aRF

PROTECTION SERIES

PDS 320

Protection Dual Supply Relay

PSS 212

Self-Powered Feeder Protection Relay

PSS 213

Self Supply Feeder Protection Relay

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Engineered to React. Designed to Endure.

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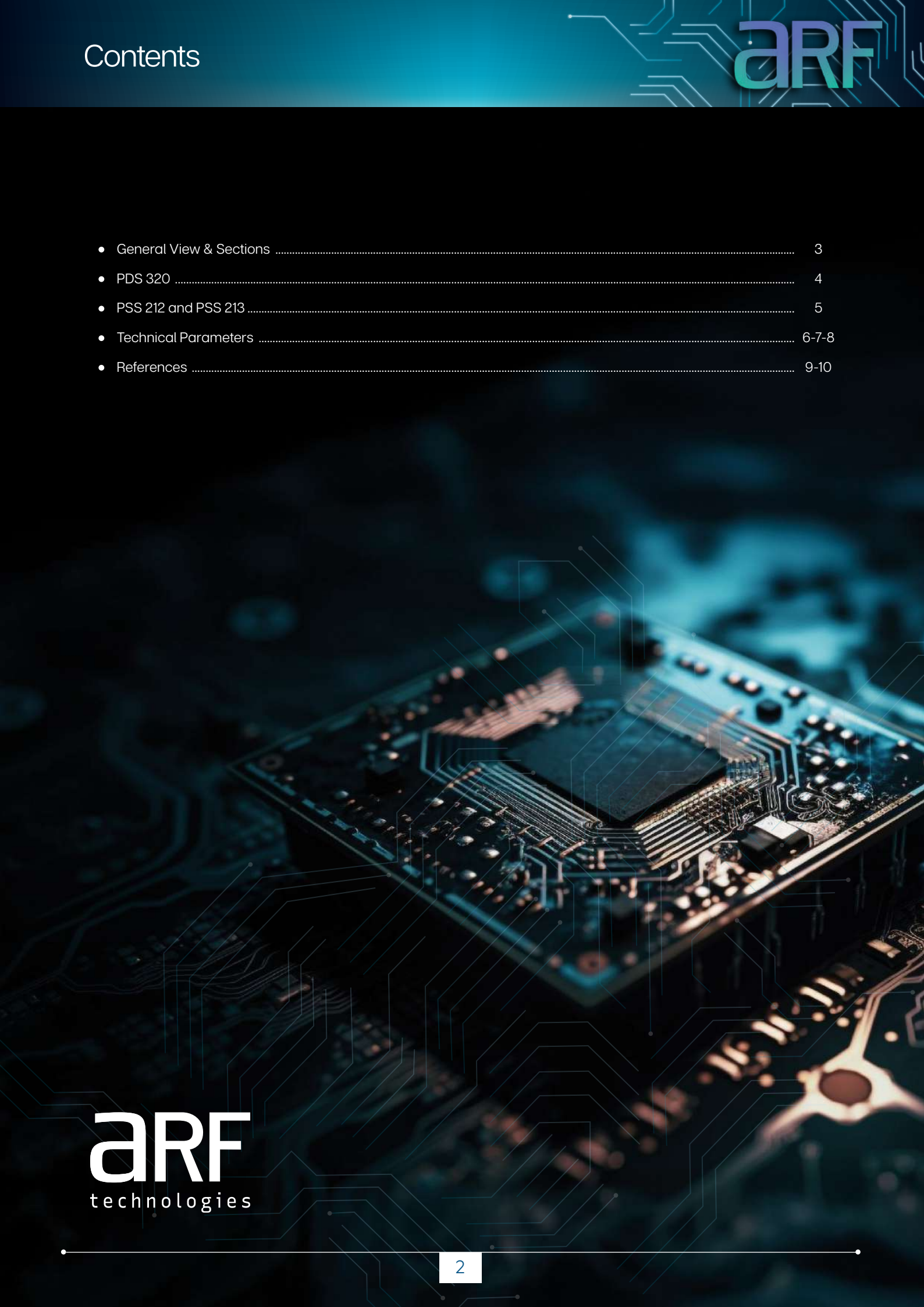
Contents



