

SPRECON®-E-P DD..6-SERIES

PROTECTION DEVICES AND COMBINED PROTECTION AND CONTROL DEVICES WITH DISTANCE PROTECTION





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)

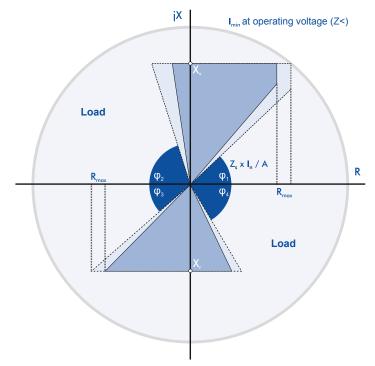
One-box solutions are distinguished from protection devices by additional control functions. Beside typical protection functions and measured-value collection, protection devices also feature control of circuit-breakers. The one-box solutions allow protection and measurement as well as control and monitoring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

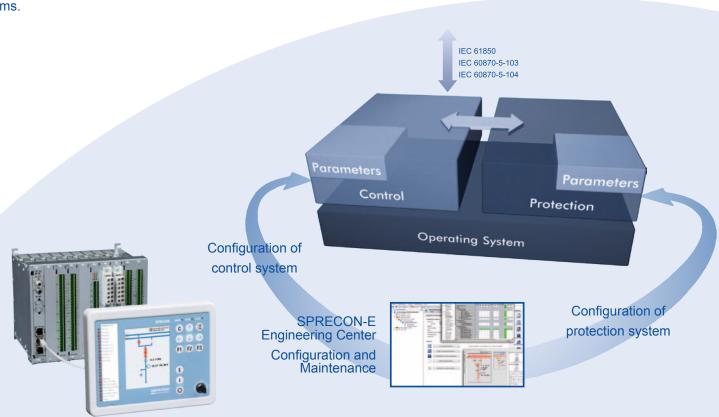
All configured bays are type-oriented stored in a database. They can be therefore copied and re-used as well as easily re-adapted, which facilitates configuration of large-scale systems.

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.



SPRECON-E-P DD..6 - TECHNICAL DATA (EXCERPT)

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		Туре		
Distance protection	IMPLEMENTED PROTECTION FUNCTIONS	IEEE C37.2		3x I_	3x I _L 1x I _E	3x I _L 1x I _E 3x U
Voltage depended V-I starting	Distance protection	21/21N	PDIS	х	х	
Polygonal Z< starting	Current starting I>>		(PTOC)	х	х	х
Distance zones/overreach zones	Voltage depended V-I starting		(PVOC)	х	х	х
Direct. backup time/time limit (non direct.)	Polygonal Z< starting			х	х	х
Switch circuit direction decision	Distance zones/overreach zones			4 / 1	4/1	4/1
Switch on protection (SOTF, SOP) 50	Direct. backup time/time limit (non direct.)			x / x	x / x	x / x
Power swing protection	Short circuit direction decision	67	PTOC, RDIR	х	х	х
Auto-reclosing (AR)	Switch on protection (SOTF, SOP)	50	PIOC	х	х	х
Teleprotection (TP)	Power swing protection	68/68T	RPSB	х	х	х
Backup- and overcurrent protection	Auto-reclosing (AR)	79	RREC	3-pole	3-pole	3-pole
(backup-)DT/IDMT, four stages 50, 51 PIOC, PTOC x x x x x x x x x	Teleprotection (TP)	85	PSCH	х	х	х
L_> (backup) DT/IDMT, four stages 50N, 51N, 51Ns PIOC, PTOC x x x x	Backup- and overcurrent protection			х	х	х
Earth fault short circuit direction	I _L > (backup-)DT/IDMT, four stages	50, 51	PIOC, PTOC	х	х	х
Phase-selective earth fault detection	I _F > (backup)DT/IDMT, four stages	50N, 51N, 51Ns	PIOC, PTOC	х	х	х
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 _{Lum} , 2x I _{Dum}) x x x x Inrush restraint PHAR x x x Overvoltage time protection (U<), U _{ms} >, two stages 59, 59N PTOV x x Undervoltage time protection (IV Ivo stages 27 PTUV x x Undervoltage time protection (Ifour stages, fetwo stages) 81 PTUF, PTOF x x x Frequency protection (Four stages, fetwo stages) 81 PTUF, PTOF x x x Directional power protection (Four stages, fetwo stages) 81 PTUF, PTOF x x x Reactive power- undervoltage protection (Pst.), Q-2, 2x2 stages 32 PDOP, (PDUP) x x x Reactive power- undervoltage protection (Q-V (PDOP, PTUV) x x x Reactive power- undervoltage protection (Q-V (PDOP, PTUV)	Earth fault short circuit direction	67N	PTOC, RDIR	х	х	х
Capture of ext. earth fault direction annunciation (PTEF, PSDE)	Phase-selective earth fault detection	64	PHIZ	Х	х	х
Current annunciation stages (2x I _{Chan} , 2x I _{Chan}) Inrush restraint Overvoltage time protection (U-), U _{NE} -), two stages 59, 59N PTOV X X X X Undervoltage time protection (U-), Uno stages 27 PTUV X X X Frequency protection (For, Q, >), 2x2 stages B1 PTUF, PTOF X X X X Directional power protection (Q-V-) Directional power protection (Q-V-) Reactive power- undervoltage protection (Q-V-) Reactive power- undervoltage protection (Q-V-) Report (PDOP, PTUV) X X X X Coverload protection 49 PTTR X X X Coverload protection 49 STMP Option Option Reclosing lockout 86 PMRI X X X CB-TRIP by an external signal (PTRC) X X X CB-TRIP by an external signal (PTRC) X X X CB-TRIP by an external signal (PTRC) X X X CPhase-sequence reversal Pulse shaper stage (programmable logic) Trip circuit supervision 74TC Rarameter sets Logic + fine stages for optocoupler inputs Virtual binary inputs/control inputs Logic + hold time for output relays Measurands, short report Event logging, non-volatile RADR, RBDR X X X X X X Measurand checks, self supervision	Earth fault direction decision	67Ns	PSDE		х	х
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Inrush restraint	Current annunciation stages (2x I _{1 san} , 2x I _{Esan})			Х	х	х
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Directional power protection (P>, Q,>), 2x2 stages 32 PDOP, (PDUP) x x Reactive power- undervoltage protection (Q-V<)	Undervoltage time protection (U<), two stages	27	PTUV	х	х	х
Reactive power- undervoltage protection (Q-V<) POPP, PTUV) X	Frequency protection (f <four f="" stages,="">two stages)</four>	81	PTUF, PTOF	х	х	х
Negative sequence protection(Ineg)	Directional power protection (P>, Q,>), 2x2 stages	32	PDOP, (PDUP)	х	х	х
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Overload protection 49 PTTR 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 x Automatic synchronizer 25 RSYN x x Fault locator (FL) 21FL RFLO x x x Phase-sequence reversal x x x x x x x Pulse shaper stage (programmable logic) x	Negative sequence protection(I _{neg})	46	PTOC	х	х	х
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Disturbance date recording, non-volatile RADR, RBDR x x x x Statistics x x x x x x x x x x x x x x x x x x x	Measurands, short report			x	х	х
Statistics x x x Measurand checks, self supervision x x x	Event logging, non-volatile		RDRE	х	х	х
Measurand checks, self supervision x x x	Disturbance date recording, non-volatile		RADR, RBDR	х	х	х
	Statistics			х	х	х
Assistance for test and putting into operation x x x	Measurand checks, self supervision			x	х	х
	Assistance for test and putting into operation			х	х	х

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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