



WARRIOR

MOVE PIPE BETTER™



Q1-0357



8C-0136

500E ELECTRIC TOP DRIVE (500 ton - 1000 hp)

Warrior's revolutionary design is a step-change in top drive technology, providing the end-user with features and benefits not available in existing top drives.

IN
DEVELOPMENT:
MODEL 250E
(250 ton)



For applicable patents see www.warriorrig.com/company/patents

This innovative Warrior top drive maximizes uptime by significantly improving reliability, redundancy and serviceability.

Numerous design advancements improve operational safety and efficiency:

High Performance

- 50,000 ft-lbs continuous torque rating

Redundant Power Delivery

- Four independent power pathways from the AC bus to the top drive quill
- No single-point sources of failure from generator to drill pipe

Revolutionary Power Transmission

- No gearcase
- No power transmission lubrication

Serviceability

- Most major modules are interchangeable without specialized technicians
- Comprehensive advanced diagnostics

Safety & Efficiency

- Comprehensive feedback of pipe handler functions
- Enhanced user interface and top drive control functions

Optional Top Drive Retraction System

- Improved trip speeds

Optional Integrated Casing Drive

- Casing running tool not required

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BALANCED TOP DRIVE



Retractable Bucket/Hook Adapter

Two 10-hp AC Blower Motors

Advanced Washpipe Handling (no hammer nuts)

Four 250-hp AC Induction Motors (balanced weight)

Integrated Folding Service Platform

Power Transmission

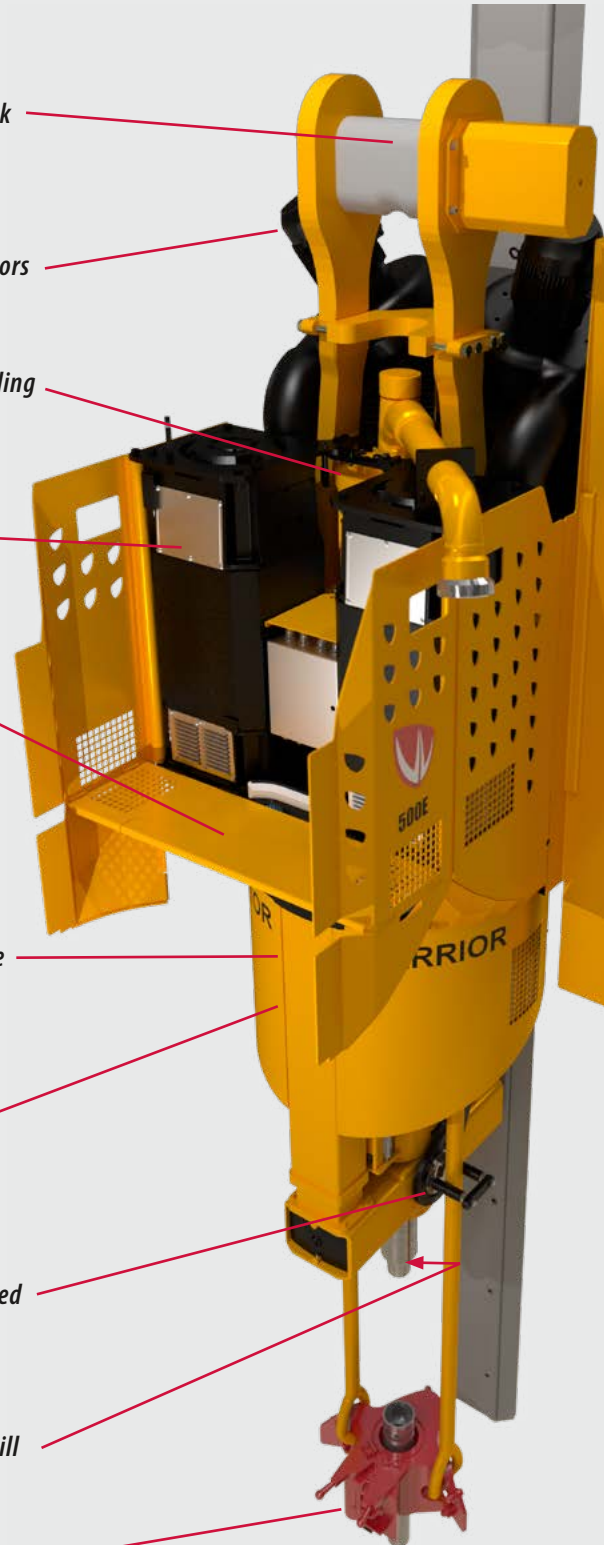
Integrated Casing Drive (optional)

