

Topics for Today:

- URL: <http://www.ece.mtu.edu/faculty/bamork/EE5223/index.htm>
- Labs - EE5224 - Begins Wed of Week 3, i.e. Jan 25th
- EERC 134 SGOc lab access for pre-labs and related software.
- Software - Aspen
 - Locals: confirm operation.
 - Online: run via Remote Desktop remote.mtu.edu
- Zones of protection, operation and protection strategies
- How to read a one-line (print out week 1 handout “Sub Schem”)
- Instrument transformers: VTs, CTs, CCVTs, MOCTs, etc.
- CTs - pedestal vs. bushing
- CT saturation & accuracy, ratios, multi-ratio Cts
- Next: print out “CT” handout, Study Chapter 5 info on CT saturation & accuracy

SMART GRID CAREER OPPORTUNITIES – EE5224 Lab:

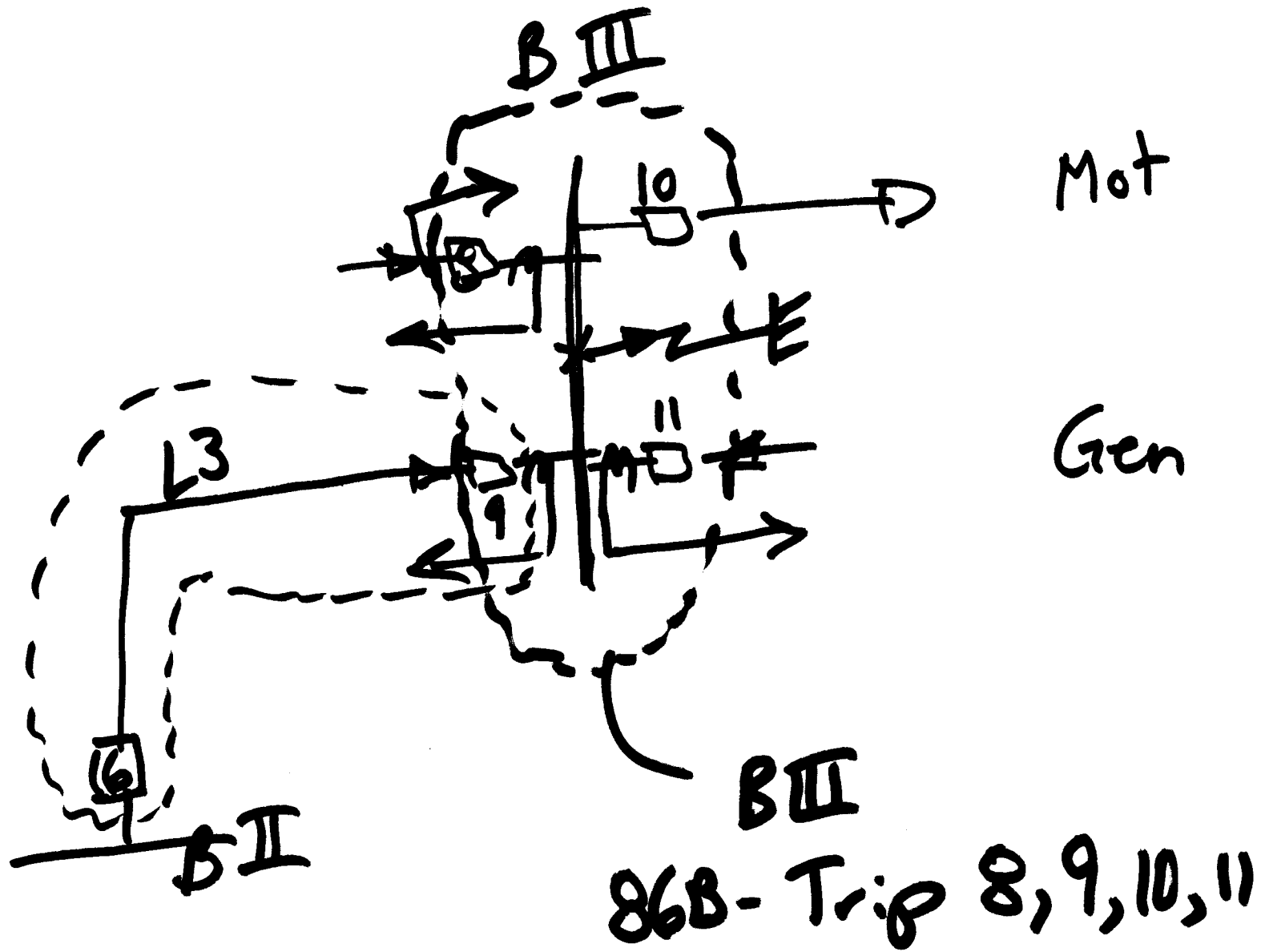
- First protection lab meets Wednesday Week 3. The weekly cycle for labs will be to meet in EERC 134 as follows:
 - ~~Wed 10am-noon; Wed 4-6pm; Thurs 4-6pm, Fri 10am-noon~~
 - No labs will meet during Winter Carnival week
 - Lab 11 (last lab) during Week 13 of semester.

