SIEMENS

SIPROTEC 5 Application Note

Ground fault supervision of 4 feeders with 7SJ82 or 7SJ85 with 4x I, 4x V

SIP5-APN-029, Edition 1

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Content

1 Ground fault supervision of 4 feeders with 7SJ82 or 7SJ85 with 4x I, 4x V

1.1 Introduction

This application describes the ground fault supervision of four feeders realized with one SIPROTEC 7SJ82 or 7SJ85 with only four current and four voltage inputs. The ground fault supervision supposed to be the only function required in each of the feeders.

1.2 Device selection

An overcurrent relay 7SJ82 or 7SJ85 with 4x I and 4x V and 120 function points (if only the ground fault supervision is required) is selected.

The overview of the application with the connections of the device to the transformers and the functional structure of the device (measuring points, function groups and functions) is as follow:

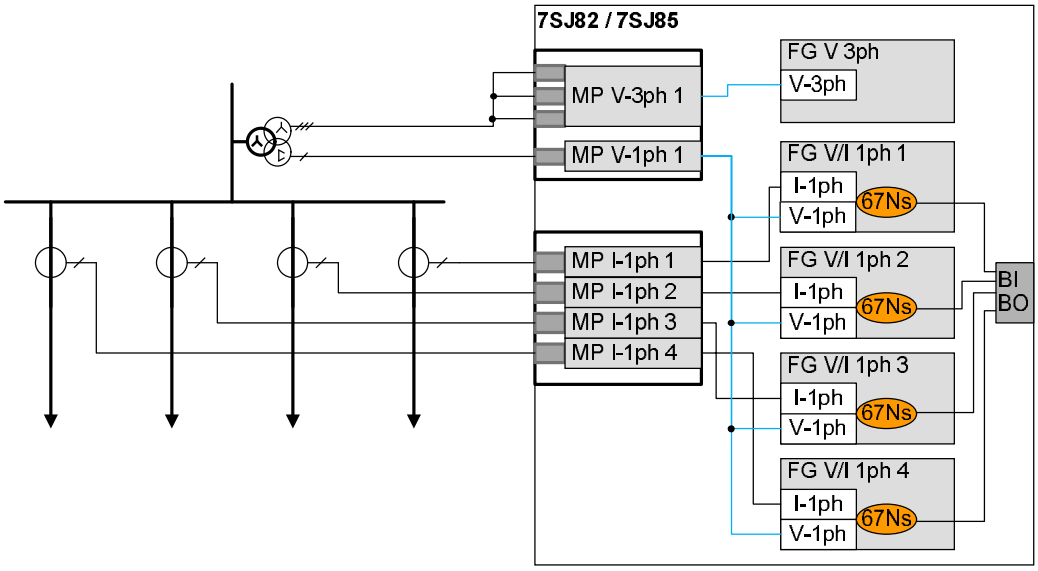


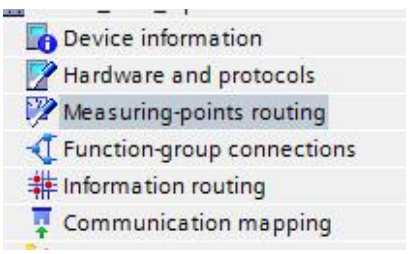
Fig.1: Overview of the device with function groups and measurement points.

Hint: The realization with one 7SJ82 for this application depends on the required sensitivity of the ground current. If the secondary ground fault current to be measured should be smaller than 30mA, then a 7SJ85 with current transformer with sensitive inputs is required. The 7SJ82 does not offer this variant.

1.3 DIGSI Settings

1.3.1 Measuring points MP

The measuring points displayed in fig. 1 must be configured in the device. The measuring points to be added in the measuring-point routing, the not used measuring points are deleted. The measuring points are routed to the transformer inputs, refer to fig. 2.



