Swedish Neutral

Premium Power Protection

Smart grid protection by neutral treatment and earth fault protection

Established in 1987

Resides in Stockholm – Sweden

GROUND FAULT NEUTRALIZER [GFN]

The GFN is the most sensitive and fastest earth fault protection system on the market meaning that you could avoid the damages normally caused by earth faults.

The GFN handles earth faults without an outage which means that you can avoid the costs/missed revenue normally connected to outages.

Earth faults (one phase to ground) constitutes 75-99% of all faults in HV networks.

Earth faults can cause injuries to humans, damage to equipment and start fires.

Earth faults cause outages and outages lead to financial losses.

DEFINITION OF RISK

IEC 60479 - General risk assessment

RISK $f(t, I^2)$

Both speed of protection and fault current
can be effected by choice of neutral treatment.

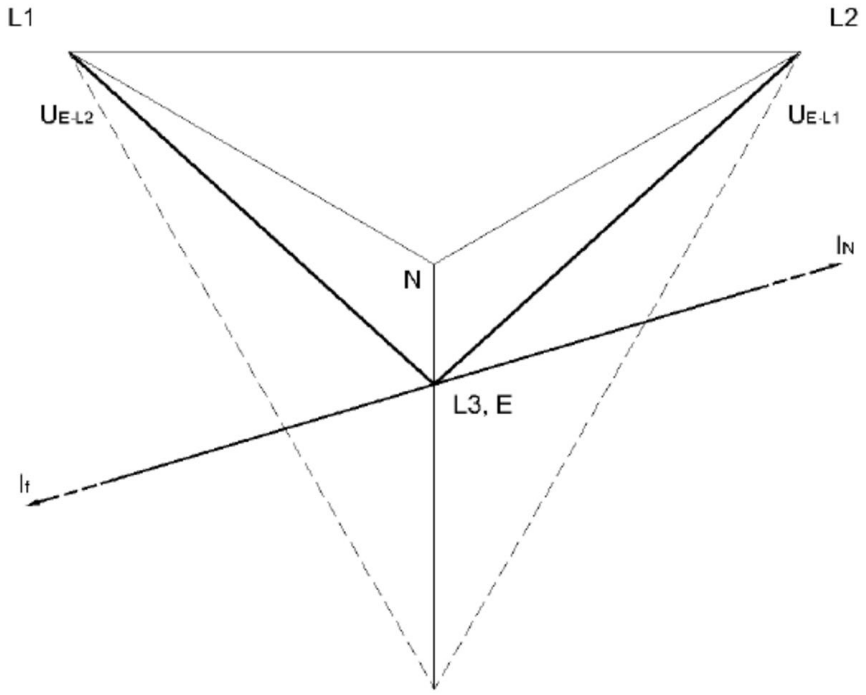
NEUTRAL TREATMENT

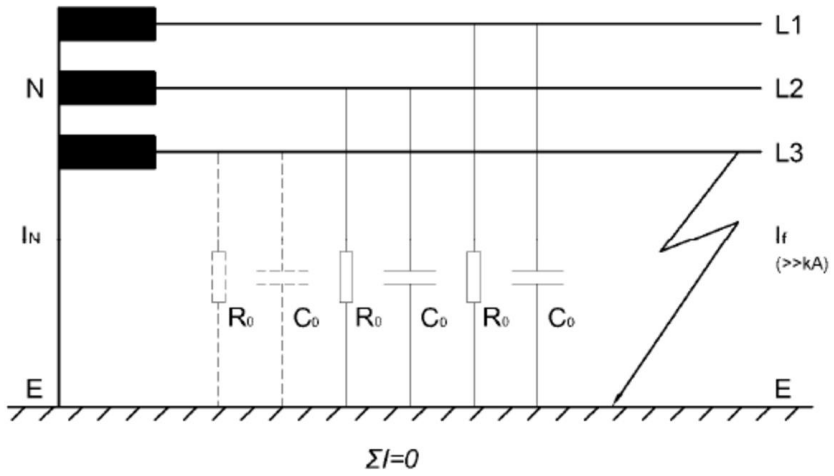
Neutral Treatment	*Fault Current*	*Speed of Protection*
Solid Grounding	10kA	0.1-1.0 sec
NER Grounding	1kA	0.1-1.0 sec
Ungrounded	100A	0.1-1.0 sec
Resonance Grounding	10A	1.0-(∞)sec
Ground Fault Neutralizer	0A (<50mA)	<60 msec

