

WHAT IS CLAIMED IS:

1. A method of operating an electric safety valve, the method comprising:
positioning the electric safety valve in a wellbore; wherein the electric safety valve
5 comprises an electric actuator positioned in an interior chamber of the electric safety valve;
wherein the interior chamber further comprises a dielectric fluid and the interior chamber is
pressure and temperature compensated with a flow passage extending axially through the
electric safety valve; wherein the pressure and temperature compensation is performed via a
compensating subassembly in pressure communication with the interior chamber thereby
10 providing a section-balanced electric safety valve; wherein the electric safety valve further
comprises a protective sleeve separating the interior chamber from the flow passage; wherein
the electric safety valve further comprises at least one compression spring rod coupled to a
closure member capable of restricting or preventing fluid flow through the flow passage; and
actuating the electric actuator; wherein the electric actuator is magnetically coupled to
15 the closure member such that actuation of the electric actuator pivots the closure member to an
open or closed position.
2. The method of claim 1, wherein the electric actuator is an electric actuator selected from
the group consisting of electric linear actuators, ball screw actuators, lead screw actuators, roller
20 screw actuators, linear induction actuators, and any combination thereof.
3. The method of claim 1, further comprising allowing or causing to allow the compression
spring rods to expand in response to a loss of power to the electric actuator.
- 25 4. The method of claim 3, wherein the expansion of the compression spring rods induces
the closure member to pivot to its closed position.
5. The method of claim 1, wherein the closure member is a flapper, ball, gate, or sleeve.
- 30 6. The method of claim 1, where the magnetic coupling comprises an inner series of
magnets and an outer series of magnets separated by the protective sleeve; wherein the inner
series of magnets comprises at least one row of magnets distributed radially in the electric safety
valve; and wherein the outer series of magnets comprises at least one row of magnets distributed
radially in the electric safety valve.

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7. The method of claim 1, wherein the compression spring rod is parallel to the electric actuator.
8. The method of claim 1, wherein the compensating subassembly further comprises coiled
5 tubing that is coiled in a tortuous path.
9. The method of claim 1, wherein the compensating subassembly further comprises a floating piston.
10. An electric safety valve comprising:
an electric actuator positioned in an interior chamber of the electric safety valve;
wherein the interior chamber further comprises a dielectric fluid and the interior chamber is
pressure and temperature compensated with a flow passage extending axially through the
electric safety valve;
15 a compensating subassembly configured to perform the pressure and temperature
compensating;
a protective sleeve separating the interior chamber from the flow passage;
at least one compression spring rod coupled to a closure member capable of restricting
or preventing fluid flow through the flow passage; and
20 a magnetic coupling of the closure member to the electric actuator.
11. The electric safety valve of claim 10, wherein the electric actuator is an electric actuator
selected from the group consisting of electric linear actuators, ball screw actuators, lead screw
actuators, roller screw actuators, linear induction actuators, and any combination thereof.
12. The electric safety valve of claim 10, wherein the closure member is a flapper, ball, gate,
or sleeve.
13. The electric safety valve of claim 10, where the magnetic coupling comprises an inner
30 series of magnets and an outer series of magnets separated by the protective sleeve; wherein the
inner series of magnets comprises at least one row of magnets distributed radially in the electric
safety valve; and wherein the outer series of magnets comprises at least one row of magnets
distributed radially in the electric safety valve.

14. The electric safety valve of claim 10, wherein the compression spring rod is parallel to the electric actuator.
15. The electric safety valve of claim 10, wherein the compensating subassembly further
5 comprises coiled tubing that is coiled in a tortuous path.
16. The electric safety valve of claim 10, wherein the compensating subassembly further comprises a floating piston.
- 10 17. A production system for a wellbore, the system comprising:
an electric safety valve comprising:
an electric actuator positioned in an interior chamber of the electric safety valve;
wherein the interior chamber further comprises a dielectric fluid and the interior chamber is
pressure and temperature compensated with a flow passage extending axially through the
15 electric safety valve;
a compensating subassembly configured to perform the pressure and temperature
compensating;
a protective sleeve separating the interior chamber from the flow passage;
at least one compression spring rod coupled to a closure member capable of
20 restricting or preventing fluid flow through the flow passage; and
a magnetic coupling of the closure member to the electric actuator;
production tubing; wherein the electric safety valve is coupled to the production tubing;
and
a control system coupled to the electric safety valve.
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18. The production system of claim 17, wherein the electric actuator is a an electric actuator
selected from the group consisting of electric linear actuators, ball screw actuators, lead screw
actuators, roller screw actuators, linear induction actuators, and any combination thereof.
- 30 19. The production system of claim 17, where the magnetic coupling comprises an inner
series of magnets and an outer series of magnets separated by the protective sleeve; wherein the
inner series of magnets comprises at least one row of magnets distributed radially in the electric
safety valve; and wherein the outer series of magnets comprises at least one row of magnets
distributed radially in the electric safety valve.

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20. The production system of claim 17, wherein the compensating subassembly further comprises coiled tubing that is coiled in a tortuous path.