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User Interface

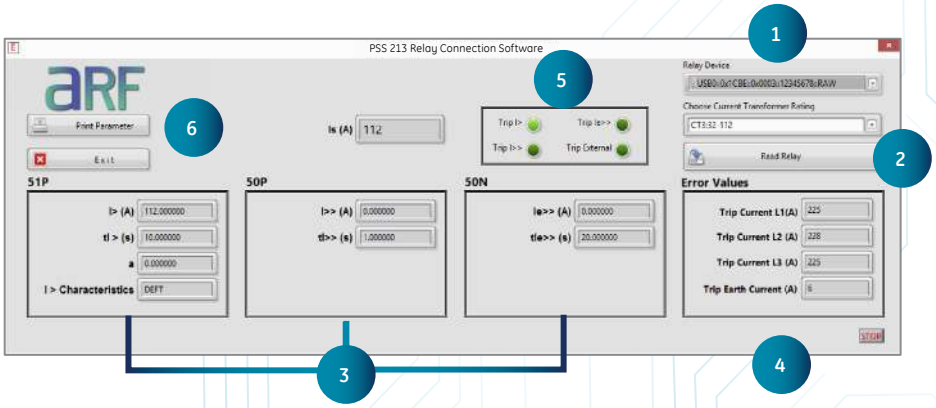
PSS 212-213 and PDS 320 has three phase current measuring analog inputs slots located at the bottom of the panel, configured to work with the chosen specific CT rating. The rating and characteristic of the CTs ratio are chosen according to the desired system configuration. Activation of the relay is signaled by “Power” LED located on the front panel.

Parameter settings are done via using HMI keypad & LCD screen

Cumulative current formation for neutral current detection is computed using the three-phase current input information through root mean square (RMS) summation.

230 VAC input can be connected for remote tripping PSS 212-213 and PDS 320, realized through the electric impulse output after maximum 1s, either with or without an activating supply power through the phase inputs. The remote trip (RT) line should not be activated for more than 3 seconds in consecutive order.

A mechanical flag indicator can be connected for visually monitoring the occurrence of trip conditions.



1. Com Port for Serial Connection
2. Read Relay Button
   a. Gathers the latest information from the relay
3. Parameter Setting Monitoring
4. Primary Current Values @Trip
5. Status Indicators of Trip
6. Print Parameters Button
   a. Prints the shown screen

Software Interface

In addition to the physical interface, PSS 213 & PDS 320 has a computer interface which one could connect through the USB port to monitor settings as well as the current values and the activated protection function of the latest trip.

PDS 320

Protection Dual Supply Relay

Key Features

- Controllable and monitorable via integrated HMI: Allows local monitoring and configuration through the built-in human-machine interface, eliminating the need for external tools.
- Expanded position functions for enhanced system control: Supports advanced operating scenarios by enabling flexible logic and control configurations.
- Increased number of I/O ports for broader integration: Offers additional digital and analog inputs/outputs to accommodate a wide range of monitoring and control needs.
- Supports IEC 60870-5-103 and Modbus RTU protocols via RS485: Ensures seamless integration into existing SCADA and automation systems through standardized communication protocols.
- Multiple supply options for increased reliability: Operates via self-supply or external auxiliary power (20–130V) and Externally powered by battery for configuration access and event log retention during power outages.

PSS 212

Self-Powered Feeder Protection Relay

PSS 213

Self Supply Feeder Protection Relay

Key Features

- Eliminates the need for external battery and its subsequent operational maintenance costs by harvesting its power through the line it protects.
- Manual adjustable protection functions through easy interface: Appropriate protection function is settable either with DIP switches or LCD screen on PSS 212 & PSS 213 respectfully.
- Robust design with metallic enclosure to endure high electromagnetic compatibility levels and environmental conditions for harsh remote site conditions
- Wide protection function ranges and flexible adjusting steps with separate adjustable tripping and delay times for various protection functions.
- Remote trip input: Electrically isolated remote trip input allowing tripping the circuit remotely.
- Impulse output for tripping coil striker and flag indicator: Applies 50ms pulses to the tripping coil of the feeder protecting medium voltage circuit breaker and flag indicator.

