Claims

1. A riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) comprising:
a riser flow spool (134, 234, 334, 434, 534, 634, 734, 834, 934,1034);
a riser isolation device (136, 236, 336, 436, 536, 636, 736, 836, 936,1036) and
an upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050);
wherein at least the riser flow spool is configured to be located on a riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) below a riser tension ring (124, 224, 324, 424, 524, 624, 724, 824, 924,1024) and wherein the upper riser disconnect assembly is configured to be located above the riser tension ring.

2. The riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of claim 1 wherein the riser isolation device (136, 236, 336, 436, 536, 636, 736, 836, 936,1036) is configured to be connected to the riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) below the tension ring (124, 224, 324, 424, 524, 624, 724, 824, 924,1024).

3. The riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of claim 1 or claim 2 wherein the upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050) is configured to be connected to a rotating control device (260, 660, 860, 1060).

4. The riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of claim 3 wherein the rotating control device (260, 660, 860, 1060) is configured to be disposed above the upper riser disconnect assembly and/or wherein the upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050) is configured to be disposed below a slip joint (114, 214, 314, 414, 514, 614, 714, 814, 914, 1014).

5. The riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of any preceding claim wherein the riser flow spool (134, 234, 334, 434, 534, 634, 734, 834, 934,1034) comprises at least one flowline (730, 731, 732), wherein the at least one flowline is configured to be connected to a distribution assembly (770), choke assembly (772), a safety valve and/or a mud-gas separator (780).

6. The riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of any preceding claim wherein the upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050) comprises an upper connector and a lower connector wherein the upper and lower connectors are configured to disconnect from one another.

7. A system for handling gas in a riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) comprising the riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of any claims 1 to 6.

8. A method of installing a riser gas handling system in a subsea riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) comprising:
installing a riser flow spool assembly on the riser below the tension ring (124, 224, 324, 424, 524, 624, 724, 824, 924,1024); and
installing an upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050) above the tension ring.

9. The method according to claim 8 comprising installing a riser isolation device 136, 236, 336, 436, 536, 636, 736, 836, 936,1036) below the tension ring (124, 224, 324, 424, 524, 624, 724, 824, 924,1024).

10. The method according to any one of claims 8 to 9 comprising installing a rotary control device (260, 660, 860, 1060) above the tension ring (124, 224, 324, 424, 524, 624, 724, 824, 924,1024) to enable managed pressure subsea drilling.

11. A method of converting a marine riser for RGH operations comprising:
installing a riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) of any of claims 1 to 6.

12. A method of handling riser gas in a subsea riser
using a riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) comprising:
a riser flow spool (134, 234, 334, 434, 534, 634, 734, 834, 934,1034);
a riser isolation device (136, 236, 336, 436, 536, 636, 736, 836, 936,1036) and

an upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050); the method comprising:
locating the riser flow spool on a riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) below a riser tension ring (124, 224, 324, 424, 524, 624, 724, 824, 924,1024)and wherein the upper riser disconnect assembly is located above the riser tension ring;
actuating the riser isolation device to close the riser above the riser flow spool and actuating the riser flow spool to divert gas trapped below the riser isolation device.

13. The method according to claim 12 comprising providing a rotary control device (260, 660, 860, 1060) above the riser tension ring during managed pressure subsea drilling operations.

14. A method of installing a rotary control device (260, 660, 860, 1060) in a riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) with riser gas handling or recovering rotary control device from a riser
using a riser assembly (100, 200, 300, 400, 500, 600, 700, 800, 900, 1000) comprising
a riser flow spool (134, 234, 334, 434, 534, 634, 734, 834, 934,1034);
a riser isolation device (136, 236, 336, 436, 536, 636, 736, 836, 936,1036); and
an upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050); the method comprising:
connecting at least the riser flow spool to the riser below a riser tension ring and wherein the upper riser disconnect assembly is connected to the riser above the tension ring; and
connecting a rotary control device (260, 660, 860, 1060) to the upper riser disconnect assembly to install a rotary control device in a riser; or
disconnecting a rotary control device from the riser above the tension ring to recover a rotary control device from a riser.

15. The method according to claim 14 comprising closing a blowout preventer on the riser (112, 212, 312, 412, 512, 612, 712, 812, 912, 1012) prior to connecting or disconnecting the rotary control device (260, 660, 860, 1060)..

16. The method according to claim 14 or 15 comprising actuating the upper riser disconnect assembly (150, 250, 350, 450, 550, 650, 750, 850, 950,1050) to connect or disconnect the rotary control device (260, 660, 860, 1060) from the riser assembly.