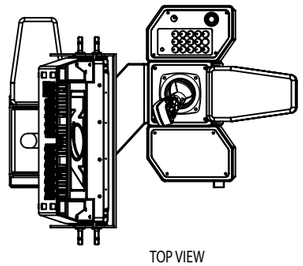
- Emergency stop button(s)
- Ergonomic joystick control
- Integrated control buttons and knobs
- Multiple levels of redundancy
- Intuitive and user-friendly graphic interface
- Touch screens with fast response time
- User selectable information displays
- Multiple language options
- Selectable units of measure
- Alarms and diagnostic screens

Amphion-SUW





FRONT VIEW



TOP VIEW

General Features:

- Stand up workstation for pipe handling operations
- Provides driller's workstation redundancy
- Integrated Talkback system
- Integrated CCTV system
- Touchscreen for monitoring and control
- Adjustable height
- Adjustable touchscreen viewing angle

Control Features:

- Ergonomic joystick control
- Integrated control buttons and knobs
- Emergency stop button
- Intuitive and user-friendly graphic interface
- Touchscreen with fast response time
- User selectable information displays
- Multiple language options
- Selectable units of measure
- Alarms and diagnostic screens

rig@nov.com

nov.com

Pressure Control Equipment

34. 6012 BOP
35. LXT BOP
36. SBOP

NOV Rig Technologies

6012 BOP

*For reference only, please contact your local sales contact for more information.

The 6012 Ram Type BOP is a rugged and powerful BOP capable of operating in a wide range of service conditions. Harsh chemical environments and extreme temperatures have little effect. The 6012 comes standard with a proven trim package that includes Xylan coating in the through bores, ram cavities and all wellbore wetted surfaces, 625 Nickel alloy inlay is included in all ring grooves, and hard plating on dynamic sealing surfaces.

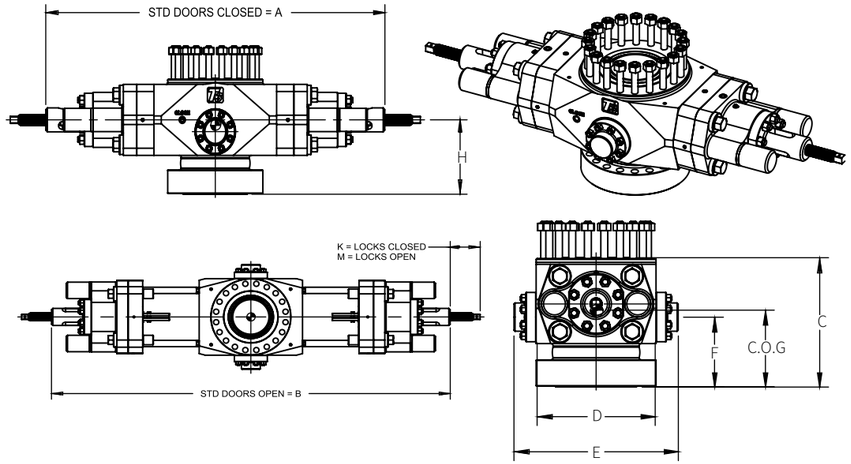
The 6012 can also be outfitted with large bore bonnets and tandem boosters in conjunction with SBRs or the Model 6000 Shear Blind Rams. The unit comes standard with manual locking screws to ensure ram position in event of hydraulic pressure loss.

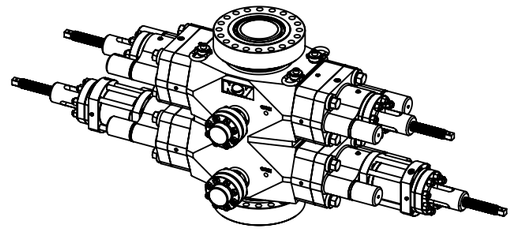
The 6012 offers a variety of options
- Size range from 7” to 26 ¾”
- Configurable body
- Double and Single body
- Shearing options

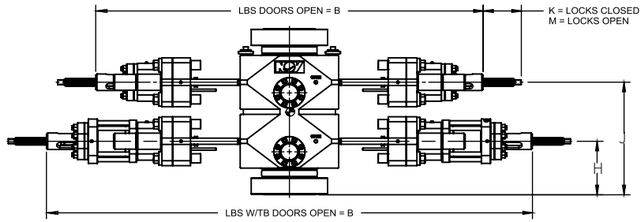
Standard Offering
- 625 nickel alloy
- Xylan coating on all wellbore wetted surfaces
- Hard plating on dynamic sealing surfaces
- Hydraulic operation

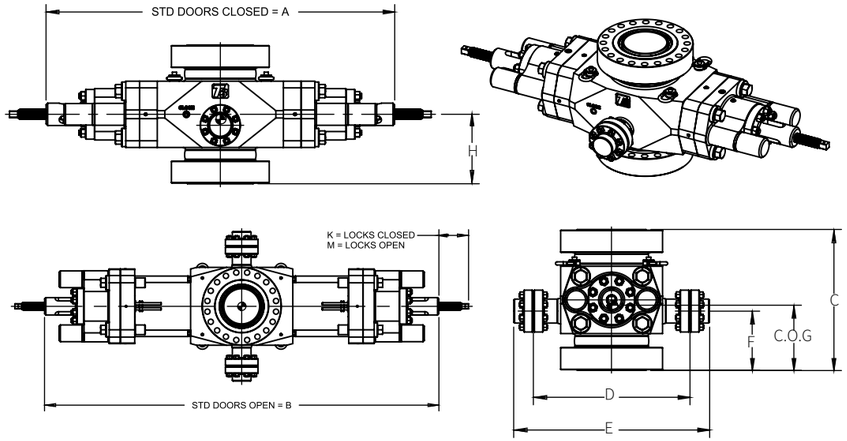
Available Bonnet Options
- Standard fixed pipe and casing rams bonnets
- Shearing bonnets
- Shearing bonnets with tandem boosters
- Shear all bonnet

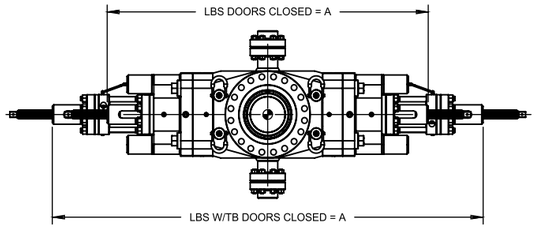
Available Ram Options
- Pipe and casing rams
- VBR
- SBR
- 6000
- SAR

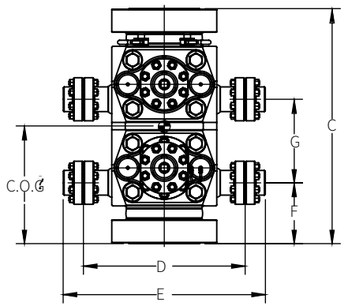












Hydraulic Operating Data

Bore Size	Working Pressure	Standard Pipe Door			Large Bore Shear W/Tandem Booster Door			
		Gallons to open	Gallons to close	Closing ratio	Gallons to open	Gallons to close	Closing ratio	Shearing Ratio
13-5/8''	3000-10000	5.5	5.8	7.0:1	10.5	17.9	10.8:1	17.8:1

SINGLE - 13-5/8'' 10M

	OTLT Size	STD "A"		STD "B"		LBS "A"		LBS "B"		LBS W/TB "A"		LBS W/TB "B"		"C"		"D"		"E"		"F"		"H"		STD "K"		STD "M"		LBS "K"		LBS "M"		LBS W/TB "K"		LBS W/TB "M"	
FXF	4-1/16" 10M	107.8	[2738]	150.4	[3820]	114.0	[2897]	153.4	[3897]	151.2	[3839]	191.3	[4859]	32.6	[828]	29.8	[757]	41.5	[1054]	17.5	[445]	20.9	[531]	3.2	[81]	11.3	[287]	5.3	[134]	15.1	[384]	4.0	[101]	15.1	[384]
SXF	4-1/16" 10M	107.8	[2738]	150.4	[3820]	114.0	[2897]	153.4	[3897]	151.2	[3839]	191.3	[4859]	32.6	[828]	29.8	[757]	41.5	[1054]	17.5	[445]	20.9	[531]	3.2	[81]	11.3	[287]	5.3	[134]	15.1	[384]	4.0	[101]	15.1	[384]

