CLAIMS

1. A DC power distribution system comprising a plurality of power sources; a DC power distribution bus comprising a plurality of DC bus sections; wherein at least one power source is coupled to each of the DC bus sections; the system further comprising one or more power switching assemblies; wherein each power switching assembly couples one of the plurality of DC bus sections to another of the plurality of DC bus sections, a system controller to control the power sources and the one or more power switching assemblies; and an inverter connected to one of the one or more power switching assemblies to supply a consumer; wherein each power switching assembly comprises a first terminal and a second terminal, the first terminal being electrically coupled to a first bus section of the DC power distribution bus and the second terminal being electrically coupled to a second bus section of the DC power distribution bus; a first semiconductor device and a second semiconductor device electrically coupled between the first terminal and the second terminal to control current flow between the first terminal and the second terminal; a current connection from each terminal to a power switching assembly controller for providing an indication of current at the first terminal and at the second terminal; a control signal line connected between the power switching assembly controller and each semiconductor device for providing a control signal to the semiconductor devices to control the current flow through them; and an inverter coupler for coupling each current connection to the inverter; wherein the inverter coupler comprises a feed from each current connection on each side of each power switching assembly to the inverter.

2. A DC power distribution system according to claim 1, wherein each power switching assembly is configured to switch power in the DC power distribution bus.

3. A DC power distribution system according to claim 1 or claim 2, wherein the power switching assembly controller is configured to receive an indication of current at each terminal through each current connection and to control the first semiconductor device and the second semiconductor device based on the received indication of current.

4. A DC power distribution system according to any preceding claim, wherein the semiconductor device comprises an insulated gate bipolar transistor.

5. A DC power distribution system according to any preceding claim, wherein the power source comprises one of a prime mover, a generator, or an energy store.

6. A method of operating a DC power distribution system comprising a plurality of power sources; a DC power distribution bus comprising a plurality of DC bus sections; at least one power source coupled to each of the DC bus sections; one or more power switching assemblies, each one coupled between one of the plurality of DC bus sections and another of the plurality of DC bus sections, a system controller to control the power sources and the one or more power switching assemblies; and at least one consumer connected to one of the one or more power switching assemblies by an inverter connected to each of a first and a second terminal of each power switching assembly; the method comprising detecting current at the first terminal and at the second terminal of each power switching assembly; based on the detected current, providing a control signal from a power switching assembly controller to a first semiconductor device and a second semiconductor device electrically coupled between the first terminal and the second terminal to control current flow between the first terminal and the second terminal to provide a required current level at one of the terminals; and supplying current to the inverter through an inverter coupler from the one terminal at which the required current level is provided.

7. A method of operating a DC power distribution system according to claim 6, wherein current supplied to the inverter through the inverter coupler is supplied through a feed from each current connection on each side of each power switching assembly to the inverter.

8. A method of operating a DC power distribution system according to claim 6 or claim 7, wherein the system controller provides an instruction to the power switching assembly controller to supply power to a specific consumer.

9. A method of operating a DC power distribution system according to any of claims 6 to 8, wherein the method further comprises monitoring the voltage at the terminals of each power switching assembly to determine whether a fault condition has been corrected.

10. A method of operating a DC power distribution system according to any of claims 6 to 9, wherein the method further comprises ceasing supply of power to that consumer on receipt of a further instruction from the system controller.

11. A method of operating a DC power distribution system according to any of claims 6 to 10, wherein the method further comprises comparing voltages at the first terminal and the second terminal and supplying current to the inverter through the inverter coupler from the terminal at which the voltage is higher.