GFN TESTED BY VICTORIAN (AUSTRALIA) GOVERNMENT (CALLED RAPID EARTH FAULT CURRENT LIMITER IN VICTORIA)

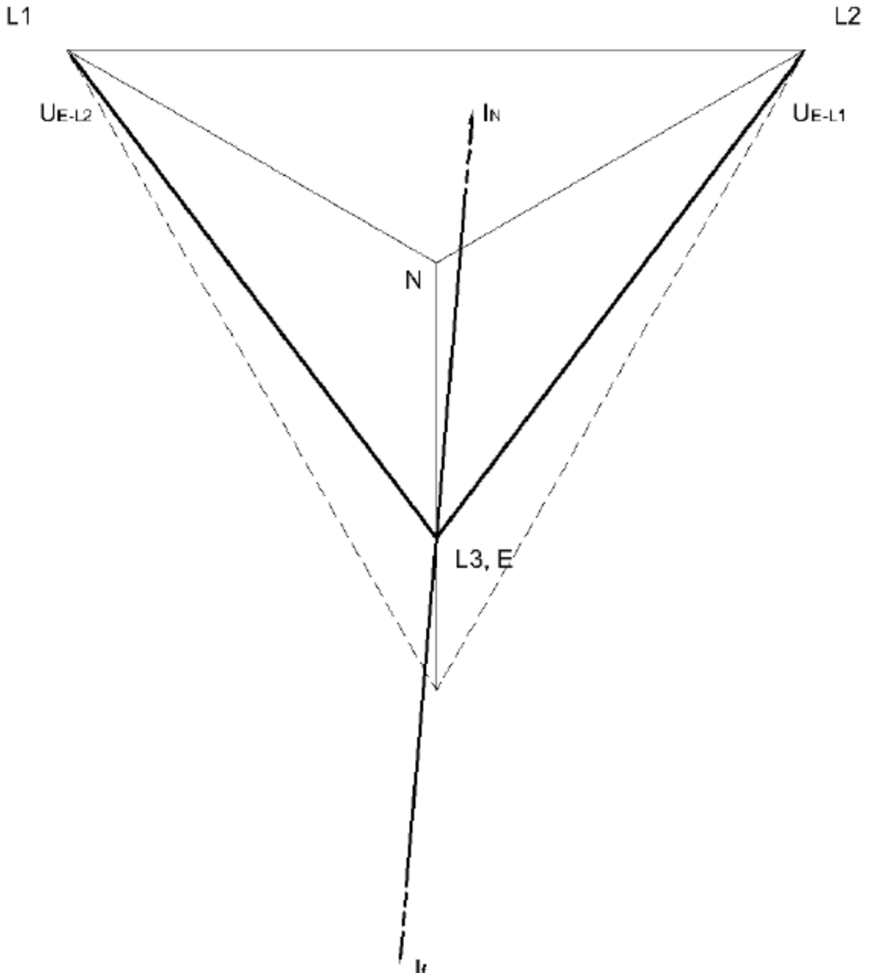
https://www.youtube.com/watch?v=n5_SwJzFUP4 (click for full video)