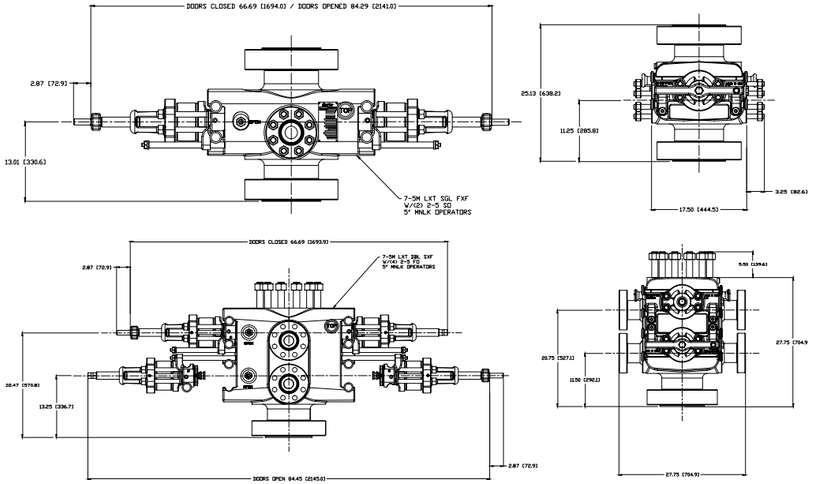
DOUBLE - 13-5/8'' 10M

	OTLT Size	STD "A"		STD "B"		LBS "A"		LBS "B"		LBS W/TB "A"		LBS W/TB "B"		"C"		"D"		"E"		"F"		"G"		"H"		"J"		STD "K"		STD "M"		LBS "K"		LBS "M"		LBS W/TB "K"		LBS W/TB "M"		"C.O.G"		STD Weight (DRY)		LBS Weight (DRY)		LBS W/TB Weight (DRY)	
FXF	4-1/16" 10M	107.8	[2738]	150.4	[3820]	114.0	[2897]	153.4	[3897]	151.2	[3839]	191.3	[4859]	67.7	[1720]	46.4	[1179]	58.1	[1476]	17.5	[445]	24.1	[612]	21.8	[554]	45.9	[1166]	3.2	[81]	11.3	[287]	5.3	[134]	15.1	[384]	4.0	[101]	15.1	[384]	33.8	[859]	22446	[10181]	22978	[10423]	23546	[10680]
SXF	4-1/16" 10M	107.8	[2738]	150.4	[3820]	114.0	[2897]	153.4	[3897]	151.2	[3839]	191.3	[4859]	58.7	[1491]	29.8	[757]	41.5	[1054]	17.5	[445]	24.1	[612]	21.8	[554]	45.9	[1166]	3.2	[81]	11.3	[287]	5.3	[134]	15.1	[384]	4.0	[101]	15.1	[384]	32.8	[833]	22082	[10016]	22614	[10257]	23182	[10515]

13'' Shown, All other sizes (7'', 11'' 16'', 20'', 21'', 26'') available upon request.

rig@nov.com
nov.com

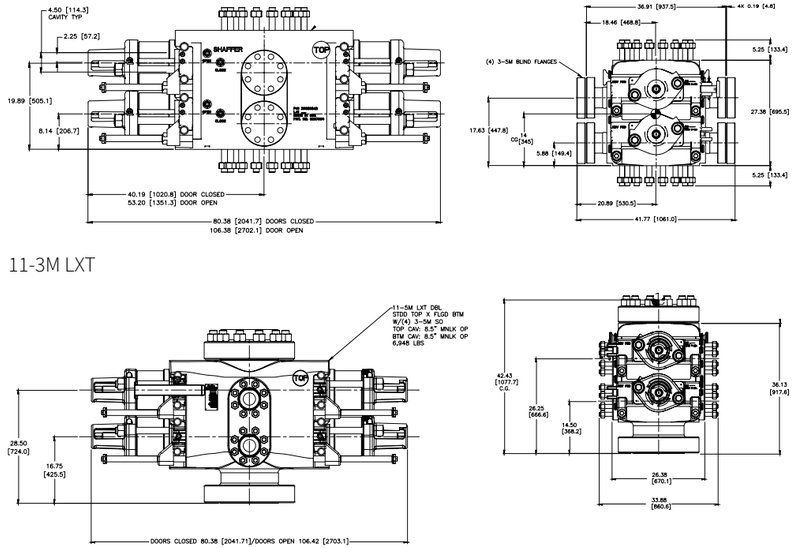
*For reference only, please contact your local sales contact for more information.



7-5M LXT

The LXT Ram is offered as:

- 7'' bore and 3,000/5,000 psi WP
- 11'' bore and 3,000/5,000 psi WP
- 13-5/8'' bore and 3,000/5,000 psi WP
- 13-5/8'' bore and 10,000 psi WP
- 21-1/4'' bore and 5,000 psi WP

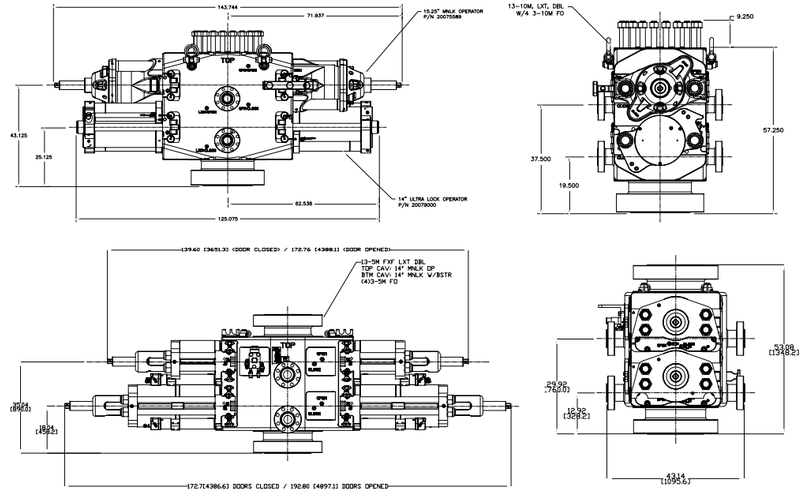


11-3M LXT

11-5M LXT

Benefits:

- Smaller dimension (length and height)
- Lighter weight
- Improved safety (no hammering bolts in confined areas)
- Quicker ram changes
- Easy ram access for faster and easier ram servicing
- Standard H2S service
- Most models compatible with Low Force Shears



13-10M LXT

13-10M LXT

Special Features:

- Boltless BOP doors: The LXT incorporates the boltless BOP door locking system design, which enables opening and closing of the BOP door.
- Improved Safety: Less manpower is needed to service the BOP and risks of injuries related to BOP ram access are reduced.
- Reduced Time for Ram Changes: Simple extraction of the two lock rods is accomplished without special tools, in significantly less time than it takes to break out and re-torque conventional door bolts.

7'' 3/5K LXT Ram BOP Specifications

Technical Specifications	Single	Double
Bore Size	7''	7''
Working Pressure	5,000 psi	5,000 psi
Piston Size	5''	5''
Height FXF SXF SXS	 25.125'' 18.25'' 11.5''	 34.875'' 27.750'' 20.750''
Width	17.50''	17.5''
Length (handle to handle)	71.58''	71.58''
Gallons to Open (1 set)	.64 gallons	.64 gallons
Gallons to Close (1 set)	.63 gallons	.63 gallons
Maximum Hydraulic Opening Pressure	3,000 psi	3,000 psi
Closing Ratio	8.45	8.45
Maximum Pipe Size	5-1/2 ''	5-1/2''

11'' 3/5K LXT Ram BOP Specifications

Technical Specifications	Single	Double
Bore Size	11''	11''
Working Pressure	5,000 psi	5,000 psi
Piston Size	8.5''	8.5''
Height FXF SXF SXS	 34.12'' 25.38'' 16.63	 44.87'' 36.13'' 27.38''
Width	26.88''	26.38'
Length (handle to handle)	80.38''	80.38''
Gallons to Open (1 set)	2.46 gallons	2.46 gallons
Gallons to Close (1 set)	2.80 gallons	2.80 gallons
Maximum Hydraulic Opening Pressure	3,000 psi	3,000 psi
Closing Ratio	5.86	5.86
Maximum Pipe Size	10.75''	10.75''

13-5/8'' 3/5K & 10K LXT Ram BOP Specifications

Technical Specifications	Single	Double	Single	Double
Bore Size	13-5/8''	13-5/8''	13-5/8''	13-4/8''
Working Pressure	5,000 psi	5,000 psi	10,000 psi	10,000 psi
Piston Size	10''	10''	15.25''	15.25''
Height FXF SXF SXS	34.625'' 26.25'' 18''	44'' 39'' 29''	50.25'' 39.625'' 29''	68.25'' 57.625'' 47''
Width	42''	42''	44.43''	44.43''
Length (handle to handle)	128.25''	128.25''	115.83''	115.83''
Gallons to Open (1 set)	4.86 gallons	4.86 gallons	12.63 gallons	12.63 gallons
Gallons to Close (1 set)	5.12 gallons	5.14 gallons	12.88 gallons	12.88 gallons
Maximum Hydraulic Opening Pressure	3,000 psi	3,000 psi	3,000 psi	3,000 psi
Closing Ratio	6.47	6.47	10.69	10.69
Maximum Pipe Size	10.75''	10.75''	10.75''	10.75''
Weights (lbs.) FXF SXF SXS	5,300 4,7000 4,100	14,185 13,600 13,000	17,000 15,700 14,400	26,700 25,400 24,100

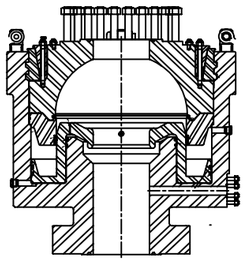
rig@nov.com
nov.com

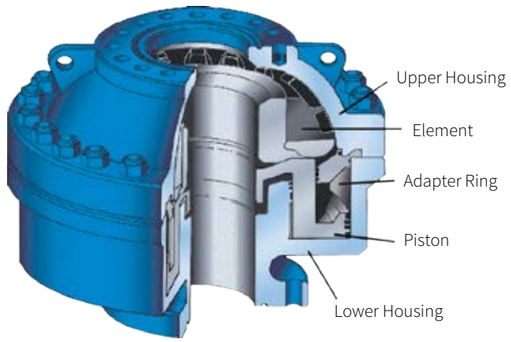
Spherical BOP

*For reference only, please contact your local sales contact for more information.

