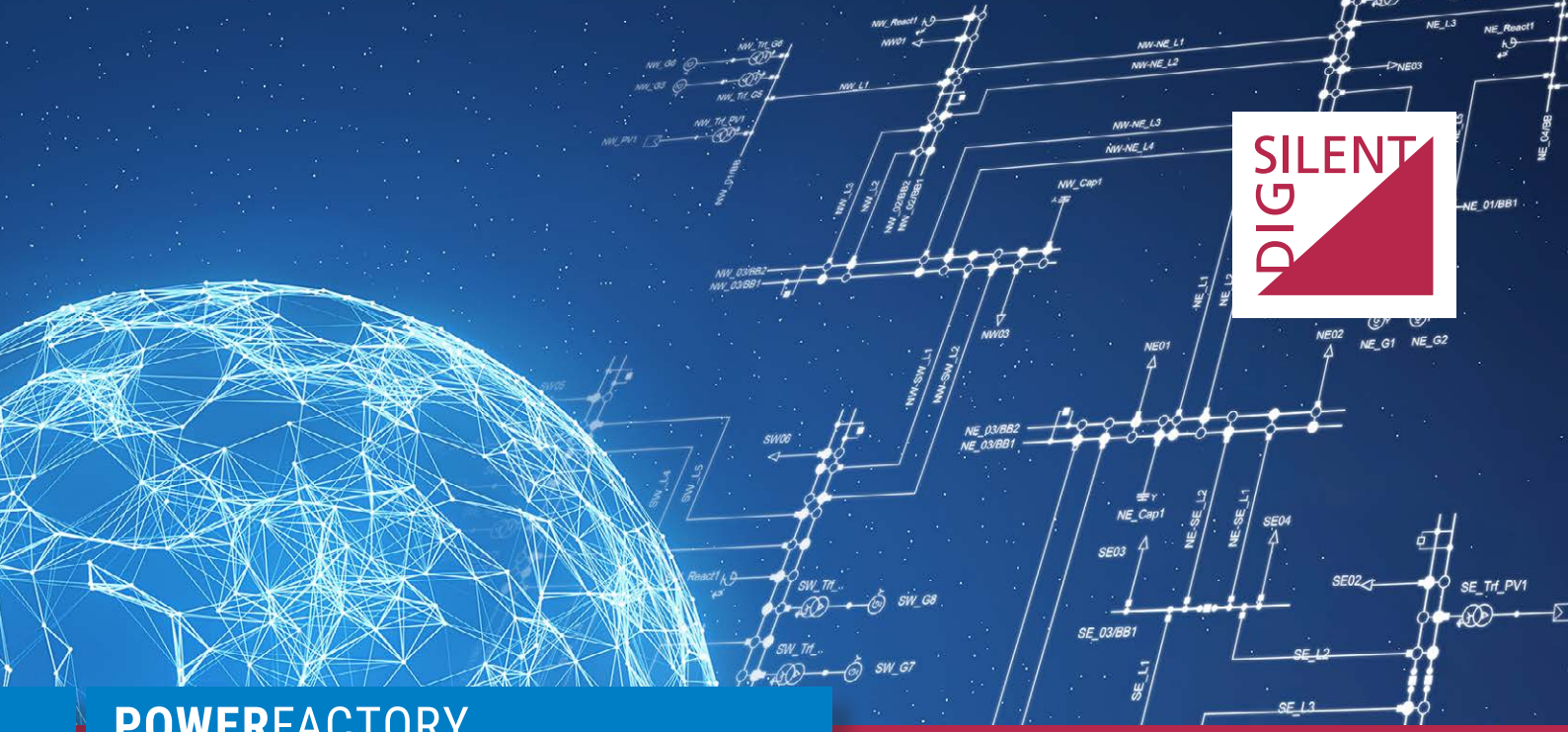

POWERFACTORY

PowerFactory 2021

Technical Reference

Siemens 7SD610

PF2021

POWER SYSTEM SOLUTIONS

MADE IN GERMANY

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Disclaimer

DIgSILENT protection device models are developed using publicly accessible information, such as user manuals, and are not validated or tested by the respective manufacturers.

1 Model information

Manufacturer Siemens

Model 7SD610

Variants The Siemens 7SD610 consists of two PowerFactory relay models (one for each nominal current) and a communication relay. Functions and model parameters are derived from information in [1].

Modelled Functionality

Functionality	7SD610
Differential Protection	X
Breaker Intertrip and Remote Tripping	-
Restricted Earth Fault Protection	-
Direct Local Trip	-
Instantaneous High-Current Switch-onto-Fault Protection	-
Backup Time Overcurrent Protection	X
Automatic Reclosure Function	-
Undervoltage and Overvoltage Protection	-
Frequency Protection	-
Circuit Breaker Failure Protection	-
Thermal Overload Protection	-

2 General description

Each model consists of a main relay with several sub-functions.

- Main relay : Measurement transformer slots, measurement processing, breaker logics
- Differential : Differential protection
- Overcurrent : Backup overcurrent protection

3 Main relay

Measurement transformers

The *"CT"* and *"VT"* slots hold the assigned 3-phase measurement transformers. The *"CT I4"* and *"VT U4"* can be assigned to current/voltage transformers dedicated for residual voltage measurement. If one or both of these remain empty, the relay will calculate the corresponding quantities from the phase values.