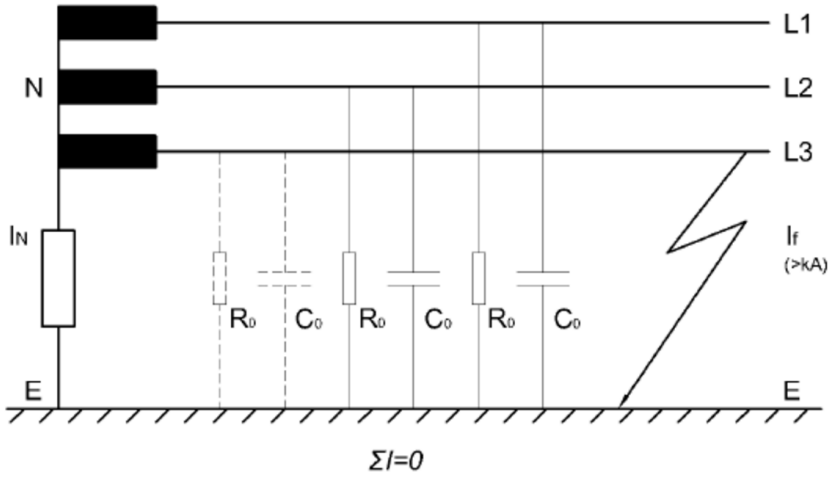
SOLIDLY GROUNDED NEUTRAL



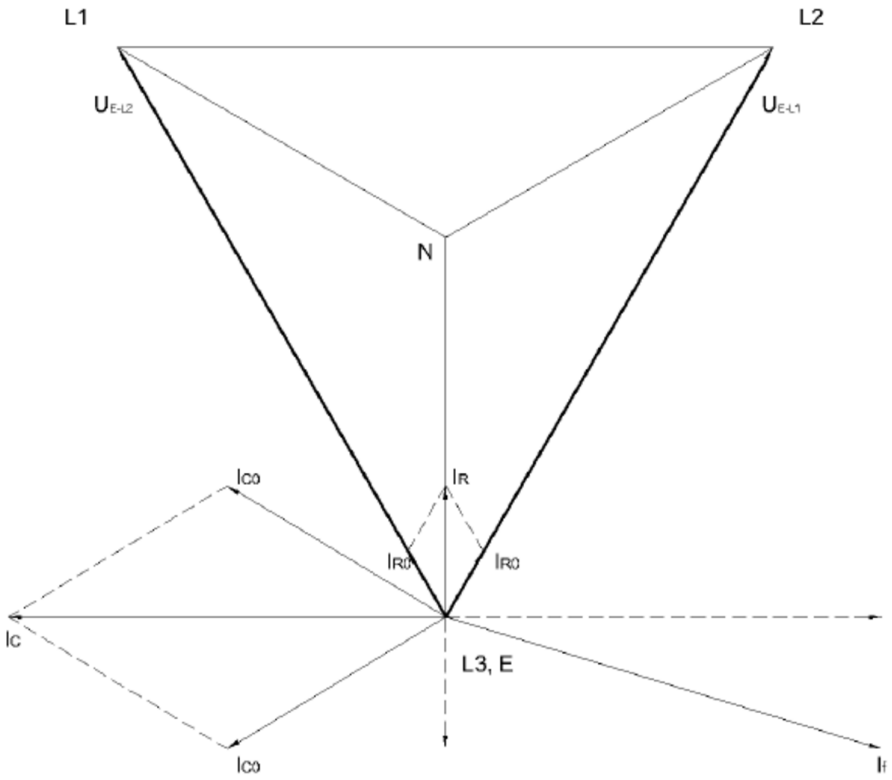


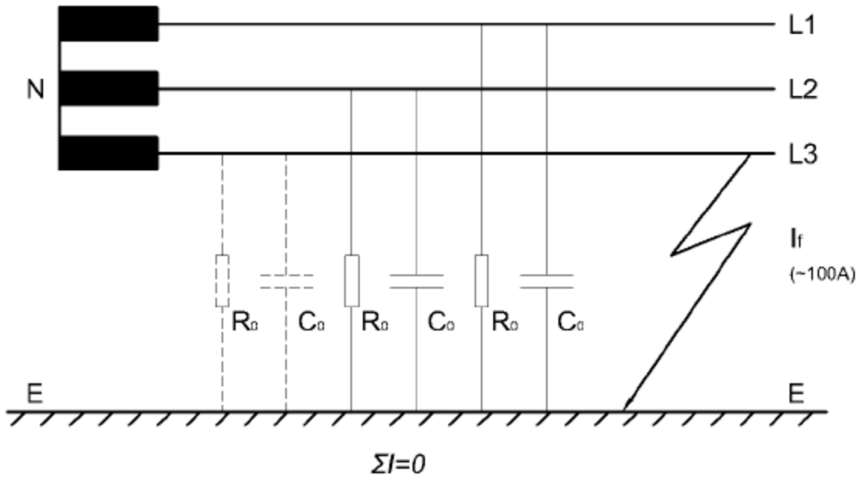