To accommodate a wide range of sizes and pressures, the ShafferTM Spherical BOP comes in two different configurations - bolted cover and wedge cover.

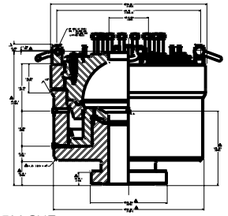
- Rugged, reliable sealing element provides positive seal after hundreds of tests to full working pressure.
- Strong, simple construction — only five major parts.
- Compact body saves space. Height is 15 to 20% less than height of some other annular BOPs.
- Simple hydraulic system. Only two hydraulic connections are needed.
- Wear rings on moving parts prevent metal-to-metal contact. This feature prolongs preventer life.
- Suitable for H2S service. Standard models are suitable for internal H2S service, and simple bolt and lifting shackle changes convert them for external H2S service.
- Servicing is easy. Element can be changed without getting mud or grit into the hydraulic system.
- Steel segments reinforce sealing element but do not protrude into well bore when element is open.
- Element design provides long stripping life.





Bolted Cover Configuration

Working Pressure (psi)	4 1/16	7 1/16	9	11	13 5/8	16 3/4	18 3/4	20 3/4	21 3/4	30 (notAPI)
10,000	X	X								
5,000		X	X	X	X					
3,000		X	X	X				X		
2,000									X	
1,000										X



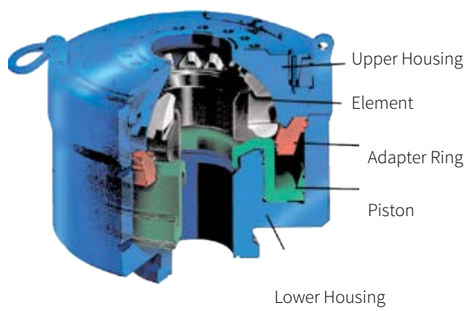
13 - 5/8'' 5M SXF

Connections	Size (in.)	Bore (in.)	W.P. (PSI)	RG. GRV.
Top	13 - 5/8''	12 - 5/8''	5,000	BX - 160
Bottom	13 - 5/8''	13 - 5/8''	5,000	BX - 160
Outlet	As required	As required	As required	As required

Estimated Weight W/ Element	
Configuration	Weight
Stud X Flange	17,518 Lbs (7,946 kg)

Wellbore Characteristics	
Working Pressure	5,000 PSI (345 Bar)
Test Pressure	7,5000 PSI (518 Bar)

Hydraulic Operator Characteristics	
Working Pressure	1,500 PSI (103 Bar)
Test Pressure	2,250 PSI (155 Bar)
Volume to open	14.59 Gallons (55.2 Lts)
Volume to close	25.56 Gallons (96.8 Lts)
Hydraulic Connections	(2) 1 - 1/2'' Female NPT



Wedge Cover Configuration

Working Pressure (psi)	4 1/16	7 1/16	9	11	13 5/8	16 3/4	18 3/4	20 3/4	21 3/4	30 (notAPI)
10,000				X	X		XX			
5,000					X	XX	XX		XX	

XX - Wedge and Dual Wedge Configurations Available

rig@nov.com nov.com

Pumping and Circulation

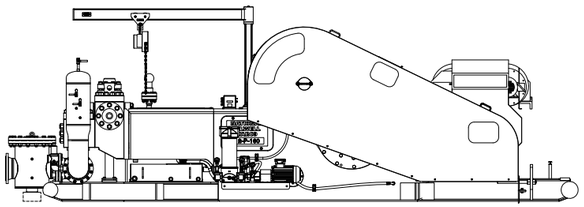
38. 12-P160 Triplex Mud Pump
39. Brandt Centrifuges
40. Brandt Shakers
41. Brandt Shaker screens
42. Brandt Agitators

12-P-160 Triplex Mud Pump

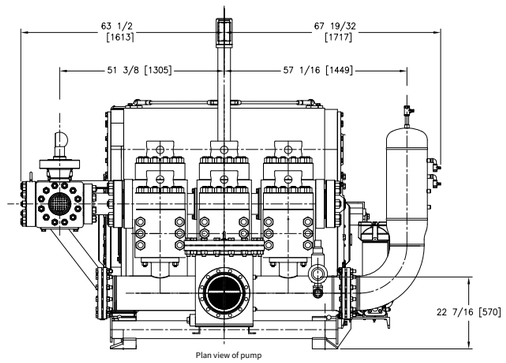
*For reference only, please contact your local sales contact for more information.

National Oilwell Varco's 12-P-160 Mud Pump provides smooth performance. It's construction is robust and durable for use in most environments. The 12-P-160 is rated @ 1,600 input horsepower (1,193 kW) at 120 strokes per minute with a 12 inch (304 mm) stroke. Multiple liner sizes allow pressure and volume to handle circulation in deep drilling applications.

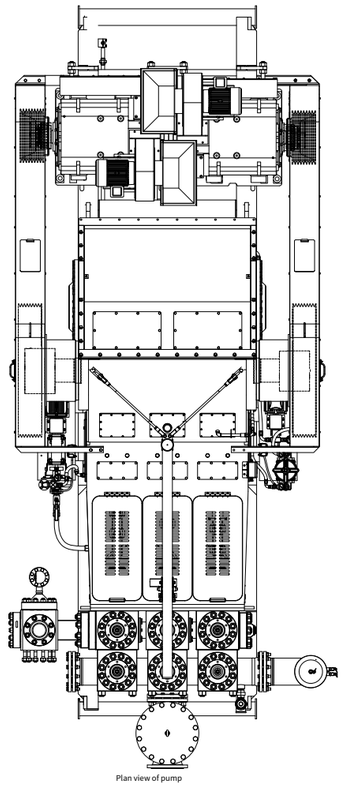
The mud pumps advanced fluid end design gives exceptionally smooth triplex performance. In addition, this unique design facilitates fast inspection and easy servicing. Compact engineering provides higher efficiency in less space. The pump's light weight and flexible design make it easily adaptable to varied rig configurations. This provides flexibility as drilling requirements and consditions change.



L.H. Side of pump



Plan view of pump



Plan view of pump

Power End

- Fabricated steel frame construction
- One-piece forged steel construction crankshaft, connecting rod and pinion shaft
- Adaptability to a variety of drive arrangements on either sides or on both sides
- Premium roller bearings to enhance smooth performance and efficiency
- Pressurized lubrication system

Belt Drive

- Belt life in excess of 10 years delivers an effective drive solution with the lowest cost of ownership in the industry
- No requirement for lube oil filter, cables, cable trays, MCC cubicles, starters

Forged Steel Crankshaft

- One piece forged steel crankshaft with pressed fit bearing journals
- Naturally balanced for smooth running
- No casting
- No welding

Optional Accessories

- HydrA-LIGN™ piston rod
- Blak-JAK™ liner retention system
- Blak-JAK™ Torque master quick change valve cover retention system
- Pneumatic pump rotation tool

Warranties

- The standard module carries a three-year, 100% warranty against cracking
- The premium module has a four-year, 100% warranty against cracking
- Crankshaft carries a seven year limited warranty

Quiet Blower

- 3000 scfm Quiet Blower emits approximately 82 dba

Condition Monitoring

- Local display graphs the pump power end vibrations and temperatures
- Trending of pump data to identify and predict maintenance needs
- Can also be used to record pumping data (strokes pressure), which can be exported via flash card to rig computer

Performance Data

Liner Size, inches (mm)			7¼" (184.2)	7" (177.8)	6 ¾" (171.5)	6½" (165.1)	6¼" (158.8)	6" (152.4)	5¾" (146.1)	5½" (139.7)	5" (127)	4½" (114.3)
Max. Discharge pressure psi (kg/cm²)			3,200 (225)	3,430 (241.1)	3,690 (259.4)	3,980 (279.8)	4,305 (302.7)	4,670 (328.3)	5,085 (357.5)	5,555 (390.5)	6,720 (472.4)	7,500 (527.2)
Speed spm	**Input HP**	**Hyd.* HP**	**Input HP**	**GPM* (LPM*)**	**GPM (LPM)**	**GPM (LPM)**	**GPM (LPM)**	**GPM (LPM)**	**GPM (LPM)**	**GPM (LPM)**	**GPM (LPM)**	**GPM (LPM)**
120 †	1,600 †	1,440	772 (2,922)	720 (2,724)	669 (2,533)	621 (2,349)	574 (2,172)	529 (2,002)	486 (1,839)	444 (1,682)	367 (1,389)	297 (1,124)
100	1,333	1,200	643 (2,435)	600 (2,270)	558 (2,111)	517 (1,958)	478 (1,810)	441 (1,668)	405 (1,533)	370 (1,401)	306 (1,158)	248 (938)
80	1,067	960	515 (1,948)	480 (1,816)	446 (1,689)	414 (1,566)	383 (1,448)	353 (1,334)	324 (1,226)	296 (1,121)	245 (927)	198 (750)
60	800	720	388 (1,461)	360 (1,362)	335 (1,267)	310 (1,175)	287 (1,086)	264 (1,001)	243 (920)	222 (841)	184 (697)	149 (564)
40	533	480	257 (974)	240 (908)	223 (844)	207 (783)	191 (724)	176 (667)	162 (613.1)	148 (561)	122 (462)	99 (375)
Volume/Stroke, gal. (Liters)			6.433 (24.35)	5.997 (22.70)	5.576 (21.11)	5.171 (19.58)	4.781 (18.10)	4.406 (16.68)	4.046 (15.32)	3.702 (14.02)	3.060 (11.58)	2.479 (9.38)

