

SIPROTEC 5 Devices and Fields of Application

Overcurrent and Feeder Protection – SIPROTEC 7SJ81

ANSI	Function	Abbr.	Available	Application Templates	
				1	2
	Protection functions for 3-pole tripping	3-pole	■	■	■
25	Synchrocheck, synchronization function	Sync	■		
27	Undervoltage protection: "3-phase" or "positive-sequence system V1"	V<	■		
27R, 59R	Voltage change protection (starting with V8.30)	dV/dt	■		
	Undervoltage-controlled reactive power protection	Q>N<	■		
32, 37	Power protection active/reactive power	P<>, Q<>	■		
37	Undercurrent	I<	■		
38	Temperature supervision	θ>	■		
46	Negative-sequence system overcurrent protection	I2>	■		
47	Overvoltage protection, negative-sequence system	V2>	■		
49	Thermal overload protection	θ, I²t	■		
50/51 TD	Overcurrent protection, phases	I>	■	■	■
	Instantaneous tripping at switch onto fault	SOTF	■		
50HS	Instantaneous high-current tripping	I>>>	■		
50N/ 51N TD	Overcurrent protection, ground	IN>	■	■	■
50N/ 51N TD	Overcurrent protection, 1-phase	IN>	■		
50 Ns/ 51Ns	Sensitive ground-fault detection for grounded arc suppression coils and isolated power systems including a) 3I0> b) admittance Y0>	INs>	■		
	Intermittent ground-fault protection	IIE>	■		
50BF	Circuit-breaker failure protection, 3-pole	CBFP	■		
59, 59N	Overvoltage protection: "3-phase" or "zero-sequence system V0" or "positive-sequence system V1"	V>	■		
67	Directional overcurrent protection, phases	I>, ∠(V, I)	■		
67N	Directional overcurrent protection, ground	IN>, ∠(V, I)	■		
67 Ns	Sensitive ground-fault detection for grounded arc suppression coils and isolated power systems including a) 3I0> b) V0>, c) cos/sine Phi, d) transient ground fault, e) Phi(V, I), f) admittance		■		
	Directional Intermittent Ground-Fault Protection	IIEdir>	■		
74TC	Trip-circuit supervision		■		
79	Automatic reclosing, 3-pole	AREC	■		
81	Frequency protection: "f"> or "f"< or "df/dt"	f<>; df/dt<>	■		
	Vector-jump protection	Δφ>	■		
86	Lockout		■	■	■
FL	Fault Locator, single-side	FL-one	■		
AFD	Arc protection (only with plug-in module ARC-CD-3FO)		■		
	Measured values, standard		■	■	■
	Switching statistics counter		■		
	PQ – Basic measured values: THD (Total Harmonic Distortion) and harmonic component (starting with V8.01) and THD voltage average values (starting with V8.40)		■		
	PQ – Basic measured values: Voltage unbalance (starting with V8.40)		■		
	PQ – Basic measured values: Voltage changes – monitoring of voltage dips, overvoltages and voltage interruptions (starting with V8.40)		■		

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ANSI	Function	Abbr.	Available	Application Templates	
				1	2
	PQ – Basic measured values: TDD - Total Demand Distortion (starting with V8.40)		■		
	CFC (standard, control)		■	■	■
	CFC arithmetic		■		
	Circuit-breaker wear monitoring	$\Sigma I_x, I^2t, 2P$	■		
	Switching sequence function		■		
	Inrush-current detection		■	■	■
	External trip initiation		■		
	Control		■	■	■
	1 circuit breaker object (number cannot be expanded)		■		
	3 disconnect/grounding conductor objects (number cannot be expanded)		■		
	Fault recording of analog and binary signals		■	■	■
	Monitoring		■	■	■
	Cyber security: Role-Based Access Control (from V7.8)		■		
	Temperature recording via communication protocol		■		
	Cyber security: Authenticated network access using IEEE 802.1X (starting from V8.3)		■		
Function point class:				0	0
The configuration and function point class for your application can be determined in the SIPROTEC 5 order configurator at www.siemens.com/siprotec .					

2.4

Table 2.4/1 SIPROTEC 7SJ81 - Functions, Application Templates

- (1) Non-directional definite-time overcurrent protection/inverse-time overcurrent protection (4*I)
- (2) Non-directional definite-time overcurrent protection/inverse-time overcurrent protection (4*I, 4*V)

SIPROTEC 5 Devices and Fields of Application

Overcurrent and Feeder Protection – SIPROTEC 7SJ81



Standard Variants for SIPROTEC 7SJ81		
AI1	1/3, 11 BI, 9 BO, 4 I	
	Housing width 1/3 x 19" 11 binary inputs 9 binary outputs (1 life contact, 8 standard) 4 current-transformer inputs Contains the following modules: base module with PS101 and IO101	
AI2	1/3, 18 BI, 14 BO, 4 I	
	Housing width 1/3 x 19" 16 binary inputs 11 binary outputs (1 life contact, 10 standard) 4 current-transformer inputs Contains the following modules: base module with IO101, PS101, IO112	
AI3	1/3, 11 BI, 9 BO, 4 I, 4V	
	Housing width 1/3 x 19" 11 binary inputs 9 binary outputs (1 life contact, 8 standard) 4 current-transformer inputs 4 voltage-transformer inputs Contains the following modules: base module with IO102 and PS101	
AI4	1/3, 16 BI, 11 BO, 4 I, 4 V	
	Housing width 1/3 x 19" 10 binary inputs 14 binary outputs (1 life contact, 13 standard) 4 current-transformer inputs 4 voltage-transformer inputs Contains the following modules: base module with IO102, PS101, and IO113	

Table 2.4/2 Standard Variants for SIPROTEC 7SJ81

You can find the technical data of the devices in the manual www.siemens.com/siprotec.

