

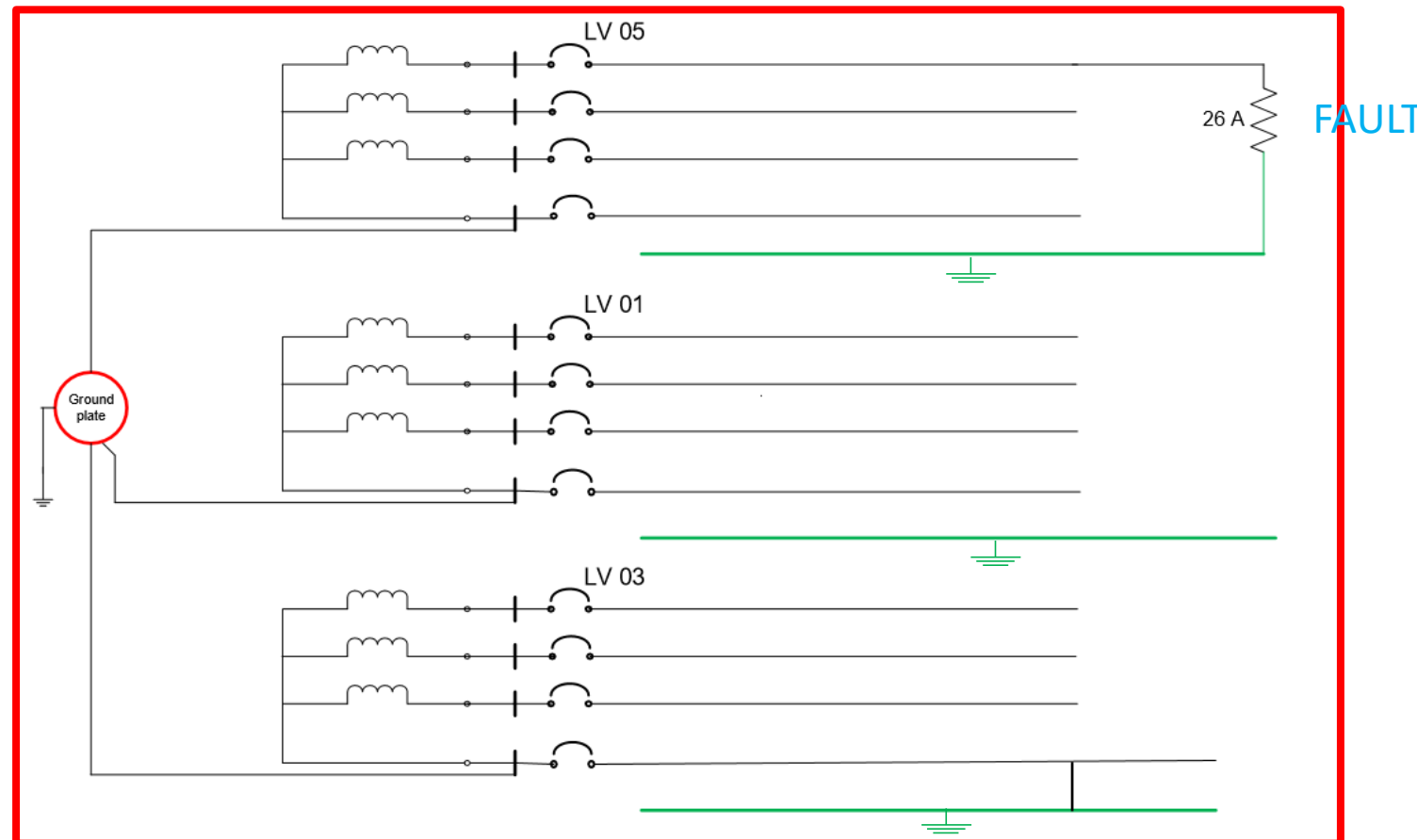
SIMES ENGINEERING

GROUND FAULT RELAY OF ACB (LV 03) MAL FUNCTION TRIP

BRIDGESTONE CARBON BLACK (THAILAND) CO., LTD

Problem

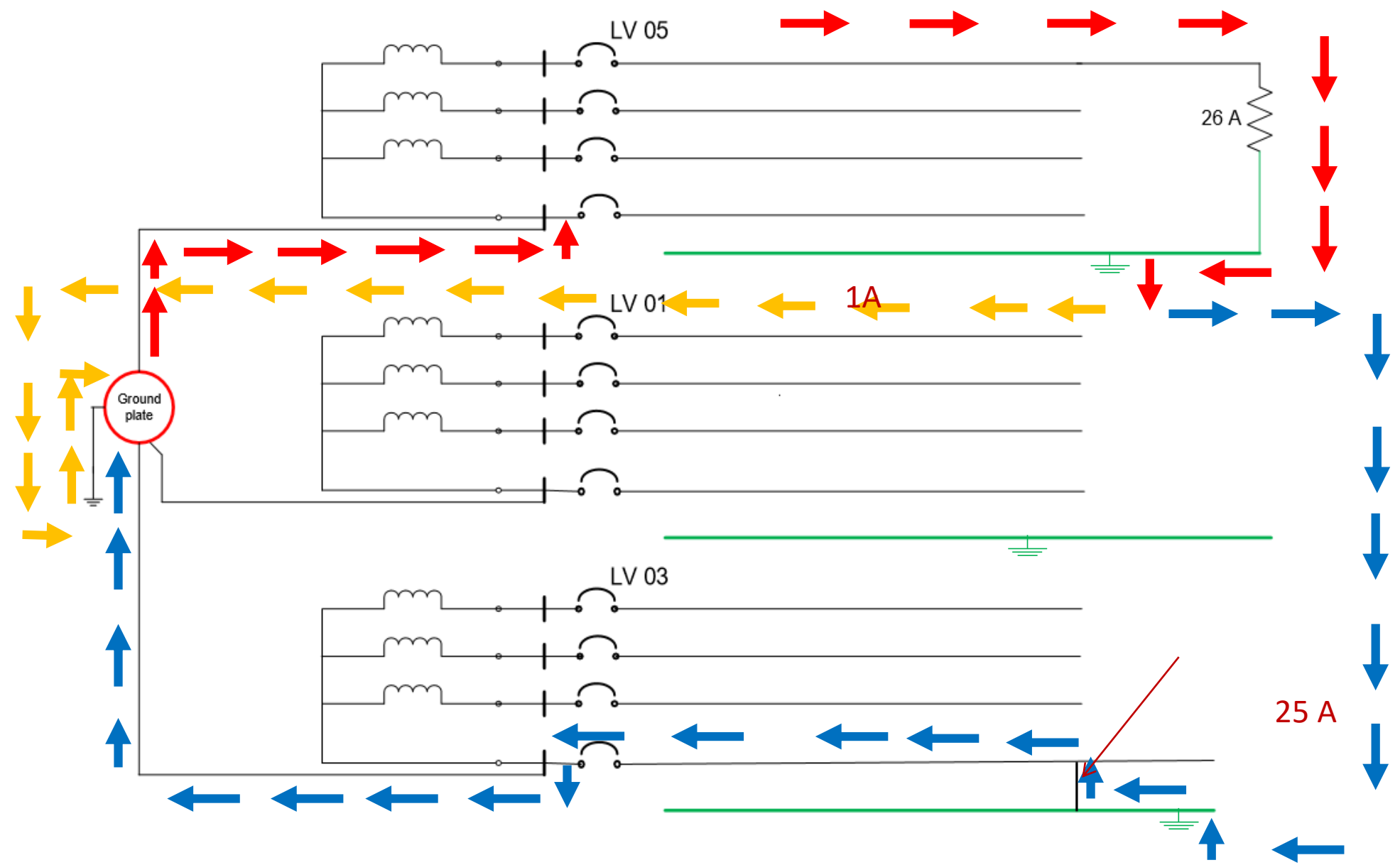
- Problem: When Single line to ground fault occur at LV-05 panel or LV-01 panel. The Ground fault relay at LV -03 will Mal function simultaneously Trip.



Fault simulation

- The earthing system of Bridgestone Carbonblack use TT System. The heater be used for fault simulator . It be connected at motor terminal in plant (receive power from LV-05) . The Single line to ground fault be simulated at **26 A**
- Red arrow show direction and amplitude of fault curent **26 A**
- Blue arrow show direction and amplitude of current pass LV -03 ACB to ground plate **25 A**
- Yellow arrow show direction and amplitude of current separate from PE bus to ground plate **1 A**

Direction and amplitude of fault current simulation



Cause of ground fault relay mal function trip at LV 03

When supply fault current (26 A)at PE bus of LV05 . The fault current be divided in 2 path .