*Based on 90% mechanical and 100% volumetric efficiency
**Pressures shown are for optional 7,500 psi fluid end configuration. standard 12-P-160 mud pump is rated for 5,000 psi (351.5 kg/cm²), and considered the maximum discharge pressure for 5¾" liners or smaller
† Rated maximum input horsepower and speed

AC drive motor*

Motor type	Standard DM27 Drill Force AC Cage induction motor
Electrical rating	Continuous duty
Temperature ambient 600V - 1,150 HP (7,700 ft-lbs)	-40°C to 45°C
Temperature ambient 690V - 1,229 HP (7,550 ft-lbs)	-40°C to 45°C
Temperature ambient 600V - 1,075 HP (7,057 ft-lbs)	-40°C to 55°C
Temperature ambient 690V - 1,150 HP (7,064 ft-lbs)	-40°C to 55°C
Insulation	Class H, VPI form wound
External cooling requirements	2,800 SCFM at motor inlet
Classification	ATEX, increased safety IECEx
Optional certification	ABS, DNV, CSA
Standard stator and Bearing RTD's	

*Optional GEB-22 AC Cage Induction Motor

Technical specifications

Height, floor to center of front inlet suction, inches (mm)	16 ½ (419)
Height, floor to center of discharge, inches (mm)	45 ¼ (1149)
Overall length over skids, inches (mm)	209 (5309)
Width over frame, inches (mm)	78 ⅝ (1997)
Width over pinion shaft, inches (mm)	113 ¾ (2889)
Height, floor to top of gear case, inches (mm)	75 (1905)
Height over fluid cylinders, inches (mm)	62 15/16 (1599)
Maximum input horsepower (kW)	1600 (1193)
Rated pump speed, spm	120
Maximum fluid cylinder liner bore, inches (mm)	7 ¼ (184.2)
Stroke, inches (mm)	12 (304.8)
Hydrostatic test pressure of fluid cylinders, psi (kg/cm2)	10,000 (703)
Gear ratio	3.439
Suction connection ASA-150 lb. R.J. flange, inches	10"
Discharge connection, cross w/ API-10,000 psi. R.J. flange, inches	6"
Valve pot, API number	MOD. 7
Weight-complete, less sheave, lbs. (kg)	54,700 (24,810)

Fluid End Modules

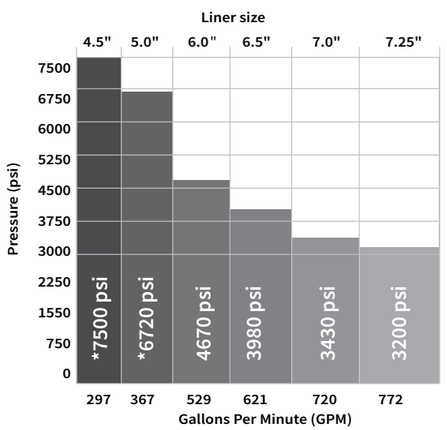
NOV offers a choice of fluid end modules and valve covers for 12-P-160 pump model to select the fluid end module that exactly matches the drilling requirements. The 12-P-160 can be equipped with either the standard or premium forged, two-piece interchangeable fluid modules.

- Cold worked for longer life - The internal bores of the standard modules are shot peened. The premium modules have auto-frettage bores. The benefits of these processes are increased module fattigue life and greater resistance to stress corrosion cracking
- High pressure modules

Fluid End key features

- Two-piece modular cylinder design is completely interchangeable between modules
- Fast Change™ screw-type valve covers, which facilitate quick removal and installation are currently standard
- Suction manifold can be equipped with front or side inlet connections
- Discharge piping connects from either side
- Piston and liner chambers are easily accessible and fully open
- Two-piece piston rod construction allows removal of piston without disturbing liner
- Easy-to-operate clamps give positive locking for liners and piston rod assemblies
- Spray system cools and lubricates piston and liner surfaces

Performance 12-P-160

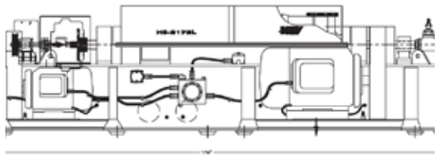


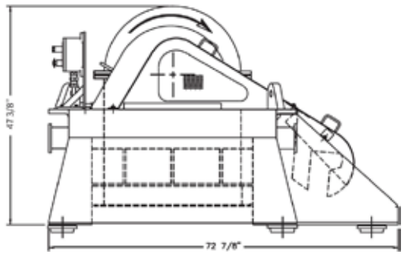
*Both 5,000 psi or 7,500 psi are available

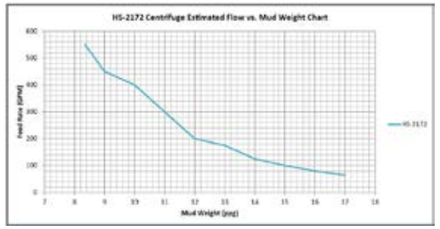
rig@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

HS-2172





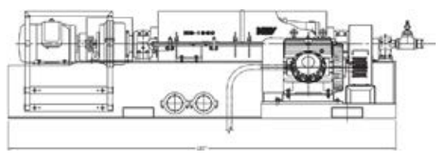


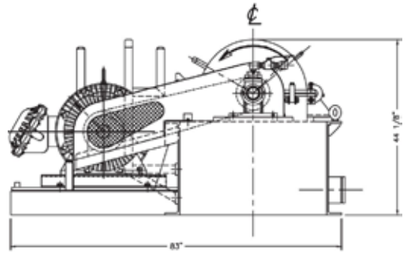
Description

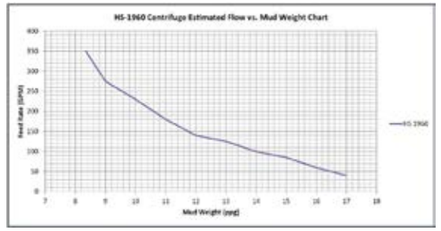
The HS-2172 series centrifuge uses high G-forces to separate fine solids from liquid. The HS-2172 centrifuge is able to exert up to 2,684 G's on the drilling fluid. It is equipped with a variable frequency drive (VFD) control which provides a controlled application of motor drive power to the centrifuge components. With a process capacity up to 550 gal/min (2,082 lit/min), the HS-2172 centrifuge is able to quickly process high volumes of mud while allowing prescribed mud weights and separation efficiencies to be maintained. This enables the HS2172 centrifuge to produce fine cut points at higher flow rates, making it ideal for high-flow applications and critical-conditions solids control.

Technical Specifications	
Part number	16680
Water capacity	550 gpm (2082 lpm)
Weight	15500 lbs (7031 kg)
Bowl diameter	21 in (533 mm)
Bowl length	72 in (1829 mm)
Bowl speed	3000 max; 2400 typical
Drive	VFD
G-Force	2684
Dimensions	174 in x 84 in x 47 in (4400 mm x 2134 mm x 1168 mm)
Main drive (bowl)	150 hp
Back drive (conveyor)	40 hp
Beach angle	5

HS-1960





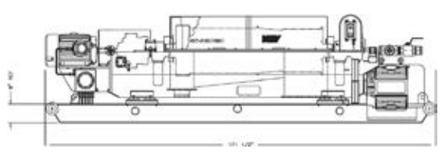


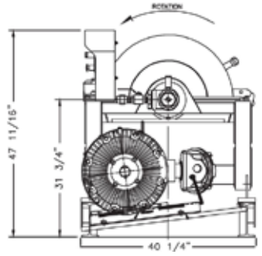
Description

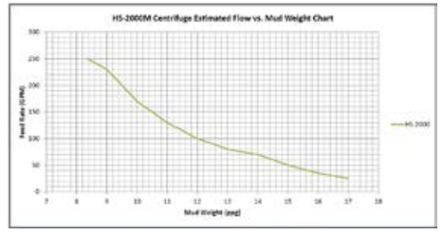
The HS-1960 series centrifuge uses high G-forces to separate fine solids from liquid. The HS-1960 centrifuge is able to exert up to 2,480 G's on the drilling fluid. It is equipped with a variable frequency drive (VFD) control which provides a controlled application of motor drive power to the centrifuge components. With a process capacity up to 350 gal/min (1,325 lit/min), the HS 1960 centrifuge is able to quickly process high volumes of mud while allowing prescribed mud weights and separation efficiencies to be maintained. This enables the HS-1960 centrifuge to produce fine cut points at higher flow rates, making it ideal for high-flow applications and critical-conditions solids control.

