SPRECON®-E-P DD..6-SERIES
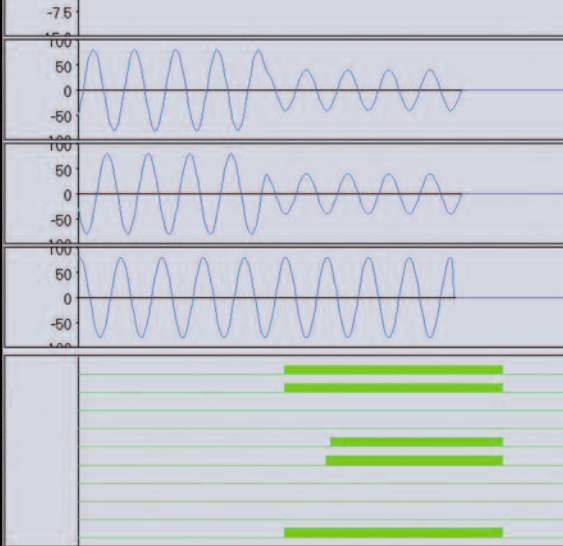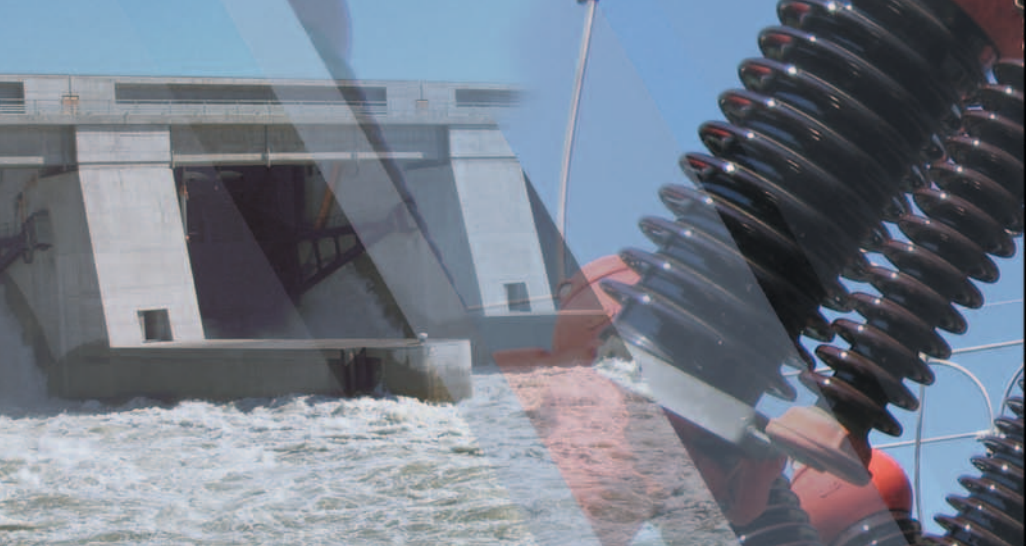
PROTECTION DEVICES AND COMBINED PROTECTION AND CONTROL DEVICES
WITH DISTANCE PROTECTION

sprecher automation

SPRECON-E-P DD..6-SERIES

INTRODUCTION

The distance protection acts as the main protection function. The devices include standardised hardware modules and firmware. They all provide protection functions of the same range. The series consists of:

- SPRECON-E-P DD..6-1 (Protection device)
- SPRECON-E-P DD..6-2 (One-box solutions with combined protection and control)

One-box solutions are distinguished from protection devices by additional control functions. Beside typical protection functions and measured-value collection, protection devices also feature control of circuit-breakers. The one-box solutions allow protection and measurement as well as control and monitoring of secondary systems.

The multifunctional SPRECON-E-P devices feature a clear separation of control and protection functions which allows either combined or separated operations of control and protection functions:

- Separated data models
- Separated control and protection firmware
- Separated control and protection configuration
- Separated passwords
- No testing of protection function at feeder nor primary circuit disconnection required on updating control parameters or firmware

RANGE OF FUNCTIONS

The devices are accentuated by a technologically fully developed and commercially optimised design. They allow realisations of sophisticated and compact solutions with clear economical benefits through highest possible flexibility and scalability.

