example, low level logic signals will typically be used for certain control, such as on the order of 5v DC or less, while higher voltage signals, such as on the order of 110v AC, 220v AC, or three-phase 440v AC may be used for powering the driven motor. The actual voltages (and frequencies and currents) may vary depending upon the standards in the countries or areas where the equipment is used. However, all such equipment must accommodate both high and low level signals.

[0005] In many systems, optocouplers and similar signal isolation devices may be used to separate signals of different levels, particularly logic signals from power signals and boards. Such devices can add significantly to the cost of the equipment, particularly where multiple such devices are needed. Moreover, providing proper isolation and distances within the packages, such as between operator interfaces and powered circuit boards is always a challenge.

[0006] There is a need, therefore, for improved techniques for driving electric motors that can respond to such design challenges.

BRIEF DESCRIPTION

[0007] Embodiments of t~~T~~he present invention provides a motor drive system and method designed to respond to these needs. In accordance with aspects of the invention, a motor drive ~~system~~ comprises ~~a motor drive comprising~~ a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region, and a plastic housing having an interior in which the control sub-assembly main circuit board is disposed. At least one component is disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive, and a plastic barrier integral with the housing and comprising only plastic material is disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component.

[0008] In accordance with other aspects of the invention, a motor drive ~~system~~ comprises ~~a motor drive that includes~~ a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region, and a plastic housing having~~with~~ an interior in which the control sub-assembly main circuit board is disposed. At least

one component is disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive, and a plastic barrier comprising only plastic material is integral with and is disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component. An operator interface is disposed over the high voltage region of the control sub-assembly main circuit board, wherein access to the operator interface is limited by the barrier, and wherein the housing comprises spacing plungers that provide a desired spacing between the surface of the operator interface and an underlying circuit board.

[0009] Other aspects of t~~T~~he invention also provide~~s~~ a motor drive comprising a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region, and a plastic housing with an interior in which the control sub-assembly main circuit board is disposed. A plastic barrier integral with the housing and comprising only plastic material is disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the low voltage region. An operator interface is disposed over the high voltage region of the control sub-assembly main circuit board, wherein the housing comprises ~~an array of~~ integral spring structures that are deformed by an operator interacting with the interface.

DRAWINGS

[0010] These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0011] FIG. 1 is a perspective view of an exemplary motor drive system in accordance with aspects of the present techniques;

[0012] FIG. 2 is a similar perspective view of the system of FIG. 1 with a control sub-assembly removed from a power sub-assembly;

[0013] FIG. 3 is a perspective view of the control sub-assembly and power sub-assembly illustrating internal plug-in connectors for mating the two and for the exchange of signals between the two;

CLAIMS:

1. A motor drive comprising:

a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region;

a housing having an interior in which the control sub-assembly main circuit board is disposed;

at least one component disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive; and

a barrier disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component.

2. The motor drive of claim 1, wherein the barrier comprises a vented wall.

3. The motor drive of claim 1, wherein the barrier is integrally molded in the housing.

4. The motor drive of any one of claims 1 to 3, comprising an operator interface disposed in the housing.

5. The motor drive of claim 4, wherein the operator interface is disposed over the high voltage region of the control sub-assembly main circuit board and is limited in access by the barrier.

6. The motor drive of claim 4 or 5, wherein the housing comprises integral spring structures that are deformed by an operator interacting with the interface.

7. The motor drive of claim 6, wherein each integral spring structure includes an integral plunger that interfaces with a respective switch when the respective spring structure is deformed by an operator interacting with the interface.

8. The motor drive of claim 7, wherein the plungers have a length selected to provide desired spacing between the interface and an underlying circuit board.

9. A motor drive comprising:

a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region;

a housing having an interior in which the control sub-assembly main circuit board is disposed;

at least one component disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive;

a barrier disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component; and

an operator interface disposed over the high voltage region of the control sub-assembly main circuit board, wherein access to the operator interface is limited by the barrier, and wherein the housing comprises spacing plungers that provide a desired spacing between the a surface of the operator interface and an underlying circuit board.

10. The motor drive of claim 9, wherein the barrier comprises a vented wall.

11. The motor drive of claim 9, wherein the barrier is integrally molded in the housing.

12. The motor drive of any one of claims 9 to 11, wherein the housing comprises integral spring structures that are deformed by an operator interacting with the interface.

