

**Features**

- Intended for railway systems (16 2/3, 50 or 60 Hz)
- Fast operation for protection and function blocking
- Detection based on delta voltage and delta current check algorithm
- Fuse failure detection from MCB auxiliary contact
- Separate outputs for distance protection blocking and voltage-dependent functions/ protections

**Application**

The fuse failure supervision function, FFRW, is intended for single- and two-phase systems. The function continuously supervises the ac voltage circuits between the voltage instrument transformers and the terminal. Different output signals can be used to block, in case of faults in the ac voltage secondary circuits, the operation of the distance protection and other voltage-dependent functions, such as the synchro-check function, under-voltage protection, etc.

It is possible to implement different measures to prevent incorrect operations. The fuse failure supervision function can work as follows:

- On the basis of external binary signals from the miniature circuit breaker or from the line disconnector. In the first case all voltage dependent functions are affected. However, in the second case the impedance measuring function is not affected.
- based on changes: a large change in the voltage without a corresponding large change in the current.

**Functionality**

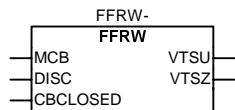
The function continuously measures the phase voltage and the phase current. The delta current and delta voltage algorithm, detects a fuse failure if a sufficient negative change in voltage amplitude without a sufficient change in current amplitude is detected in each phase separately. This check is performed if the circuit breaker is closed. Information about the circuit breaker position is brought to the function input CBCCLOSED through a binary input of the terminal.

A blocking signal is sent to the protection functions to be blocked, if a change greater than the set operate value DU occurs in the

voltage, without a change greater than the set operate value DI on the current occurring on the same phase.

The other output is activated when the disconnector is open and is used to block the voltage measuring functions.

A separate function input is connected to the auxiliary contact on a miniature circuit breaker (if used). An input signal from the miniature circuit breaker activates both the outputs on the FFRW function.

**Function block**

en02000656.vsd

**Input and output signals****Table 1: Input signals for the FFRW (FFRW-) function block**

Signal	Description
MCB	Operation of MCB
DISC	Line disconnector position
CBCCLOSED	Circuit breaker closed information

Path in local HMI: ServiceReport/Functions/FuseFailure (RW)/FuncOutputs

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

Signal	Description
VTSU	Block for voltage measuring functions
VTSZ	Block for impedance measuring functions

**Technical data****Table 3: FFRW - Fuse failure supervision function**

Function	Setting range	Accuracy	
		50/60 Hz	16 2/3 Hz
Operate voltage level	(10-50)% of U1b in steps of 1%	+/- 5.0% of U <sub>r</sub>	+/- 5.0% of U <sub>r</sub>
Operate current level	(10-50)% of I1b in steps of 1%	+/- 5.0% of I <sub>r</sub>	+/- 5.0% of I <sub>r</sub>
Operate voltage change level	(50-90)% of U1b in steps of 1%	+/- 10.0% of U <sub>r</sub>	+/- 10.0% of U <sub>r</sub>
Operate current change level	(10-50)% of I1b in steps of 1%	+/- 10.0% of I <sub>r</sub>	+/- 10.0% of I <sub>r</sub>

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