1. An actuator (1) for displacing a control device (2) for use in oil or gas production systems, comprising:

an electric drive (4) comprising a torque motor (10, 11);

a hollow shaft (12) driven by the electric drive (4);

a safety clutch unit (14) comprising a driven side (13) and a driving side (15), the driven side (13) of the safety clutch unit (14) being connected to the hollow shaft (12) at an interior driving end portion of the hollow shaft (12);

a thread drive (5) displaceable by the electric drive (4) and comprising:

a threaded spindle (6) displaceable in a substantially axial direction between an advanced position (8) and a retracted position (9) so as to displace the control device (2); and

a screw nut (7) supported such that it is rotatable and axially non-displaceable, the screw nut (7) being connected for rotation to and by the driving side (15) of the safety clutch unit (14).

2. The actuator of claim 1, wherein torque motor (10, 11) further comprises a rotor (16) secured on an outer side (17) of the hollow shaft (12).

3. The actuator of claim 2, wherein an outer side (17) of the hollow shaft comprises a radially outward projecting abutment projection (18), the rotor (16) being held between the abutment projection (18) and a counter element (19).

4. The actuator of claim 1, further comprising at least two torque motors (10, 11) arranged on the hollow shaft (12).

5. The actuator of claim 1, further comprising a connection sleeve (20) coupling the driving side (15) of the safety clutch unit (14) and the screw nut (7).

6. The actuator of claim 5, further comprising a driving journal (21) projecting from the connection sleeve (20) in a substantially axial direction, and wherein the safety clutch unit (14) is secured to the driving journal (21) on the driving side (15).

7. The actuator of claim 6, wherein the safety clutch unit (14) is secured to the driving journal (21) by a clamping device (22) so as to prevent rotation relative thereto.

8. The actuator of claim 6, wherein the driving journal (21) comprises an axial hole (23).

9. The actuator of claim 1, further comprising a first housing section (24) accommodating the electric drive (4) and a second housing section (25) accommodating the thread drive (5), the first and second housing sections being detachable from one another.

10. The actuator of claim 5, further comprising:

a first housing section (24) accommodating the electric drive (4) and a second housing section (25) accommodating the thread drive (5), the first and second housing sections being detachable from one another; and

a bearing unit (26) arranged between an inner side (27) of the second housing section (25) and an outer side (28) of the connection sleeve (20) so as to rotatably support the connection sleeve (20).

11. The actuator of claim 1, wherein the threaded spindle (6) is supported in an axially displaceable but non-rotatable manner.

12. The actuator of claim 11, further comprising a guide sleeve (29) comprising a guide slot (31) engaged by a guide pin (32) projecting radially outwards relative to the threaded spindle (6).

13. The actuator of claim 11, further comprising:

two housing sections (24, 25) detachable from one another, a first housing section (24) accommodating the electric drive (4) and a second housing section (25) accommodating the thread drive (5) and comprising an end opening (33) opposite to the first housing section (24); and

a guide sleeve (29) comprising:

an opening insert (34) which covers the second housing section end opening (33) ; and

an opening (35) for passing the threaded spindle (6) therethrough.

14. The actuator of claim 1, wherein the threaded spindle (6) is connected to a piston rod (38) at an end (37) facing the control device (2).

15. The actuator of claim 1, further comprising a connection element (39) releasably secured to the threaded spindle (6), the guide pin (32) projecting radially outwards from the connection element (39).

16. The actuator of claim 1, further comprising a motion sensor (40) comprising a sensor element (42) configured to measure the threaded spindle (6).

17. The actuator of claim 1, further comprising a plug device (43) configured to transmit at least one of control signals, datat, and a supply voltage.

18. The actuator of claim 9, wherein the second housing section (25) is connectable to a connection housing (44), which is adapted to be flange-mounted.

19. The actuator of claim 18, further comprising a spring sleeve (46) arranged between the connection housing (44) and the second housing section (25), the spring sleeve (46) configured to accommodate a return spring (47).

20. The actuator of claim 19, wherein the return spring (47) is operative between the spring sleeve (46) and the threaded spindle (6).