Technical Parameters

PROTECTION FUNCTIONS

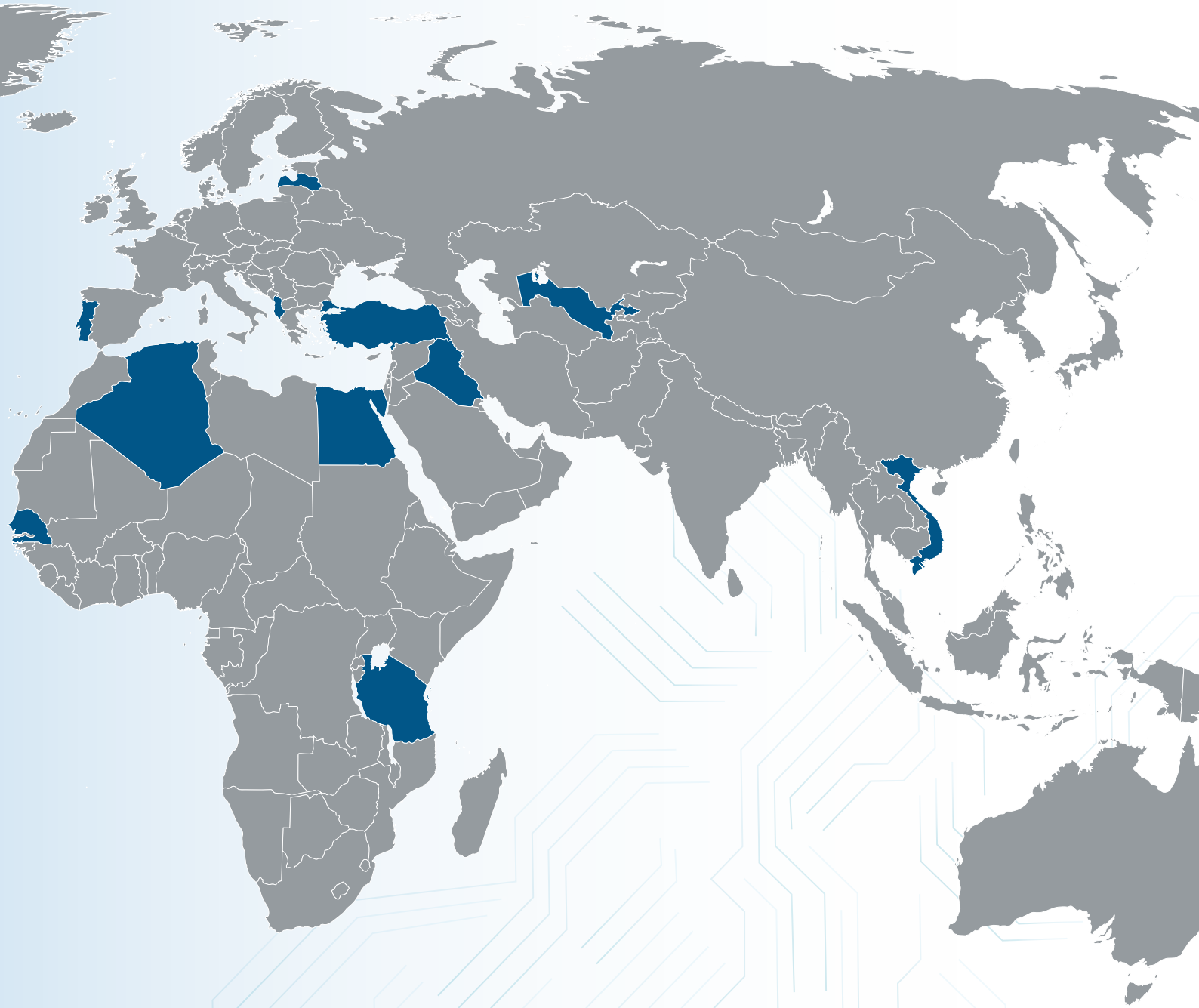
Type	PSS 212	PSS 213
Function 50P I>>	✓	✓
Function 50N IN>>	✓	✓
Function 51P I>	✓	✓
Function 51N IN>	–	✓
Function 51Q I2>	–	✓
Function 49 (Thermal Overload)	–	✓
Function 46 (Phase Unbalance)	–	✓
Function Ipeak Ipeak>>	–	✓
Function IH2	–	✓
Setting Group	1	2
Current Measurement	True RMS	True RMS or DFT (selectable)
Event Recording	Last Fault Record	Up to 100 Event Records
Disturbance Fault Recording	–	10 Fault Records
Inputs	1 External (Remote) Trip Input: 230 V AC ± 20%	1 External (Remote) Trip Input: 230 V AC ± 20%
Outputs	1 Striker Tripping Coil Output 24 V DC, min. 55 mJ Trip impulse duration is 20 ms 1 Flag Indicator Output 24 V DC, min. 10 mJ Trip impulse duration is 20 ms	1 Striker Tripping Coil Output 24 V DC, min. 55 mJ Trip impulse duration is 20 ms 1 Flag Indicator Output 24 V DC, min. 10 mJ Trip impulse duration is 20 ms
Human Machine Interface	4×8-Position DIP Switches	16x2 Character LCD & 9-keys Keypad
Front USB Port	USB Mini-B: Read-only serial communication with desktop application for monitoring only	USB Mini-B: Serial communication with desktop application for configuration and monitoring
Nominal Frequency	50 or 60 Hz	50 or 60 Hz
Self Powering from Current	Three Phase self-power level: 0.35 × Is min Single Phase self-power level: 0.45 × Is min	Three Phase self-power level: 0.35 × Is min Single Phase self-power level: 0.45 × Is min
Transformer Rating	8 to 896 A depending on specific CT model	8 to 896 A depending on specific CT model
Battery Supply	Standard Powerbank	Standard Powerbank
Operating Temperature	-40 to 70°C	-40 to 70°C
Storage Temperature	-40 to 85°C	-40 to 85°C
Relative Humidity	0,93	0,93

