

MiCOM P54x

(P543, P544, P545 & P546)

Reduced CT Requirements

P54x/EN BN_RCTR/A01

Software Version D1A

Briefing Note

Note

The technical manual for this device gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact the appropriate Schneider Electric technical sales office and request the necessary information.

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REDUCED CT REQUIREMENTS

CHAPTER 1

Date (month/year):	12/2014
Products covered by this chapter:	This chapter covers the specific versions of the MiCOM products listed below. This includes only the following combinations of Software Version and Hardware Suffix. C0115 2ENa
Hardware suffix:	
Software version:	D1A
Connection diagrams:	This includes a list of the Connection Diagrams for the Products covered by this document. 10P54302 (SH 1 to 2) 10P54303 (SH 1 to 2) 10P54400 10P54404 (SH 1 to 2) 10P54405 (SH 1 to 2) 10P54502 (SH 1 to 2) 10P54503 (SH 1 to 2) 10P54600 10P54604 (SH 1 to 2) 10P54605 (SH 1 to 2) 10P54606 (SH 1 to 2) C01720ENa

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Notes:

1 REDUCED CT REQUIREMENTS (P54X VERSION D1A)

1.1 Operation

The CT saturation detection uses a Phase Comparison algorithm (similarly to P746 phase comparison solution) to supervise the Current Differential operation.

The Phase comparison algorithm provides immunity to CT saturation.

Phase Comparison confirms that a fault is either internal or external to the protected line section.

Advantages of phase comparison:

- It is an additional tripping criterion. It only allows the line differential algorithm to operate if the fault is detected as internal.
- On an external fault (with a saturating CT) which then evolves to an internal fault, phase comparison allows the trip even if the CT remains saturated.

A trip will occur when the fault condition is detected as internal.

This algorithm operates using the measured Fourier values on a phase by phase basis.

- Phase comparison current criteria: Phase Comparison algorithm only uses currents above “Phase Comparison” current threshold = 2 * “Max I load/Inom” Setting value.
- This phase comparison current criteria is a on a “per line end” algorithm, i.e. the algorithm runs independently in each relay within the line differential protection scheme.

Example to illustrate the algorithm for a given line end:

Consider one end (“end m”) with one CT (“CT m”)

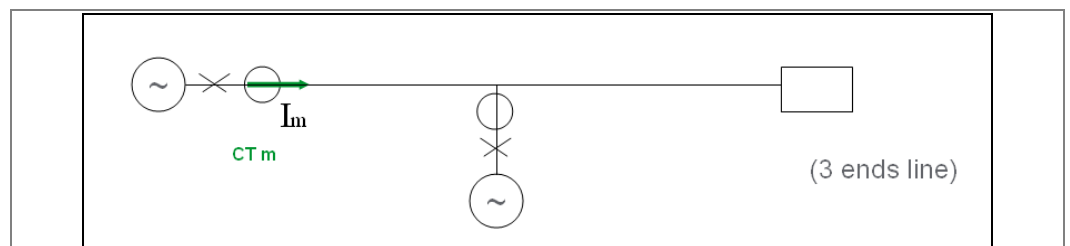
CT m has the following ratio characteristics: “primary current CTm”/ “secondary current CTm”