Starting range (distance protection)
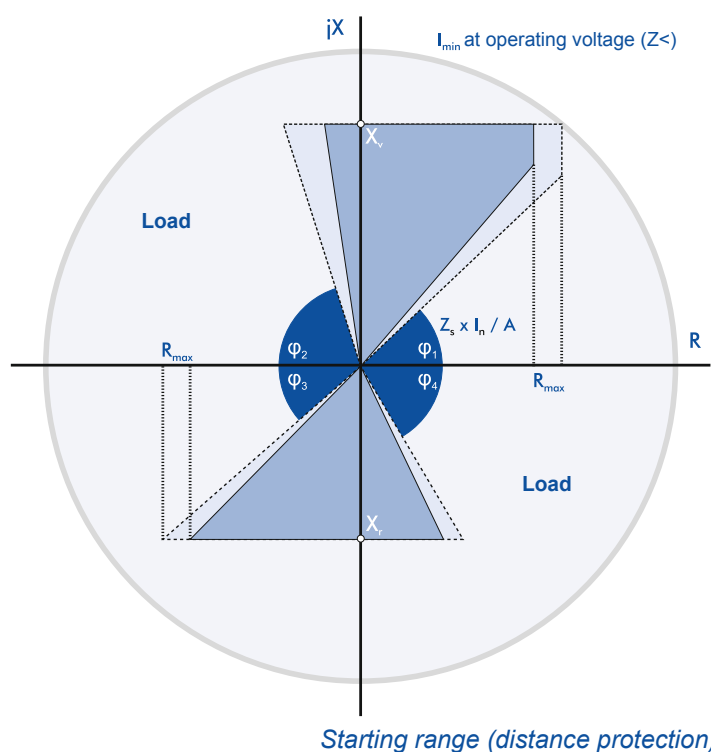
AREAS OF APPLICATION

The SPRECON-E-P DD..6 devices are multifunctional devices for protection, control and automation of energy stations. They can be applied as main protection units of overhead power transmission lines and cables of all grids and neutral-point connections at medium or high voltage levels.

Control of the circuit-breaker (connect/disconnect) acts as a 3-pole automatic reclosing procedure. The devices can be also used as back-up protection for overhead lines or cables. Furthermore, they can be applied as back-up protection for other primary systems such as transformers and busbars. The integrated starting methods with simultaneous impedance monitoring of the six measuring loops guarantee high selectivity and sensitivity for all loading cases.

The implementation of standard and proprietary protocols allows close collaboration with controlling systems of various manufacturers. All necessary protection and control functions are integrated in the devices.

Configuration

All functions can be configured separately. By separating protection configuration from control configuration, all different kinds of requirements of different applications can be met.