Technical Specifications	
Part number	20000
Water capacity	350 gpm (1325 lpm)
Weight	11600 lbs (5262 kg)
Bowl diameter	19.4 in (493 mm)
Bowl length	60 in (1524 mm)
Bowl speed	3000 max; 2400 typical
Drive	VFD
G-Force	2480
Dimensions	180 in x 83 in x 44 in (4572 mm x 2108 mm x 1118 mm)
Main drive (bowl)	125 hp
Back drive (conveyor)	40 hp
Beach angle	5

HS-2000





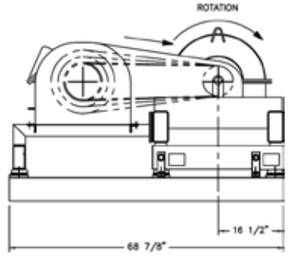


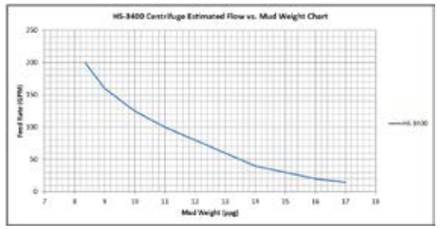
Description

The HS-2000 series centrifuge uses high G-forces to separate fine solids from liquid The HS-2000M is able to exert up to 2,617 G's on the drilling fluid. The HS-2000M is equipped with a variable frequency drive (VFD) control which provides a controlled application of motor drive power to the centrifuge components. With a process capacity up to 250 gal/min (946 lit/min), the HS-2000M series centrifuge offers outstanding performance over a wide range of drilling applications and conditions.

Technical Specifications	
Part number	15670
Water capacity	250 gpm (946 lpm)
Weight	8800 lbs (7031 kg)
Bowl diameter	18 in (457 mm)
Bowl length	60 in (1524 mm)
Bowl speed	3200 max; 2600 typical
Drive	VFD
G-Force	2617
Dimensions	172 in x 40 in x 48 in (4369 mm x 1016 mm x 1219 mm)
Main drive (bowl)	75 hp
Back drive (conveyor)	30 hp
Beach angle	5

HS-3400



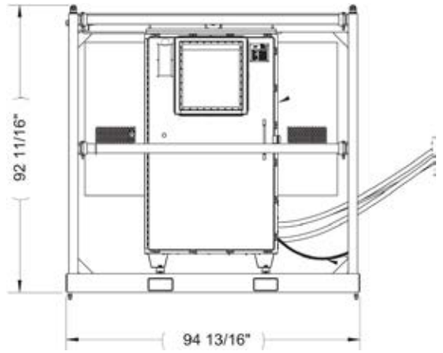


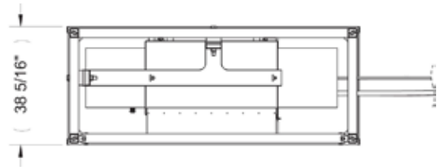
Description

The HS-3400 series centrifuge uses high G-forces to separate fine solids from liquid. Three models are available: HS-3400FS, HS-3400VSD and HS-3400FVS. The HS-3400FVS is able to exert up to 3,180 G's on the drilling fluid. With a process capacity up to 200 gal/min (757 l/min), the HS-3400 series centrifuge offer outstanding performance over a wide range of drilling applications.

Technical Specifications	
Part number	10849
Water capacity	200 gpm (757 lpm)
Weight	4800 lbs (2177 kg)
Bowl diameter	14 in (2177 mm)
Bowl length	49.5 in (1257 mm)
Bowl speed	3200 max; 2200 typical
Drive	Fixed
G-Force	2036
Dimensions	98 in x 69 in x 44 in (2489 mm x 1753 mm x 1118 mm)
Main drive (bowl)	40 hp
Back drive (conveyor)	N/A
Beach angle	10

VFD Control Cabinet





Description

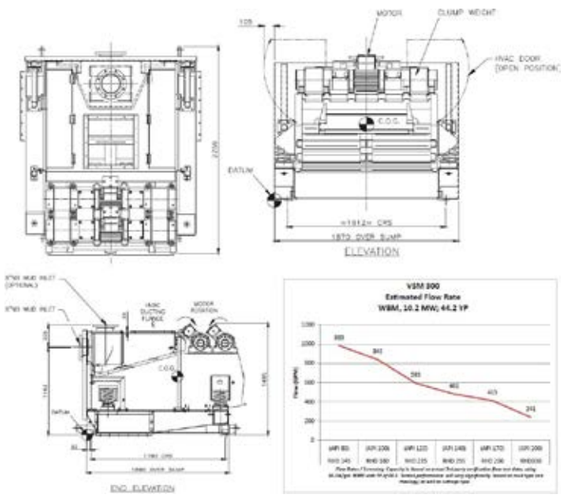
All variable frequency drive (VFD) enclosures are designed the same for all centrifuges. VFD's are rated to match motor and load requirements and are recognized by the American Bureau of Shipping & DNV for hazardous area use. Designed for arctic, desert and hazardous area service, where power disconnect is required for hazardous area duty.

Technical Specifications	
Weight	2646 lbs (1200 kg)
Dimensions	95 in x 38 in x 93 in (2413 mm x 965 mm x 2362 mm)

brandt@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

VSM 300™

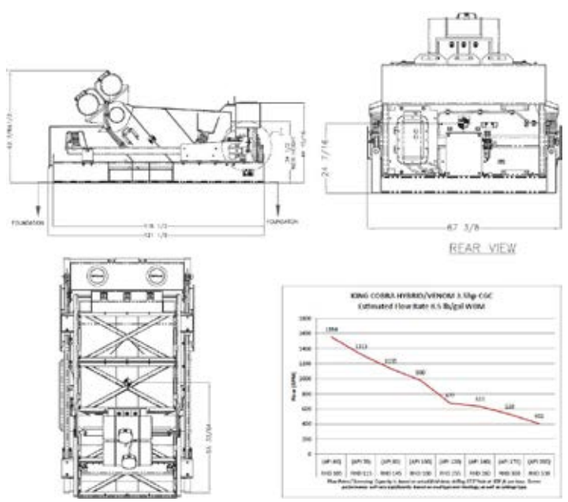


Description

The VSM 300 is a balanced elliptical motion, fine screen shaker which utilizes three screen decks, an integrated scalping deck, a primary fine screen deck and a drying deck. This unit is ideal for offshore and clay/gumbo formations, it is an extremely simple machine to operate requiring little maintenance. The primary screen deck employs a PNEUMOSEAL™ bladder system for securing the screens. The screen changes can be carried out in 2-3 minutes by one operator. This unit has a fixed deck angle of 0° in the feed zone and 7° on the incline screen ramp. No adjustments are required.

Technical Specifications	
Vibration	Balanced Elliptical
Screens and Deck Type	(3) Screens Scalping Dec (0°) (4) Screens Primary Deck (+7°) (2) Screens Drying Deck (+7°)
Basket Angle	Fixed
Special Features	Pneumatic Screen Clamping
Screen Type	Pretension Repairable
G-Force	Automatically adjusts to drilling conditions with CONSTANT-G-CONTROL™ 5.3-6.3-7.3 G's
Deck Area	20.5 ft² (1.9 m²) 26.3 ft² (2.4 m²) 3 ft² (0.3 m²)
Motor Data	(2) 4.0 hp (3.0 kw)
Weir Height	39 in. (991 mm)
Dimensions	108 in x 74 in x 59 in (2754 mm x 1870 mm x 1505 mm)
Weight	5370 lbs (2436 kg)

KING COBRA™ VENOM™

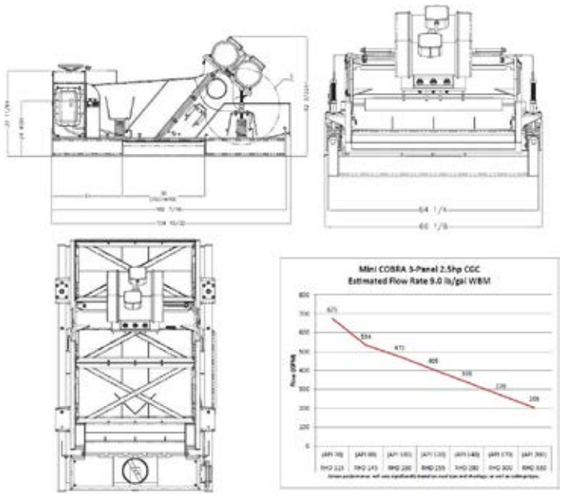


Description

The KING COBRA VENOM shaker is a fine screen shaker with several motor/ starter options producing linear or tuned elliptical motion. The KING COBRA VENOM is provides a lower profile than the KC Hybrid shaker. The VENOM utilizes CONSTANT-G CONTROL technology which increases the shakers G-Force during drilling operations to optimize capacity and finer screening. The shaker is almost always located at the flow line unless it is preceded by a "scalping" or gumbo shaker. The KING COBRA VENOM shaker removes a large percentage of drill cuttings before the mud is circulated through the surface mud system leading to improved performance of downstream solids control equipment.

