TorkDrive™ Electronic Modular Casing-Running and Drilling Tool

Minimizes manual casing handling on offshore rigs by using mechanized equipment and wireless controls

Applications

- Running and pulling casing, reaming with casing, and drilling with casing in:
  - Operations with tapered casing strings
  - Deep wells
  - Deepwater wells
  - Extended-reach and deviated wells
- Operations with exceptional challenges and/or safety risks
- Pushing down, reciprocating, circulating, and rotating casing during casing-running, drilling-with-casing (DwC™), or reaming-with-casing (RwC™) operations

Features and Benefits

- The TorkDrive electronic modular (EM) casing-running and drilling tool mitigates differential sticking and other problems that can lead to nonproductive time.
- The tool enhances safety by removing conventional tongs, elevators, and associated personnel from the rig floor.
- Remotely operated bails eliminate the need for a stabber in the derrick.
- The electronic control system directly integrates with existing rig control systems to enable wireless operation from the driller's cabin.
- Exchangeable clamping modules accommodate a range of pipe sizes. An external clamping module handles 4 1/2- to 10 3/4-in. tubulars; three internal clamping modules handle 9 5/8- to 22-in. casing.
- The modular design accelerates and simplifies rigging up and exchanging the clamping modules. The separate actuator and clamping modules reduce individual component size and weights on smaller rigs and increase efficiency when running tapered casing strings.
- The tool design enables switching between fill-up and circulation modes without repositioning the tool, which enhances operational efficiency.
- A sliding sleeve mechanism enables venting during casing-string fill-up to eliminate pressure buildup and prevent the sudden release of compressed air when the tool is removed from the casing.
- The flowback feature of the mud-saver valve enables automatic switching between fill-up and flowback modes, which eliminates the need to remove the mud-saver valve or reposition the tool.
- Wireless, remote control enables operations in any rig-floor environment.
- Multiple safety interlocks help to prevent dropped strings.

The TorkDrive EM tool directly integrates with existing rig control systems to enable operation from the driller's cabin, which reduces personnel on the rig floor.

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Features and Benefits (continued)

- The integral-compensator design helps to prevent thread damage by neutralizing tool and joint weight during makeup or breakout. The integral compensator also enables the operator to quickly position the tool over successive joints for maximum efficiency. The long compensation stroke facilitates instant switching between makeup and breakout without repositioning the tool.
- The patented external clamping system evenly distributes and maintains gripping force during rotation, reciprocation, and push-down operations to enable running longer, heavier strings at high circulating pressures and to minimize the potential for pipe damage.
- The ability to hoist casing using a top-drive connection rather than elevator bails (links) enables rotational speeds up to 100 rpm for more efficient makeup cycles and DwC operations.
- A variety of torque-reaction-bracket designs adapt to any rig structure for faster operational response.
- Integral torque/turn monitoring capabilities are completely independent of the top-drive control system and facilitate safe, efficient troubleshooting.
  - The TorkSub™ electronic load cell provides accurate measurements of the applied torque and string weight to indicate string sticking.
  - A high-resolution turns sensor monitors turns/rpm during makeup, which enables operators to respond to inadequate or excessive torque.
  - Both the TorkSub load cell and turns sensor are ATEX certified for use in hazardous environments, which reduces the risk of gas ignition.
- The tool is compatible with Weatherford TorkPro® software, which displays torque data and enables monitoring of dynamic forces that could affect connection makeup.

Tool Description

TorkDrive tools are the primary components of the Weatherford OverDrive™ system, which provides a safer, more efficient alternative to conventional casing installation. Each TorkDrive tool combines several conventional casing-running tools: a power tong, elevator, fill-up/circulation tool, and weight compensator.

The TorkDrive EM tool is well suited for running and pulling casing, drilling with casing, and reaming with casing in offshore operations and other challenging well applications. It can be used to circulate, push down, reciprocate, and rotate the casing string while providing up to 80,000 ft-lb (108,465 N•m) of torque.

Mounted on the top drive and operated remotely, the TorkDrive EM tool uses the rotational power of the top drive to make up casing. This configuration eliminates scaffolding, equipment, and personnel typically needed on the rig floor to run casing. The tool is capable of interfacing with any top-drive system and can be installed quickly, without modifications, to the top drive or rig structure.

The Weatherford TorkDrive suite also includes the TorkDrive heavy-duty, compact, DT, and modular casing-running and drilling tools.

