Current transformers in the cable compartment

The cable compartments in the Siemens 8DJH Ring Main Units are a convenient location for the installation of Current Transformers. But without optimisation of CT specification, a large amount of real estate of the compact secondary switchgear can be taken and dramatically increase cable termination labour and overall project costs.

As you can see in Figure 1, specifying four Current Transformers requires them to be cable-mounted and doesn't leave much space for the cable termination elbow. The CTs and wiring will need to be moved, fitted over the cable, cable elbow terminated and then the CTs and wiring refitted and reconnected. This arrangement adds considerably to the installation time. As the CT wiring will have been disturbed, several panel factory CT wiring tests will need to be repeated.

Figure 1. Four CTs in 8DJH cable compartment

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To optimise installation, consider your protection design/ CT requirements.

- A current transformer enables the conversion of high primary currents to a measurable secondary current range. Secondary currents are created by the magnetic field of the primary current passing through the CT. Less primary current makes it harder to create secondary currents, hence CT will need to increase mass to create same amount of magnetic field. By understanding the load range on the circuit, you can better determine the true requirements.
- The ratio can very much affect the size of the CTs. Selecting high ratios tends to make the CT smaller, while low ratios make them very large.
- Consider what the true burden requirement is. If you are connecting numerical relays, you are not going to require a large VA rating. Break the habit of specifying CT burdens that come from the age of using electromechanical relays. However, don't go to extremes, as assuming your ratios and class are unchanged, a 2.5VA CT is smaller but it's not half the size of 5 VA CT.
- Consider the overall protection scheme and its appropriateness to the application and the type of switchgear being used. We do see some very complex protection schemes on smaller panels. In some cases, basic protection, such as fuses or self-powered protection relays, may have been viable.
- Where possible use cable bushing CTs as these simplify HV cable installation because the CTs do not need to be moved when the cable is installed/terminated. However, for compact switchgear like the Siemens 8DJH series there is limited space and limited options (**500 mm wide L & R panels only**, 150/1 2.5VA 10P or 400/1 4VA 10P ratings). However, if they can be used, there are significant cost advantages for the overall project. See Figure 2 and Figure 3 for the location and nature of these CTs.

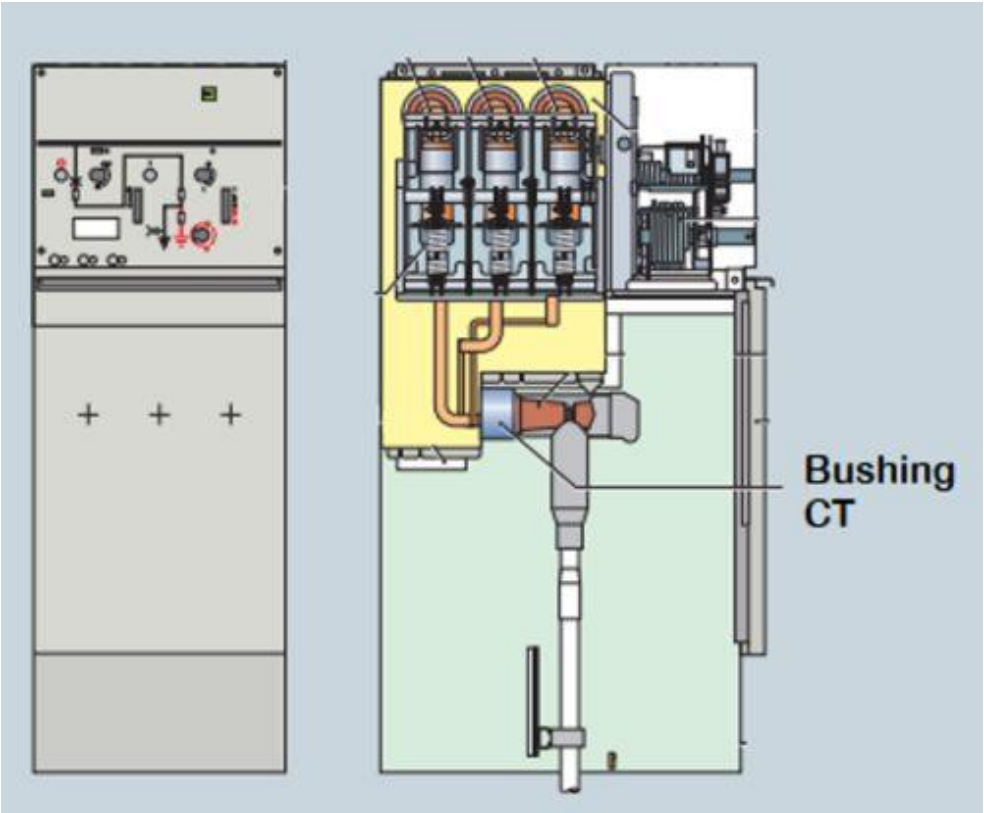

Figure 2. 8DJH bushing CT location for 500 mm L & R panels

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Figure 3. Example 8DJH bushing CTs

There are two other options to also consider:

1. Use Low Power CTs, which are much smaller and less onerous as they don't have 1 or 5 A secondary currents and the associated open circuit secondary risks. However, the range of protection relays that accept Low Power CTs are limited at this time (Siemens SIPROTEC Compact 7SJ81 and SIPROTEC 5 series 7SY82).
2. Use a merging unit. This is overkill for 8DJH and compact switchgear, but the concept is worth mentioning as we love the technology. Here one set of CTs (which can be Low Power) connect to a merging unit. The merging unit then sends sampled measured values via Ethernet to the various protection relays. Merging units are a good alternative to the 'multiple CTs to multiple protection relay' applications.

The design team at HV Power are always available to work with you on your next switchboard to explore your options. Please feel free to contact us.

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