

WHAT IS CLAIMED IS:

1. A downhole well tool for use in a subterranean well, the downhole well tool comprising:

an actuator assembly configured to displace a member of the downhole well tool, the actuator assembly comprising a first motor, a load yoke displaceable by the first motor, and an elongated position indicator bar having at least one profile formed thereon,

in which friction between the load yoke and the position indicator bar varies as the load yoke displaces relative to the position indicator bar.

2. The downhole well tool of claim 1, in which the member comprises a closure member having at least open and closed positions in which fluid flow through the downhole well tool is respectively permitted and blocked by the closure member.

3. The downhole well tool of claim 1, in which the actuator assembly further comprises a garter spring carried on the load yoke, and the friction between the load yoke and the position indicator bar changes in response to engagement between the garter spring and the at least one profile.

4. The downhole well tool of claim 3, in which the friction increases in response to engagement between the garter spring and the at least one profile.

5. The downhole well tool of claim 3, in which the friction decreases in response to engagement between the garter spring and the at least one profile.

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6. The downhole well tool of claim 1, in which the actuator assembly further comprises a bow spring carried on the load yoke, and the friction between the load yoke and the position indicator bar changes in response to engagement between the bow spring and the at least one profile.

7. The downhole well tool of claim 6, in which the friction increases in response to engagement between the bow spring and the at least one profile.

8. The downhole well tool of claim 6, in which the friction decreases in response to engagement between the bow spring and the at least one profile.

9. The downhole well tool of claim 1, in which a change in the friction results in a corresponding change in electrical current supplied to the first motor.

10. The downhole well tool of claim 9, in which the change in electrical current corresponds to a predetermined position of the member of the downhole well tool.

11. The downhole well tool of claim 1, in which multiple changes in the friction results in a corresponding pattern of changes in electrical current supplied to the first motor.

12. The downhole well tool of claim 11, in which the pattern of changes in electrical current corresponds to a predetermined position of the member of the downhole well tool.

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13. The downhole well tool of claim 1, in which a direction of displacement of the downhole well tool member is reversible in response to a change in polarity of electrical power supplied to the first motor.

14. The downhole well tool of claim 1, in which the actuator assembly comprises a second motor, and a first ball screw, and in which the first and second motors are connected to respective opposite ends of the first ball screw.

15. The downhole well tool of claim 14, in which the actuator assembly comprises third and fourth motors, and a second ball screw, and in which the third and fourth motors are connected to respective opposite ends of the second ball screw.

16. The downhole well tool of claim 1, in which the actuator assembly comprises a second motor, and first and second ball screws, and in which the first motor is connected to the first ball screw, the second motor is connected to the second ball screw, and the load yoke is displaceable by rotation of the first and second ball screws by the first and second motors.

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17. A downhole well tool for use in a subterranean well, the downhole well tool comprising:

an actuator assembly configured to displace a member of the downhole well tool, the actuator assembly comprising a motor, a cam rotatable by the motor, and a bow spring positioned to periodically engage at least one cam lobe on the cam as the cam is rotated by the motor,

in which friction between the bow spring and the cam varies as the cam is rotated by the motor.

18. The downhole well tool of claim 17, in which the member comprises a closure member having at least open and closed positions in which fluid flow through the downhole well tool is respectively permitted and blocked by the closure member.

19. The downhole well tool of claim 17, in which a change in the friction results in a corresponding change in electrical current supplied to the motor.

20. The downhole well tool of claim 19, in which the change in electrical current corresponds to a predetermined incremental displacement of the member.

21. The downhole well tool of claim 17, in which a direction of displacement of the downhole well tool member is reversible in response to a change in polarity of electrical power supplied to the first motor.

22. A downhole well tool for use in a subterranean well, the downhole well tool comprising:

an actuator assembly configured to displace a member of the downhole well tool, the actuator assembly comprising a motor, a cam rotatable by the motor, and a switch contact positioned to periodically electrically contact a bow spring in response to engagement between the bow spring and at least one cam lobe on the cam as the cam is rotated by the motor.

23. The downhole well tool of claim 22, in which the member comprises a closure member having at least open and closed positions in which fluid flow through the downhole well tool is respectively permitted and blocked by the closure member.

24. The downhole well tool of claim 22, in which electrical contact between the bow spring and the switch contact results in a corresponding change in electrical current in a conductor connected to the motor.

25. The downhole well tool of claim 24, in which the change in electrical current corresponds to a predetermined incremental displacement of the member.

26. The downhole well tool of claim 22, in which a direction of displacement of the downhole well tool member is reversible in response to a change in polarity of electrical power supplied to the first motor.

27. A downhole well tool for use in a subterranean well, the downhole well tool comprising:

an actuator assembly configured to displace a member of the downhole well tool, the actuator assembly comprising a motor, a load yoke displaceable by the motor, a bow spring carried on the load yoke, and an elongated position indicator bar having at least one switch contact positioned thereon,

in which electrical contact between the bow spring and the switch contact changes an electrical current in a conductor connected to the motor.

28. The downhole well tool of claim 27, in which the member comprises a closure member having at least open and closed positions in which fluid flow through the downhole well tool is respectively permitted and blocked by the closure member.

29. The downhole well tool of claim 27, in which the change in electrical current corresponds to a predetermined position of the member of the downhole well tool.

30. The downhole well tool of claim 27, in which a direction of displacement of the downhole well tool member is reversible in response to a change in polarity of electrical power supplied to the motor.

31. The downhole well tool of claim 27, in which the at least one switch contact comprises multiple switch contacts, and in which at least one of multiple different resistors is connected between each of the switch contacts and the conductor.

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32. The downhole well tool of claim 27, in which each of the at least one of multiple different resistors corresponds to a respective different position of the member.

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33. A system for use with a subterranean well, the system comprising:
a system controller comprising a computer, a power supply and at least one current sensor;
multiple downhole well tools, each of the downhole well tools comprising a motor and a member displaceable by the motor; and
an umbilical connected between the system controller and the downhole well tools, at least one conductor of the umbilical being connected to the motor of each of the downhole well tools.

34. The system of claim 33, in which a change in current in the conductor connected to the motor of one of the downhole well tools indicates a position of the member of the one of the downhole well tools.

35. The system of claim 33, in which a pattern of changes in current in the conductor connected to the motor of one of the downhole well tools indicates a position of the member of the one of the downhole well tools.

36. The system of claim 33, further comprising a switching module connected between the system controller and the downhole well tools, in which the system controller is positioned subsea, and a tubing hanger is positioned between the switching module and the system controller.

37. The system of claim 36, in which the switching module supplies electrical power to the at least one conductor in response to communication from the system controller.

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38. The system of claim 36, in which the switching module changes a polarity of electrical power supplied to the at least one conductor in response to communication from the system controller.