

# SIEMENS

*Ingenuity for life*



## Main Protection Functions – Limit Overview V7.90

# SIPROTEC 5 Application

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## Main Protection Functions – Limit Overview

APN-050, Edition 2

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### 1 Main Protection Functions – Limit Overview

#### 1.1 Introduction

SIPROTEC 5 offers with its innovative modular and flexible hardware, software and communication a perfectly tailored and cost optimized solution for each application. The high degree of flexibility and scalability, not only from the hardware perspective but also regarding functionality, is one of the key features of the SIPROTEC 5 platform.

A single SIPROTEC 5 device can protect multiple feeders, which can be very useful to grant redundancy with reduced investment, as shown in figure 1:

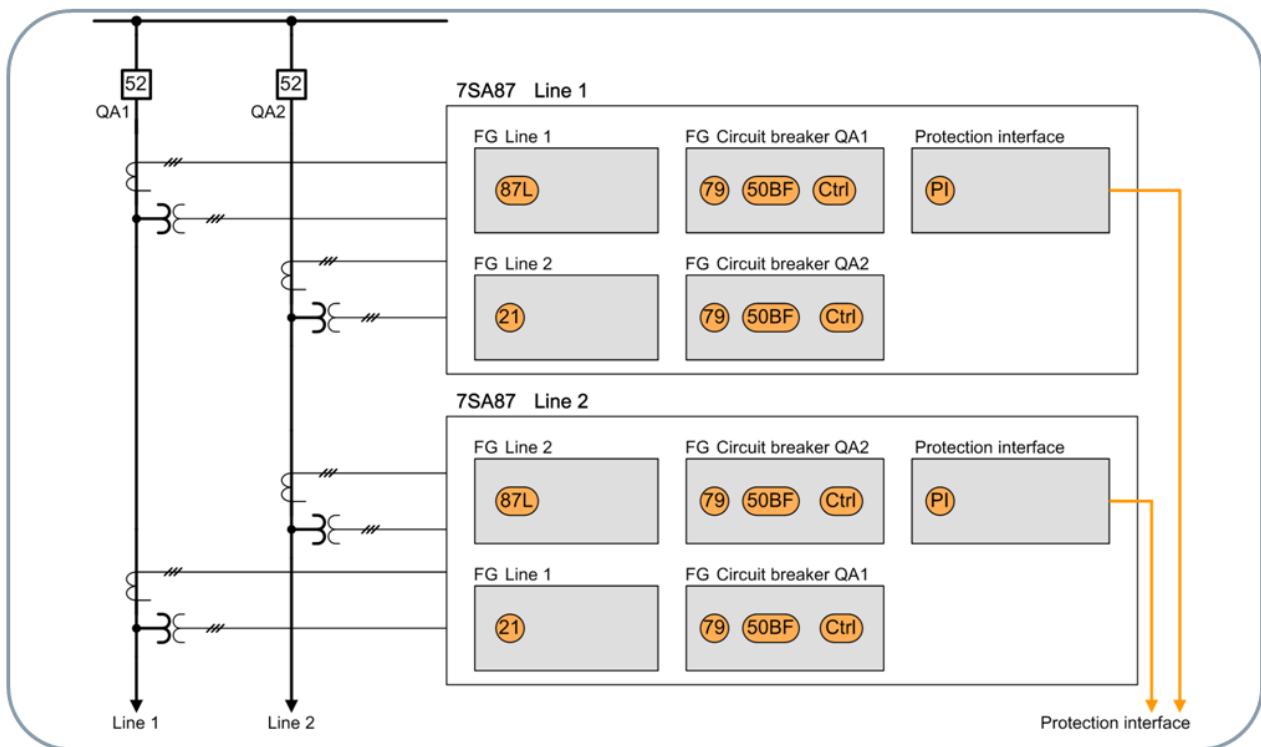


Figure 1: Protection and control of two feeders with one device

This innovative concept is also a unique selling proposition referring to piloting of the IEC 61850 process bus technology. The customer can herewith use a SIPROTEC 5 device to protect the bay using the current and voltage connected to its own terminals and run in parallel, in the same device, a protection scheme based on sampled measured values (SMV) received from a merging unit. Easy, cost effective and ready to compare!

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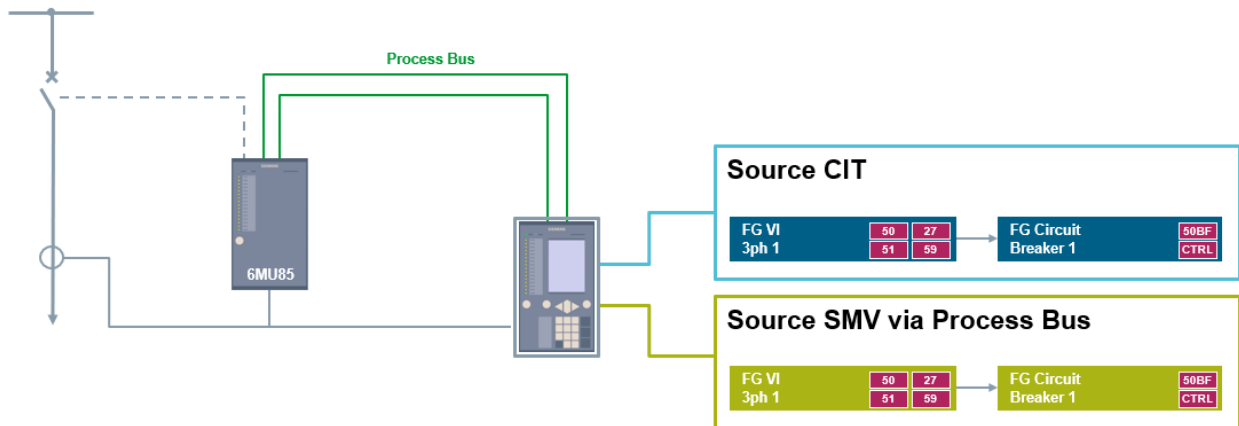


Figure 2: SIPROTEC 5 with one function group for conventional and one for SMV measurements

As throughout the lifecycle of the SIPROTEC 5 devices the processing capability is being improved and in parallel new functionalities are being added, it is not easy to keep in mind the system limits of every SIPROTEC 5 device type all the time. The goal of this application note is to provide a clear overview of the limits regarding the main protection functions.