The protection-specific functions are separately configured or deactivated depending on the respective application. Irrelevant functions are hidden and inactive which allows simple and structured configuration of the devices.
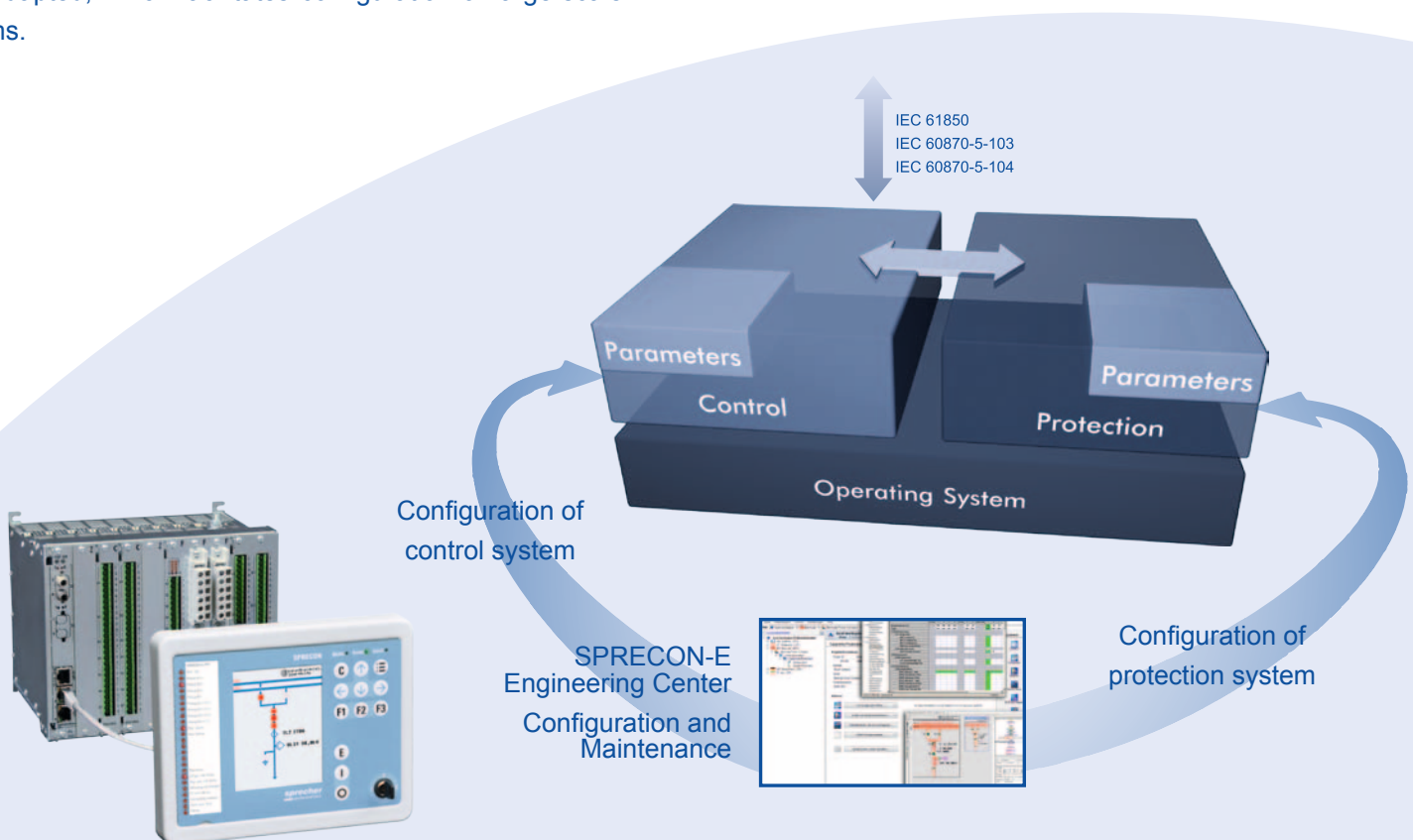
All configured bays are type-oriented stored in a database. They can be therefore copied and re-used as well as easily re-adapted, which facilitates configuration of large-scale systems.

Operating

In order to meet the requirements of efficient system management, all operations can be accomplished with the detachable HMI control panel. Hence, protection configurations can be locally carried out beside usage of the operating program "COMM-3".

All relevant information about processes and devices is shown on the full-graphical display of the control panel. Additionally, configurable LEDs are available for signalling.

Separated navigation keys allow clear user guidance through the various pages and submenus. Furthermore, they facilitate simple configuration of extensive protection and control functions.

IEC 61850
IEC 60870-5-103
IEC 60870-5-104

Parameters
Control

Parameters
Protection

Operating System

Configuration of
control system

SPRECON-E
Engineering Center
Configuration and
Maintenance

Configuration of
protection system

Principle of consequent separation of protection and control

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DIMENSIONS & WEIGHT
- Dimensions: 212x176x257mm (WxHxD) incl. connections
- Weight: < 6kg

GENERAL FUNCTIONS
- Remote maintenance and configuration
- Time synchronisation (DCF77, GPS, station & remote control)

COMMUNICATION
- IEC 60870-5-103/-104, IEC 61850
- RS232, RS422/485, fibre-optic, 10/100 Mbit Ethernet
- 2 additional optical Ethernet interfaces for redundant ring
- Wireless communication (external GSM or wireless modem)
- Integration of stand-alone devices via station bus (counter, metering devices, protection relays, AVR, Petersen coil controller, etc.)

