Double Point Status Inputs to REG-D/DA

The Paragramer Feature of the REG-D/DA uses the status of various switching devices associated with each transformer to automatically determine the parallel status of every transformer in a parallel control scheme:

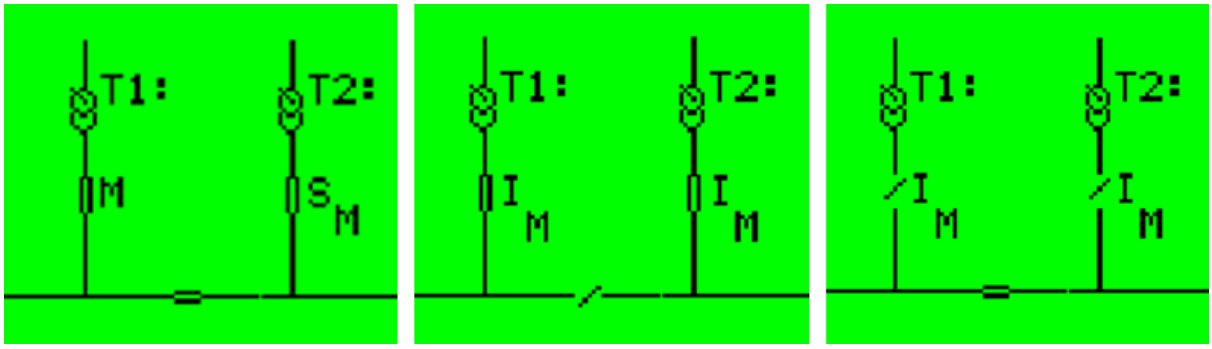

Figure 1. Circuit breaker and bus section display which control parallel program activation.

Some common examples of the status inputs used include the circuit breaker (PG:CB) and the bus section (PG_SC1), as shown above. These inputs are commonly brought into the REG-D/DA as a single point logic signal, often at 110 Vdc.

But what happens when one of these signals fails (for example, a rodent chews through the cable, or a loose connection develops in the input circuit)? Besides a dead rat (hopefully), in perhaps 90 % of applications, 0 V on the status input represents an open breaker or open bus section. The REG-D/DAs will detect this as being that the transformers are now in Independent Mode, when in fact they are still connected to the same bus. Slight variations in the measured bus voltage can then cause the REG-D/DA's to begin working/regulating against each other and tapping apart to control the bus voltage.

A misconception amongst some users is that the REG-D/DAs in such a situation will ultimately lock out, because either the circulating current has become excessive, or because the Permissible Difference of Taps limit has been violated. However, **both of these checks are only active for transformers in parallel**, because Independent transformers must be free to operate independently. The result is that although the bus voltage remains in the bandwidth, the actual circulating current can become dangerously large as the transformers tap further and further apart.

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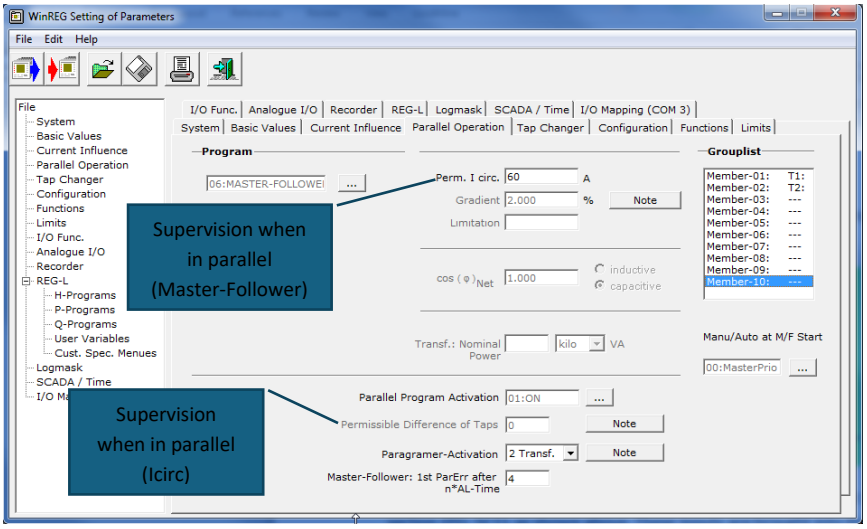

Figure 2. WinREG parallel operation backup supervision.

Fortunately, A.Eberle has a simple solution to this issue: double point inputs. By connecting both a N/O and a N/C contact to the REG-D/DA from each status input, and inverting one of them, the REG-D/DA will automatically use both of the contacts to determine the status of the bus status input.

Only the '01' and '10' states are considered valid. If '00' or '11' error states occur:

- The status input is assumed to be in the **closed** state, thereby preventing the REG-D/DAs from going into Independent Mode (other behaviour can be programmed if required).
- The standard relay function 83:PG_INERR is raised for alarm purposes (see our technical library for the full list of possible I/O functions).
- The breaker/section display on the Paragramer display will rotate to indicate an undefined condition, warning the operator/technician.

[Our Technical Library Item "VR-011 Voltage Regulator backup supervision and error reporting" is a useful introduction to the main supervision/fault detection algorithms provided.]

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