simultaneous fluid communication with a same one of the one or more inlets, and one or more subsea valve assemblies, each configured to selectively control hydraulic fluid communication from at least one of the one or more inlets to at least one of the outlets, where a first one of the outlets is configured to be in fluid communication with an actuation port of the hydraulically actuated device, and a second one of the outlets is configured to be in fluid communication with an outlet of a second subsea valve module.

[0016] According to an aspect of the present invention, there is provided a manifold for providing hydraulic fluid to a hydraulically actuated device of a blowout preventer comprise first and second subsea valve modules, each comprising one or more inlets, each configured to receive hydraulic fluid from a pressure source, one or more outlets, each in selective fluid communication with at least one of the one or more inlets, one or more vents configured to permit hydraulic fluid flow to at least one of a hydraulic reservoir and subsea environment; and one or more subsea valve assemblies, each changeable between: a first state in which a respective one of the one or more outlets is in fluid communication with a respective one of the one or more inlets; a second state in which the respective one of the one or more outlets is in fluid communication with a respective one of the one or more vents; and a third state in which neither the respective one of the one or more inlets nor the respective one of the one or more vents is in fluid communication with the respective one of the one or more outlets; where at least one of the inlet(s) of the first subsea valve module is configured to receive hydraulic fluid from a first pressure source, and at least one of the inlet(s) of the second subsea valve module is configured to receive hydraulic fluid from a second pressure source that is different from the first pressure source; where at least one of the one or more outlets of the first subsea valve module is configured to be in simultaneous fluid communication with at least one of the one or more outlets of the second subsea valve module and an actuation port of the hydraulically actuated device.

[0017] Some embodiments of the present manifolds for providing hydraulic fluid to a hydraulically actuated device of a blowout preventer comprise first, second, and third subsea valve modules, each comprising one or more inlets, each configured to receive hydraulic fluid from a fluid source, one or more outlets, each in selectively fluid communication with at least one of the one or more inlets, and one or more subsea valve assemblies, each configured to selectively control hydraulic fluid communication from at least one of the one or more inlets to at least one of the one or more outlets, where at least one of the one or more outlets of the first subsea valve module is configured to be in simultaneous fluid communication with at least one of the one or more outlets of the second subsea valve module, at least one of

CLAIMS

1. A manifold for providing hydraulic fluid to a hydraulically actuated device of a blowout preventer, the manifold comprising:

first and second subsea valve modules, each comprising:

one or more inlets, each configured to receive hydraulic fluid from a pressure source;

one or more outlets, each in selective fluid communication with at least one of the one or more inlets;

one or more vents configured to permit hydraulic fluid flow to at least one of a hydraulic reservoir and subsea environment; and

one or more subsea valve assemblies, each changeable between:

a first state in which a respective one of the one or more outlets is in fluid communication with a respective one of the one or more inlets;

a second state in which the respective one of the one or more outlets is in fluid communication with a respective one of the one or more vents; and

a third state in which neither the respective one of the one or more inlets nor the respective one of the one or more vents is in fluid communication with the respective one of the one or more outlets;

where at least one of the inlet(s) of the first subsea valve module is configured to receive hydraulic fluid from a first pressure source, and at least one of the inlet(s) of the second subsea valve module is configured to receive hydraulic fluid from a second pressure source that is different from the first pressure source;

where at least one of the one or more outlets of the first subsea valve module is configured to be in simultaneous fluid communication with at least one of the one or more outlets of the second subsea valve module and an actuation port of the hydraulically actuated device.

2. The manifold of claim 1, where at least one of the subsea valve modules is configured to be coupled to at least one other of the subsea valve modules.

3. The manifold of claim 2, where at least two of the subsea valve modules define one or more conduits when the at least two of the subsea valve modules are coupled together, the one or more conduits each in fluid communication with at least one of the outlet(s) of each of the at least two subsea valve modules and configured to communicate hydraulic fluid to a respective actuation port of the hydraulically actuated device.

4. The manifold of claim 1, where at least one of the subsea valve modules comprises one or more isolation valves configured to selectively block fluid communication through at least one of the one or more inlets.

5. The manifold of claim 4, where at least one of the one or more isolation valves is configured to automatically block fluid communication through at least one of the one or more inlets upon decoupling of the fluid source from the subsea valve module.

6. The manifold of claim 1, where at least one of the subsea valve modules comprises one or more isolation valves configured to selectively block fluid communication through at least one of the outlet(s).

7. The manifold of claim 6, where at least one of the one or more isolation valves is configured to automatically block fluid communication through at least one of the outlet(s) upon decoupling of another of the subsea valve modules from the subsea valve module.

8. The manifold of claim 1, where at least one of the one or more subsea valve assemblies comprises:

a first two-way valve configured to selectively allow fluid communication from the respective one of the one or more inlets to the respective one of the one or more outlets; and

a second two-way valve configured to selectively divert hydraulic fluid from the respective one of the one or more outlets to the respective one of the one or more vents.