



NEC 230.46 Line Side Connectors Update and Fault Managed Equipment

Effective January 1, 2023, NEC 230.46 requires wire connectors used for splicing or tapping conductors on the line side of the service to be Certified (Listed).

by UL

Q This is a follow-up to the UL Solutions Question Corner in the January 2023 *IAEI News*. Effective January 1, 2023, *National Electrical Code*® (NEC®) 230.46 requires wire connectors used for splicing or tapping conductors on the line side of the service to be Certified (Listed) as suitable for this use. How will these connectors be marked to identify this use on the line side of service equipment? Are there any connectors UL Certified (Listed) for this use?

A Yes, wire connectors UL Certified (Listed) for this use are now available. These wire connectors are UL Certified (Listed) under the product category Wire Connectors and Soldering Lugs (ZMVV). The guide information for this category states that connectors suitable for use on the line side of service equipment may be marked with the following or equivalent: “SR” or “Suitable for Use on the Line Side of Service Equipment.” These markings may appear on a connector, smallest unit container, or information sheet placed in the smallest unit container.

One way to identify connectors Certified (Listed) for this use is to search UL Product iQ® at www.ul.com/piq:

1. Begin the search by entering the Category Control Number (CCN) “ZMVV” in the “Create a Search Now” field.
2. On the next screen, enter the manufacturer’s file number or name in the keyword search field.
3. Select the ZMVV Certification (Listing) file from the results.
4. In the left navigation under “Resources,” select “View Products in this Listing.”

5. Once viewing those search results, use the “Search Template” in the left navigation to see Certified (Listed) models eligible to display the SR or equivalent text option by selecting the “Use Statement” field and then selecting “Suitable for use on the line side of service equipment.” A complete list of models from this file that are eligible to bear this marking will be displayed. If this text option is missing from the “Use Statement” field, the manufacturer does not have any connectors Certified (Listed) for the use.

Searching UL Product iQ is complimentary; registration is required for full access.

Q The 2023 NEC® added new Article 726 Class 4 Fault-Managed Power Systems. Does UL Solutions Certify (List) this type of equipment, and what requirements are used for Certification (Listing)?

A Yes, UL Solutions does Certify (List) Class 4 fault-managed power systems under the product category Fault-Managed Power Systems - Class 4 (DLQC) for compliance with UL 1400-1, Outline of Investigation for Fault-Managed Power Systems.

Each of these systems includes a transmitter, receiver and Class 4 cable. These systems are characterized by sophisticated monitoring and control systems that check the circuit for faults and control the power transmission to ensure that the energy delivered into a fault is limited. Class 4 power systems differ from Class 2 and Class 3 systems in that they are power limited with respect to risk of electric shock and fire hazards



between the output of the Class 4 transmitter and input of the Class 4 receiver (Class 4 circuit). Class 4 power systems are not power limited at the source. The output of the transmitter is limited to 450 V peak or DC.

These systems are intended to be installed in accordance with Article 726, Class 4, Fault-Managed Power Systems of the *NEC*® and are found in industrial or commercial locations such as hotels, airports, offices and sports stadiums and arenas. One of the main applications for this technology is powering cell towers for 5G applications. They are not suitable for installation in dwelling units.

Class 4 transmitters must be marked with:

- Input voltage
- Output voltage
- For use with _____ receiver(s) (manufacturer and part number)
- For use with _____ Class 4 Cable(s) (manufacturer and part number)

Class 4 receivers must be marked with:

- For use with _____ transmitter(s) (manufacturer and part number)
- Output voltage and current and type of output, i.e., Class 1, Class 2 or Class 4
- If designed for use with specific utilization equipment, that equipment shall be identified

UL Solutions also Certifies (Lists) Class 4 cable under

the product category Class 4 Cable (DLPY) for compliance with UL 1400-2, Outline of Investigation for Fault-Managed Power Systems – Part 2: Requirements for Cables. This category covers cable types CL4P (Plenum), CL4R (Riser) and CL4 (General Use) in 24 – 6 AWG intended for use in Class 4 power systems described in *NEC*® Article 726 and installed in accordance with *NEC*® Article 722 Cables for Power-Limited Circuits and Fault-Managed Power Circuits. The cable is rated for 450 V dc but is not so marked.

The UL Solutions guide information and Certifications (Listings) for Class 4 fault-managed power systems and Class 4 cable can be viewed on UL Product iQ at www.ul.com/piq; enter DLQC or DLPY in the search field. Searching UL Product iQ is complimentary; registration is required for full access.

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