

The Issues and Problems with Fused Meter Leads

1. Fused meter leads introduce another variable into the meter safety issue by adding an aftermarket lead to the meter, which violates manufacturer and our recommendations – always use OEM leads.
2. Using leads other than the meter manufacturer's leads, especially a configuration (fused) not originally supplied by the manufacturer may void product liability coverage in the event of a failure that cannot be directly attributed to protective features of the meter failing.
3. Meters that are tested by 3rd parties to the IEC meter standard EN61010-1 by 3rd party testing labs that test the meters in compliance to the standard cannot actually be tested in compliance with the IEC standard with fused leads.
4. Even though you use a manufacturer's model of fusible leads, as a rule, that manufacturer (Fluke for example) simply offers them at face value. Fluke actually DOES NOT recommend fused leads for Fluke meters tested to IEC EN61010-1.
5. As already stated, Fluke, one of the most trusted meter and instrument manufacturers in the world does not recommend fused leads due to the fact a qualifying Cat III or Cat IV meter must withstand 20 pulses in the 6 KV or better range without failing or causing personal injury. With a fused lead, the energy must be absorbed by a fuse in the individual's hands (he/she is holding the leads).
6. Fused leads put a potential explosion hazard in the hands of the technician if the wrong fuse is used. For example a 250V BAF control circuit fuse is used mistakenly in place of a 600V current limiting fast blow fuse on a meter exposed to 600V AC (480 V system) the possibility of the lead exploding in a fault is probable. Obviously an exploding lead may well lead to an exploding meter and ultimately an arc flash.

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7. A quality meter like a Fluke would likely withstand an overvoltage surge that caused the improperly fused lead to explode. Point made, the category rating system requires the meter to withstand the 20 high voltage surges, between 2500 and 8000V depending on the category rating, and still be in tact and functional after the test. Fused leads actually circumvent this requirement and negate the inherent user protection built into the meter that made it possible for the meter to pass its category test to begin with.

8. Fused leads, in general, create a “panacea” attitude that there is no way the operator can be injured with a meter, no matter how inferior that meter may be, or how poor his/her work practices are. This is a false assumption especially in light of the fact that surge currents can get through a fuse very quickly. This is known as the I^P or instantaneous let through. DMM fusing by companies like Fluke or Simpson are specifically designed to limit let through current (I^2T) and surge current (I^P). Since the fuse in the leads may end up being just a common control circuit fuse that was readily available, a catastrophe may result if a surge is encountered, or the meter is misused.

9. Fused leads are always in the meter test loop. So whatever operation, measuring current, ohms or voltage they are there in the test circuit. If the fuses in the lead set are wrong, and the user ends up energizing the meter with the leads in the wrong configuration (plugged into current jacks accidentally testing live voltage) the risk of explosion of the leads in the hands of the operator is always present. Consider then a quality industrial meter, third party tested and certified to the appropriate category in the hands of an experienced user. Improper fuses **IN THE METER ITSELF** (not in the leads), although a serious issue, **DOES NOT EXPOSE THE USER TO A HAZARD** with the meter set on VOLTAGE and the standard leads plugged into the voltage and common jack on the meter. The only time a risk might occur is if the meter is set on current and a live voltage is accidentally encountered. ***Even if the incorrect fuse INSIDE THE METER did fail catastrophically, at least the fuse is IN THE METER and not in the users HANDS in a fused lead.***

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10. The last point makes clear, then, how important the CORRECT fuses IN THE METER itself really are. In order for a fused meter to be safe it must
- Be tested and certified by a 3rd party independent testing facility and be certified for the category it is labeled for
 - fused in the CURRENT circuit(s)
 - Used by an individual that is trained, assessed as qualified and continually vigilant of his/her meter's condition and assure only the manufacturer's recommended fuses are used in his/her meter.

Bottom line is meters tested to IEC EN61010-1 Meter Standard are robust and up to the challenges of an industrial environment. "Certified" or "Designed to" EN61010-1 standards DOES NOT make the meter safe!

- Adding a fuse in the leads is not the solution. A better path forward includes the suggestions listed below:
- Specify meters for high power industrial use must be 3rd Party Independently TESTED, not JUST certified, as in compliance with EN61010-1 standard.
- Avoid meters from tool mass marketers and DIY stores in an industrial environment, as most of them, even if labeled Cat III, cannot pass actual testing at a Cat III level.
- Use quality Industrial meters from a reputable meter manufacturer 3rd party tested and certified and fused for 600 volts minimum in the amps circuit.
- Only trained and qualified persons should make measurements using a DMM. All meters should be tested on a KNOWN LIVE VOLTAGE SOURCE (live/dead/live) test before EVERY use, or if the meter goes into standby (goes to sleep) or is turned off then back on.

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6. Electricians should be skills assessed, trained and given refresher training on a regular basis. Heightened awareness of the right meter to use, how to tell if they actually have the right meter for the job and meter safety is essential. Additionally, the training and awareness program will be much more effective than just simply sticking a fused lead set on a meter and believing you are safe. Once a year (or more often, depending upon the power levels and fault energy meters are exposed to) all electricians in your facility should be witness tested for voltage rated PPE use, meter selection and voltage measurement work practices to maintain a high standard of safety.

7. There is no substitute for an experienced individual using a high quality industrial meter that is 3rd party tested and meets or exceeds the IEC meter standard, EN61010-1. Fused leads actually DIMINISH the effectiveness of the voltage input circuit of this meter, which must withstand 20 pulses of high voltage, 2.5 to 8 KV depending on the Category the meter is tested to.

8. Inferior meters not TESTED to meet or exceed the category rating they are given should be banned from industrial sites.