DRILLING TOOL WITH NEAR-BIT ELECTRONICS

BACKGROUND

[0001] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the presently described embodiments. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present embodiments. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

[0002] Oil and gas wells are generally drilled by using a drill string, which is made up of drill pipe and a bottom hole assembly (BHA). The bottom hole assembly traditionally includes a drill bit which breaks up rock formations to create a well, a motor which provides rotational drive to the drill bit, and one or more logging while drilling (LWD) and measurement while drilling (MWD) tools. For example, the BHA can include a mud motor, a rotary steerable system (RSS), or both. The LWD/MWD tools include a variety of sensors which collect data during the drilling process regarding a variety well characteristics such as rock porosity, permeability, pressure, temperature, magnetic field, gravity, acceleration, magnetic resonance characteristics or fluid flow rate, pressure, mobility, or viscosity characteristics of a fluid within the borehole, as well as various drilling characteristics or parameters including the direction, inclination, azimuth, trajectory, and the like.

SUMMARY

[0002a] According to a first aspect of the present invention, there is provided a drilling system, including: a drilling motor including: a housing; a power unit disposed within the housing; and a shaft including a transmission shaft and a drive shaft, the transmission shaft coupled to the power unit; wherein the drive shaft comprises a proximal end and a distal end; a drill bit coupled to the distal end of the drive shaft; and an electronics assembly disposed within an internal orifice of the drilling motor extending at least partially past the distal end of the drive shaft into the drill bit without being directly connected to or supported by the drill bit, wherein the electronics assembly includes a sensing device at least partially disposed within a housing.

[0002b] According to a second aspect of the present invention, there is provided a drilling system, including: a drilling motor including: a housing; a power unit disposed within the housing; and a shaft including a transmission shaft and a drive shaft, the transmission shaft coupled to the power unit; wherein the drive shaft including a proximal end and a distal end; a conductive path traversing at least a portion the drilling motor; and an electronics assembly disposed within an internal orifice of the drilling motor extending at least partially past the distal end of the drive shaft into the drill bit without being directly connected to or supported by the drill bit, wherein the electronics assembly includes a sensing device at least partially disposed within a housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Illustrative embodiments of the present disclosure are described in detail below with reference to the attached drawing figures, which are incorporated by reference herein and wherein:

[0004] FIG. 1 illustrates a well being drilled drilling system, in accordance with example embodiments of the present disclosure;

[0005] FIG. 2A–2E illustrate, in continuous longitudinal sequence, a drilling tool, in which FIG. 2B continues from FIG. 2A at point A, FIG. 2C continues

CLAIMS

1. A drilling system, comprising:

a drilling motor comprising:

a housing;

a power unit disposed within the housing; and

a shaft comprising a transmission shaft and a drive shaft, the transmission shaft coupled to the power unit;

wherein the drive shaft comprises a proximal end and a distal end;

a drill bit coupled to the distal end of the drive shaft; and

an electronics assembly disposed within an internal orifice of the drilling motor extending at least partially past the distal end of the drive shaft into the drill bit without being directly connected to or supported by the drill bit, wherein the electronics assembly comprises a sensing device at least partially disposed within a housing.

2. The drilling system of claim 1, wherein the electronics assembly is disposed within the drive shaft.

3. The drilling system of claim 1, wherein the electronics assembly is coupled to the distal end of the drive shaft.

4. The drilling system of claim 2, wherein the electronics assembly comprises one or more stabilizers extending from the electronics assembly and configured to stabilize the electronics assembly within the drive shaft.

5. The drilling system of claim 1, wherein the electronics assembly further comprises:

an electronics housing, the sensing device disposed within the electronics housing; and

a connector formed at one end of the electronics housing, the connector configured to mechanically and electrically couple the electronics assembly to a conductive path within the drilling motor.

6. The drilling system of claim 5, wherein the conducting path comprises a first conductor, a second conductor and the connector, the first conductor is associated with the housing and the second conductor is associated with the shaft, the connector conductively connects the first conductor and the second conductor, the first and second conductors are movable relative to each other.

7. The drilling system of claim 5, wherein the conductive path provides power transmission and data communication.

8. The drilling system of claim 5, wherein the connector comprises a threaded connector.

9. The drilling system of claim 5, wherein the connector includes a stab-in electronics connector.

10. The drilling system of claim 1, further comprising a measurement while drilling or logging while drilling tool disposed up-hole of the drilling motor, wherein the electronics assembly is communicatively coupled to the measurement while drilling or logging while drilling tool.

11. The drilling system of claim 1, wherein the sensing device is configured to sense at least one of a drilling condition, drilling tool condition, formation data, and location data.

12. A drilling system, comprising:

a drilling motor comprising:

a housing;

a power unit disposed within the housing; and

a shaft comprising a transmission shaft and a drive shaft, the transmission shaft coupled to the power unit;

wherein the drive shaft comprising a proximal end and a distal end;

a conductive path traversing at least a portion the drilling motor; and

an electronics assembly disposed within an internal orifice of the drilling motor extending at least partially past the distal end of the drive shaft into the drill bit without being directly connected to or supported by the drill bit, wherein the electronics assembly comprises a sensing device at least partially disposed within a housing.

13. The drilling system of claim 12, wherein the electronics assembly is located at least partially within the drive shaft.

14. The drilling system of claim 12, further comprising a mounting sub coupled to the distal end of the drive shaft, wherein the electronics assembly is coupled to the mounting sub.

15. The drilling system of claim 12, wherein the electronics assembly further comprises:

an electronics housing, the sensing device disposed within the electronics housing; and

a connector formed at one end of the electronics housing, the connector configured to mechanically and electrically couple the electronics assembly to a conductive path within the drilling motor.

16. The drilling system of claim 15, wherein the conducting path comprises a first conductor, a second conductor and the connector, the first conductor is associated with the housing and the second conductor is associated with the shaft, the connector conductively connects the first conductor and the second conductor, the first and second conductors are movable relative to each other.