

## INTISARI

PLTA Sutami memiliki Transformator Utama Step-Up 39000KVA. Untuk menunjang keandalan transformator ini, diperlukan suatu sistem proteksi salah satunya adalah rele diferensial GBT2D form BT2. Rele diferensial berfungsi melindungi transformator terhadap gangguan dari dalam (internal) transformator tersebut. Apabila terjadi gangguan di dalam transformator seperti hubung singkat, maka timbul selisih antara arus yang masuk dan keluar dari transformator bersangkutan dan selisih arus inilah yang mengoperasikan rele ini.

Rele diferensial dibantu oleh CT pada sisi primer dan sekunder transformator utama untuk mengukur nilai arus yang masuk dan keluar dari transformator. Seharusnya nilai arus sekunder dari CT pada sisi primer dan sekunder transformator utama dibuat semirip mungkin. Jika terjadi selisih arus sekunder CT kedua sisi terlalu besar maka rele terjadi *trip* sesuai fungsi rele diferensial. Namun nilai arus tidak memungkinkan bernilai sama persis agar  $I_1 + I_2 = 0$  karena nilai rasio belitan CT harus menyesuaikan dari pabrik. Untuk mengatasi hal tersebut rele diferensial dilengkapi penyetelan *ratio matching tap*. Perhitungan tertentu dibutuhkan untuk menentukan *ratio matching tap* yang tepat agar rele tidak mengalami kesalahan operasi. Berdasarkan perhitungan yang dilakukan maka *Ratio Matching Tap* terminal 6 dilakukan pengaturan pada tap 4,6 dan terminal 7 dilakukan pengaturan pada tap 8,7.

Besar arus *pickup* direpresentasikan oleh besar arus gangguan yang terjadi. Arus gangguan menyebabkan arus diferensial (arus beda  $I_d$ ) antara terminal 6 dan terminal 7. Ketika terjadi arus  $I_d$  mencapai arus *pickup* maka rele akan beroperasi. Berdasarkan pengujian arus *pickup* pada tahun 2015, Rele GBT2D masih dalam keadaan baik.

Kata kunci: rele diferensial, *ratio matching tap*, arus *pickup*

## ABSTRACT

*Sutami Hydropower owns a Step-Up Main Transformer 39000KVA. It is need a protection system to support the reliability of this transformer. One of them is the differential relay GBT2D form BT2. Differential relay serve to protect against internal faults of the transformer. In the event of transformer short circuit, then the result is difference between the currents in and out of the transformer and this currents gap that operates this relay.*

*Differential relay assisted by CT at the primary and secondary side of the main transformer to measure the current value in and out of the transformer. Supposedly, secondary current values of CT in the primary and secondary side of the main transformer are made as closely as possible. If there is a difference in both sides of the CT secondary current is too large, then cause a trip relay corresponding to differential function. However, the current rating does not allow worth exactly that  $I_1 + I_2 = 0$  because the value of CT ratio has made from the factory. To overcome this, differential relay is included by ratio matching tap adjustment. Certain calculations are needed to determine the appropriate ratio matching tap so relay not take an error operation. Based on calculations carried the Ratio Matching Tap, terminal 6 do the settings on the tap 4,6 and terminal 7 do the settings on the tap 8,7.*

*The value of pickup currents represented by a fault current. Fault current causes differential current ( $I_d$ ) between terminal 6 and terminal 7. Relay will operate when an  $I_d$  current reaches the pickup current. Based on pickup current testing in 2015, differential relay GBT2D still in good condition.*

*Key words: differential relay, ratio matching tap, pickup current*