



# UL 1400-1 FMPS Update

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**Solutions**

# Background and History

- Issue 1 of the Outline of Investigation published Dec. 2022
- Three certifications since publication, other investigations ongoing
- Very Test Intensive
- What did we learn, what can be improved?
- OOI allows for revisions without going through an ANSI process

# Issue 2 Update

- Began in August of 2024 (Working Group that developed Issue 1)
- 70 Pages of comments (technical & editorial)
- Goals
  - Be consistent with terms
  - Is there duplicate testing that could be removed
  - Make standard flow better, remove duplication of requirements
  - Update Illustrations (flow charts, figures, tables)
  - Review Electric Shock Section 5
  - Submit completed Issue 2 of the OOI as a standard and form a Technical Committee (TC) that will be responsible for updates.
- After review of all comments, a small editorial group was formed to organize everything.

# Notable Changes

- Definitions revised/added for clarity
  - Fault Current Limit Mask
  - Fault Waveform
  - Pulse Mask Threshold
- Electric Shock Section completely rewritten
  - Inclusion of an Evaluation Overview
  - Flow charts have been revised for clarity (Fault Event Period, Fault Event Period Pulse Sequence)
  - Removal of references to the ATIS document, specifically Test Configurations (added an Annex to indicate all test permutations)
  - Fault Current Limit illustrations with Heart Factors of 1 and 0.4
  - Updated Illustrations for Let-Go Limit Curve and Let-Go Voltage Limit Curve
  - Added requirements for Fault Waveforms during the Fault Recovery Period that consists of a sequence of different waveform segments (AC, DC or AC+DC)
  - Added requirements for burns to body tissue

# Notable Changes, cont.

- **Removal of Parallel Arc Fault Tests**
  - The group felt like this was unnecessary due to other testing
  - Series Arc Fault Tests remain in the standard
- **Connector Requirements Better Defined**
  - Previous Annex's were convoluted and confusing (removed)
  - Requirements for connectors evaluated to UL 1977 (Component Connectors used in data, signal, control and power applications) used in systems that have Series Resistive Arc Fault Protection (voltage/current rating) vs ones that don't (additional tests required) are better defined.
- **Transmitter/Receiver/Grounding Requirements**
  - Requirements for the transmitter, receiver and for grounding have been better segregated to avoid confusion and repetition

# Questions?