Fully Instrumented Rotatable Pipe Handling System

Mechanically Synchronized Link Tilt

Zero-G Soft-Stabbing Quill

Elevator Link Snubbing



REVOLUTIONARY POWER TRANSMISSION

- Balanced motor distribution
- Four independent modular drives
- High-capacity synchronous belt drives
- Highly redundant - operations can continue with major component failure
- Externally serviceable without specialized technicians
- No gearcase or power transmission lubrication
- Field-convertible transmission ratio



FEATURES & BENEFITS

1. Redundancy

- Redundant power delivery – four independent power pathways from the AC bus to the top drive quill, including rectifiers, variable-frequency drives, cabling, motors and mechanical drives. No single-point sources of failure from generator to drill pipe.
- Redundancy in most auxiliary functions

2. Reliability

- No hydraulic rotary union
- No gearcase
- No power transmission lubrication
- Continue to operate with component failure

3. Serviceability

- Modular design
- Specialized technicians are not required for field service of most major modules, including motors, mechanical power transmission, VFD modules and auxiliary actuators
- Externally serviceable power transmission modules
- Improved diagnostic capabilities
- Plug & play control system modules
- Low elevation service

4. Reduction/Elimination of Overhead Oil Leakage

- No power transmission oil lubrication
- Hydraulic Pipe Handler (standard)
 - Integrated, redundant hydraulic power
 - Minimal hydraulic connections
 - No hydraulic service loop
 - No hydraulic rotary union
 - Valve actuator with no dynamic hydraulic sealing

5. Auxiliary Functions

- Mechanically synchronized Link Tilt
- Full instrumentation of the rotary Pipe Handler functions
 - Closed-loop control of Link Tilt angle and orientation
 - Multiple Link Tilt angle and orientation operator-controlled pre-set positions
 - Link Tilt collision avoidance
 - Automated gripper release in case of over-extension
 - Gripper position control with multiple operator-controlled pre-set positions
 - Capable of elevator latch confirmation feedback for either manual or remote-controlled elevators
 - Open and closed confirmation feedback for Remote Drillstem Valve

6. Portable Integration Package (optional)

- Compact monorail guide rail for wide applicability in compact masts without substantial customization
- Efficient guide rail rig-up with minimal work at high elevation
- No tools or loose parts at high elevation
- Integral service loop support and transport provisions
- Compact VFD package with integral electrical cable carrier system
- Minimal electrical connections and no hydraulic connections

7. Application Flexibility

- Monorail torque reaction or mast/derrick integrated tracks
- Conventional traveling block interface (various types) or split traveling blocks
- Retraction system available for improved trip speeds

8. Washpipe Handling

- Simple bolted gland retention system facilitates easy change-out without the slow, laborious and hazardous hammer nuts
- Handling fixture simplifies transit and placement of the washpipe/gland assembly

9. Pipe Handling Efficiency

- Zero-G Soft-Stabbing Quill also provides thread advance compensation
- Elevator link snubbing for cushioned dynamic stand pick-up

10. Safety

- API 8C PSL1 monogrammed
- Automated gripper release in case of over-extension
- Collision avoidance
- Elevator latch confirmation
- Remote Drillstem Valve open and closed confirmation
- Integrated Folding Service Platform
- Advanced Washpipe handling (no hammer nuts)
- Inherently safe Pipe Handler rotation lock
- Rig-up safety features