Current-measuring points

		Basismodul			
		1A			
		1A1-1A2	1A3-1A4	1A5-1A6	1A7-1A8
Measuring point	Connection type	I P 1A1	I P 1A2	I P 1A3	I S 1A4
(All)	(All)	(All)	(All)	(All)	(All)
Meas.point I-1ph 1		Ix			
Meas.point I-1ph 2			Ix		
Meas.point I-1ph 3				Ix	
Meas.point I-1ph 4					Ix
Add new					

Voltage-measuring points

		Basismodul			
		1B			
		1B1-1B2	1B3-1B4	1B5-1B6	1B7-1B8
Measuring point	Connection type	V 1.1	V 1.2	V 1.3	V 1.4
(All)	(All)	(All)	(All)	(All)	(All)
Meas.point V-3ph 1	3 ph-to-gnd voltages	V A	V B	V C	
Meas.point V-1ph 1					VN
Add new					

Fig. 2: Routing of the measuring points in DIGSI 5

1.3.2 Function groups FG

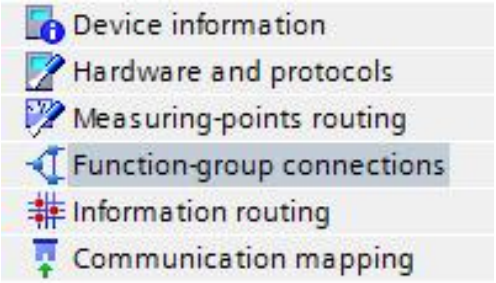
Following function groups are required:

- 4x FG V/I 1ph for the ground fault supervision of four feeders
- 1x FG V 3ph for the measuring of the phase-ground voltage for the correct determination of the network frequency.

Circuit-breaker function groups will not be configured, because there are no 3-phase current measuring points present. No 3-phase current measurement is available in the feeders on the primary side. The cut out of the function group FG circuit-breaker has no impact of the application.

1.3.3 Connection of the measuring points with the function groups

The measuring points must be connected to the different function groups afterwards, refer to the following figure.