Technical Specifications	
Vibration	Linear and tuned elliptical
Screens and Deck Type	(4) Screens Contour Plus (0°, +5°, +5°, +5°)
Basket Angle	Adjustable (-2° to +2°)
Special Features	Pneumatic Basket Adjustment
Screen Type	Pretension Repairable
G-Force	8.3 Nominal G's with CONSTANT-G-CONTROL™ 7.3-8.3G's 9 - in loaded drilling conditions
Deck Area	33.4 ft² (3.1 m²)
Motor Data	(2) 3.5 hp (2.6 kw)
Weir Height	34.5 in. (867 mm)
Dimensions	121 in x 67 in x 63 in (3077 mm x 1711 mm x 1600 mm)
Weight	4500 lbs (2043 kg)

MINI COBRA™ 3-Panel

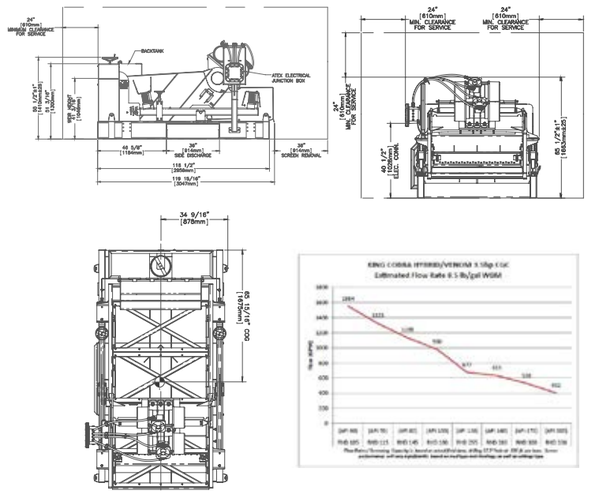


Description

The Mini COBRA 3-Panel Shaker is a fine screen shaker with several motor/ starter options producing linear motion. The Mini COBRA 3-Panel shaker is a smaller footprint and weir height design shaker for smaller land and workover rigs. The shaker is almost always located at the flow line unless it is preceded by a "scalping" or gumbo separator. The shaker removes a large percentage of drill cuttings before the mud is circulated through the surface mud system, leading to improved performance of downstream solids control equipment.

Technical Specifications	
Vibration	Linear
Screens and Deck Type	(2) Screens (0°, +5°, +5°)
Basket Angle	Adjustable (0° to 3°)
Special Features	N/A
Screen Type	Pretension Repairable
G-Force	6.6 Nominal G's
Deck Area	25.4 ft² (2.4m²)
Motor Data	(2) 2.5 hp (1.9 kw)
Weir Height	24 in. (610 mm)
Dimensions	105 in x 66 in x 53 in (2657 mm x 1680 mm x 1346 mm)
Weight	3800 lbs (1724 kg)

KING COBRA™ HYBRID



Description

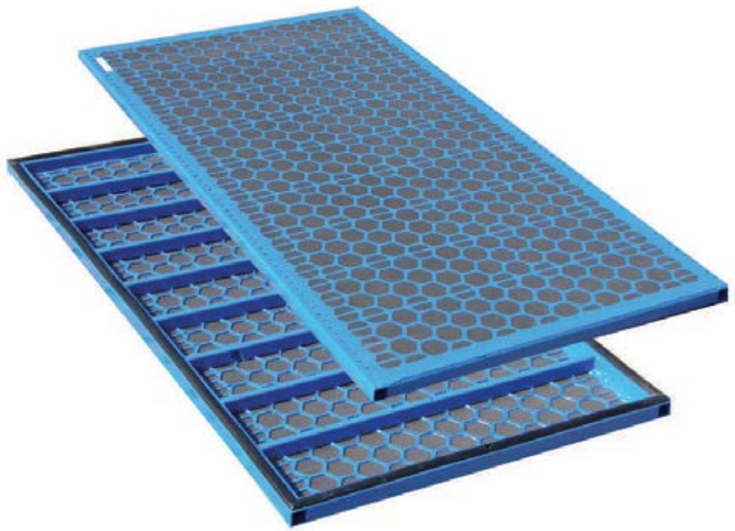
The KING COBRA HYBRID shaker combines the reliable KING COBRA skid, back tank, and screen angle adjustment features with the rugged KING COBRA VENOM shaker basket. The basket's patented CONTOUR PLUS™ design reduces the liquid pool depth to provide better conveyance of drilled solids across the screens. Configured for 0° at the feed panel and +5° on the remaining panels, the CONTOUR PLUS design minimizes basket angle elevation and achieves drier solids and increased screen life by decreasing the mud pool weight over the screens.

Technical Specifications	
Vibration	Linear or Dual
Screens and Deck Type	(4) Screens (0°, +5°, +5°, +5°)
Basket Angle	Adjustable -5° to +3°)
Special Features	N/A
Screen Type	Pretension Repairable
G-Force	Fixed nominal • 6.1 G's - 2.5 hp • 7.4 G's- 2.5 hp "High-G" option • 8.0 G's - 3.5 hp With CONSTANT-G CONTROL - patented worldwide: • Automatically - sustained settings as loading increases or decreases • 6.3 G optimal - 2.5 hp • 7.3 -8.3 G optimal - 3.5 hp
Deck Area	33.4 ft2 (3.1m2)
Motor Data	2.5 hp (1.9 kW) each - Standard 3.5 hp (2.6 kW) each - Optional
Weir Height	24 in. (610 mm)
Dimensions	105 in x 66 in x 53 in (2657 mm x 1680 mm x 1346 mm)
Weight	5300 lbs (2404 kg)
Optional Certifications	ATEX Zone 1, CE Ex II 2 G c IIB T4 Gb; Ta -20°C to +40/55°C • No CGC: Ta -20°C to +55°C • CGC: Ta -20°C to +40°C

brandt@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

VENOM™ Screens

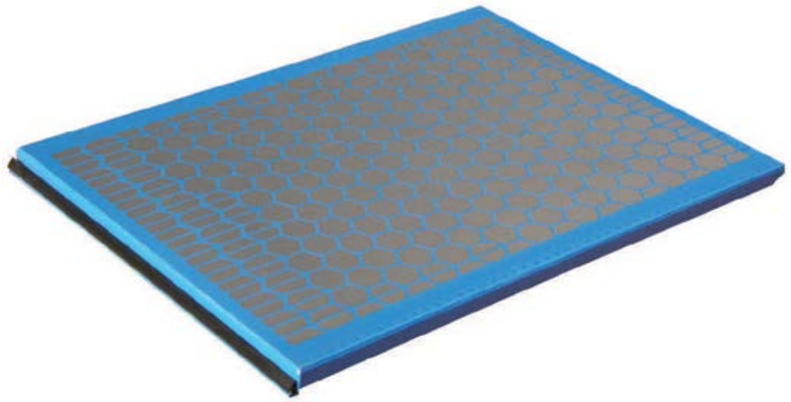


Description

The VENOM series shale shaker screens utilize an advanced frame design and unique mesh combinations to effectively and efficiently separate detrimental drilled solids from drilling fluid. VENOM series screens are designed to fit all COBRA™, KING COBRA™, and LCM-3D series shale shakers. All VENOM Series Screens are API RP 13c Compliant.

Technical Specifications	
VENOM SCREENS	
Available Mesh	MG, XF, RHD, PXL
MG API Availability	20, 30, 40
MG Cut Point Range	900µ– 426µ(Depending on API Size Selected)
MG NBOA	0.50 m^2
XF API Availability	60, 70, 80, 100, 120, 140, 170, 200, 230, 270, 400
XF Cut Point Range	267µ – 39.2µ (Depending on API Size Selected)
XF NBOA	0.50 m^2
RHD API Availability	45, 50, 60, 70, 80, 100, 120, 140, 170, 200
RHD Cut Point Range	334µ – 69.9µ (Depending on API Size Selected)
RHD NBOA	0.50 m^2
PXL API Availability	80, 100, 120, 140, 170, 200, 230, 270, 325
PXL Cut Point Range	192µ – 47.5µ (Depending on API Size Selected)
PXL NBOA	0.47 m^2
Dimensions	49 in x 25 in x 1 in (1250 mm x 635 mm x 25 mm)
Weight	32 lbs (14.5 kg)

VSM-300™ Screens

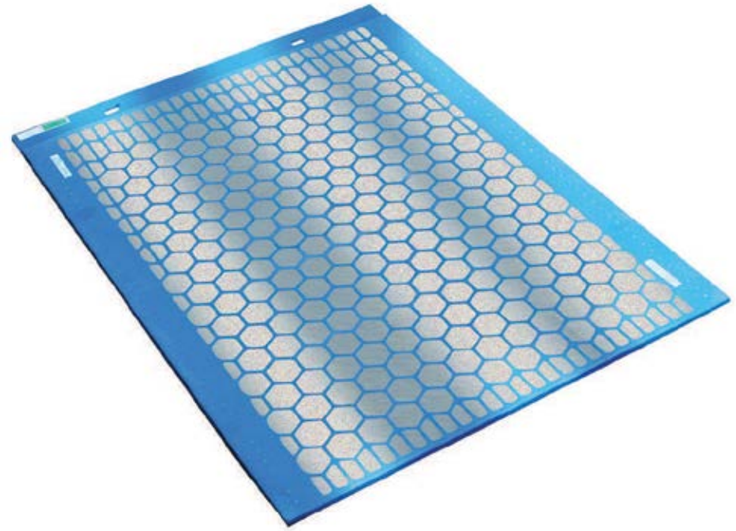


Description

The VSM 300 series shale shaker screens utilize an advanced frame design and unique mesh combinations to effectively and efficiently separate detrimental drilled solids from drilling fluid. All VSM 300 Series Screens are API RP 13c Compliant.