Information summarized in the table was gained from the SIPROTEC 5 Online Configurator which is accessible on the Internet under the following link: <https://w3.siemens.com/smartgrid/global/en/products-systems-solutions/Protection/Pages/protection-relay-configurator.aspx>

In case of complex applications, it is a good practice to create the project in DIGSI before closing the device selection, as the software continuously monitors the load of the CPU by using the load model. In such a way, DIGSI determines whether the configuration is likely to overload the device and if that is the case, it shows a warning and prevents the application from being load into the device. More information about this feature can be found in the chapter "Resource-Consumption Supervision" in every device manual.

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## Partners Application Note Main Protection Functions – Limit Overview

### 1.2 Main Protection Functions – Limit Overview Table:

#### Main Functions in Devices (FW V7.90)

Device	Distance	Line Differential	Stub	Line Diff including Power Tx	Transformer Differential	Transformer Side	Transformer Neutral-Point	Impedance for Tx	AVC for 2-w Tx	AVC for 3-w Tx	AVC for Grid Coupler Tx	Parallel Operation for 2-W Tx	Generator Differential	Synch. Function with Balancing Cmd.
7SJ82	-	-	-	-	-	-	-	-	Max 4	-	-	-	-	Max 20. (1 Channel)
7SJ85	-	-	-	-	-	-	-	-	Max 4	Max 4.	Max 4.	Max 1. Up to 7 Tx	-	Max 20. (1 Channel)
7SJ86	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7UT85	Max. 2	Max. 1	Max. 2	-	Max. 1	Max. 3	Max. 2	Max. 3	Max 4.	Max 4.	Max 4.	Max 1.	Max 1.	-
7UT86	Max. 2	Max. 1	Max. 2	-	Max. 2	Max. 4	Max. 3	Max. 3	Max 4.	Max 4.	Max 4.	Max 1.	Max 1.	-
7UT87	Max. 2	Max. 1	Max. 2	-	Max. 3	Max. 5	Max. 5	Max. 3	Max 4.	Max 4.	Max 4.	Max 1.	Max 1.	-
7SA82	Max. 1	-	-	-	-	-	-	Max. 2	Max 4.	-	-	Max 1.	-	-
7SA86	Max. 2	-	Max. 2	-	-	-	-	Max. 2	Max 4.	Max 4.	Max 4.	Max 1.	-	-
7SA87	Max. 2	-	Max. 2	-	-	-	-	Max. 2	Max 4.	Max 4.	Max 4.	Max 1.	-	-
7SL82	Max. 1	Max. 1	-	Max. 1	-	-	-	Max. 2	Max 4.	-	-	-	-	-
7SL86	Max. 2	Max. 1	Max. 2	Max. 1	-	-	-	Max. 2	Max 4.	Max 4.	Max 4.	-	-	-
7SL87	Max. 2	Max. 1	Max. 2	Max. 1	-	-	-	Max. 2	Max 4.	Max 4.	Max 4.	-	-	-
7SD82	-	Max. 1	-	Max. 1	-	-	-	-	Max 4.			Max 1.	-	-
7SD86	-	Max. 1	Max. 2	Max. 1	-	-	-	-	Max 4.	Max 4.	Max 4.	Max 1.	-	-
7SD87	-	Max. 1	Max. 2	Max. 1	-	-	-	-	Max 4.	Max 4.	Max 4.	Max 1.	-	-
7UM85	-	-	-	-	Max. 2	Max. 6	Max.3	Max. 2	-	-	-	-	Max. 2	Max 9. (1 Channel)
7VE85	-	-	-	-	-	-	-	-	-	-	-	-	-	Max 8. (1.5 or 2 Channels)
7SS85								Max. 10						

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### 1.3 Abbreviations

Clarification of the abbreviations used in the table:

AVC: Automatic Voltage Control

Tx: Transformer

2-w Tx: Two Winding Transformer

3-w Tx: Three Winding Transformer

### 1.4 SIPROTEC 5 and DIGSI 5 tutorials on YouTube

A series of tutorial videos help to enhance communications, share information and educate a large audience. Anytime and anywhere.

In the videos our skilled experts present technical details related to SIPROTEC 5 devices and the engineering software DIGSI 5. Always practice-oriented, clear, and what's more - convincingly. Thus, the videos not only attract and train customers in an effective and efficient way but also provide helpful information for all Siemens colleagues.

Watch the latest tutorials on YouTube and learn about SIPROTEC 5 and DIGSI 5.

[https://www.youtube.com/results?search\\_query=SIPROTEC+5](https://www.youtube.com/results?search_query=SIPROTEC+5)

### 1.5 Summary

This application should assist to select easily the perfectly tailored SIPROTEC 5 device for your switchgear and application. Don't forget to double-check with DIGSI specially in case of complex applications.

A proper selection of the right SIPROTEC 5 device right from the beginning!

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