

Claims

1. A well control system for a riser comprising:
a riser assembly; and
at least one flow meter;
wherein the at least one flow meter is located on an outer surface of the riser assembly.
2. The well control system according to claim 1 comprising at least one choke assembly wherein the at least one choke assembly is located on the riser assembly.
3. The well control system according to claim 1 or 2 wherein the at least one choke assembly and the at least one flow meter assembly form part of a managed pressure drilling manifold, wherein the managed pressure drilling manifold is located on the riser assembly.
4. The well control system according to any preceding claim wherein the riser assembly comprises at least one valve assembly located on the riser assembly.
5. The well control system according to any preceding claim wherein the riser assembly comprises a rotating control device.
6. The well control system according to claims 2 to 5 wherein the at least one flow meter and the at least one choke assembly are integrated with a flow spool on a riser slip joint.
7. The well control system according to any preceding claim wherein the at least one flow meter is selected from the group comprising orifice plate, wedge, venturi, Coriolis, Pitot tubes, differential pressure flow meter and/or variable area flow meters.
8. The well control system according to any preceding claim comprising a control unit configured to receive at least one measurement signal from the at least one flow meter to measure at least one parameter or at least one property of

drilling fluid or drilling fluid flow in the riser and/or in a least one mud return line.

9. The well control system according to claim 8 wherein the control unit is configured to monitor drilling fluid flow in the riser and/or in a least one mud return line.
10. The well control system according to claim 8 or claim 9 wherein the control unit is configured to calculate, estimate or predict the density and/or viscosity of the flowing drill fluid.
11. The well control system according to any preceding claim wherein the at least one flow meter has a flow measurement range of 10 to 2000 USG/min.
12. The well control system according to any preceding claim wherein the system comprises two or more flow meters.
13. A method of measuring at least one parameter or property of drilling fluid in a subsea riser comprising:
providing a well control system for a riser comprising a riser assembly;
at least one flow meter;
wherein the at least one flow meter is located on an outer surface of the riser assembly; and
measuring at least one parameter or at least one property of the drilling fluid in the riser.
14. The method according to claim 13 comprising comparing the at least one parameter or at least one property of the drilling fluid with a desired range of drilling fluid operating parameters or properties.
15. The method according to claim 13 or claim 14 comprising generating a control signal from the control unit when the at least one parameter at least one property of the drilling fluid is determined to be outside of the desired range of operating parameters or properties.

16. The method according to any of claims 13 to 15 comprising measuring a pressure differential across a differential pressure flow meter ΔP .
17. The method according to any of claims 13 to 16 comprising determining or calculating a friction factor, a discharge coefficient of the flow, Reynolds number, density, viscosity and/or a flow rate of the drilling fluid.
18. The method according to any of claims 13 to 17 comprising measuring at least one parameter or at least one property of the fluid using two or more flow meters.
19. The method according to any of claims 13 to 18 comprising switching between a first flow meter having a first flow measurement range and a second flow meter having a second flow measurement range.
20. A system for managed pressure drilling in a riser comprising:
a well control system assembly comprising:
a riser assembly;
at least one flow meter;
wherein the at least one flow meter is located on an outer surface of the riser assembly; and
a rotating control device.
21. The system according to claim 20 wherein the riser assembly comprises at least one choke assembly and/or at least one valve assembly located on the riser assembly above the tension ring.
22. The system according to claim 20 or claim 21 wherein the riser assembly comprises a slip joint and the at least one flow meter is located on an outer surface of the slip joint.
23. A method of managed pressure drilling in a subsea drilling operation comprising providing a well control system for a riser assembly comprising
a riser assembly;
at least one flow meter;

wherein the at least one flow meter is located on an outer surface of the riser assembly; and
providing a rotating control device; and
measuring at least one property of drilling fluid flow using the at least one flow meter.

24. The method according to claim 23 comprising providing at least one choke assembly located on an outer surface of the riser assembly; and actuating the at least one choke assembly to control flow.
25. The method according to claim 23 or claim 24 comprising diverting managed pressure drilling fluid returns from beneath the rotating control device back into the riser via the at least one flow meter.