21. The actuator of claim 1, wherein the hollow shaft (12) is rotatably supported.

22. The actuator of claim 21, wherein the hollow shaft (12) comprises anend portion (49) connected to the driven side (13) of the safety clutch unit (14) so as to prevent rotation relative thereto.

23. The actuator of claim 14, wherein the piston rod (38) is secured to a connection element (39) releasably secured to the threaded spindle (6).

24. The actuator of claim 1, characterized in that a gear unit (53) is arranged between the electric drive (4) and the thread drive (5).

25. The actuator of claim 1, wherein the safety clutch unit (14) is arranged substantially within the hollow shaft (12).

26. The actuator of claim 1, wherein the hollow shaft (12) comprises a constriction of diameter (58) to which the driven side (13) of the safety clutch unit (14) is releasably connected.

27. The actuator of claim 1, wherein the torque motor (10, 11) comprises a dual-winding torque motor.

28. The actuator of claim 6, wherein the connection sleeve (20) is at least partially arranged within the hollow shaft (12).

29. The actuator of claim 21, further comprising:

a connection sleeve (20) coupling the driving side (15) of the safety clutch unit (14) and the screw nut (7); and

wherein the hollow shaft (12) is rotatably supported relative to the connection sleeve (20).

30. The actuator of claim 16, wherein:

the threaded spindle (6) is connected to a piston rod (38) at an end (37) facing the control device (2); and

the sensor element (42) extends up to and into the piston rod (38) and/or up to the control device (2).

31. The actuator of claim 9, wherein the first and second housing sections (24, 25) are integral.

Claims

1. An actuator (1) for displacing a control device (2) including a valve, a gate valve (3) or the like, in particular for use in oil or gas production systems, said actuator (1) comprising an electric drive (4) and a thread drive (5) displaceable by means of said electric drive (4) and comprising at least a threaded spindle (6) and a screw nut (7), said threaded spindle (6) being displaceable in a substantially axial direction between an advanced position (8) and a retracted position (9) so as to displace the control device (2), **characterized in that** the electric drive (4) comprises at least one torque motor (10, 11) with a hollow shaft (12), said hollow shaft (12) being connected to the driven side (13) of a safety clutch unit (14) such that it is secured against rotation relative thereto, and said safety clutch unit (14) being, on the driving side (15) thereof, connected in a motion-transmitting manner to the screw nut (7) which is supported such that it is rotatable and axially non-displaceable.

2. An actuator according to claim 1, **characterized in that** a rotor (16) of the torque motor (10, 11) is secured in position on the outer side (17) of the hollow shaft (12).

3. An actuator according to claim 1 or 2, **characterized in that** the hollow-shaft outer side (17) is provided with an abutment projection (18), which projects in particular radially outwards, the rotor (16) being held between said abutment projection (18) and a counterelement (19).

4. An actuator according to one of the preceding claims, **characterized in that** the hollow shaft (12) has arranged thereon at least two torque motors (10, 11).

5. An actuator according to one of the preceding claims, **characterized in that** a connection sleeve (20) for motion coupling is arranged between the driving side (15) of the safety clutch unit (14) and the screw nut (7).

6. An actuator according to claim 5, **characterized in that** the safety clutch unit (14) is arranged on a driving journal (21) projecting from the connection sleeve (20) in a

substantially axial direction, and that it has its driving side (15) secured to said driving journal (21).

7. An actuator according to one of the preceding claims, **characterized in that**, by means of a clamping device (22), such as a fitted key, a clamping hub or the like, the driving side (15) of the safety clutch unit (14) is arranged on the driving journal (21) such that it is secured against rotation relative thereto.

8. An actuator according to claim 6 or claim 7, **characterized in that** the driving journal (21) is provided with an axial hole (23).

9. An actuator according to one of the preceding claims, **characterized in that** the actuator (1) comprises at least two housing sections (24, 25) which can be detached from one another, the first housing section (24) accommodating the electric drive (4) and the second housing section (25) accommodating at least the thread drive (5).

10. An actuator according to claim 9, **characterized in that** a rotation-type bearing unit (26) is arranged between the inner side (27) of the second housing section (25) and the outer side (28) of the connection sleeve (20) so as to rotatably support the latter.

