

**SIEMENS**



Products for modern energy grids

# SIPROTEC 5

## Protection, automation, and monitoring

Integrated  
Advanced  
Cyber  
Security



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# SIPROTEC 5

Innovative, modular, and high quality

Based on more than 100 years of experience: SIPROTEC 5, the highly modular and flexible generation of smart digital field devices for innovative solutions in modern medium-, high-, and extra high-voltage grids, featuring these functions:

- Protection
- Automation
- Monitoring



## Innovation focal points

### **Customized: Perfectly tailored fit**

Individually configurable devices deliver customized and cost-efficient solutions over the entire life cycle.

### **Networked: Designed to communicate**

With this groundbreaking system architecture, you have all your communication under control.

### **Integrated: Comprehensive workflow**

Integrated engineering from end to end, from system design to operation facilitates system development all along the line.

### **Secure: Safety and security inside**

Multilayered security mechanisms throughout the entire chain ensure maximum security and availability.

## All advantages at a glance

- Safety for employees and equipment
- Cost savings on initial investment, spare part inventory, maintenance, and expansion
- Efficient functioning with optimized operating concepts using the unique DIGSI 5 engineering tool for all applications and devices
- Reliable, high-performance communication solutions
- User-friendly thanks to new system solutions and ergonomic operating concepts
- Flexibility thanks to modular functionality and hardware

# SIPROTEC 5

Secure, reliable, and interoperable

Certified quality and conformity – confirmed by independent test laboratories worldwide



The SIPROTEC 5 portfolio – suitable for every application

Main function	Device types
<b>Overcurrent protection</b> Overcurrent protection and control	7SJ82, 7SJ85
<b>Line protection</b> Distance protection and control	7SA82, 7SA86, 7SA87
Line differential protection and control	7SD82, 7SD86, 7SD87
Combined line differential and distance protection and control	7SL82, 7SL86, 7SL87
Breaker management and control	7VK87
Overcurrent protection as backup for lines	7SJ86

Main function	Device types
<b>Transformer differential protection</b> Transformer differential protection, control and monitoring	7UT82, 7UT85, 7UT86, 7UT87
<b>Motor protection</b> Motor protection and control	7SK82, 7SK85
<b>Generator protection</b> Generator protection and control	7UM85
<b>Busbar protection</b> Centralized busbar protection	7SS85
<b>Bay controller</b> Bay controller with control/interlocking functions and monitoring, optionally with protection functions	6MD85, 6MD86
<b>Fault recorder and power quality recorder</b> Fault recorder with PMU	7KE85

Devices are flexibly expandable with system functions like PMU and arc protection. All devices 7XX85, 86, and 87 can be enhanced with expansion modules.

# Applications

Flexible, versatile, and integrative

Discover these and many other application options with SIPROTEC 5 – thanks to the DIGSI 5 function library.

Protection of a generator and excitation transformer

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Protection of a generator in busbar connection

Protection of a power plant (generator and step-up transformer)

Differential protection of a phase angle regulating transformer (PAR)

Differential and distance protection of a transformer

Protection of grids with renewable generation

Differential protection of a motor

Protection of a capacitor bank with filter circuit

Feeder protection with integrated transient earth fault function

Arc protection

Process bus solution and PRP/HSR

Fault recorder with PMU

Protection of a breaker-and-a-half system

Transformer protection with voltage controller

Protection and control of multiple feeders

### Autotransformer bank

7UT86/87

FG autotransformer side 1	49 50 61	FG autotransformer 1	87T 87TNode	FG circuit breaker QA1	50BP CrtI
FG autotransformer side 2	50S1	FG autotransformer compensation side	50S1	FG circuit breaker QA2	50BP CrtI
FG autotransformer ground side				FG circuit breaker QA3	50BP CrtI
				FG circuit breaker QA4	50BP CrtI

### Distance protection of two parallel lines

7SA87

FG line 1	21	FG circuit breaker QA1	79 50BF CrtI
FG line 2	21	FG circuit breaker QA2	79 50BF CrtI

# System solutions

## Consistent, individual, and configurable

### Perfectly tailored fit

- Completely tailored to your needs – thanks to a modular system design in hardware, functionality, and communication
- Functional integration of diverse applications – including protection, control, measurement, monitoring, power quality, and fault recording
- Identical expansion and communication modules – for all devices
- Straightforward installation and interchangeability plus optimal reliability – with innovative terminal block technology
- Lower training costs, higher security – thanks to identical functions across the entire system family

### Holistic workflow

- Integrated end-to-end system and device engineering – from the single line of the plant to device parameterization
- Simple and intuitive – graphical linking of primary and secondary technologies
- Adaptable application templates – convenient for most common applications
- Open interfaces such as XML – for seamless integration into the processing world
- Integrated tools – for reliable testing during the engineering and start-up phases and for simulation of operating scenarios
- Highest interoperability, efficient replacement and expansion concepts – guaranteed by flexible IEC 61850 object modeling
- Comprehensive – one IEC 61850 system configurator for all IEC 61850 devices in your plant

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### Your immediate advantage:

Save money on your initial investment and spare part inventory with individually configurable devices.