NEUTRAL EARTHING RESISTOR GROUNDED NEUTRAL



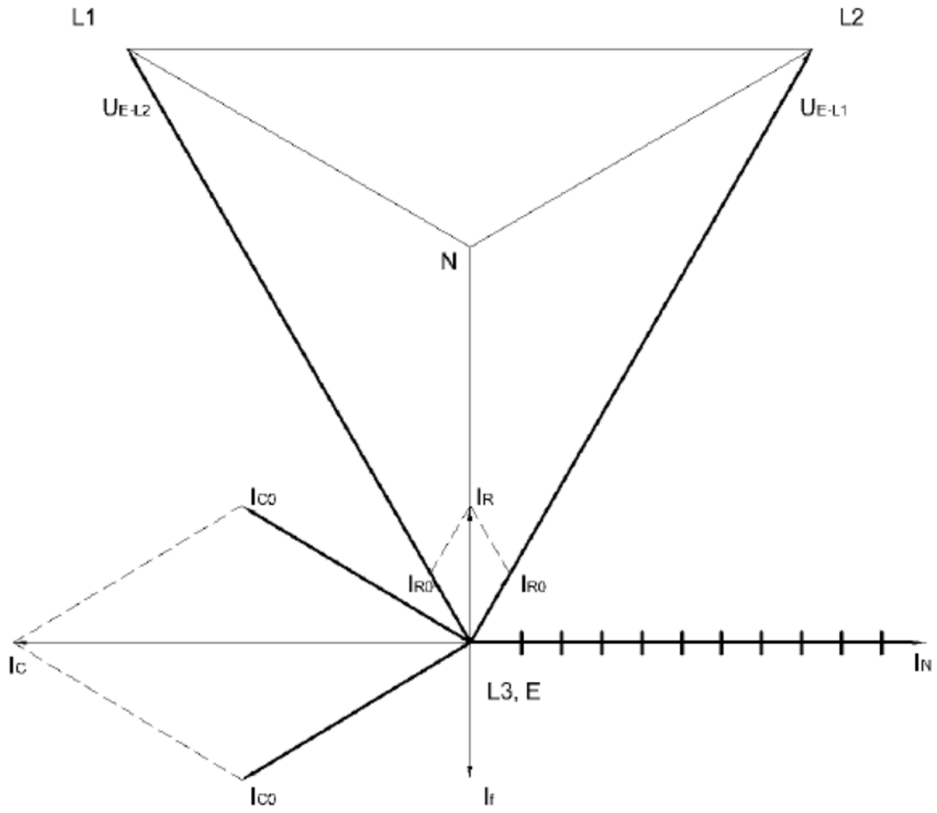


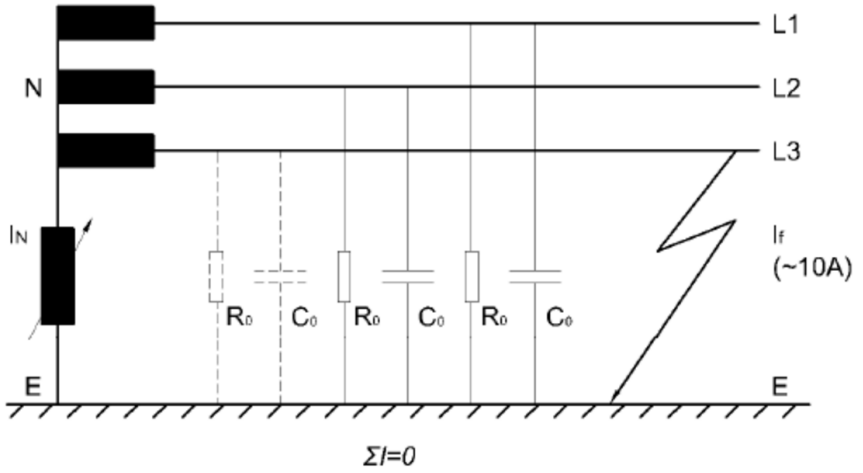
UNGROUNDED NEUTRAL