13. The motor drive of claim 12, wherein each integral spring structure includes one of the spacing plungers, and wherein each spacing plunger interfaces with a respective switch when the respective spring structure is deformed by an operator interacting with the interface.

14. A motor drive comprising:

a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region;

a housing having an interior in which the control sub-assembly main circuit board is disposed;

an operator interface disposed over the high voltage region of the control sub-assembly main circuit board, wherein the housing comprises integral spring structures that are deformed by an operator interacting with the interface.

15. The motor drive of claim 14, wherein each integral spring structure includes an integral plunger that interfaces with a respective switch when the respective spring structure is deformed by an operator interacting with the interface.

16. The motor drive of claim 15, wherein the plungers have a length selected to provide desired spacing between the interface and an underlying circuit board.

17. The motor drive of any one of claims 14 to 16, comprising at least one component disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive, and a barrier disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component; and

18. The motor drive of claim 17, wherein access to the operator interface is limited by the barrier.

19. The motor drive of claim 17 or 18, wherein the barrier comprises a vented wall.

20. The motor drive of claim 17 or 18, wherein the barrier is integrally molded in the housing.

CLAIMS:

1. A motor drive comprising:

a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region;

a plastic housing having an interior in which the control sub-assembly main circuit board is disposed;

at least one component disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive; and

a plastic barrier integral with the housing and comprising only plastic material disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component.

2. The motor drive of claim 1, wherein the barrier comprises a vented wall.

3. The motor drive of claim 1, wherein the barrier is integrally molded in the housing.

4. The motor drive of claim 1, comprising an operator interface disposed in the housing.

5. The motor drive of claim 4, wherein the operator interface is disposed over the high voltage region of the control sub-assembly main circuit board and is limited in access by the barrier.

6. The motor drive of claim 4, wherein the housing comprises integral spring structures that are deformed by an operator interacting with the interface.

7. The motor drive of claim 6, wherein each integral spring structure includes an integral plunger that interfaces with a respective switch when the respective spring structure is deformed by an operator interacting with the interface.

8. The motor drive of claim 7, wherein the plungers have a length selected to provide desired spacing between the interface and an underlying circuit board.

9. A motor drive comprising:

a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region;

a plastic housing having an interior in which the control sub-assembly main circuit board is disposed;

at least one component disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive;

a plastic barrier comprising only plastic material integral with and disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component; and

an operator interface disposed over the high voltage region of the control sub-assembly main circuit board, wherein access to the operator interface is limited by the barrier, and wherein the housing comprises spacing plungers that provide a desired spacing between the a surface of the operator interface and an underlying circuit board.

10. The motor drive of claim 9, wherein the barrier comprises a vented wall.

11. The motor drive of claim 9, wherein the barrier is integrally molded in the housing.

12. The motor drive of claim 9, wherein the housing comprises integral spring structures that are deformed by an operator interacting with the interface.

13. The motor drive of claim 12, wherein each integral spring structure includes one of the spacing plungers, and wherein each spacing plunger interfaces with a respective switch when the respective spring structure is deformed by an operator interacting with the interface.

14. A motor drive comprising:

a control sub-assembly main circuit board subdivided into a high voltage region and a low voltage region;

a plastic housing having an interior in which the control sub-assembly main circuit board is disposed;

a plastic barrier integral with the housing and comprising only plastic material disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the low voltage region; and

an operator interface disposed over the high voltage region of the control sub-assembly main circuit board, wherein the housing comprises integral spring structures that are deformed by an operator interacting with the interface.

15. The motor drive of claim 14, wherein each integral spring structure includes an integral plunger that interfaces with a respective switch when the respective spring structure is deformed by an operator interacting with the interface.

16. The motor drive of claim 15, wherein the plungers have a length selected to provide desired spacing between the interface and an underlying circuit board.

17. The motor drive of claim 14, comprising at least one component disposed in the interior and designed to be accessed by an operator during installation and/or maintenance of the motor drive, and a barrier disposed in the housing to limit access to the high voltage region of the control sub-assembly main circuit board while allowing access to the at least one component.

18. The motor drive of claim 17, wherein access to the operator interface is limited by the barrier.

19. The motor drive of claim 17, wherein the barrier comprises a vented wall.

20. The motor drive of claim 17, wherein the barrier is integrally molded in the housing.