Technical Specifications	
VSM 300 PRIMARY SCREENS	
Available Mesh	XF, RHD, PXL
XF API Availability	60, 70, 100, 120, 140, 170, 200, 230, 270, 325, 400
XF Cut Point Range	261µ – 38.8µ (Depending on API Size Selected)
XF NBOA	0.33 m^2
RHD API Availability	50, 60, 70, 80, 100, 120, 140, 170, 200
RHD Cut Point Range	323µ – 81.6µ (Depending on API Size Selected)
RHD NBOA	0.33 m^2
PXL API Availability	80, 100, 120, 140, 170, 200, 230, 270, 325
PXL Cut Point Range	192µ – 47.5µ (Depending on API Size Selected)
PXL NBOA	0.33 m^2
Dimensions (LxWxH)	35.5 in x 27 in x 1 5/8 in
Weight	22 lbs (9 kg)
VSM 300 SCALPER SCREENS	
Available Mesh	MG
Scalper API Availability	10, 12, 20, 30, 45, 50, 60, 80, 100
Scalper Cut Point Range	2027µ – 150µ (Depending on API Size Selected)
Scalper NBOA	0.36 m2
Scalper Weight	34 lbs (15 kg)
Scalper Dimensions (LxWxH)	35.9 in x 26.6 in x 1.5 in (937 mm x 676 mm x 38 mm)

VSM™ Multi-Sizer Screens



Description

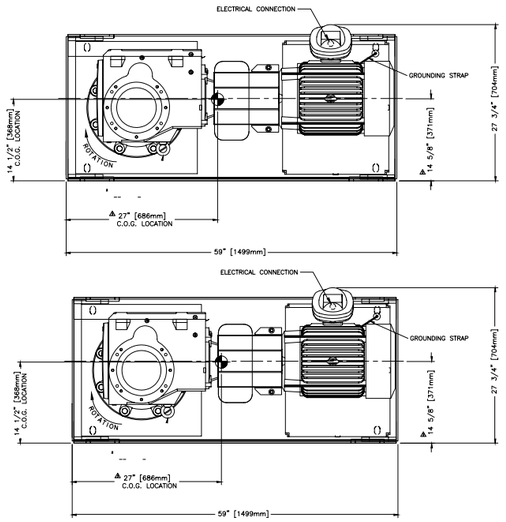
The VSM Multi-Sizer series shale shaker screens utilize an advanced frame design and unique mesh combinations to effectively and efficiently separate detrimental drilled solids from drilling fluid. All VSM Multi-Sizer Series Screens are API RP 13c Compliant.

Technical Specifications	
VSM MULTI-SIZER PRIMARY SCREENS	
Available Mesh	XF, RHD, PXL
XF API Availability	270, 325, 400, 425
XF Cut Point Range	51.3µ – 32.5µ (Depending on API Size Selected)
XF NBOA	0.32 m^2
RHD API Availability	45, 60, 70, 80, 100, 120, 140, 170, 200
RHD Cut Point Range	334µ – 78.3µ (Depending on API Size Selected)
RHD NBOA	0.32 m^2
PXL API Availability	80, 100, 120, 140, 170, 200, 230, 270, 325
PXL Cut Point Range	192µ – 47.5µ (Depending on API Size Selected)
PXL NBOA	0.40 m^2
Dimensions (LxWxH)	36.8 in x 26.9 in x 1.0 in (935 mm x 683 mm x 25 mm)
Weight	30 lbs (13 kg)
VSM MULTI-SIZER SCALPING SCREENS	
Available Mesh	MG
Scalper API Availability	10, 12, 14, 18, 25, 30, 40, 45, 60
Scalper Cut Point Range	60µ – 10µ
Scalper NBOA	0.39 m2
Scalper Weight	18 lbs (8 kg)
Scalper Dimensions LxWxH)	36.9 in x 26.5 in x 1.1 in (937 mm x 673 mm x 27 mm)

brandt@nov.com
nov.com

*For reference only, please contact your local sales contact for more information.

MA-20RG

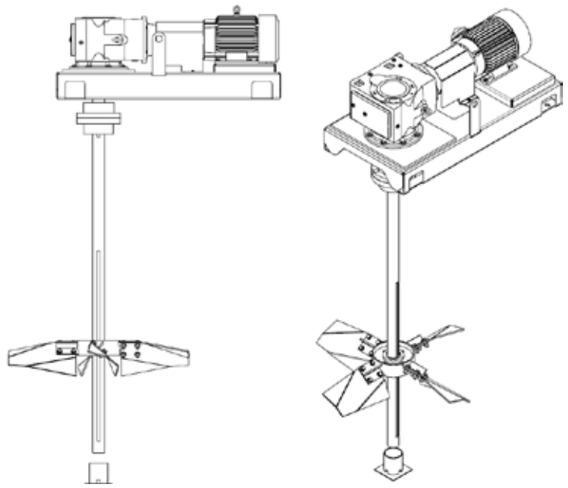


Description

The MA-RG series mud agitators are horizontally mounted motor with a helical-bevel gearbox. They are heavy duty mechanical mixers used for viscous fluids such as drilling fluids. The gearbox utilizes a helical-bevel gear drive system that reduces the rotational speed of the motor to drive the impeller(s). MA-RG series agitators are very compact. Their low profile reduces headroom requirements and provides more layout space on top of the tanks. The 1:1 height to width ratio results in a lower center of gravity, providing stability and safety should the impeller encounter a sudden shock load. MA-RG agitators use a mounting skid for robust installation. They also utilize the same impellers as the VMAI Agitators, the main difference being the size and mounting configuration. Multiple sizes and locations of impeller configurations are available. MA-RG agitators are sized to meet all drilling rigs needs and have a large and successful install base worldwide.

Technical Specifications	
Dimensions (less shaft and impeller)	Length: NEMA: 59 in (1499 mm) IEC: 65 ¾ in (1670 mm) Width: NEMA: 27 ¾ in (704 mm) IEC: 23 in (582 mm) Height: NEMA: 26 ⅛ in (663.6 mm)IEC: 30 in (760 mm)
Weight	1300 lb (590 kg)
Gearbox	Helical-Bevil
Nominal Gearbox Ratio	31:28:1
Maximum Torque	42,480 in-lb (4,799.6 Nm)
Impeller Shaft Diameter	3.25 in (82.6 mm)
Impeller Shaft Weight	28.2 lb/ft (35.7 kg/m)

MA-10RG

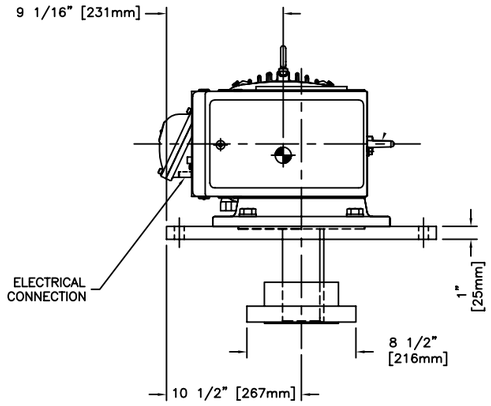


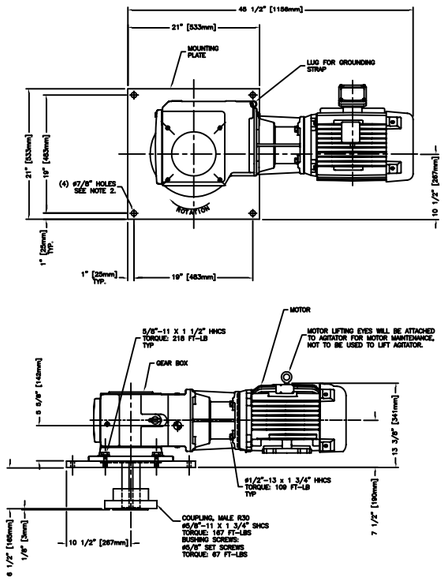
Description

The MA-RG series mud agitators are horizontally mounted motor with a helical-bevel gearbox. They are heavy duty mechanical mixers used for viscous fluids such as drilling fluids. The gearbox utilizes a helical-bevel gear drive system that reduces the rotational speed of the motor to drive the impeller(s). MA-RG series agitators are very compact. Their low profile reduces headroom requirements and provides more layout space on top of the tanks. The 1:1 height to width ratio results in a lower center of gravity, providing stability and safety should the impeller encounter a sudden shock load. MA-RG agitators use a mounting skid for robust installation. They also utilize the same impellers as the VMAI Agitators, the main difference being the size and mounting configuration. Multiple sizes and locations of impeller configurations are available. MA-RG agitators are sized to meet all drilling rigs needs and have a large and successful install base worldwide.

