

# How to set 64 REF protection in Sepam following the CT position in the transformer installation schematic?

## 1 Purpose of the document

The purpose of this document is to explain how to set the 64 REF protection in the Sepam following the CT position in the transformer installation schematic. It is applicable for Sepam T6x, T8x, G82 and G88.

## 2 Description of the 64REF protection

The restricted earth fault protection function detects phase-to-earth faults on three phase windings with earthed neutral. This function protects generators and transformers.

The protected zone is between the 3 phases CTs I1, I2, I3 (or I'1, I'2, I'3) and the neutral point current measurement I0 (or I'0).

The vector associated with the current sensors determines the conventional direction of connection.

## 3 General rule

For this protection, it is necessary to have one current measurement (CT or CSH) in neutral wire to measure the residual current and one CT in each phase to measure the phases current. Both current measurement should be on the same side of the transformer. It means you must assign on the same side I<sub>o</sub>- I<sub>x</sub> (For example primary) and on the other side I'<sub>o</sub>- I'<sub>x</sub> (for example secondary). We can't assign I'<sub>o</sub> and I<sub>x</sub> on the different side of the transformer.

## 4 Two possible schematics and associate setting for 64 REF

### 4.1 Schema N°1 – 64 REF on primary and secondary side (available only for T8x)

I and I<sub>o</sub> for primary side

I' and I'<sub>o</sub> for secondary side

CT-VT sensors configuration window showing parameters for various sensors (I, I<sub>o</sub>, I'<sub>o</sub>, I', V, V<sub>o</sub>) and a schematic of a transformer with two earth neutrals.

Transformer with 2 earth neutrals

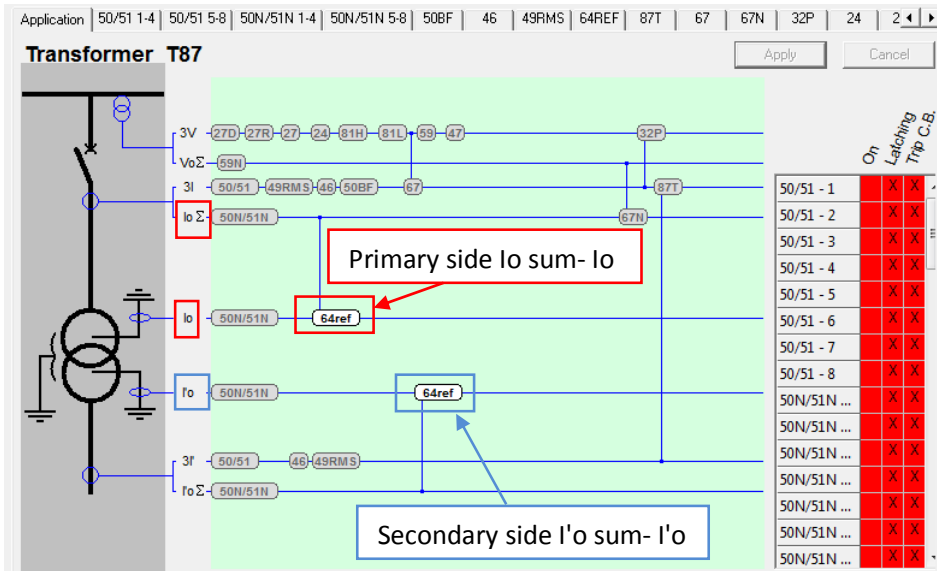
### 4.2 64 REF settings for Schema N°1

64REF: Restricted earth fault configuration window showing settings for two units (Unit 1 and Unit 2).

