What is claimed is:

1. A submersible fluid system for operating at or near the bottom of an open body of water, the system comprising:

a fluid-end comprising a fluid rotor disposed in a fluid-end housing;

an electric machine housing coupled to the fluid-end housing and comprising a hermetically sealed cavity;

an electric machine disposed entirely within the hermetically sealed cavity of the electric machine housing, the electric machine comprising an electric machine stator and an electric machine rotor;

a magnetic coupling that couples the electric machine rotor and the fluid rotor, wherein the magnetic coupling comprises:

a magnet in the hermetically sealed cavity defined by the electric machine housing and coupled to the electric machine rotor, and

a magnet coupled to the fluid rotor and in magnetic interaction with the magnet of the electric machine rotor; and

a substantially non-magnetically conductive wall between the magnet of the electric machine rotor and the magnet of the fluid rotor;

wherein the hermetically sealed cavity of the electric machine housing contains a gas at a pressure that is less than a pressure of a fluid entering the fluid rotor of the fluid-end and less than a hydrostatic pressure of a fluid surrounding the electric machine housing when submerged at a specified depth.

2. The system of claim1, wherein:

a drive-end of the fluid rotor extends into an interior bore of the electric machine rotor and the magnet of the fluid rotor is coupled to an exterior of the drive-end;

the magnet of the electric machine rotor resides in the interior bore of the electric machine rotor; and

the wall comprising a substantially non-magnetically conductive cylinder is disposed within the interior bore of the electric machine rotor.

3. The system of claim 2, further comprising a support extending from an end of the electric machine housing toward the fluid-end housing and clamping to axially strain the substantially non-magnetically conductive cylinder between the support and the fluid-end housing.

4. The system of claim 3, wherein the support is spring biased toward the fluid-end housing.

5. The system of claim 3, further comprising a fluid passage through the support and into an interior of the substantially non-magnetically conductive cylinder, the fluid passage coupled to receive fluid from an exterior of the system and communicate the fluid to an interior of the cylinder.

6. The system of claim 5, wherein the fluid comprises substantially gas.

7. The system of claim 2, wherein the cylinder comprises at least one of a gas impermeable ceramic or glass inner sleeve within a fiber-matrix composite outer sleeve.

8. The system of claim 7, wherein the outer sleeve compressively strains the inner sleeve.

9. The system of claim 2, wherein the cylinder comprises at least one of gas impermeable ceramic or glass inner sleeve within a fiber-matrix composite outer sleeve, and

at least one of the inner or outer sleeves comprises a seal surface about one end and a seal surface about an opposite end.

10. The system of claim 2, wherein the hermetically sealed cavity of the electric machine housing contains a gas at a pressure of about atmospheric and an interior of the cylinder contains a fluid at a pressure of about the pressure of fluid entering the fluid rotor of the fluid-end.

11. The system of claim 1, wherein the electric machine comprises a magnetic bearing supporting the electric machine rotor to rotate within the electric machine stator, and the bearing is wholly contained within the hermetically sealed cavity.

12. The system of claim 1, further comprising a plurality of seals sealing the hermetically sealed cavity, and wherein the seals are entirely static seals.

13. The system of claim 12, wherein at least one of the seals comprises a metal-to-metal seal.

14. The system of claim 1, wherein the electric machine rotor comprises a permanent magnet that interacts with the stator to at least one of rotate the electric machine rotor relative to the stator or generate electricity when moved relative to the stator.

15. The system of claim 1, wherein the electric machine comprises a motor and the fluid rotor comprises one or more of a pump rotor or a compressor.

16. The system of claim 1, wherein the electric machine comprises a generator.

17. A method of coupling an electric machine to a fluid-end in a submersible fluid system for operating at or near the bottom of an open body of water, the method comprising:

maintaining a rotor of the electric machine in an area of a first pressure in a hermetically sealed cavity defined by an electric machine housing, the rotor hermetically sealed from a fluid rotor of the fluid-end in an area of a second, different pressure; and

coupling the rotor of the electric machine to the fluid rotor with a magnetic coupling through a stationary wall between the rotor of the electric machine and the fluid rotor, wherein the magnetic coupling comprises:

a magnet within the hermitically sealed cavity of first pressure and coupled to the rotor of the electric machine, and

a magnet within the hermitically sealed cavity of second pressure and coupled to the fluid rotor;

wherein the first pressure is less than the second pressure, and the first pressure is less than a hydrostatic pressure of a fluid surrounding the electric machine housing when submerged at a specified depth.

18. The method of claim 17, comprising sealing the area containing the rotor of the electric machine from the area containing the fluid rotor entirely with static seals.

19. The method of claim 18, comprising maintaining a stator of the electric machine in the area of the first pressure.

20. A fluid system for operating at or near the bottom of an open body of water, the system comprising:

a fluid-end comprising a fluid rotor disposed in a fluid-end housing;

a pump shaft contained in a submersible pump housing, the pump shaft having a pump permanent magnet;

a rotor extending from an end of an electric machine housing, the rotor having a rotor permanent magnet and residing in a hermetically sealed cavity defined by the electric machine housing; and

the pump permanent magnet residing proximate to the rotor permanent magnet communicating magnetic flux between the rotor permanent magnet and the pump permanent magnet and coupling the pump shaft with the rotor, the rotor is configured to rotate within a stator, and a magnetic coupling couples the rotor to the pump shaft to rotate the pump shaft at the same speed as the rotor;

wherein the magnetic coupling comprises a magnet in the hermitically sealed cavity defined by the electric machine housing and coupled to the rotor;

wherein the hermetically sealed cavity of the electric machine housing contains a gas at a pressure that is less than a pressure of a fluid entering the fluid rotor of the fluid-end and less than a hydrostatic pressure of a fluid surrounding the electric machine housing when submerged at a specified depth.