

## Tool Specification

# 9 in. BlackBox High Frequency Tool

Our BlackBox™ High-Frequency (HF) memory-module tool samples dynamics data at 1500 Hz and load measurements at 100 Hz. With advanced internal memory that can record a full dataset for 175 hours, it provides data for weight on bit, torque on bit, three-axis vibration, annular pressure, internal pressure, temperature, and RPM. Due to the high memory capacity of the BlackBox HF tool, all of the high-speed, sampled data is stored and delivered to the surface where it can be further analyzed in the office.

### Mechanical specifications

#### Specifications and dimensions<sup>1</sup>

Size	9 in.
Overall length	72 in.
Material	4330V Mod.
Material yield strength	165 ksi
Max tool OD	9 in.
Nominal ID	3 in.

#### Data performance<sup>4</sup>

Memory life	175 hr continuous (typical) 8 GB data storage
Data collection	Vibration record rate = 1500 Hz All other record rates = 100 Hz

#### Dynamic sensor specifications<sup>5</sup>

Measurement type	Range	Sensor accuracy	Sensor resolution
Lateral vibration (x-axis, y-axis)	±40 g	1% FS	0.0025 g
Axial vibration (z-axis)	±40 g	1% FS	0.0025 g
RPM	±333	5% FS	0.05 rpm
Weight	±300 klb	2.5% FS	13 lb
Torque	±40 kft-lb	2% FS	2 ft-lb
Annular pressure	0 to 20,000 psi	0.4% FS	0.7 psi
Internal pressure	0 to 20,000 psi	0.4% FS	0.7 psi
Temperature	-20° C to 150° C	3° C	0.13° C

<sup>1</sup> All measurements listed are nominal. Redressed or worn Sub values may vary.

<sup>2</sup> Maximum internal, external, or hydrostatic pressure.

<sup>3</sup> The maximum make-up torque should be applied when possible.

To determine MUT for uphole and downhole connections, consult the specifications sheet of the mating component.

The lesser of the two max MUT values shall not be exceeded.

<sup>4</sup> Values assume default data configurations are used.

<sup>5</sup> Values are based at the ambient temperature under nominal vibration levels.



### Features

- Three axis vibration channels sampled at 1,500 Hz
  - The high speed sample rate gives the capability to identify high frequency events such as HFTO and rock properties
- 8 GB of memory
  - The large memory allows us to store all of the data the tool captures, which give the analyst a clear picture of what is happening downhole
- Delayed start feature
  - With delayed start the tool can conserve battery and extend runtime
- Removable memory
  - Allows the tool to be immediately go back downhole

## Specifications

### Mechanical ratings

#### 6½ in. Reg. Box Connection

Rating pressure <sup>2</sup>	20,000 psi
Dogleg - Rotating	9°/100 ft
- Sliding	18°/100 ft
Max tension	1,200 K
Max torque	130,000 ft-lbs
Rated temperature	32° F (0° C) to 302° F (150° C)

#### Uphole connection

Tool connection	6½ in. Reg. Box
Tool joint ID	3 in.
Tool joint OD	8 in.
Max make-up torque <sup>3</sup>	80,300 ft-lb

#### Downhole connection

Tool connection	6½ in. Reg. Pin
Tool joint ID	3 in.
Tool joint OD	8 in.
Max make-up torque <sup>3</sup>	80,300 ft-lb

#### 6½ in. FH Pin Connection

Rating pressure <sup>2</sup>	20,000 psi
Dogleg - Rotating	8°/100 ft
- Sliding	16°/100 ft
Max tension	1,250 K
Max torque	140,000 ft-lbs
Rated temperature	32° F (0° C) to 302° F (150° C)

#### Uphole connection

Tool connection	6½ in. FH Box
Tool joint ID	4¼ in.
Tool joint OD	8¾ in.
Max make-up torque <sup>3</sup>	89,400 ft-lb

#### Downhole connection

Tool connection	6½ in. FH Pin
Tool joint ID	4¼ in.
Tool joint OD	8¾ in.
Max make-up torque <sup>3</sup>	89,400 ft-lb

#### 7½ in. Reg. Pin Connection

Rating pressure <sup>2</sup>	20,000 psi
Dogleg - Rotating	8°/100 ft
- Sliding	16°/100 ft
Max tension	1,200 K
Max torque	130,000 ft-lbs
Rated temperature	32° F (0° C) to 302° F (150° C)

#### Uphole connection

Tool connection	7½ in. Reg. Box
Tool joint ID	4 in.
Tool joint OD	8¾ in.
Max make-up torque <sup>3</sup>	109,600 ft-lb

#### Downhole connection

Tool connection	7½ in. Reg. Pin
Tool joint ID	4 in.
Tool joint OD	8¾ in.
Max make-up torque <sup>3</sup>	109,600 ft-lb