WHAT IS CLAIMED IS:

1. A configurable and compliant circuit protection system for an explosive environment, the system comprising:

at least one switch device comprising:

a housing;

a line-side terminal and a load-side terminal coupled to the housing;

a bus structure in the housing and including at least one solid state switching element operable in an arc-free manner to connect the load-side terminal to the line-side terminal and disconnect the load-side terminal from the line-side terminal; and

a controller configured to:

receive a selected one of a plurality of different settings for operation of the at least one solid state switching element to protect a connected electrical load; and

determine whether the received setting exceeds a wiring limit of the bus structure for the explosive environment to prevent the bus structure from becoming an ignition source in the explosive environment, and operate the at least one solid state switching element based on the determination as to whether the received setting exceeds the wiring limit of the bus structure for the explosive environment;

whereby the switch device is compliant for use in the explosive environment without requiring a separately provided explosion-proof enclosure.

2. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to determine the wiring limit.

3. The configurable and compliant circuit protection system of claim 2, wherein the controller is further configured to accept a wiring ampacity limit for a line-side or load-side wiring at a location of the at least one switch device in a power system, and compare the accepted wiring ampacity limit and the determined wiring limit.

4. The configurable and compliant circuit protection system of claim 2, wherein the controller is further configured to determine a wire gauge for a connection made to the line-side terminal and ~~a~~ the load-side terminal.

5. The configurable and compliant circuit protection system of claim 4, wherein the controller is configured to determine the wire gauge according to a position of a fastener that completes ~~a~~ the connection to the line-side or load-side terminal.

6. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to accept a temperature input, and based on the temperature input the controller is configured to determine whether ~~a~~ the wiring limit has been exceeded.

7. The configurable and compliant circuit protection system of claim 6, wherein the controller is further configured to operate the at least one solid state switching element in response to the temperature input to maintain a surface temperature of the housing at or below a rated temperature for the explosive environment, thereby precluding the housing from being an ignition source in the explosive environment.

8. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to communicate the ~~accepted setting~~ selected one of the plurality of different settings to at least one other switch device in a network of switch devices.

9. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to identify an error in ~~the~~ wiring connected to the line-side or load-side terminal, and generate a notification or alert ~~of~~ for the identified error.

10. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to:

accept the received setting only when the wiring limit is not exceeded; and

control the at least one solid state switching element according to the accepted setting.

11. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to:

reject the received setting when the wiring limit is exceeded; and

prompt a selection of an alternative one of the plurality of settings.

12. The configurable and compliant circuit protection system of claim 1, wherein the controller is further configured to:

enable a fail-safe mode when the received setting exceeds the wiring limit.

13. The configurable and compliant circuit protection system of claim 1, wherein the controller is configured to detect a unique current signature of ~~at least one~~ the connected load.

14. The configurable and compliant circuit protection system of claim 13, wherein the controller is further configured to:

monitor a change in the unique current signature over time; and

generate a notice or alert based on the monitored change in the unique current signature.

15. The configurable and compliant circuit protection system of claim 13, wherein the controller is further configured to automatically select one of the plurality of different settings based on the detected unique current signature.

16. The configurable and compliant circuit protection system of claim 1, wherein the at least one switch device further comprises at least one mechanical switch contact in the bus structure, and the housing including a sealed internal enclosure containing the at least one mechanical switch contact, thereby precluding the switch contact from being an ignition source in the explosive environment.

17. The configurable and compliant circuit protection system of claim, 1, wherein the at least one solid state switching element is encapsulated.

18. The configurable and compliant circuit protection system of claim, 1, wherein the at least one switching device is configured as a solid state circuit breaker.

19. The configurable and compliant circuit protection system of claim, 1, wherein the at least one switching device is configured as a hybrid circuit breaker.

20. The configurable and compliant circuit protection system of claim, 1, wherein the housing is chemically resistant to elements in the hazardous location.