CLAIMS

1. An electrical contactor assembly comprising:

a socket defining a signal cavity, the socket having a first socket opening at a first socket end and a second socket opening at a second socket end opposite the first socket end;

a signal contact probe located within the signal cavity, the signal contact probe comprising:

a shell having a body defining a shell cavity, the shell having a first shell opening at a first end of the shell and a second shell opening at a second end of the shell opposite the first end of the shell,

a first plunger received in the shell cavity and extending through the first shell opening and located in the first socket opening,

a second plunger received in the shell cavity and extending through the second shell opening and located in the second socket opening, and

a first shell insulation member located on an outside surface of the shell and away from the first plunger and the second plunger, the first shell insulation member being configured to prevent the shell from contacting the socket; and

an end insulation ring located in the second socket opening and around the second plunger, the end insulation ring configured to facilitate a substantially constant impedance through the signal contact probe, and configured to restrict lateral movement of the second plunger within the second socket opening.

2. The electrical contactor assembly of claim 1, further comprising:

a ground cavity having a conductive material disposed on an inner surface of the ground cavity; and

a ground contact probe located within the ground cavity and separated from contacting the socket by the conductive material disposed on the inner surface of the ground cavity.

3. The electrical contactor assembly of claim 1, wherein the socket includes a socket body and a socket retainer, the socket body and the socket retainer being made of a

metal material.

4. The electrical contactor assembly of claim 3, wherein the socket body further comprises a body insulation layer disposed on an inner surface of the signal cavity located in the socket body, and wherein the socket retainer further comprises a retainer insulation layer disposed on an inner surface of the signal cavity located in the socket retainer.

5. The electrical contactor assembly of claim 1, wherein the first shell insulation member occupies substantially all of the outside surface of the shell within the socket body.

6. The electrical contactor assembly of claim 1, further comprising a second shell insulation member located proximal to the second plunger, and

wherein the first shell insulation member is located proximal to the first plunger.

7. The electrical contactor assembly of claim 6, wherein the first shell insulation member and the second shell insulation member are located within the socket body.

8. The electrical contactor assembly of claim 1, wherein the end insulation ring is made of polytetrafluoroethylene.

9. The electrical contactor assembly of claim 1, wherein the end insulation ring is attached to an inner surface of the socket by an epoxy.

10. The electrical contactor assembly of claim 1, wherein the end insulation ring is attached to an inner surface of the socket by compression fit.

11. An electrical contactor assembly comprising:

a socket defining a signal cavity, the socket having a socket body, a socket retainer, a first socket opening at a first socket end, and a second socket opening at a second socket end opposite the first socket end, the signal cavity having an inner surface;

a signal contact probe located within the signal cavity, the signal contact probe comprising:

a shell having a body defining a shell cavity, the shell having a first shell opening at a first end of the shell and a second shell opening at a second end of the shell opposite the first end of the shell,

a first plunger received in the shell cavity and extending through the first shell opening and located in the first socket opening, and

a second plunger received in the shell cavity and extending through the second shell opening and located in the second socket opening; and

an insulating sleeve made of a dielectric material and occupying substantially an entire space within the signal cavity between the signal contact probe and the inner surface of the signal cavity such that the signal contact probe and the insulating sleeve substantially occupy the signal cavity, the insulating sleeve having a first part occupying an area of the signal cavity not occupied by the signal contact probe within the socket body and a second part occupying an area of the signal cavity not occupied by the signal contact probe within the socket retainer, the first part and the second part directly contacting each other, the insulating sleeve contacting the first plunger, the second plunger, and the shell, and configured to facilitate a substantially constant impedance through the signal contact probe,

wherein the socket body and the socket retainer are made of a metal material, and

wherein the socket body further comprises a body insulation layer disposed on an inner surface of the signal cavity located in the socket body, and wherein the socket retainer further comprises a retainer insulation layer disposed on an inner surface of the signal cavity located in the socket retainer.

12. The electrical contactor assembly of claim 11, further comprising:

a ground cavity having a conductive material disposed on an inner surface of the ground cavity, and

a ground contact probe located within the ground cavity and separated from contacting the socket by the conductive material disposed on the inner surface of the ground cavity.

13. The electrical contactor assembly of claim 11, further comprising a second signal contact probe located within a second signal cavity, and a second insulating sleeve occupying substantially an entire space within the second signal cavity between the second signal contact probe and an inner surface of the second signal cavity such that the second signal contact probe and the second insulating sleeve occupy substantially an entire space within the second signal cavity,

wherein the signal contact probe is a first signal contact probe, and the first signal contact probe and the second signal contact probe are configured to form a differential pair for communicating signals.

14. An electrical contactor assembly comprising:

a socket defining a signal cavity, the socket having a socket body, a socket retainer, a first socket opening at a first socket end, and a second socket opening at a second socket end opposite the first socket end, the signal cavity having an inner surface;

a first signal contact probe and a second signal contact probe located within the signal cavity, the first signal contact probe and the second signal contact probe forming a differential pair for communicating signals; and

an insulating sleeve made of a dielectric material and occupying substantially an entire space within the signal cavity between the first contact probe and the inner surface of the signal cavity, between the second contact probe and the inner surface of the signal cavity, and between the first contact probe and the second contact probe, such that the first contact probe, the second contact probe, and the insulating sleeve substantially occupy the signal cavity, the insulating sleeve having a first part occupying an area of the signal cavity not occupied by the first signal contact probe and the second signal contact probe within the socket body and a second part occupying an area of the signal cavity not occupied by the first signal contact probe and the second signal contact probe within the socket retainer, the first part and the second part directly contacting each other, the insulating sleeve configured to maintain signal integrity throughout the first signal contact probe and the second signal contact probe,

wherein the socket body and the socket retainer are made of a metal material,

and

wherein the socket body further comprises a body insulation layer disposed on an inner surface of the cavity located in the socket body, and wherein the socket retainer further comprises a retainer insulation layer disposed on an inner surface of the cavity located in the socket retainer.

15. The electrical contactor assembly of claim 14, further comprising:

a ground cavity having a conductive material disposed on an inner surface of the ground cavity, and

a ground contact probe located within the ground cavity and separated from contacting the socket by the conductive material disposed on the inner surface of the ground cavity.