189.6.2.1 Isolated MPoE systems

Isolated MPoE systems, as shown in Figure 189–11, are recommended for mixing segments that cross any of the following:

Ground references
Boundaries between separate power distribution systems
Boundaries of a single building

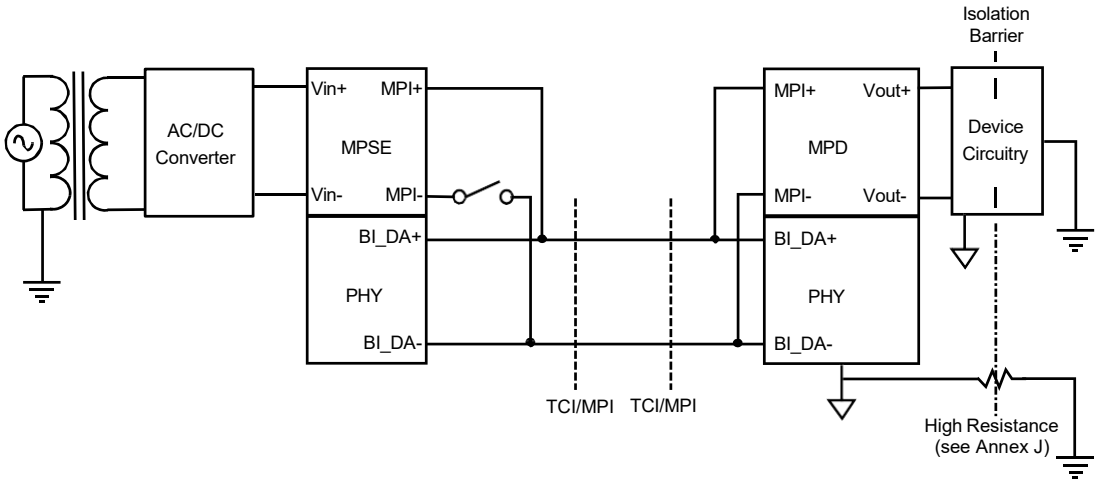

Figure 189–11—Isolated MPoE system diagram

Isolated MPoE systems have isolation requirements that are aligned with Clause 33 and Clause 145 isolation requirements. These isolation requirements target compatibility with low-voltage systems that prohibit intentional grounding of any conductor, such as a Safety Extra-Low Voltage (SELV) system. Because the MPSE outputs are isolated and floating, disconnecting the more negative conductor is sufficient to stop the flow of power and ground loops are not present.

189.6.2.1.1 MPoE requirements for isolated MPoE systems

Isolated MPDs and isolated MPSEs shall provide electrical power isolation as specified in Annex J.1.2 between all accessible external conductors, including frame ground (if any), and all MPI conductors, including those not used by the MPD or MPSE. MPD isolation is evaluated with the isolated MPSE disconnected from the MPD.

An isolated MPSE that has more than one isolated MPSE MPI does not require electrical power isolation between isolated MPSE MPIs. A device incorporating at least one isolated MPD shall provide electrical power isolation between all MPIs on the device, including MPIs associated with either additional MPDs or any MPSE.

This electrical isolation shall meet the isolation requirements ~~as~~ specified in Annex J.1.2. Any equipment that can be connected to an isolated MPSE or isolated MPD through a non-MPI connector that is not isolated from the MPI conductors needs to provide isolation between all accessible external conductors, including frame ground (if any), and the non-MPI connector. Connectors providing such a connection are recommended to be labeled (see 189.7.8).

189.6.2.1.2 MPSE switching for isolated MPoE systems

An isolated MPSE shall switch the more negative conductor. It is allowed to switch both conductors.

189.6.2.2 Grounded MPoE systems

Grounded MPoE systems, as shown in Figure 189–12, are recommended for mixing segments that share a common, continuous ground with all interconnected equipment.

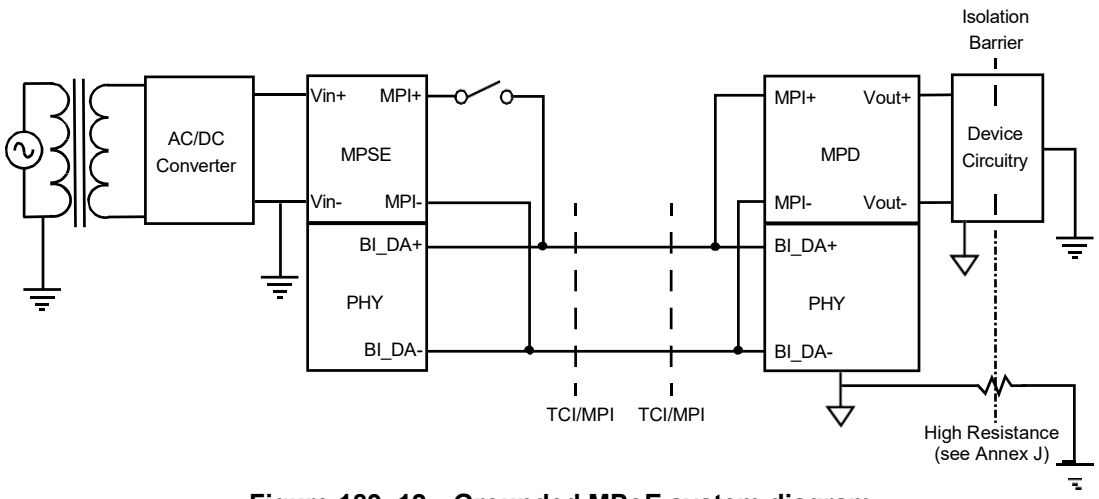

Figure 189–12—Grounded MPoE system diagram

NOTE - The MPD in Figure 189–12 has no low resistance ground connection on the line side of the required isolation barrier. This is intentional to prevent ground loops and to satisfy the isolation requirement specified in 189.6.2.2.1.

Grounded MPoE systems have isolation requirements that are aligned with Clause 104 isolation requirements. These isolation requirements target compatibility with low-voltage systems that intentionally ground one conductor, such as Protective Extra-Low Voltage (PELV) systems. Grounded MPSEs are permitted to ground the more negative conductor of their power supply. Grounded MPSEs are specified in 189.6.2.2.2 to switch their more positive conductor because switching only the negative conductor could allow a ground path to prevent an MPSE from controlling the flow of power.

MPDs are specified to have an isolation requirement so the current supplied by the MPSE on the MPI returns to the MPSE via the MPI.

189.6.2.2.1 MPoE requirements for grounded MPoE systems

A grounded MPSE does not require electrical power isolation between mixing segments, nor is electrical power isolation required between Clause 104 link segments and the MPoE mixing segments.

MPDs that are compatible with grounded MPSEs shall provide electrical power isolation as specified in Annex J.1.3 between all accessible external conductors, including frame ground (if any), and all non-MPI conductors, including those not used by the MPD. MPD isolation is evaluated with the grounded MPSE disconnected from the MPD.

A device incorporating at least one MPD compatible with grounded MPSEs shall provide electrical power isolation between all MPIs on the device. Note this includes MPIs associated with either additional MPDs or any MPSE.

This electrical power isolation shall meet the isolation requirements ~~as~~ specified in Annex J.1.3. Any equipment that can be connected to an MPD through a non-MPI connector that is not isolated from the MPI conductors needs to provide isolation between all accessible external conductors, including frame ground (if any), and the non-MPI connector. Connectors providing such a connection are recommended to be labeled (see 189.7.8).

189.6.2.2.2 MPSE switching for grounded MPoE systems

A grounded MPSE shall switch the more positive conductor. It is allowed to switch both conductors.