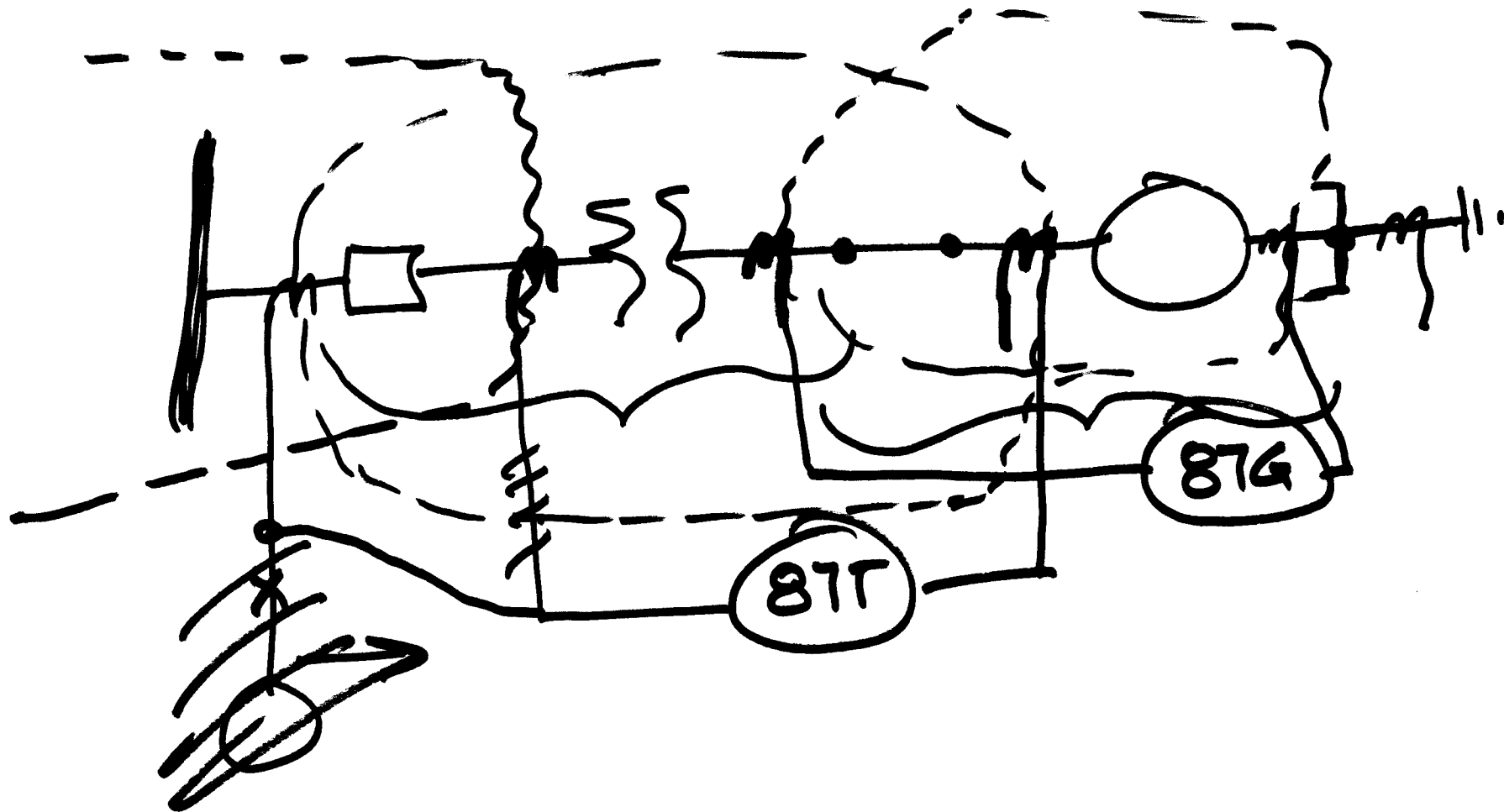
There are currently 3 open slots in Wed lab section. You can still add!