### Your immediate advantage:

Make the most of your substantial time savings and high level of data security and transparency throughout the entire life cycle of your system using the unique DIGSI 5 engineering tool for all applications and devices.



# Communication

Comprehensive, interoperable, and secure

## Designed to communicate

- Straightforward adaptation to existing communication structures
- Scalable redundancy according to requirements – in hardware and software
- Seamless – redundancy protocols PRP, HSR and RSTP
- Several parallel communication channels – for integrated solutions
- Always matching communication modules – plug-in, retrofittable
- Two independent serial protocols – on one module
- Process bus interfaces – conforming to standards IEC 61850-9-2 and IEEE 1588
- Comprehensive test routines – integrated

## Safety and security inside

- Maximum protection of personnel and equipment – with proven functions
- Highest strength in terms of voltage, EMC, and climatic and mechanical stress – thanks to durable and ruggedized hardware and an ingenious layout of the entire electronics
- High availability – the result of sophisticated self-monitoring routines
- Compliant to the strict cyber security requirements – according to the BDEW Whitepaper and NERC CIP
- Security through encryption – on the entire communication chain between DIGSI and device
- Automatic logging – for safety-critical actions and attempts to access devices and systems

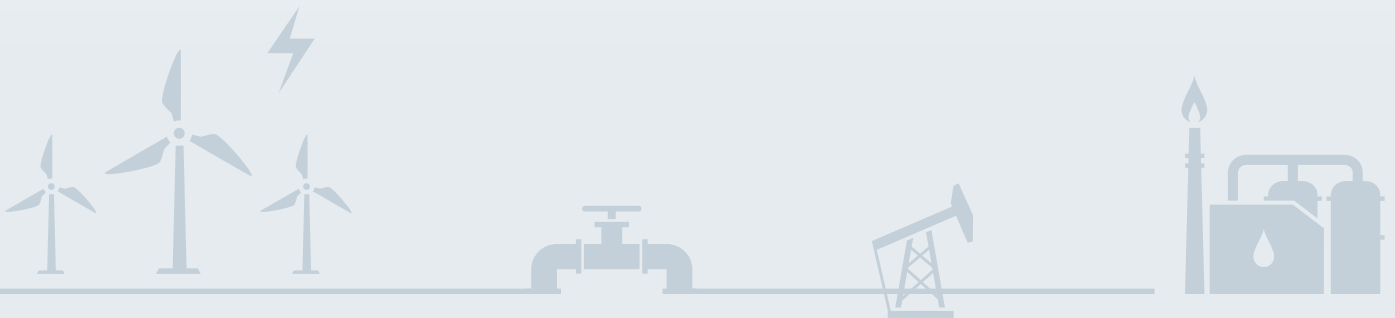
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### Your immediate advantage:

With innovative communication as a central component in your system architecture, you will take advantage of the essential flexibility and security that is required within the highly networked system landscape of the future.

### Your immediate advantage:

Enjoy an exceptionally high level of system security and reliability with our multilayered integrated security and safety mechanisms.



# Hardware

## Modular, robust, and innovative

- Precise adaptation of the hardware to your needs and application
- High availability thanks to dust-tight, sealed, and temperature-optimized housing
- Simple installation and interchangeability with maximum safety through innovative terminal technology
- Retrofittable and exchangeable plug-in modules
- Simple stocking of spare parts thanks to identical expansion and communication modules for all devices



On-site operation panels for base modules

On-site operation panels for expansion modules

Base modules

Expansion modules

Plug-in modules

Subject to changes and errors.

The information given in this document only contains general descriptions and /or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

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This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit ([www.openssl.org](http://www.openssl.org)).

This product includes cryptographic software written by Eric Young ([ey@cryptsoft.com](mailto:ey@cryptsoft.com)).

Published by  
Siemens AG 2016  
Energy Management Division  
Freyeslebenstrasse 1  
91058 Erlangen, Germany

Order No. EMDG-B10022-00-7600  
Printed in Germany  
Dispo 6200  
HL 16092344 WS 01161.0\_1.0

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