Circulating Current Method Paralleling Equipment Adjustments M-2001 Application (M-0115A, M-0127)

1. Put the M-0115A **Parallel/Independent** switche in the **Independent** position and check the independent operation of the control. **Put the M-0115A sensitivity settings on N**. (NOTE: All M-0115A sensitivity settings MUST always be the same for proper operation.)

2. With load on the transformers and zero R&X LDC settings, increase the R(resistance) **LINE DROP COMPENSATION** setting on each control individually. **The control should call for a raise**. This will be indicated by the M-2001 Raise LED; you may choose not to wait for the timeout and actual tapchange before resetting to zero. If the control does not call for a raise or calls for a lower, reduce the LTC settings back to zero and check the CT polarities.

3. **(OPTIONAL)** Repeat with the X (reactance) **LINE DROP COMPENSATION** setting. Assuming a lagging load power factor, the same results should occur.

4. **SET** the M-2001 controls to identical **BANDCENTER**, **BANDWIDTH and TIME DELAY** settings and return the R and X **LINE DROP COMPENSATION** settings to **0**. **Manually place the transformer taps on the same position (Tap).**

5. Put the M-0115A **Parallel/Independent** switches in the **Parallel** position. No operation changes should occur. Read each M-2001 **CONTROL CIRC I** values which should be near zero amps if the transformers and current transformers are properly matched. If there is a small circulating current, one must be LEAD and the other LAG. (In multiple transformer applications, the sum of LEAD currents should be approximately equal to the sum of the LAG currents.) The **CONTROL LOAD I** in each M-2001 should be approximately equal. If they are not, recheck wiring.

6. (If an **AUTO/MANUAL** switch is available, step 6 may be completed in **MANUAL** mode;) Manually raise one transformer one tap and lower another transformer one tap. Both related M-2001 **CONTROL CIRC I** values should be equal, one **LAG** and one **LEAD**. Each M-2001 **CONTROL LOAD I** should remain approximately unchanged.

   A) If either, but not both, transformer operates toward the other (or is indicated by the M-2001 RAISE or LOWER LEDs in the case of MANUAL mode), the sensitivity settings (N) are appropriate.

   B) If both transformers operate back to the original tap positions (or is indicated by the M-2001 RAISE or LOWER LEDs in the case of MANUAL mode), the sensitivities should be one step **LESS SENSITIVE** and step 6 retried.

   C) If neither transformer operates (or is indicated by the M-2001 RAISE or LOWER LED's in the case of MANUAL mode), the sensitivities should be one step **MORE SENSITIVE** until one transformer operates toward the other.

   D) Continue until A), above, is satisfied. (Confirm operations in the AUTO mode;)

7. The setting of the M-0127 overcurrent relay is recommended at the circulating current value between three and four step difference between the transformers. This value can be calculated by multiplying the one-tap-difference circulating current value.

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