Technical Description

Brandt® King Cobra Hybrid Shaker

REFERENCE	REFERENCE DESCRIPTION
Shakers	Shale Shaker

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CHANGE DESCRIPTION

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01	First issue

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1 FUNCTIONAL DESCRIPTION

The NOV Brandt® King Cobra Hybrid Shaker is a fine screen shaker with several motor/starter options producing linear, smart controlled acceleration linear, or dual elliptical and linear motion. The shaker is almost always located at the flow line unless it is preceded by a “scalping” shaker or gumbo box. The King Cobra Hybrid 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.

The King Cobra Hybrid Shaker is designed to do two primary jobs:

- separate drilled solids from the mud
- transport the solids rapidly and efficiently off the screens

1.1 Functions

- Removes detrimental drilled solids with efficient linear or elliptical motion
- Minimize mud loss while enhancing cuttings dryness and saving valuable fluids
- Multi-plane design extends screen life
- Optimizes screen coverage for greater shaker performance
- Treats the full flow
- Removes solids before degradation occurs
- Relieves loading on downstream equipment
- Allows for faster rate of penetration (ROP)

The shaker’s mechanical condition, operating parameters, and screen selection can make or break the shaker’s performance

2 TECHNICAL DESCRIPTION

2.1 General Description

Rigs may employ any number of shakers, depending on the specific drilling parameters of the well. Typically, several shakers are utilized for normal drilling operations. Additional shakers are added in response to a specific well program.

DIMENSIONS	
LENGTH [IN (MM)]:	120 (3048)
WIDTH [IN (MM)]:	67 (1701.8)
HEIGHT* [IN (MM)]:	65 (1651)
NOMINAL WEIGHT* [LB (KG)]:	4500 (2041.2)
WEIR HEIGHT [IN (MM)]:	41 (1041.4)
WEIR HEIGHT OPTION [IN (MM)]:	37 (938.9)
BASKET ANGLE RANGE:	-5° to +3°
DECK AREA [FT^2 (M^2)]:	33.4 (3.1)
NUMBER OF SCREENS	4
DECK TYPE	0^0,$+5^0$,$+5^0$,$+5^0$

* Dependant on Shaker Features

MOTION OPTIONS					
VIBRATION TYPE*	Linear or Elliptical	CGC Linear	CGC Dual Motion	CGC Linear	CGC Dual Motion
EACH MOTOR [HP (KW)]	2.5 or 3.5 (1.86 or 2.6)	2.5 (1.86)	2.5 (1.86)	3.5 (2.6)	3.5 (2.6)
G-FORCE	6.3 or 8.3 Nominal	6.3	6.3 Linear 6.3 Elliptical	7.3, 8.3	7.3, 8.3 Linear 6.3, 7.3 Elliptical

* Dependant on Shaker Features

3 COMPONENTS

- Shaker basket
- Vibratory Motors
- Skid
- Back tank

3.1 Shaker Basket

During optimal operation, with the basket in the neutral position, the first screen is evenly flooded with 1 to 2 in (25 to 51 mm) of mud. The pool of mud creates an even hydrostatic head on the screen surface that increases the amount of mud that can pass through the first three screens. The first screen of the King Cobra Hybrid is flooded more evenly and shallowly, a slow-moving solids bed does not form, thus increasing screen life and optimizing shaker performance.

- The design of the King Cobra Hybrid basket also includes a drying screen
- The liquid pool extends to the end of the third screen, and the fourth screen is used to remove all excess liquid from the screened particles (dry the cuttings)
- During flow surges or changes in flow conditions, liquid can run off the end of the third screen and onto the fourth screen
- Fluid on the fourth screen flows back to the baffle plate and builds up a second pool, preventing the loss of any whole mud off the end of the shaker
- Angle adjustment allows the basket to be tilted upward by as much as 3° and downward by as much as -5°
- During unusually heavy flow conditions the basket can be pivoted uphill to increase the depth of the pool

Sticky clays and gumbo often do not convey uphill and may not convey horizontally with a linear motion shaker. When sticky clays or gumbo are encountered, the basket can be tilted downward to make sure that the material conveys. The operator can adjust the basket angle while the unit is running by using the hand wheels located on each side of the basket.

If your King Cobra Hybrid separator is equipped with the tuned elliptical motion option, you may find that switching from linear motion to tuned elliptical motion results in improved conveyance of sticky clays and gumbo.

3.2 Vibratory Motors

The vibrator system includes the two canister type vibrator motors, a motor mounting motion tube and a plate. Each vibrator motor contains eccentric weights that generate a circular shaking force when rotated. During operation the two motors rotate in opposite directions, creating either a net linear or a net elliptical shaking force on the basket. This shaking force is directed through the center of mass of the basket, resulting in equal motion along the entire length of the screening surface. The motion conveys the solids along the screen, even upward, and off the discharge end of the shaker. The basket motion has been carefully designed to give the unit optimum performance over a wide range of drilling conditions.

- 2.5 hp or 3.5 hp electric motors
- Available for most voltage/frequency requirements
- Other electrical code styles and temperature ratings also available

(Reference motor data sheet for specific information.)

3.2.1 Linear (Straight Line) Motion

- Developed by a pair of eccentric shafts rotating in opposite directions
- Provides superior cuttings conveyance
- Able to operate at an uphill slope to provide improved liquid retention and better conveyance, which allows the use of API #200 (74µ) screens

3.2.2 Tuned Elliptical Motion

- Gently clears the screen of solids and allows for a flat or a slightly inclined bed
- Allows conveyance of sticky clays and gumbos

3.3 Skid

- Skid mounting allows easy installation, take down, and transportation
- Multiple Shakers may be placed on same skid for minimal footprint
- Safely transfers reaction forces to the top of the mud tank

3.4 Back Tank

- Allows for adjustable weir plates to regulate mud flow across shaker
- Can be shared between multiple shakers in a shaker system

4 CONTROLS

4.1.1 Constant-G Control®* (CGC)

- Maintains an optimal G-force rating on Brandt® shaker products during varying liquid/solids loading conditions
- Maximizes shaker screen performance, solids conveyance, and throughput while enhancing screen life
- Automatic power adjustment to clear shaker under heavy loading
- Increases shaker capacity up to 35%
- Provides capability to screen up to 3 API screens finer
- Larger motors
- Extends motor and bearing life
- G-Force sensor (accelerometer)
- VFD starter
- **Benefits:**
  - Automatic adjustments for high throughput in top hole
  - Automatic adjustments for high screen life in bottom hole

* Constant-G Control is a patent-pending technology and an industry first

4.1.2 CGC Operational Description (select models only)

On a conventional shaker, G-force drops as weight on the basket increases due to constant motor RPM and force, causing the unit to be less efficient while loaded and to experience a reduction in its ability to process drilling fluids.

With the addition of an accelerometer on the basket tied to the VFD operating the motors, the VFD is able to constantly monitor the basket G-force and adjust the motor speed in order to maintain G-force at predetermined set points, depending on fluids and solids loading on the basket. The basket will run at a lower G-force and will reduce wear on screens and components, while operating with little solids loading. When loading becomes more extreme and higher G's are needed to process all of the drilling fluid, the basket will automatically ramp up to a higher G-force.

5 PAINT SPECIFICATIONS

Paint specifications per NOV Standard provided upon request.