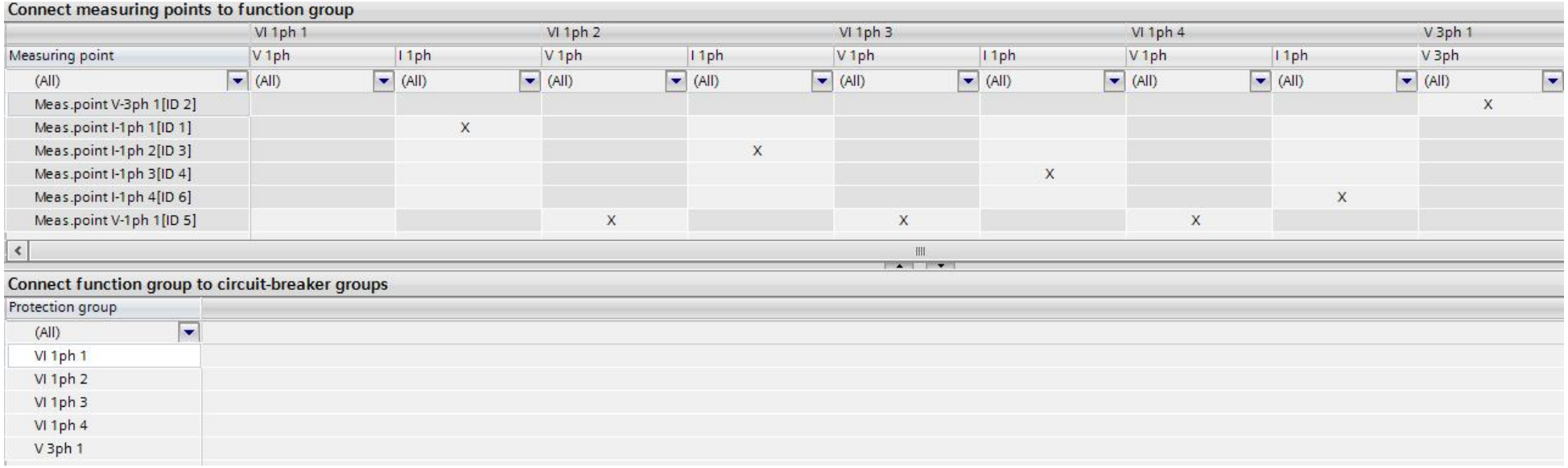


Fig. 3: Connection of the measuring points with the function groups in DIGSI 5

1.3.4 Functional overview in DIGSI 5 editor

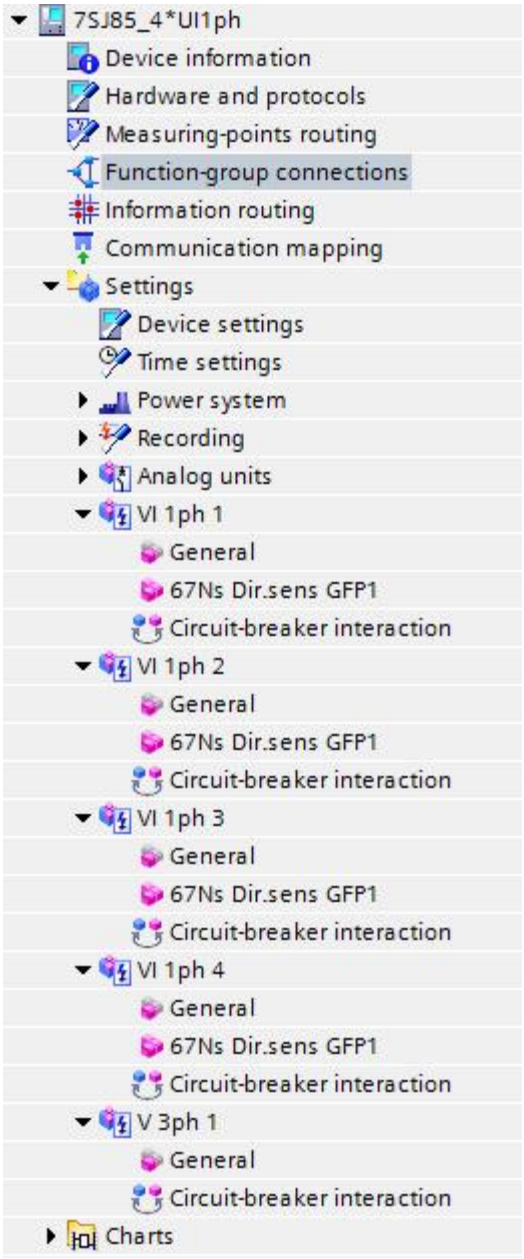


Fig. 4: Overview of the functions

1.3.5 Ground fault indication

In most of the cases the ground fault should only be indicated. Indication „Ground fault" of each of the 4 protection functions will be used.

In case that a trip should be initiated, it must be considered that there is no function group circuit breaker configured which usually issues the trip.

Each of the protection function generate an own operate (trip) indication. The minimum operating time of the operate indication can be configured with the parameter shown in fig. 5.

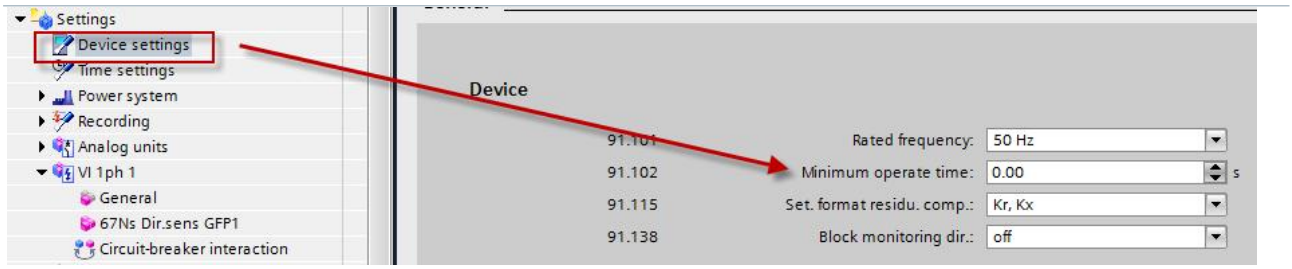


Fig 5: Setting for the duration of the indication

The default value is 0 s, because it is usually not used. The settings need to be changed to a common value of e.g. 100ms.

1.4 Summary

The expandability of function groups „FG V/I 1ph“ as well as the flexible and an easy connection of the measurement points allow the ground fault supervision of 4 feeders with one SIPROTEC 7SJ8x with only 4 current and 4 voltage inputs.

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