

Subject: Re: [EVDL] Isolation of the power circuit - reasons for and against?

Date: 18 September 2008 12:45:43 PM

From: morganl@gmail.com

To: ev@lists.sjsu.edu

Ask him what makes grounded safer than ungrounded.

His main argument seems to be that houses require the supply neutral to be connected to earth ground.

However, the EV regulations of other countries seem much more applicable to EVs than house grounding. The chassis of the vehicle cannot serve the same purpose of earth ground; it doesn't have the same electrical properties.

Yes, breakup contactors, multiple fuses, crash sensors, and proper insulation will make an EV safer. But isolation (in addition to these other safety features) will also reduce the negative consequences of problems.

He is framing the question as isolation or other safety measures, while in reality they are not mutually exclusive.

-Morgan LaMoore

Subject: Re: [EVDL] Isolation of the power circuit - reasons for and against?

Date: 18 September 2008 12:44:41 PM

From: kaze0010@umn.edu

To: ev@lists.sjsu.edu

Tell Bill Dube that the regulation does not have to require that the traction system is not isolated, however it must not require that IT BE isolated as there are better, more reliable and more predicatable ways to make the system safe and these should be allowed, even encouraged for the future safety of EVs.

It appears this is essentially going into the debate of whether double insulated or grounding is better for safety. The differences are covered here:

http://en.wikipedia.org/wiki/Appliance_classes

It seems EVDL members are pretty much in the double insulated camp, while this EV safety committee member thinks that grounding is just as good or better, and believes the regulations should allow either route.

If one uses the grounded pack design, a GFCI is going to be critical in making the design safe, and to shut things down if leaks develop. (A note on GFCI's: I recall that US spec GFCI's have a much lower trigger threshold than European GFCI's...say 5 ma vs 20 ma or so. This may increase safety at the risk of higher false positives (mis triggers) (some equipment is not recommended to be run on GFCI circuits because an unnoticed erroneous triggering is likely worse than allowing the leakage to take place. e.g. data center equipment, freezers.)

Subject: Re: [EVDL] Isolation of the power circuit - reasons for and against?

Date: 18 September 2008 12:48:22 PM

From: peter.gabrielsson@gmail.com

To: ev@lists.sjsu.edu

Oh dear.

Well, it strikes me that he provides no reasoning as to why a center grounded system with the protection he mentions would provide better protection than an insulated battery pack. He counters none of the arguments made by people on this list. He just states that it is safer, tears down a straw man argument, attacks DC motor people, etc.

This is probably a waste of my time but, more comments below

On Wed, Sep 17, 2008 at 6:49 PM, Ian Hooper <evdl@zeva.com.au> wrote:

Sorry to dig up an old thread, but I shared everyone's comments regarding isolation with our EV safety committee, and here's the response from main proponent for non-isolated traction circuits. I welcome any further comment:

Floating battery systems with one module of 200 or 300V without even the offering of leakage detection are so old school and give the owner a false sense of safety.

Isolated battery packs does not prevent leakage detection.

They go against Australian and European electrical standards that require protective earth and supply neutral connected to earth.

All high voltage EV standards I'm aware of calls for isolated battery pack. Can he provide us with what specific standard he's referring to?

They will also give EVs a bad reputation with the public as people get electrocuted.

Care to provide an example of people having been electrocuted by an EV because of its isolated battery pack?

Centre grounded systems with breakup contactors to 72V or less and fuses at each battery pack location with automatic crash sensor activated contactor dropout and effectively insulated wiring, motor and terminals offer the best safety practice for the future of EVs.

All of those things are good measure commonly used in EVs, except, the center ground for reasons already discussed.

OK, the wet DC motor people may not like the home truths.

ad hominem

You can post that on any forum you like and I will be interested to hear any informed and justified argument to the contrary. Reasons such as "we have always done it that way" and "that would mean I need to make my motor waterproof" don't wash.

strawman

Tell Bill Dube that the regulation does not have to require that the traction system is not isolated, however it must not require that IT BE isolated as there are better, more reliable and more predicatable ways to make the system safe and these should be allowed, even encouraged for the future safety of EVs.

I am talking EV conversions.

Commercial EV manufacturers will go their own way and have to meet their own standards. If ADRs set higher standards then manufacturers will have to meet them.

Commercial EV manufacturers follow SAE standards j1772, j1773,j2344,j2289.

Subject: Re: [EVDL] Isolation of the power circuit - reasons for and against?

Date: 18 September 2008 12:56:23 PM

From: evpost@drmm.net

To: ev@lists.sjsu.edu

I'm not an electrician nor have I a EE degree, but my understanding is that the neutral of structures' electrical system is grounded for lightning protection. In fact, grounding the public utility electrical system increases the hazard from electrical shock, but this is accepted because it greatly reduces the hazard from lightning.

Again this is my understanding from reading over the years, but I could be

misunderstanding what I've read.

It doesn't seem to me that this would apply nearly as strongly to an EV's traction supply, which is more or less enclosed in the Faraday cage which the vehicle provides. What am I missing?

David Roden - Akron, Ohio, USA
EVDL Administrator

Subject: Re: [EVDL] Isolation of the power circuit - reasons for and against?

Date: 18 September 2008 1:06:47 PM

From: evanfoss@gmail.com

To: ev@lists.sjsu.edu

On 9/18/08, EVDL Administrator <evpost@drmm.net> wrote:
I'm not an electrician nor have I a EE degree, but my understanding is that the neutral of structures' electrical system is grounded for lightning protection. In fact, grounding the public utility electrical system increases the hazard from electrical shock, but this is accepted because it greatly reduces the hazard from lightning.

The motives behind that change depending on the type of power involved. There are things like arc-flash that I don't think can happen with the few hundred volts in an EV. The industrial equipment people are the closest model to the EV builders and they always isolate power very carefully.

I wonder what the FCC has to say about the EMI generated by not isolating?

Subject: Re: [EVDL] Isolation of the power circuit - reasons for and against?

Date: 18 September 2008 3:01:15 PM

From: evan.tuer@gmail.com

To: ev@lists.sjsu.edu

They go against Australian and European electrical standards that require protective earth and supply neutral connected to earth. They will also give EVs a bad reputation with the public as people get electrocuted.

This is why I stressed the importance of defining what "power circuit" means. Here your friend is confusing the battery system and the AC mains supply (possibly deliberately).

The AC supply IS grounded and that ground WILL be connected to the car chassis while charging, according to regulations and good sense. Nobody at all has said otherwise.

This does not directly affect whether you ground the battery pack though.

it must not require that IT
BE isolated as there are better, more reliable and more predicatable ways to make the system safe and these should be allowed, even encouraged for the future safety of EVs.

Which are what? He's had many reasons why isolating the pack from the chassis is a good (and in practice, essential) idea, and hasn't countered any of these with argument, nor has he given better ideas.