You are encouraged to add this lab, the employers

- consulting firms,
- utilities,
- grid transmission companies,
- corporate or gov't R&D groups, and
- equipment manufactures

look very highly at this practical experience with state of the art equipment and practical knowledge of relay applications and smart grid technologies. “Relay engineers are like gold.”

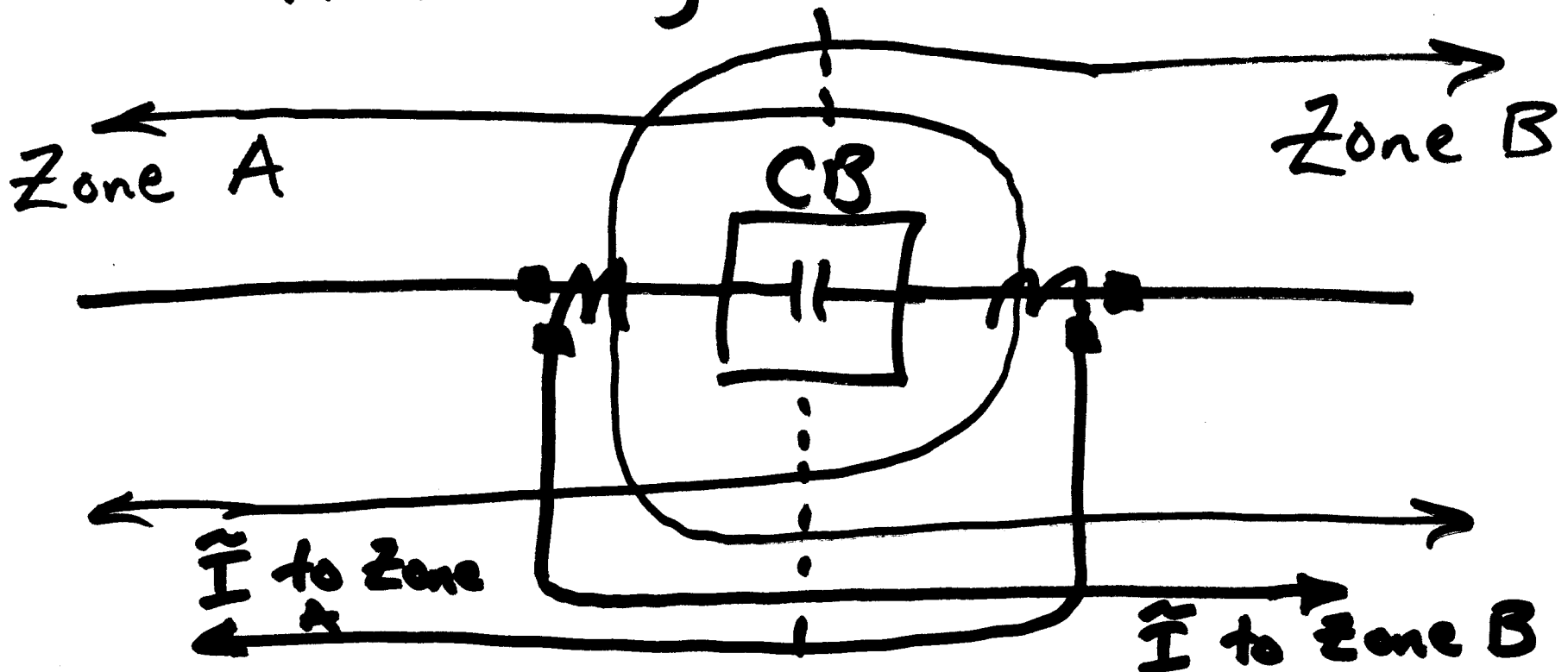




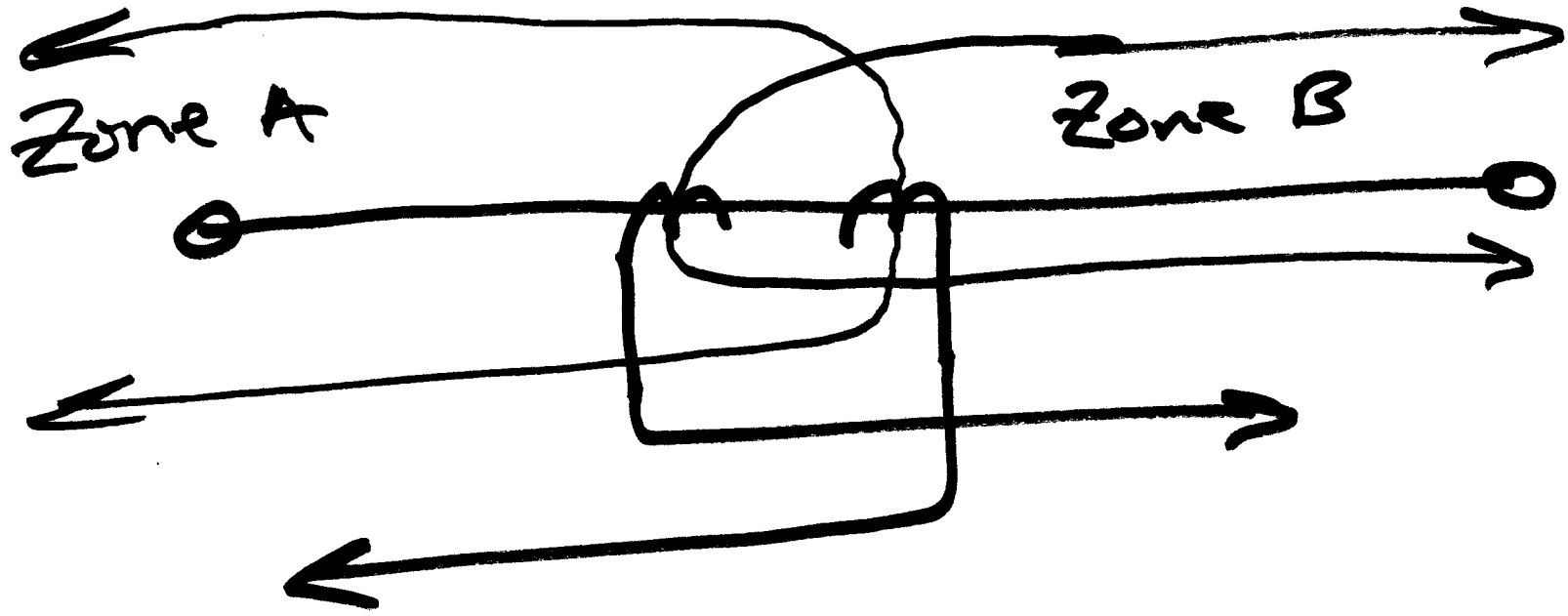
Zones of Protection

- overlapping
- Preferably at CB

(Note: CT is actual boundary of Zone!)