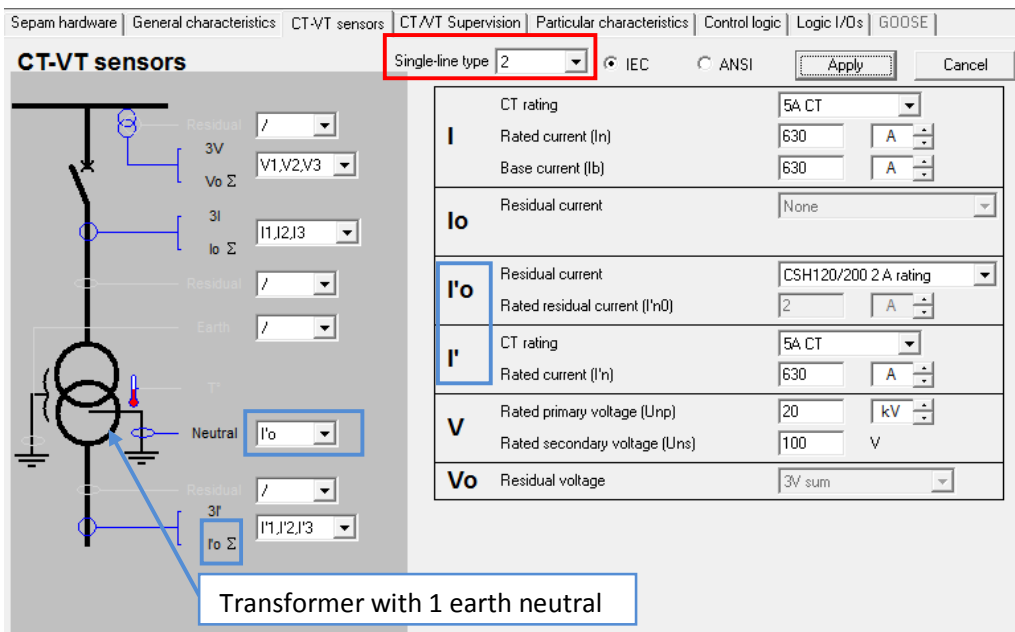
Setting for primary side I<sub>o</sub> sum- I<sub>o</sub>

Setting for secondary side I'<sub>o</sub> sum- I'<sub>o</sub>

Tripping behaviour	01	02	03	04	05	L1	L2	L3	L4	L5	L6	L7	L8	L9	English	Local	Rec.
64REF - 1															REST. EARTH FLT.	DIFF. TERRE REST.	×
64REF - 2															REST. EARTH FLT.	DIFF. TERRE REST.	×



### 4.3 Schema N°2 - 64 REF on secondary side. I' and I'o for secondary side



## 4.4 64 REF settings for Schema N°2

**64REF: Restricted earth fault**

Apply Cancel

Only one setting available I'o sum- I'o of course secondary side

Unit 1: On  Latching  Trip C.B.  Measurement: I'o sum - I'o Iso threshold: 63 A

Unit 2: On  Latching  Trip C.B.  Measurement: I'o sum - I'o Iso threshold: 63 A

Tripping behaviour

	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5	L6	L7	L8	L9	English	Local	Rec.
64REF - 1															REST. EARTH FLT.	DIFF. TERRE REST.	X
64REF - 2															REST. EARTH FLT.	DIFF. TERRE REST.	X

**Transformer T87**

Apply Cancel

Secondary side I'o sum- I'o

	On	Latching	Trip C.B.
50/51 - 1	X	X	X
50/51 - 2	X	X	X
50/51 - 3	X	X	X
50/51 - 4	X	X	X
50/51 - 5	X	X	X
50/51 - 6	X	X	X
50/51 - 7	X	X	X
50/51 - 8	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X
50N/51N ...	X	X	X

## 5 More information

- To summarize the I and I<sub>o</sub> or I' and I'<sub>o</sub> measurement elements must be placed the same side of the transformer to validate the 64REF protection.
- If in the "Application" tab of the "protection settings" menu you don't see a protection, it means that the protection isn't available don't try to set it in this protection tab.
- If in the "Application" tab of the "protection settings" the label is red color it is mean the setting of the protection is wrong and the protection will not work.