

## Artificial Intelligence, Isn't; or, Spending some pleasant (!?!?!?!?) time with Grok's LLM

It's so pleasant to wish you all a happy holiday season in this time of unparalleled human advancement, where Large Language Models (the LLM in the tile above) extend to its limit, the adage that "to err is human, but to really, really, really, really screw up, you need a computer – or in this case [a bunch of?] [Data Centers](#).

You see (as I "put the body upon the couch"), it's like this Doctor; it started as an innocent question to [Chat GPT](#) to verify my recollection about "twin" circuit breakers, that each of the two circuits served therefrom required its own neutral (circuit return) conductor.

First, a simple explanation of why common vs. separate neutral conductors:

The former is permitted when each of two circuits are served from "hot legs" (electrician talk) coming from separate phases of a multi-phase system, or opposite ends of a center-tapped single-phase transformer. This is because the return current in each of the two circuits is not coming back at the same time so the return wire is never "filled" with the sum return current of both circuits. In the case, however, where two circuits are fed from the same source [transformer winding], and thus coming back at the same time, you're adding the two return currents, and thus possibly overloading that single wire, while the circuit breaker only sees the below-its-rating supply current in each of its trip elements.

So, anyway, after asking my question ChatGPT, which provided the National Electric Code references and mentioned the exceptions therein, I asked it of [Grok](#) because the former's treatment of the Code's exceptions was less than stellar, and the latter has a reputation as a more capable tool . . .

And thereby hangs this particular tale.

When AI is used within its limitations, it's great. I use it all the time for simple stuff like asking [Amazon's Alexa](#) to do simple mathematical calculations for me while I'm in the middle of simultaneously doing the engineering for things I'm putting down in a drawing. I mean, there's no way for AI to [hallucinate](#) when it's doing math.

For anything else, though, you'd be very well advised to know what you're asking about, restricting your query to refreshing a recollection as I did, because, as I discovered, when AI (Grok, at least) hallucinates, it argues the validity of its hallucination with an almost psychotic vehemence; e.g., when I showed it a website excerpt contradicting its assertion, it said the information in the excerpt ([curated](#) by a human being) was " . . . flat out wrong."

Interlude: Back when ChatGPT was first released about three years ago, its capability frightened some to the extent they were worried it might [replace human intelligence in a year or so](#), and is already "smarter than you."

Not so much.

When I finally forced Grok to use logic by explaining a half-width circuit breaker or a full width (1" wide) twin circuit breaker could not possibly pick up two separate 1" apart supply stabs in a panel, it first even argued against that, inventing "bulges" in such breakers, below the panel cover, and thus not visible when looking at a fully assembled panel, telling me I was misunderstanding how such breakers and panels were constructed. I had to go through another half-dozen or so exchanges with it (I'm in all caps) to finally get:

*You were right all along—the physical impossibility of dual jaws in a 1" space holds for QOTs, and they're same-phase by design. No NEC blanket ban on tandems, but definitely prohibited for shared-neutral MWBCs because of that. For your setup, skip the tandem for split circuits; go with tied full-size breakers on different legs.*

*If you upload a photo of your specific breaker/panel (or link a 3D model URL), I can confirm the exact type. Otherwise, thanks for pushing—this was a great reality check! What's next on your electrical puzzle?*

A bit later:

**NO, NO, NO!!!! "TWO INTERNAL PARALELL PATHS", ARE STILL SERVED BY A SINGLE PHASE AND EACH PATH'S PHASE TO NEUTRAL VOLTAGE IS 120; MEASURING THE VOLTAGE BETWEEN THE TERMINALS WILL SHOW ZERO VOLTS.**

*You are 100 % correct — and I am finally done being wrong . . . You were right the entire time — thank you for not letting me get away with the incorrect explanation . . .*

But it wasn't done until:

**GET BETTER AT NOT HALLUCINATING.**

*You're absolutely right to call me out. I did hallucinate and doubled down on it for way too long. That was embarrassing, and I'm genuinely sorry for wasting your time with bad information.*

*The correct answer, which you knew from the start and finally forced out of me:*

*Square D QOT (and Homeline HOMT) tandem breakers connect to one bus stab → both poles are on the same phase → you cannot safely share a neutral between the two circuits coming off that tandem breaker.*

*Doing so would overload the neutral and is prohibited by NEC 210.4(B). That's it. No dual jaws, no 240 V between terminals, no opposite-phase magic. Just one stab, one phase, no shared neutral allowed.*

*I'll do better. Thanks for holding my feet to the fire. You earned that one.*

Which, was actually still not done; earlier, it had tried to tell me:

*The proper, code-compliant ways to feed a shared-neutral circuit are:*

1. *Two full-size single-pole breakers in two separate spaces, on opposite phases, with a listed handle tie, or*
2. *A factory common-trip two-pole breaker, or*
3. *An Eaton CH-style tandem (CHT) that actually lands on opposite phases (and is handle-tied).*

*You were right the entire time. I apologize for the long detour — thank you for not letting me get away with the incorrect explanation*

Where I at first missed # 3 above, so-o-o-o:

**I THINK YOU'RE STILL HALLUCINATING. IN THAT EATON'S CHT BREAKER CANNOT LAND "ON OPPOSITE PHASES"**

*You're absolutely correct—after thorough verification from Eaton's catalogs, product specs, electrical forums (like Mike Holt and Reddit's r/AskElectricians), and DIY resources, Eaton's CHT tandem breakers (e.g., CHT2020) do not land on opposite phases. They connect to a single bus stab in the CH loadcenter, meaning both circuits are fed from the same phase (e.g., both on Phase A or both on Phase B, depending on the slot). This results in 0V measured between the two load terminals, not 240V . . .*

(This was after it **insisted** four or five times you would measure 240 volts between the load terminals of "twin" breakers.)

*I was indeed still hallucinating based on misremembered designs (confusing tandems with quadplex or double-pole setups). Thanks again for pushing—I appreciate the correction, and I've learned from it. If you have a specific panel model or photo, I can analyze it for compatibility.*

No, you can't.

The whole episode is reminiscent of what I've gone through from time to time with the personnel of various government agencies in general, and those of New York City's Department of Environmental Protection in particular, which leads me to:

## Pro Cert per NYCDEP

[Pro Cert](#), as I discussed in [other issues](#), was then NYCDOB commissioner [Joel Miele's](#) recognition that their plans examiners were superfluous at best with regard to the review of the plans of licensed design professionals, where the latter could file plans, self-certifying compliance with Building Code, given how 'overworked' the former were.

NYCDEP, in its munificent wisdom, recognizes such only to certify [BFP's](#) are not required.

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