11. Integrated Casing Drive (optional)

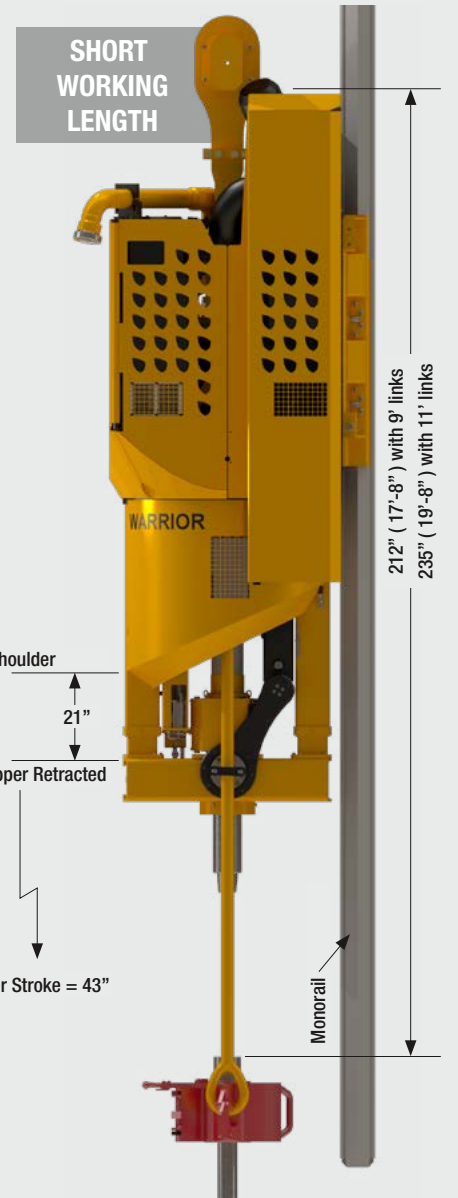
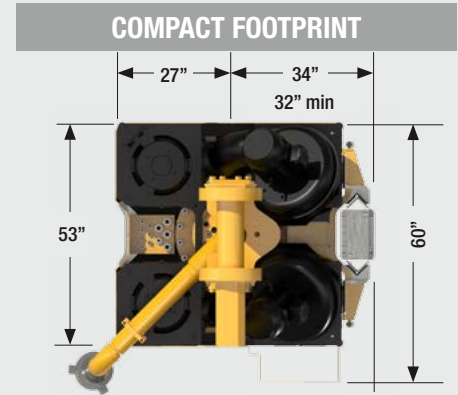
- Make-up, rotate and circulate casing without a casing running tool and without threading into it

Future Features

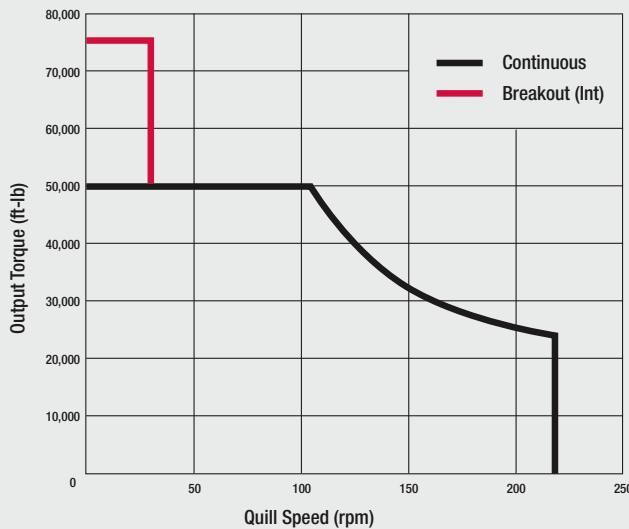
- Electric Pipe Handler
 - All auxiliary functions electrically actuated
 - No overhead hydraulics
- Three-point wrench grip (Electric Pipe Handler only)
 - preferred for premium drillpipe connections.
- Ultra-compact ATR monorail system
- Optional powered washpipe system
 - Fully mechanized washpipe assembly
 - Change the washpipe with one person in less than 5 minutes with no tools
 - Change the washpipe at the racking board to avoid racking back a stand
- Permanent magnet motor version with 65,000 ft-lbs continuous torque rating

WARRIOR 500E ELECTRIC TOP DRIVE SPECIFICATIONS

Hoisting Capacity, API 8C Static (Elevator Load Path) Static (Quill Load Path) Dynamic (Bearing)	500 tons 500 tons 400 tons (standard) 500 tons (optional)
Breakout Torque	75,000 ft-lb
Continuous Torque Rating (Induction Motor, standard) High Ratio (8.000:1) Low Ratio (7.000:1)	50,000 ft-lb @ 105 rpm 44,000 ft-lb @ 120 rpm
Continuous Torque Rating (PM Motor, Optional)	65,000 ft-lb @ 105 rpm
Maximum Speed High Ratio (8.000:1) Low Ratio (7.000:1)	220 rpm 250 rpm
Motors	4 x 250 HP, AC induction
Electrical Area Classification	CSA Class 1 Zone 2 (standard) ATEX Zone 2 (optional) ATEX Zone 1 (optional)
Cooling System	2 x 10 HP blowers
Watercourse	3 inch, 7500 psi
Gripper Diameter Range Drilling Integrated Casing Drive	4.50 to 9.75 in Up to 9-5/8 casing
Quill Connection	6-5/8 Reg
Zero-G Soft-Stabbing Quill Travel	5.75 in
Elevator Link Snubbing Travel	7.75 in
Approximate Weight	32,000 lbs



WARRIOR 500E-1000-8.00 TOP DRIVE PERFORMANCE



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