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Specifications

Clamping tool	External	Internal	Internal	Internal
Pipe size	4-1/2 to 10-3/4 in.	9-5/8 to 10-3/4 in.	11-3/4 to 15 in.	16 to 22 in.[a]
Rated load [b]	500 tons (453,592 kg)	500 tons (453,592 kg)	650 tons (589,670 kg)	650 tons (589,670 kg)
Connection to top drive	7 5/8-in. API Reg			
Design standard	API 8C PSL 1			
Maximum push-down force with standard mechanical bumper plate	50 tons (45,359 kg)	25 tons (22,680 kg)	25 tons (22,680 kg)	25 tons (22,680 kg)
Maximum push-down force with optional hydraulic bumper plate	N/A	50 tons (45,359 kg)	50 tons (45,359 kg)	50 tons (45,359 kg)
Maximum rotating speed	100 rpm			
Approximate weight, including actuator and fill-up tool	13,960 lb (6,330 kg)	9,700 lb (4,400 kg)	9,925 lb (4,500 kg)	11,800 lb (5,350 kg)
Maximum circulating pressure	3,625 psi (25 MPa)			
Minimum tool ID	With 4 1/2- to 5 1/2-in. fill-up tool: 1.535 in. (39 mm) With 6 5/8- to 8 5/8-in. fill-up tool: 1.968 in. (50 mm) With 9 5/8- to 24-in. fill-up tool: 2.756 in. (70 mm)	With 9 5/8- to 10 3/4-in. mud bridge: 2.559 in. (65 mm) With 11 3/4- to 14-in. mud bridge: 2.559 in. (65 mm)	With 9 5/8- to 10 3/4-in. mud bridge: 2.559 in. (65 mm) With 11 3/4- to 14-in. mud bridge: 2.559 in. (65 mm)	With 16- to 22-in. mud bridge: 2.756 in. (70 mm)

[a] *The 22-in. size requires a modified bumper plate. For more information, contact an authorized Weatherford representative.*
[b] *String weight and circulation pressure load are included.*

Power Unit

Weight, including oil	3,310 lb (1,500 kg)
Dimensions, L × W × H	67.2 × 35.3 × 70.2 in. (1,702 × 896 × 1,783 mm)
Power	30 hp (22 kW) at 400 V/50 Hz 34 hp (25 kW) at 460 V/60 Hz

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Specifications (continued)

Actuator

Pipe size	4-1/2 to 22 in.
Approximate weight	7,275 lb (3,300 kg)
Maximum makeup torque capability	80,000 ft-lb (108,500 N•m)
Maximum rotating speed	100 rpm

Actuator Shipping Container

Empty weight	2,870 lb (1,300 kg)
Maximum payload	7,700 lb (3,500 kg)
Maximum gross weight	10,590 lb (4,800 kg)

Wireless Control Panel

Operating temperature range	−22 to +122°F (−30 to +50°C)
Weight	6.6 lb (3 kg)
Dimensions, L × W × H	13.5 × 9.2 × 7.2 in. (342 × 234 × 183 mm)
Frequency, CE-approved European module	433.050 to 434.775 MHz
Frequency, FCC- and IC-approved module	458.525 to 459.175 MHz
Signal strength	10 mW
IP class	65
Batteries	Rechargeable Li-ion, 7.2 V, 1,100 mAh; use only original spare batteries
Operating time	Approximately 8 hours of continuous operation with fully charged batteries
ATEX class	II 2 G Ex ia IIB T4 Gb

Bails

Weight	660 lb (300 kg)

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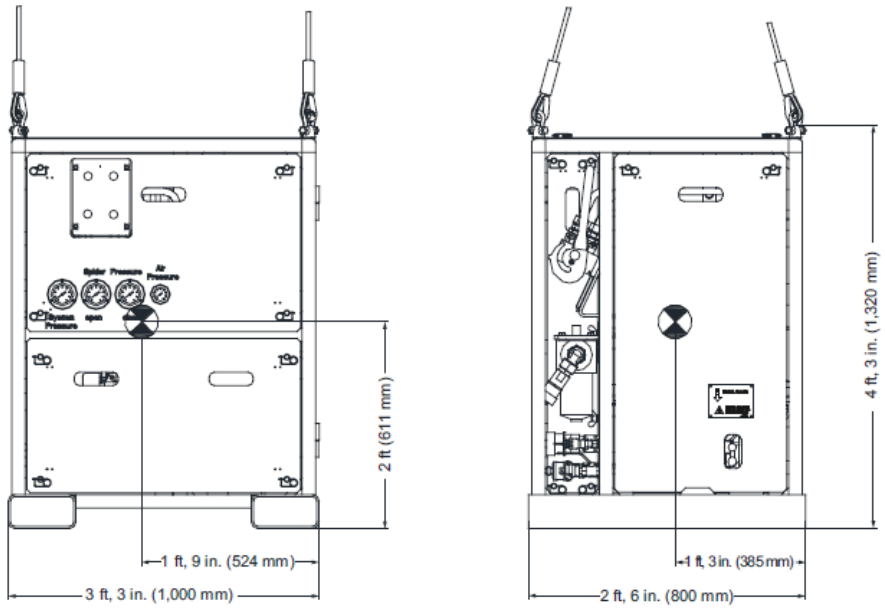
Specifications (continued)

