

Features

- Current reversal logic
- Weak end infeed logic
- Can be adjusted to different requirements by means of configuration possibilities

Application

The EFCA additional communication logic is a supplement to the EFC scheme communication logic for the residual overcurrent protection.

To achieve fast fault clearing for all earth faults on the line, the TEF earth-fault protection function can be supported with logic, that uses communication channels. REx 5xx terminals have for this reason available a scheme communication logic.

If parallel lines are connected to common buses at both terminals, overreaching permissive communication schemes can trip unselectively due to fault current reversal. This unwanted tripping affects the healthy line when a fault is cleared on the other line. This

lack of security can result in a total loss of interconnection between the two buses. To avoid this type of disturbance, a fault current-reversal logic (transient blocking logic) can be used.

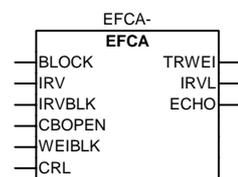
Permissive communication schemes for residual overcurrent protection, can basically operate only when the protection in the remote terminal can detect the fault. The detection requires a sufficient minimum residual fault current, out from this terminal. The fault current can be too low due to an opened breaker or high positive and/or zero sequence source impedance behind this terminal. To overcome these conditions, weak end infeed (WEI) echo logic is used.

Design

The reverse directed signal from the directional residual overcurrent function, starts the operation of a logic. The output signal, from the logic, will be activated, if the fault has been detected in reverse direction for more than the tPickUp time set on the corresponding timers. The tDelay timer delays the reset of the output signal. The signal block operation of the overreach permissive scheme for residual current, and thus prevents unwanted operation due to fault current reversal.

The weak end infeed logic uses normally a reverse signal from the directional residual overcurrent function. The weak-end-infeed logic echoes back the received permissive signal, if the reverse directional measuring element is activated during the last 200 ms. Further, it can be set to give signal to trip the breaker if the echo conditions are fulfilled and the residual voltage is above the set operate value for $3U_0 >$.

Function block



xx00000205

**Input and output
signals**

Table 1: Input signals for the EFCA (EFCA-) function block

Signal	Description
BLOCK	Blocking of function
IRV	Activation of current reversal logic
IRVBLK	Blocking of current reversal logic
WEIBLK	Blocking of weak end infeed logic
CRL	Carrier received for weak end infeed logic

Table 2: Output signals for the EFCA (EFCA-) function block

Signal	Description
TRWEI	Trip by weak end infeed logic
IRVL	Operation of current reversal logic
ECHO	Carrier send by weak end infeed logic

Technical data

Table 3: Current reversal and weak end infeed logic

Parameter	Setting range	Accuracy
Operate voltage for WEI trip	5-70 % of U_r in steps of 1%	+/-5% of set value
Current reversal pickup timer	0-60 s in steps of 1 ms	+/-0.5% +/-10 ms
Current reversal delay timer	0-60 s in steps of 1 ms	+/-0.5% +/-10 ms

Manufacturer

ABB Automation Products AB
Substation Automation Division
SE-721 59 Västerås
Sweden
Tel: +46 (0) 21 34 20 00
Fax: +46 (0) 21 14 69 18