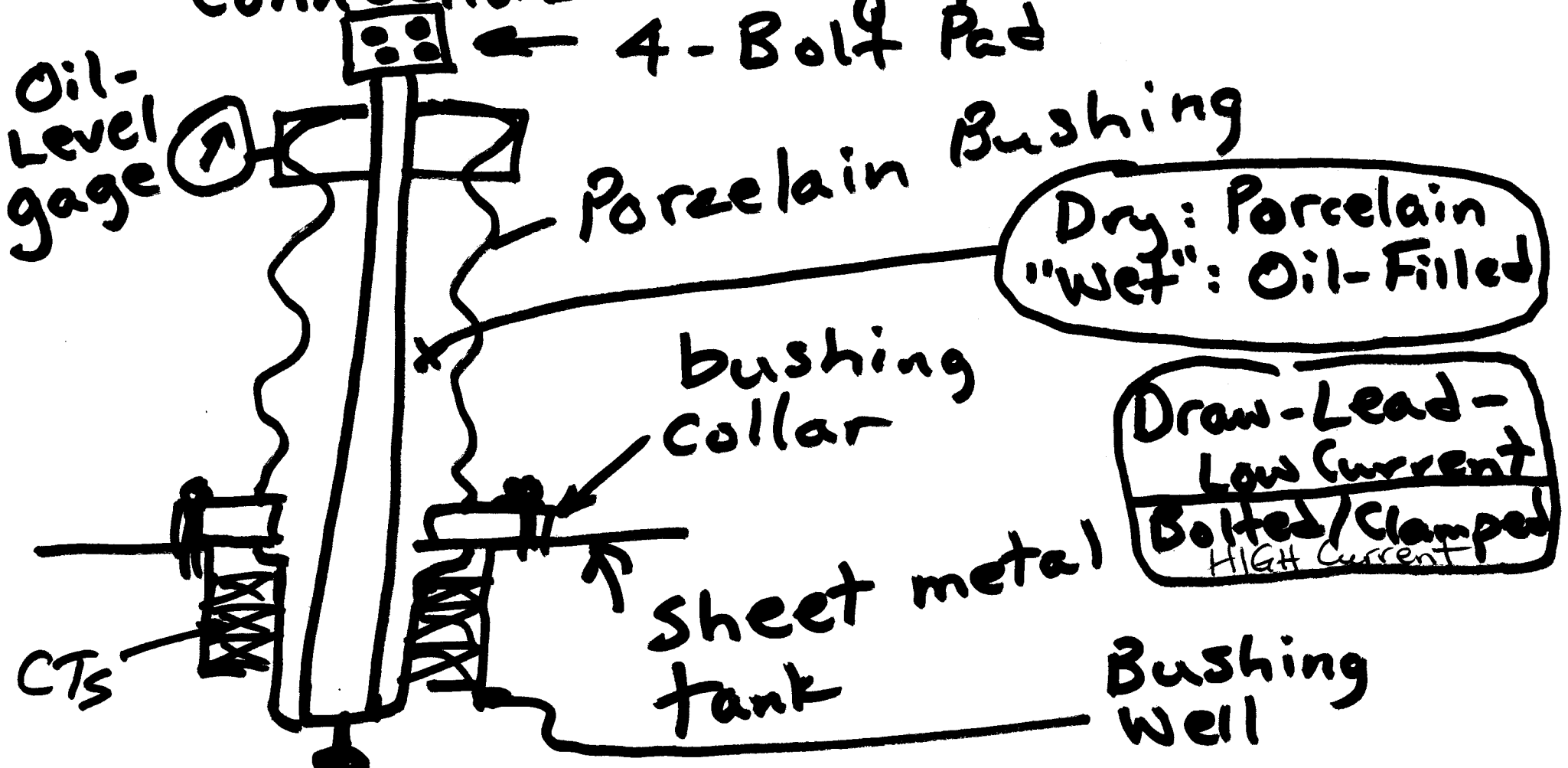


No CB?



Bushings HV Lead

Connections into equipment.



← 4-Bolt Pad

Oil-Level gage

Porcelain Bushing

Dry: Porcelain
"Wet": Oil-Filled

bushing collar

Draw-Lead-Low Current
Bolted/Clamped High Current

sheet metal tank

CTs

Bushing Well