7SJ81 Overcurrent-Time Protection - Overview Function points calculation

(P1J613275)

Functions Free of Charge

ANSI	Function	Abbr.	Included
	Protection functions for 3-pole tripping	3-pole	✓
37	Undercurrent	I<	✓
38	Temperature supervision	θ>	✓
46	Negative-sequence overcurrent protection	I2>	✓
49	Thermal overload protection	θ, I ² t	✓
	Instantaneous tripping at switch onto fault	SOTF	✓
50HS	Instantaneous high-current tripping	I>>>	✓
50N/ 51N TD	Overcurrent protection, ground	IN>	✓
50N/ 51N TD	Overcurrent protection, 1-phase	IN>	✓
50Ns/ 51Ns	Sensitive ground-current detection for systems with resonant or isolated neutral systems incl. a) 3I0>, b) admittance Y0>	INs>	✓
74TC	Trip-circuit supervision	TCS	✓
86	Lockout		✓
AFD	Arc-protection (only with plug-in module ARC-CD-3FO)		5 X ✓
	Measured values - standard		✓
	Switching statistic counters		✓
	PQ-Basic measured values: THD (Total Harmonic Distortion) and harmonics (from V8.01) THD voltage aggregation values (from V8.40)		✓
	CFC (Standard, control)		✓
	Switching sequences function		20 X ✓
	Inrush current detection		✓
	External trip initiation		✓

	Control		✓
	1 Circuit-breaker object (Qty. not extendable)		✓
	Disconnecter/Grounding switch		3 X ✓
	3 Disconnecter/Gnd. switch objects (Qty. not extendable)		✓
	Monitoring and supervision		✓
	Fault recording of analog and binary signals		✓
	Temperature acquisition via communication protocol		✓

Functions with Costs

ANSI	Function	Abbr.	Included	Quantity	Value	Points
25	Synchrocheck, synchronization function	Sync		0	50	0
27	Undervoltage protection: "3-phase" or "positive-sequence system V1"	V<		0	5	0
27R, 59R	Rate-of-voltage-change protection (from V8.30)	dV/dt		0	5	0
	Undervoltage-controlled reactive power protection	Q>/V<		0	15	0
32, 37	Power protection active/reactive power	P<>, Q<>		0	10	0
47	Overvoltage protection, negative-sequence system	V2>		0	5	0
50/51 TD	Overcurrent protection, phases	I>	2 X ✓	2	30	0
	Intermittent ground-fault protection	lie>		0	20	0
50BF	Circuit-breaker failure protection, 3-pole	CBFP		0	5	0
59, 59N	Overvoltage protection: "3-phase" or "zero-sequence system V0"	V>		0	5	0
67	Directional overcurrent protection, phases			0	15	0
67N	Directional overcurrent protection, ground			0	15	0

67Ns	Dir. sensitive ground-fault detection for systems with resonant or isolated neutral incl. a) $3I_0>$, b) $V_0>$, c) Cos-/SinPhi , d) Transient ground-fault fct., e) $\text{Phi}(V,I)$, f) admittance			0	30	0
	Directional intermittent ground-fault protection	lie dir>		0	20	0
79	Automatic reclosing, 3-pole	AR		0	35	0
81	Frequency protection: "f>" or "f<" or "df/dt"	f<>; df/dt<>		0	5	0
	Vector-jump protection	$\Delta\phi>$		0	20	0
FL	Fault locator, single-sided	FL-one		0	25	0
	PQ-Basic measured values: Voltage unbalance (from V8.40)			0	20	0
	PQ-Basic measured values: Voltage variations - voltage dips, swells and interruptions (from V8.40)			0	30	0
	PQ-Basic measured values: TDD - Total Demand Distortion (from V8.40)			0	10	0
	CFC arithmetic			0	80	0
	Circuit-breaker monitoring (from V9.20)	ΣI_x , I^2t , $2P$, tO , tC , pole scatter, discrepancy		0	10	0
	Disconnecter monitoring (from V9.50)	tO , tC		0	5	0
	Multiplexing of protection interface			0	50	0
SSR	Slow-scan recorder (Mod.: from V8.80, Non-Mod.: from V9.40)	SSR	1 X ✓	1	40	0
CR	Continuous recorder (Mod.: from V9.20, Non-Mod.: from V9.40)	CR	1 X ✓	1	20	0
	Cyber Security: Role-Based Access Control (from V7.8)			0	25	0
	Cyber Security: IEEE 802.1x based network authentication (from V8.3)			0	10	0
27-CEI	Region Italy: undervoltage protection according to the CEI 0-16 standard (from V9.50)	V<		0	5	0

59-CEI	Region Italy: overvoltage protection according to the CEI 0-16 standard (from V9.50)	V>		0	5	0
81-CEI	Region Italy: frequency protection according to the CEI 0-16 standard (from V9.50)	f<>		0	10	0
Total:						0