Technical Specifications	
Dimensions (less shaft and impeller)	Length: NEMA: 46 ⅜ in (1177 mm) IEC: 46 ⅜ in (1177 mm) Width: NEMA: 26 in (660 mm) IEC: 26 in (660 mm) Height: NEMA: 20 ¼ in (512 mm) IEC: 20 ½ in (521 mm)
Weight	750 lb (340 kg)
Gearbox	Helical-Bevel
Nominal Gearbox Ratio	34:39:1
Maximum Torque	24,780 in-lb (2,799.76 Nm)
Impeller Shaft Diameter	3 in (76.2m)
Impeller Shaft Weight	24 lb/ft (35.7 kg/m)

MA-RGC





Description

The MA-RG-C horizontal agitator uses a triple reduction helical bevel gearbox driven by a C-face motor with a close coupling style. This variation also features a base plate instead of a mounting skid, reducing the overall height.

Impellers
Impellers are available with flat blades (radial flow), contour blades (axial flow) and canted blades (radial/axial flow). The impellers are sized according to tank volume and expected duty. Active mud system compartments such as solids removal sections, mud mixing sections, and slug pits which need a higher shear force to produce immediate mixing, are another consideration in impeller sizing.

Shafts
Several types of shafts are offered. Mild steel shafts are cut to length and joined to the gearbox output shaft with a rigid coupling. Solid shafts are keyed at the bottom for adjustment of impeller height. Hollow pipe shafts are available on select models for use in deep tanks. They are supplied in flanged sections and bolted together making them ideal when lifting height is limited.

Features
- Explosion proof motors & starters (optional)
- Provides optimal mixing
- Triple reduction helical gearbox
- Baseplate mounted & motor direct mounted

Benefits
- Can be used in a variety of locations
- Lowers mud cost
- Quiet, efficient, low operational temperature
- Small footprint
- Requires less headroom

Technical Specifications					
Model	hp/kW	Length	Width	Height	Weight
MA-3RG-C	3 hp (2.2kW)	NEMA: 34 1/2 in. (876mm)	NEMA: 17 in (432 mm)	NEMA: 11 1/8 in (283 mm)	340 lb (154.2 kg)
MA-5RG-C	5 hp (3.7 kW)	NEMA: 37 ½ in (952 mm)	NEMA: 17 in (432 mm)	NEMA: 11 ¼ in (286 mm)	351 lb (159.2 kg)
MA-7.5RG-C	7.5 hp (5.6 kW)	IEC: 40 ⅛ in (1019 mm)	IEC: 16 in (407 mm	IEC: 12 ⅝ in (321 mm)	481 lb (218.2 kg)
MA-10RG-C	10 hp (7.5 kW)	NEMA: 45 ½ in (1156 mm)	NEMA: 21 in (533 mm)	NEMA: 13 ⅜ in (341 mm)	685 lb (311 kg)
MA-15RG-C	15 hp (11.2 kW)	NEMA: 50 ½ in (1283 mm)	NEMA: 22 in (559 mm)	NEMA: 14 ¾ in (375 mm)	839 lb (381 kg)

Engineering Tables

*For reference only, please contact your local sales contact for more information.

Multiply	By	To Obtain
Acre Feet	7758	Barrels
Acres	0.4047	Hectares
Acres	43560	Square Feet
Atmospheres	1.00323	Kilograms Per Sq Centimeter
Atmospheres	14.696	Pounds Per Square Inch
Barrels	5.614	Cubic Feet
Barrels	0.15898	Cubic Meters
Barrels	42	Gallons
Barrels Per Day	0.15898	Kiloliter a Day
Barrels Per Day	0.15625	Metric Tons a Day
Bars	14.503	Pounds Per Square Inch
Centimeters	0.032808	Feet
Centimeters	0.3937	Inches
Centimeters	0.010936	Yards
Cubic Centimeters	0.06102	Cubic Inches
Cubic Centimeters	0.03381	Fluid Ounces
Cubic Feet	0.02832	Cubic Meters
Cubic Feet	7.48	Gallons
Cubic Feet	28.316	Liters
Cubic Feet Per Minute	0.04719	Liters Per Second
Cubic Feet Per Minute	0.028317	Cubic Meters Per Minute
Cubic Feet-Water (60 Degrees F)	62.366	Pounds (AVDP)
Cubic Inches	16.387	Cubic Centimeters
Cubic Inches	0.01639	Liters
Cubic Meters	6.289	Barrels
Cubic Meters	35.3146	Cubic Feet
Cubic Meters	1.30795	Cubic Yards
Cubic Meters	264.172	Gallons
Cubic Meters Per Hour	4.4028	Gallons Per Minute
Feet	30.48	Centimeters
Feet	0.3048	Meters
Gallons	0.02381	Barrels
Gallons	0.003785	Cubic Meters
Gallons	231	Cubic Inches
Gallons	3.785	Liters
Gallons Per Minute	34.296	Barrels Per Day
Gallons Per Minute	227.1	Liters Per Hour
Gallons Per Minute	0.00105	Liters Per Second
Gallons (IMP)	1.201	Gallons
Gallons Water (60 Degrees F)	8.337	Pounds (AVDP)
Grams	0.0353	Ounces
Grams Per Square Centimeter	0.0142	Pounds Per Square Inch
Grams Per Cubic Centimeter	0.0361	Pounds Per Cubic Inch
Horsepower	0.7457	Kilowatts

Multiply	By	To Obtain
Horsepower	745.7	Watts
Horsepower	550	Foot Pounds Per Second
Inches	2.54	Centimeters
Inches	0.0254	Meters
Inches Mercury (60 Degrees F)	1.1308	Feet Water (60 Degrees F)
Kilograms	35.2739	Ounces
Kilograms	2.20462	Pounds (ADVP)
Kilograms	0.001102	Short Tons
Kilograms Per Cubic Meter	0.0624	Pounds Per Cubic Foot
Kilograms Per SQ Centimeter	14.223	Pounds Per Square Inch
Kilometers	3280.8	Feet
Kilometers	0.6214	Miles (Statute)
Kilowatts	1.3405	Horsepower
Liters Per Hour	0.0044	Gallons Per Minute
Liters	0.2642	Gallons
Liters	0.03531	Cubic Feet
Liters	61.025	Cubic Inches
Liters Per Second	2.1189	Cubic Feet Per Minute
Liters Per Second	15.8507	Gallons Per Minute
Meters	3.2808	Feet
Meters	39.37	Inches
Meters	1.0936	Yards
Miles (Statute)	1.6093	Kilometers
Millimeters	0.03937	Inches
Pounds (AVDP)	0.4536	Kilograms
Pounds Per Square Inch	70.069	Grams Per Sq Centimeters
Pounds Per Square Inch	0.07031	Kilograms Per SQ Centimeter
SQ Centimeters	0.155	Square Inches
Square Feet	0.0929	Square Meters
Square Inches	6.4516	SQ Centimeters
Square Inches	645.16	Square Millimeters
SQ Kilometers	0.3861	Square Miles
Square Meters	10.7639	Square Feet
Square Meters	1.959	Square Yards
Square Miles	640	Acres
SQ Millimeters	0.00155	Square Inches
Square Yards	0.8361	Square Meters
Tons (Short)	907.184	Kilograms
Tons (Short)	0.907184	Tons (Metric)
Tons (Metric)	2204.622	Pounds (AVDP)
Tons (Metric)	1.1023	Tons (Short)
Watts	0.00134	Horsepower
Yards	91.44	Centimeters
Yards	0.9144	Meters

Other Calculations	
For Rotating Objects	$HP = \frac{T \times N}{5252}$ T = Torque (lbft) N = Speed (rpm)
Objects in Linear Motion	$HP = \frac{F \times V}{33000}$ F = Force (lbs) V = Velocity (ft/min)
For Pumps	$HP = \frac{GPM \times Head \times Specific\ Gravity}{3960 \times Efficiency\ of\ Pump}$ $HP = \frac{GPM \times PSI}{1713 \times Efficiency\ of\ Pump}$ GPM = Gallons Per Minute Head = Height of Water (ft) Efficiency of Pump = 100% PSI = Pounds per Inch Specific Gravity of Water = 1.0 1 CuFt per SEc. = 448 GPM 1 PSI = A Head of 2.309 ft (water weight) 62.36 lbs per CuFt at 62F
For Fans and Blowers	$HP = \frac{CFM \times PSF}{33000 \times Efficiency\ of\ Fan}$ $HP = \frac{CFM \times PIW}{6356\ X\ Efficiency\ of\ Fan}$ $HP = \frac{CFM \times PSI}{229 \times Efficiency\ of\ Fan}$ CFM = Cubic Feet per Minute PSF = Pounds per Square Foot PIW = Inches of Water Gauge PSI = Pounds per Square Inch Efficiency of Fan = 100%

Note: Gallons are US gallons unless otherwise specified. Barrels are 42 US gallons.

rig@nov.com

nov.com

Corporate Headquarters
7909 Parkwood Circle Drive
Houston, Texas 77036
USA

Rig Technologies Headquarters
10353 Richmond Avenue
Houston, Texas 77042
USA

rig@nov.com

nov.com

Rigdoc 100622415