11. An actuator according to one of the preceding claims, **characterized in that** the threaded spindle (6) is supported at a guide sleeve (29) in an axially displaceable but non-rotatable manner.

12. An actuator according to claim 11, **characterized in that** the guide sleeve (29) is provided with at least one guide slot (31) extending in the direction of displacement (30) of the threaded spindle (6), said guide slot (31) being engaged by a guide pin (32) which projects radially outwards relative to the threaded spindle (6).

13. An actuator according to claim 11 or claim 12, **characterized in that** the guide sleeve (29) is provided with an opening insert (34) which covers an end opening (33) of the second housing section (25) opposite to the first housing section (24) and which is provided with an opening (35) for passing the threaded spindle (6) therethrough.

14. An actuator according to one of the preceding claims, **characterized in that** the threaded spindle (6) is connected to a piston rod (38) at its end (37) facing the control device (2).

15. An actuator according to anyone of claims 12 to 14, **characterized in that** a connection element (39) is releasably secured to the threaded spindle (6), the guide pin (32) projecting radially outwards from said connection element (39).

16. An actuator according to one of the preceding claims, **characterized in that,** at one end (41) of the actuator (1), a motion sensor (40) is arranged whose sensor element (42) is connected in particular to the threaded spindle (6).

17. An actuator according to one of the preceding claims, **characterized in that** a plug device (43) is provided on the actuator (1), said plug device (43) being used for transmitting control signals/data and/or a supply voltage.

18. An actuator according to anyone of claims 9 to 17, **characterized in that** the second housing section (25) is connectable to a connection housing (44), which is adapted to be flange-mounted on a feed line (45) or a control device housing.

19. An actuator according to claim 18, **characterized in that** a spring sleeve (46) for accommodating a return spring (47) is arranged between the connection housing (44) and the second housing section (25).

20. An actuator according to claim 19, **characterized in that** the return spring (47) is arranged such that it is essentially operative between the spring sleeve (46) and the threaded spindle (6).

21. An actuator according to one of the preceding claims, **characterized in that** the hollow shaft (12) is rotatably supported at both end portions (48, 49) thereof, especially the first end portion (48) being rotatably supported on the inner side (50) thereof and the second end portion (49) being rotatably supported on the outer side (17) of the hollow shaft (12).

22. An actuator according to claim 21, **characterized in that** the second end portion (49) of the hollow shaft (12) is connected to the driven side (13) of the safety clutch unit (14) such that it is secured against rotation relative thereto.

23. An actuator according to anyone of claims 15 to 22, **characterized in that** the piston rod (38) is secured to the connection element (39).

24. An actuator according to one of the preceding claims, **characterized in that** two or more such actuators (1) are arranged in parallel on one side and/or on opposed sides of the control device (2).

25. An actuator according to one of the preceding claims, **characterized in that** a gear unit (53), in particular a so-called harmonic drive (54), is arranged between the electric drive (4) and the thread drive (5).

26. An actuator according to one of the preceding claims, **characterized in that** the safety clutch unit (14) is arranged substantially within the hollow shaft (12).

27. An actuator according to one of the preceding claims, **characterized in that** the hollow shaft (12) is provided with a constriction of diameter (58) to which the driven side (13) of the safety clutch unit (14) is releasably connected.

28. An actuator according to one of the preceding claims, **characterized in that** the torque motor (10, 11) is implemented as a dual-winding torque motor.

29. An actuator according to anyone of claims 6 to 28, **characterized in that** the connection sleeve (20) is arranged within the hollow shaft (12), at least with its driving journal (21).

30. An actuator according to anyone of claims 21 to 29, **characterized in that** the first end portion (48) of the hollow shaft (12) is rotatably supported on the outer side (17) thereof and that the inner side of said first end portion is rotatable relative to the connection sleeve (20).

31. An actuator according to anyone of claims 16 to 30, **characterized in that** the sensor element (42) extends up to and into the piston rod (38) and/or up to the control device (2).

32. An actuator according to anyone of claims 9 to 31, **characterized in that** the first and second housing sections (24, 25) are formed integrally with one another.