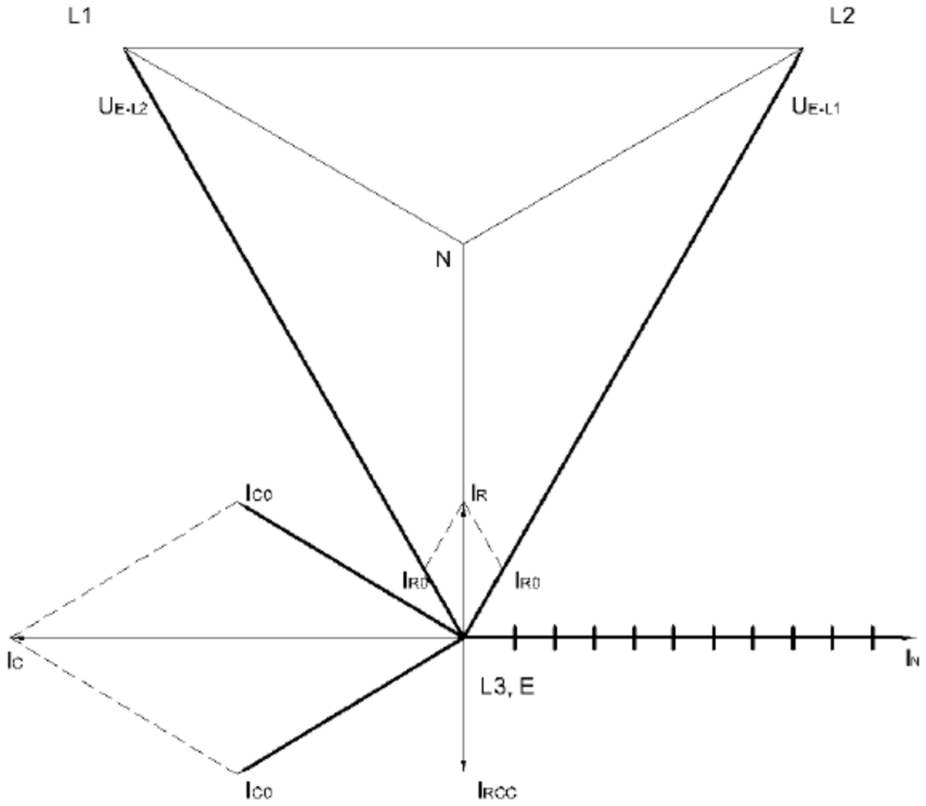


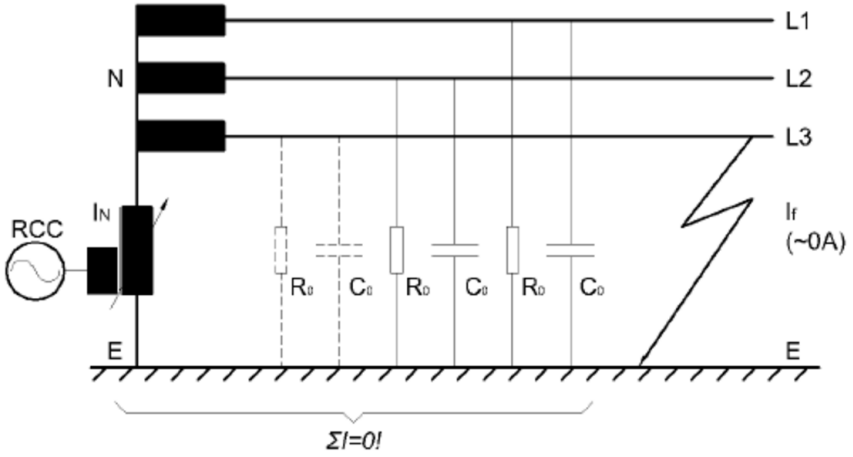
RESONANCE GROUNDED NEUTRAL
(ARC SUPRESSION COIL, WIDLEY USED IN EUROPE)