Base Box

Approximate weight	1,102 lb (500 kg)
Maximum hydraulic pressure	2,466 to 3,046 psi (17 to 21 MPa)
Maximum hydraulic flow	15.9 to 21.1 gal/min (60 to 80 L/min)
Maximum hydraulic fluid temperature	158°F (70° C)
Oil filtration	10 µm



Base box

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Specifications (continued)

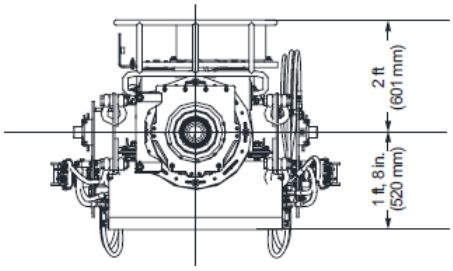
External Clamping Tool

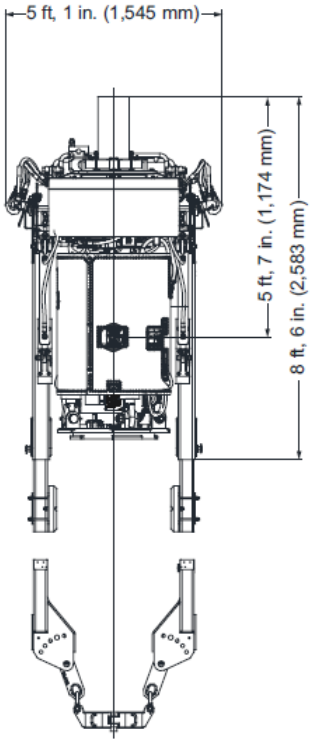
Pipe size [a]	4-1/2 to 10-3/4 in.
Approximate weight [b]	6,614 lb (3,000 kg)
Maximum makeup torque capability	60,000 ft-lb (81,349 N•m)
Maximum rotating speed	100 rpm

[a] *The pipe size depends on the grapple size used.*
[b] *Torque limits for rotating or drilling with casing should be calculated separately. For additional information, contact Weatherford, or refer to the appropriate calculation software.*

External Clamping Tool Shipping Container

Empty weight	992 lb (450 kg)
Maximum payload	7,938 lb (3,600 kg)
Maximum gross weight	8,930 lb (4,050 kg)





External clamping tool

External clamping tool

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Specifications (continued)

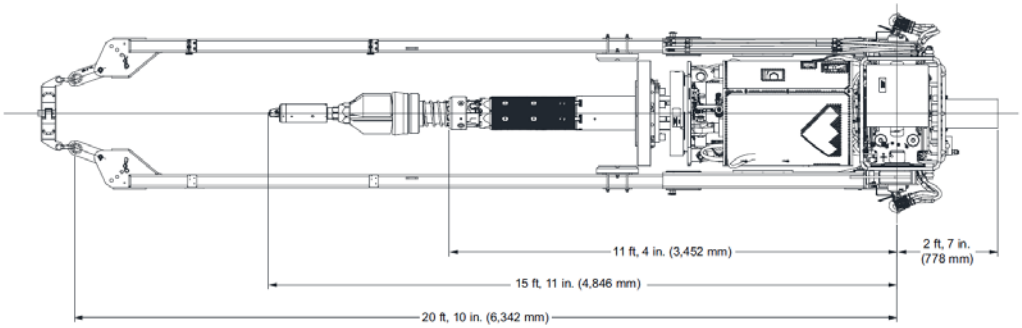
Internal Clamping Tool

Pipe size [a]	9-5/8 to 10-3/4 in.	11-3/4 to 15 in.	16 to 22 in.
Approximate weight [b]	2,500 lb (1,100 kg)	2,700 lb (1,200 kg)	4,883 lb (2,215 kg)
Maximum makeup torque capability	60,000 ft-lb (81,349 N•m)	80,000 ft-lb (108,000 N•m)	80,000 ft-lb (108,000 N•m)
Maximum rotating speed	100 rpm		

[a] The pipe size depends on the slip size and clamping tool used.
[b] Torque limits for rotating or drilling with casing should be calculated separately. For additional information, contact Weatherford, or refer to the appropriate calculation software.

Internal Clamping Tool Shipping Container

Empty weight	1,700 lb (800 kg)
Maximum payload	7,050 lb (3,200 kg)
Maximum gross weight	8,820 lb (4,000 kg)



Internal clamping tool

Internal clamping tools

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