IMPLEMENTED PROTECTION FUNCTIONS	Reference		Type		
	IEEE C37.2	IEC 61850-7-4	DD 6 $3x\ I_L$ $3x\ U$	DDE 6 $3x\ I_L$ $1x\ I_E$ $3x\ U$	DDEY 6 $3x\ I_L$ $1x\ I_E$ $3x\ U$ $1x\ U_{NE/Sync}$
Distance protection	21/21N	PDIS	x	x	x
Current starting I>>		(PTOC)	x	x	x
Voltage depended V-I starting		(PVOC)	x	x	x
Polygonal Z< starting			x	x	x
Distance zones/overreach zones			4 / 1	4 / 1	4 / 1
Direct. backup time/time limit (non direct.)			x / x	x / x	x / x
Short circuit direction decision	67	PTOC, RDIR	x	x	x
Switch on protection (SOTF, SOP)	50	PIOC	x	x	x
Power swing protection	68/68T	RPSB	x	x	x
Auto-reclosing (AR)	79	RREC	3-pole	3-pole	3-pole
Teleprotection (TP)	85	PSCH	x	x	x
Backup- and overcurrent protection			x	x	x
I_L> (backup-)DT/IDMT, four stages	50, 51	PIOC, PTOC	x	x	x
I_E> (backup)DT/IDMT, four stages	50N, 51N, 51Ns	PIOC, PTOC	x	x	x
Earth fault short circuit direction	67N	PTOC, RDIR	x	x	x
Phase-selective earth fault detection	64	PHIZ	x	x	x
Earth fault direction decision	67Ns	PSDE		x	x
Capture of ext. earth fault direction annunciation		(PTEF, PSDE)	x	x	x
Current annunciation stages (2x $I_{L>an}$, 2x $I_{E>an}$)			x	x	x
Inrush restraint		PHAR	x	x	x
Overvoltage time protection (U>, U_{NE}>), two stages	59, 59N	PTOV	x	x	x
Undervoltage time protection (U<), two stages	27	PTUV	x	x	x
Frequency protection (f<four stages, f>two stages)	81	PTUF, PTOF	x	x	x
Directional power protection (P>, Q,>), 2x2 stages	32	PDOP, (PDUP)	x	x	x
Reactive power- undervoltage protection (Q-V<)		(PDOP, PTUV)	x	x	x
Negative sequence protection(I_{neg})	46	PTOC	x	x	x
Overload protection	49	PTTR	x	x	x
Temperature protection	49	STMP	Option	Option	Option
Reclosing lockout	86	PMRI	x	x	x
Circuit breaker failure protection (CBF)	50BF	PTOC, RBRF	x	x	x
CB-TRIP by an external signal		(PTRC)	x	x	x
Automatic synchronizer	25	RSYN			x
Fault locator (FL)	21FL	RFLO	x	x	x
Phase-sequence reversal			x	x	x
Pulse shaper stage (programmable logic)			x	x	x
Trip circuit supervision	74TC		x	x	x
Parameter sets			4	4	4
Logic + time stages for optocoupler inputs			x	x	x
Virtual binary inputs/control inputs			15/15	15/15	15/15
Logic + hold time for output relays			x	x	x
Measurands, short report			x	x	x
Event logging, non-volatile		RDRE	x	x	x
Disturbance date recording, non-volatile		RADR, RBDR	x	x	x
Statistics			x	x	x
Measurand checks, self supervision			x	x	x
Assistance for test and putting into operation			x	x	x

ADDITIONAL PROTECTION FUNCTIONS
- Phase preference for double earth faults
- Pulse shaper stages
- Separation of protection data from control data
- Nominal current selection (1/5 A) via terminal connection
- Settings via control panel and PC through menu-assisted plain-text messaging

CONTROL FUNCTIONS
- Control and monitoring of switching devices and process elements
- Power output with high making/breaking capacity (option)
- Command output either directly or by SBO (select before operate)
- Control of transformer tap changers or Petersen coils
- Configurable automatic functions
- Switching device interlocking
- Group-assigned indication and measured-value blocking
- Threshold value monitoring
- Maximum demand value calculation
- Maximum value calculation (non-return pointer)
- Configurable transmission modes for measured values
- Metered value capturing
- Operating hours counter, switching operations counter
- Event recording

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