The first path current(25 A) will flow from PE bus of LV 05 to PE of LV 03 and pass LV03 ACB . The ground fault relay in LV 03 ACB will operate with this current .

The second path current (1 A) will flow from PE Bus LV 05 to Ground plate and return to transformer

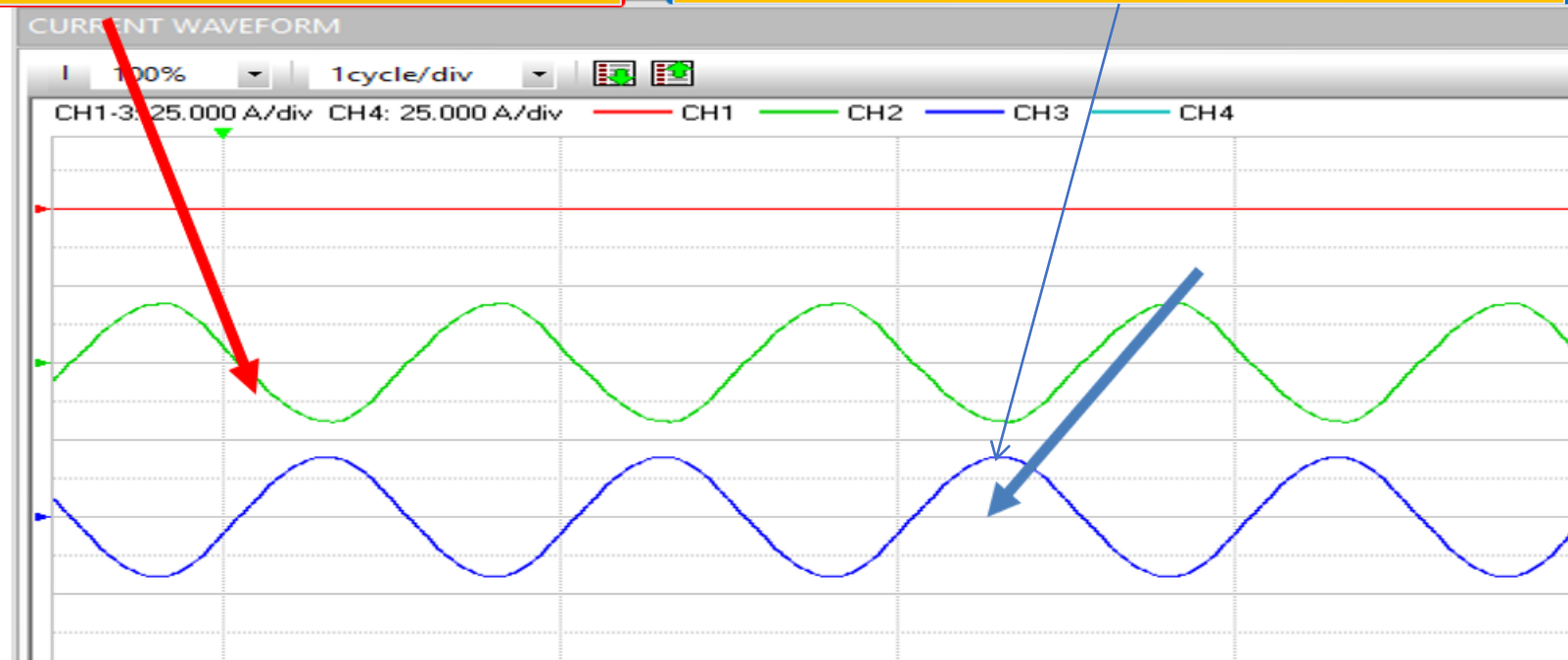
The ground fault relay of LV 05 will operate due to 26 A single line to ground fault current.

These are when ground fault occur at LV05 OR LV 01 . The ground fault at LV 03 will simultaneously trip .

The direction of current from LV 03 enter to ground plate and the current leave from ground plate to neutral of LV 05 transformer will opposite direction . The waveform be recorded by hioki 3196 . (see next slide)

Current leave from ground plate to LV05 Transformer

Current from LV03 to ground plate



Solution

- Change low voltage earthing system from T-T to TN-S . The fault current will easy flow from PE bus to neutral transformer .
- The four transformers grounding will separate not combine .
- Find out connected cable of neutral and PE at LV 03
- Earthing system Training program for sub contract
- Advantage of TN – S System
- The small touch voltage at machine when insulation failure at machine.
- The Insulation failure machine can easy identify .

Improved diagram