I_m is the current flowing in CT m

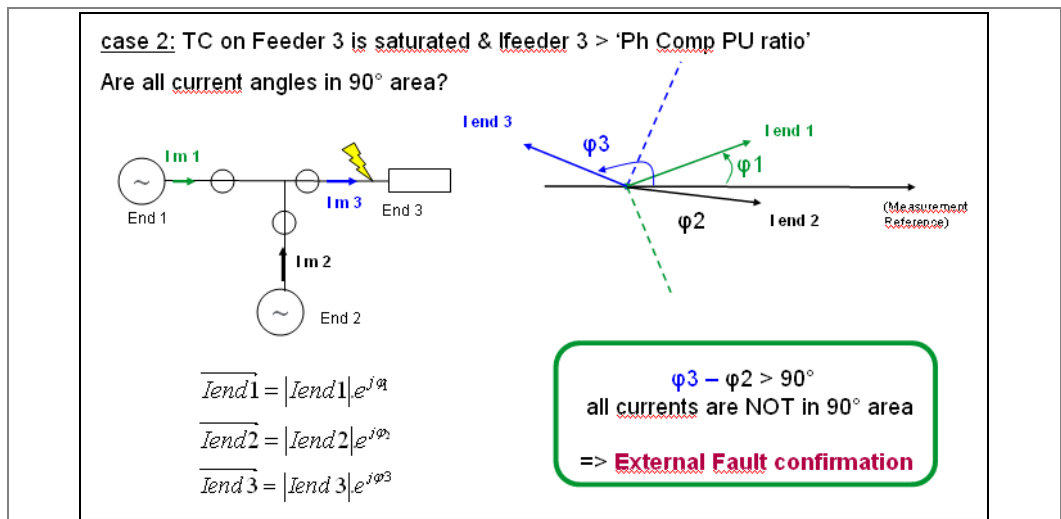
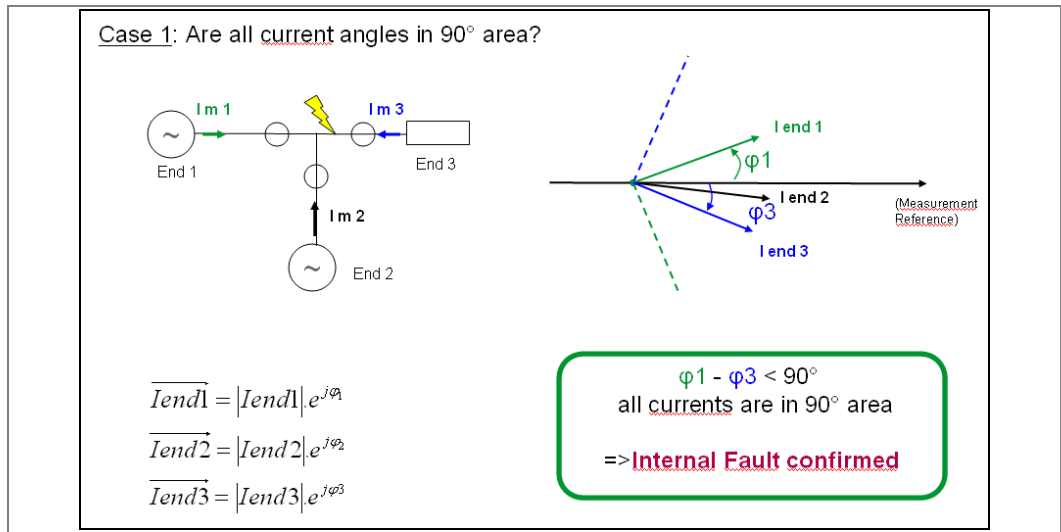
To be considered as internal, angles of all local and remote currents shall be within 90° of each other (on an individual phase by phase basis).

If there is only one current above the “2.0 *” “Phase Comparison” current, the fault is considered internal

- The phase of a saturated current may vary from -90° to +90° CT requirements have to be fulfilled)



Use cases to illustrate the behavior of the application:



1.2 Settings

Two new menu cells have been added to the “PHASE DIFF” menu for this feature.

Menu Text	Default Setting	Available Settings
Diff CT Sat Stab	Disabled	Enabled or Disabled
Only available in models with Differential Protection. Enable (activate) or Disable (turn-off) the Current Transformer CT Saturation detection algorithm. Default is “Disabled”, i.e. operation is as per previous releases.		

Menu Text	Default Setting	Settings Range		Step Size
		Min.	Max.	
Max I load/Inom	1.00	1.00	2.00	0.05
This specifies the minimum current level required before the phase comparison restraint condition is deemed as valid, it is used to block the CT saturation detection for load current. This is normally set just above the expected typical load level. The setting range is 1.0 - 2.0 I Load Nominal. The CT saturation detection is blocked if the measured current is less than 2.0 * Max I load/Inom setting (i.e. level is 2.0 to 4.0 I Load)				

The Following DDB signals have been added.

DDB No.	English Text	Source	Description
1792	Idiff Sat Block	C Diff	Current differential Saturation detected (on any phase).
1793	Idiff Sat Bk PhA	C Diff	Current differential Saturation detected on Phase A
1794	Idiff Sat Bk PhB	C Diff	Current differential Saturation detected on Phase B
1795	Idiff Sat Bk PhC	C Diff	Current differential Saturation detected on Phase C

The above DDBs are available to the PSL and can be mapped to (e.g.) LED etc if necessary.

Notes:



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