Measurement units

The *"Measurement"* slots process the transformer input and hold the nominal current and voltage values. The nominal current is fixed for each model.

Address	Relay Setting	Model Unit	Model Parameter	Note
204	Unom SECONDARY	Measurement	Unom	

Breaker logics

The *"Trip Logic"* holds the breaker(s) to be tripped.

4 Differential

This sub-function is models the differential protection. For a functional differential protection scheme both relay models involved need to be connected with the communication relay. The absence of the communication scheme will be treated as a communication failure and block the differential protection.

Note

- Both devices in the differential protection scheme should use the same nominal current
- The *"blocked"* state of one device (e.g. inrush blocking) is not transferred to the other device
- The time setting is effective for both, the restrained and un-restrained region

Address	Relay Setting	Model Unit	Model Parameter	Note
1210	I-DIFF>	Differential	Release Threshold	
1217A	T-DELAY I-DIFF>	Differential	Time Settings	
1219A	I> RELEASE DIFF	Diff Release	Pickup Current	see 1)
1233	I-DIFF>>	Differential	Unrestrained Differential Threshold	
2301	INRUSH REST.	Differential	Disable Harmonic Blocking	
2302	2nd HARMONIC	Differential	2nd Harmonic Blocking: Threshold	
2303	CROSS BLOCK	Differential	2nd Harmonic Blocking: Phase Interlock	
2305	MAX INRUSH PEAK	Differential	Disable Harmonic Blocking	

Notes:

1) Set the unit out of service, if $1219A = 0$

5 Overcurrent

This function models the (backup) overcurrent protection.

Note

- The direction for the phase elements is always self-polarised; the voltage used is either the fault or memorised voltage
- The direction for zero-sequence elements is always determined with I0 and U0

Address	Relay Setting	Model Unit	Model Parameter	Note
2601	Operating Mode			see 1)
2610	Iph>>	Iph>>	Pickup Current	
2611	T Iph>>	Iph>>	Time Setting	
2612	3I0>>	3I0>>	Pickup Current	
2613	T 3I0>>	3I0>>	Time Setting	
2620	Iph>	Iph>	Pickup Current	
2621	T Iph>	Iph>	Time Setting	
2622	3I0>	3I0>	Pickup Current	
2623	T 3I0>	3I0>	Time Setting	
2640	Ip>	Ip>	Current Setting	
2642	T Ip Time Dial	Ip>	Time Dial	see 2)
2643	Time Dial TD Ip	Ip>	Time Dial	see 3)
2646	T Ip Add	Ip>	Time Adder	
2650	3I0p PICKUP	3I0p	Current Setting	
2652	T 3I0p TimeDial	3I0p	Time Dial	see 2)
2653	TimeDial TD3I0p	3I0p	Time Dial	see 3)
2656	T 3I0p Add	3I0p	Time Adder	
2660	IEC Curve	Ip> Ip> Dir 3I0p 3I0p Dir	Characteristic	see 2)
2661	ANSI Curve	Ip> Ip> Dir 3I0p 3I0p Dir	Characteristic	see 3)
2680	Direction Iph>	Iph> Dir	Tripping Direction	
2681	Iph> Dir.	Iph> Dir	Pickup Current	
2682	T Iph> Dir.	Iph> Dir	Time Setting	
2683	Direction 3I0>	3I0> Dir	Tripping Direction	
2684	3I0> Dir.	3I0> Dir	Pickup Current	
2685	T 3I0> Dir.	3I0> Dir	Time Setting	
2688	Direction IP	Ip> Dir	Tripping Direction	
2689	Ip> Dir.	Ip> Dir	Current Setting	
2690	T Ip Dir.	Ip> Dir	Time Dial	see 2)
2691	D Ip Dir.	Ip> Dir	Time Dial	see 3)
2692	T Ip Add Dir.	Ip> Dir	Time Adder	
2693	Direction 3I0P	3I0p Dir	Tripping Direction	

Address	Relay Setting	Model Unit	Model Parameter	Note
2694	3I0p Dir.	3I0p Dir	Current Setting	
2695	T 3I0p Dir.	3I0p Dir	Time Dial	see 2)
2696	D 3I0p Dir.	3I0p Dir	Time Dial	see 3)
2697	T 3I0p Add Dir.	3I0p Dir	Time Adder	

Notes:

1) – Off: Disable the whole sub-function
   – Emergency Only: Enable the *"Emergency Only"* logic
   – On: Disable the *"Emergency Only"* logic
2) Only applicable if address *126* is set to *"TOC IEC"*
3) Only applicable if address *126* is set to *"TOC ANSI"*

6 Available Mapping Files

Hardware Version	Firmware Version	Language	Multiple Setting Groups	Model
7SD610x-xxAxx	4.7	de		7SD610 1A 7SD610 5A
			X	7SD610 1A 7SD610 5A
		en		7SD610 1A 7SD610 5A
			X	7SD610 1A 7SD610 5A

7 References

[1] Siemens AG. *SIPROTEC 4 Differential Protection 7SD610*. C53000-G1176-C145-8, Edition 05.2016.