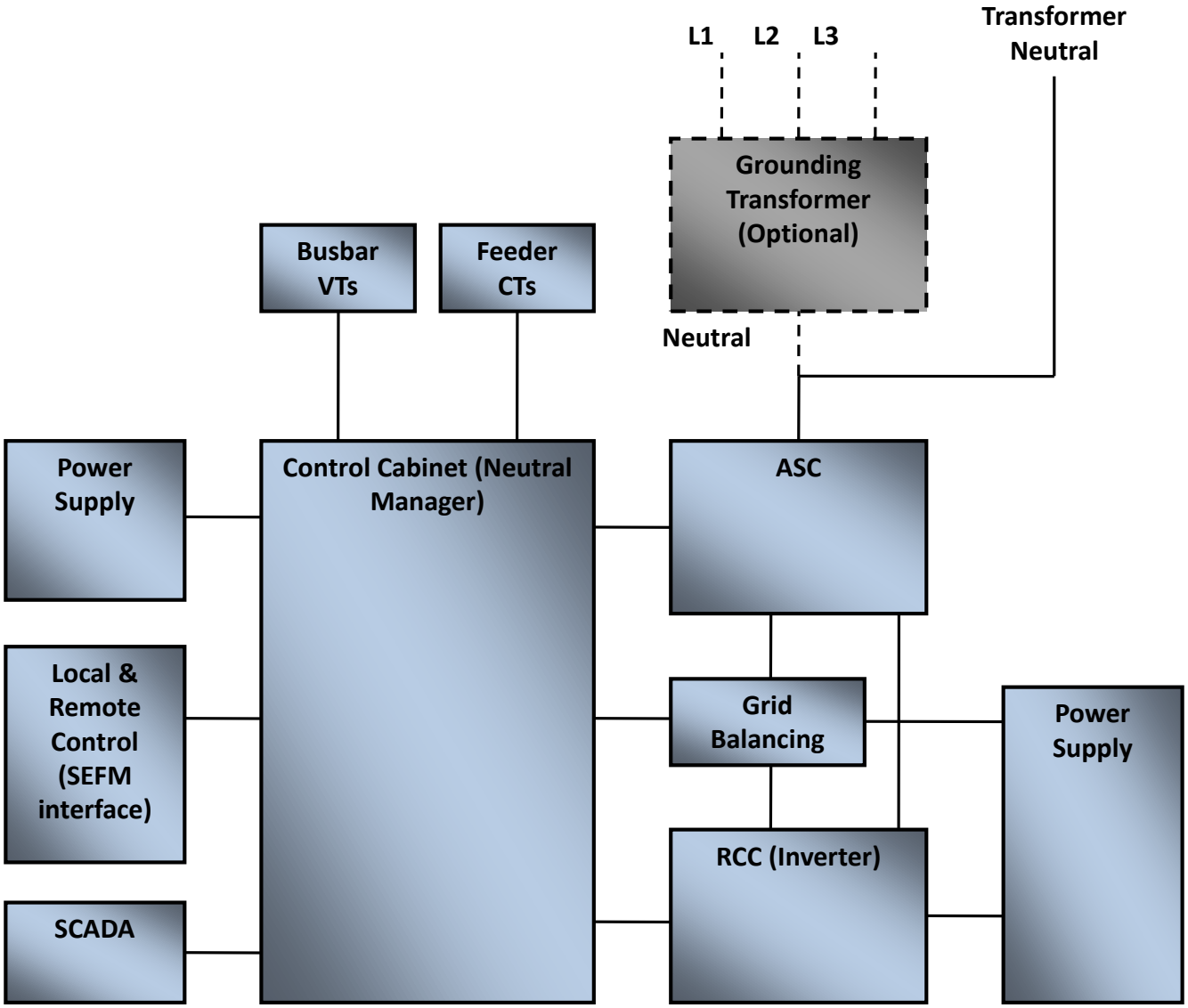


GFN GROUNDED NEUTRAL



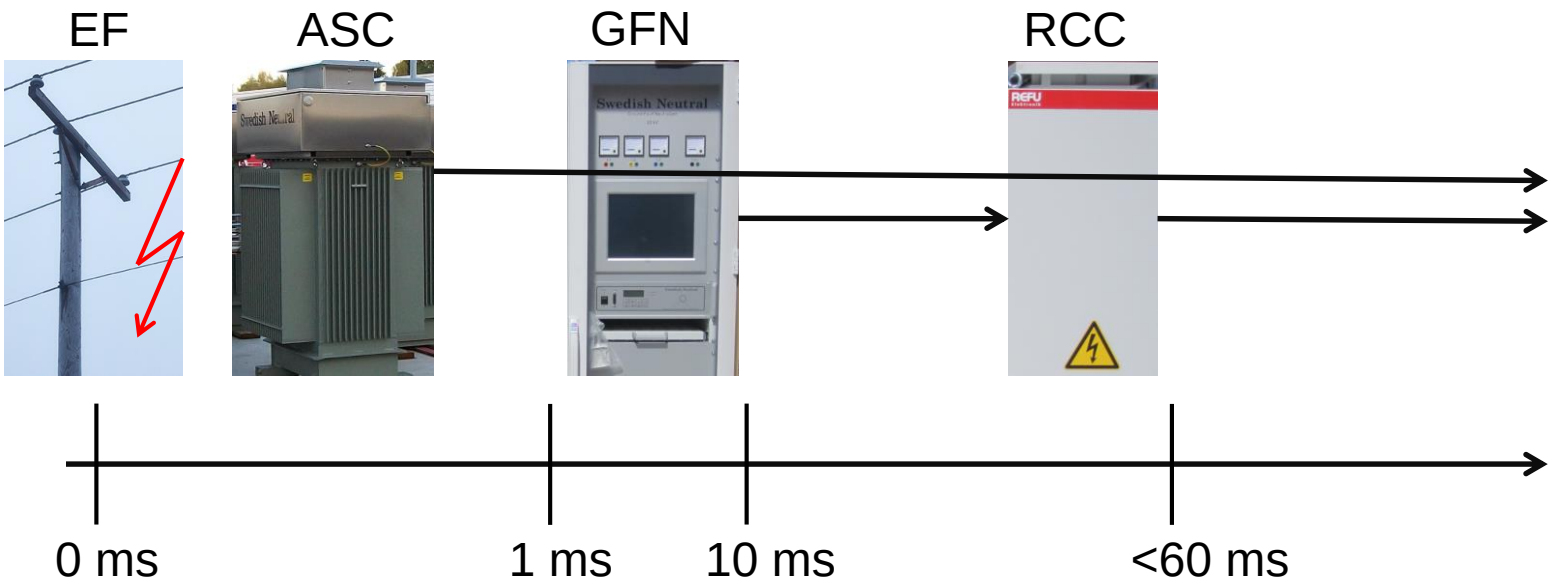


GFN SYSTEM – BLOCK DIAGRAM

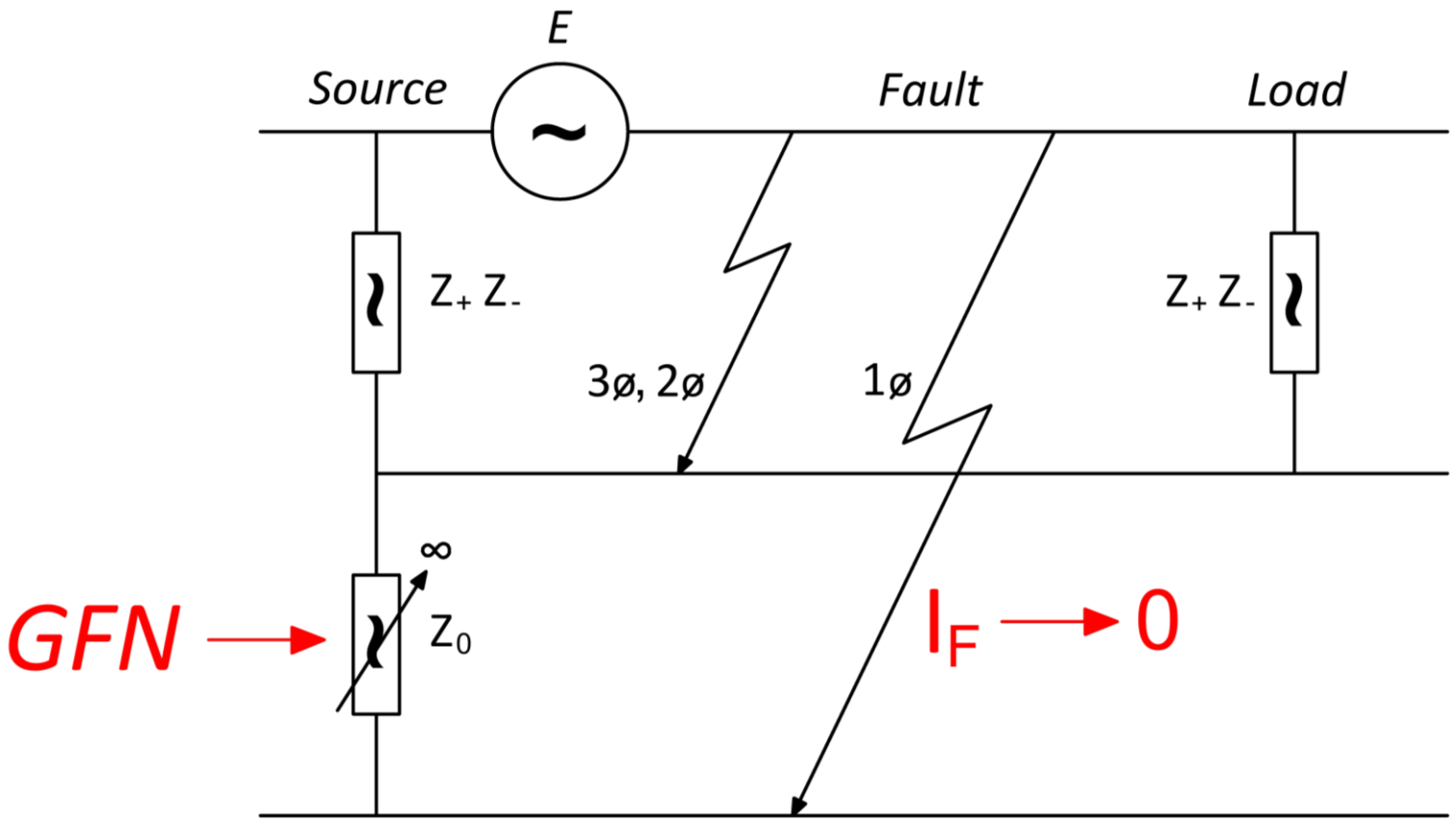


EARTH FAULT – GFN OPERATION

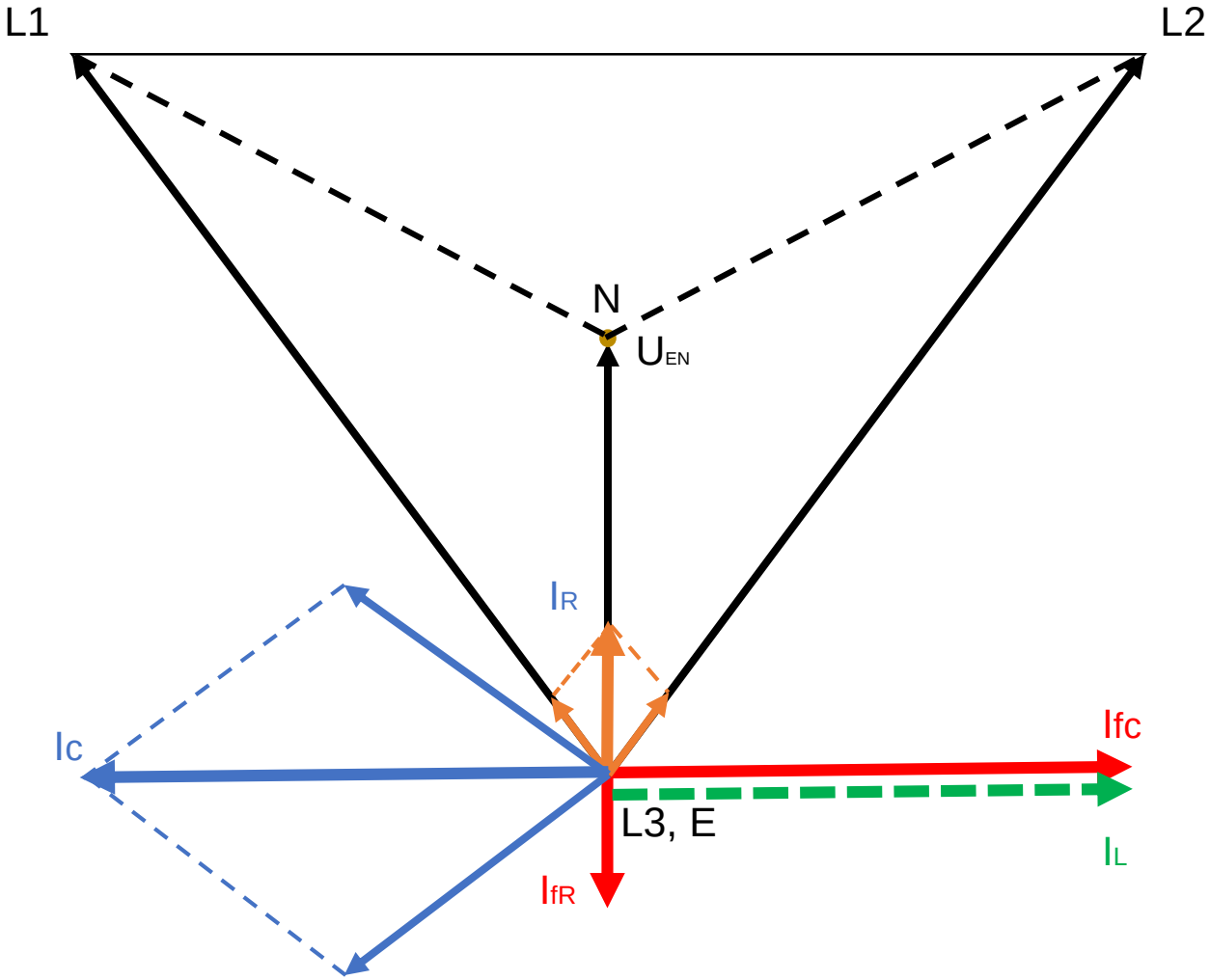
1. Earth Fault
2. The ASC instantly compensates for the capacitive earth fault current
3. The GFN detects the fault in 1 ms when the EF threshold is exceeded
4. The GFN determines the faulty phase within 10 ms from detection and requests RCC compensation
5. The RCC compensates for the earth fault current within 60 ms
6. What happens next is up to the operator to decide



LOAD BETWEEN PHASES – GFN BETWEEN PHASE & GROUND



VECTOR DIAGRAM RESONACE GROUNDED SYSTEM, EARTH FAULT IN L3



NMTERM (USER INTERFACE) – MAIN WINDOW