PROTECTION FUNCTIONS

Type	PDS 320	PSS 212 / PSS 213
Function 50P **I>>**	• Function enable: No/Yes (Trip Output) • Current tap: 0.35 to 20.00 x Is (step 0.01 x Is) • Time delay: 0.00 to 600.00 s (step 0.01 s) • Activation level: 100%	• Deactivation level: 95% • Timing accuracy: ±40 ms or ±5% • Instantaneous Deactivation
Function 50N **IN>>**	• Function enable: No/Yes (Trip Output) • Current tap: 0.20 to 20.00 x Is (step 0.01 x Is) • Time delay: 0.00 to 600.00 s (step 0.01 s) • Activation level: 100%	• Deactivation level: 95% • Timing accuracy: ±40 ms or ±5% • Instantaneous Deactivation
Function 50G **IG>>**	• Function enable: No/Yes (Trip Output) • Current tap: 0.20 to 20.00 x Is (step 0.01 x Is) • Time delay: 0.00 to 600.00 s (step 0.01 s) • Activation level: 100% • Deactivation level: 95% • Timing accuracy: ±40 ms or ±5% • Instantaneous Deactivation	Not Available
Function 51P **I>**	• Function enable: No/Yes (Trip Output) • Curve Type: IEC 60255-151 Curves and Special Curves • Curve Type: Definite Time, IEC Inverse, IEC Very Inverse, IEC Extremely Inverse, IEC Long Time Inverse, Rapid Inverse (RI), Full Range (FR) Fuse, High Voltage Fuse (HV) • Time dial (TMS or Time Factor): 0.05 to 10.00 (step 0.01) • Time Delay (only for Definite Time): 0.00 to 600.00 s (step 0.01 s)	• Current tap: 0.35 to 2.50 x Is (step 0.01 x Is) • Activation level: 100% • Deactivation level: 95% • Timing accuracy: ±40 ms or ±5%
Function 51N **IN>**	• Function enable: No/Yes (Trip Output) • Curve Type: IEC 60255-151 Curves and Special Curves • Curve Type: Definite Time, IEC Inverse, IEC Very Inverse, IEC Extremely Inverse, IEC Long Time Inverse, Rapid Inverse (RI), Full Range (FR) Fuse, High Voltage Fuse (HV) • Time dial (TMS or Time Factor): 0.05 to 10.00 (step 0.01) • Time Delay (only for Definite Time): 0.00 to 600.00 s (step 0.01 s)	• Current tap: 0.20 to 2.50 x Is (step 0.01 x Is) • Activation level: 100% • Deactivation level: 95% • Timing accuracy: ±40 ms or ±5%
Function 51G **IG>**	• Function enable: No/Yes (Trip Output) • Curve Type: IEC 60255-151 Curves and Special Curves • Curve Type: Definite Time, IEC Inverse, IEC Very Inverse, IEC Extremely Inverse, IEC Long Time Inverse, Rapid Inverse (RI), Full Range (FR) Fuse, High Voltage Fuse (HV) • Time dial (TMS or Time Factor): 0.05 to 10.00 (step 0.01) • Time Delay (only for Definite Time): 0.00 to 600.00 s (step 0.01 s) • Current tap: 0.05 to 2.50 x Is (step 0.01 x Is) • Activation level: 100% • Deactivation level: 95% • Timing accuracy: ±40 ms or ±5%	Not Available
Function 51Q **I2>**	• Function enable: No/Yes (Trip Output) • Curve Type: IEC 60255-151 Curves and Special Curves • Curve Type: Definite Time, IEC Inverse, IEC Very Inverse, IEC Extremely Inverse, IEC Long Time Inverse, Rapid Inverse (RI), Full Range (FR) Fuse, High Voltage Fuse (HV) • Time dial (TMS or Time Factor): 0.05 to 10.00 (step 0.01) • Time Delay (only for Definite Time): 0.00 to 600.00 s (step 0.01 s)	• Current tap: 0.20 to 2.50 x Is (step 0.01 x Is) • Activation level: 100% • Deactivation level: 95% • Timing accuracy: ±40 ms or ±5%
Function 49 **(Thermal Overload)**	• Function enable: No/Yes (Trip Output) • Curve Type: IEC 60255-151 Curves and Special Curves • Curve Type: Definite Time, IEC Inverse, IEC Very Inverse, IEC Extremely Inverse, • IEC Long Time Inverse, Rapid Inverse (RI), Full Range (FR) Fuse, High Voltage Fuse (HV)	• Time dial (TMS or Time Factor): 0.05 to 10.00 (step 0.01) • Time Delay (only for Definite Time): 0.00 to 600.00 s (step 0.01 s)
Function 46 **(Phase Unbalance)**	• Function enable: No/Yes (Alarm Output) • Current tap: 5 to 200 % (step 1%) • Time delay: 0.00 to 600.00 s (step 0.01 s)	• Instantenous deactivation • Timing accuracy: ±40 ms or 5%
Function CLP	• Function enable: No/Yes • Pickup Time: 0.00 to 600.00 s (step 0.01 s) • Drop out Time: 0.00 to 600.00 s (step 0.01 s) • (Phase-Ground) Instantenous Overcurrent Multiplier: 1.00 to 6.00 (step 0.01) • (Phase-Ground) Time Delayed Overcurrent Multiplier: 1.00 to 6.00 (step 0.01) • Pickup/Dropoff Level: 0.04 × In	Not Available

Technical Parameters

	Type	PDS 320	PSS 212 / PSS 213
PROTECTION FUNCTIONS	**Function Ipeak** **Ipeak>>**	• Function enable: No/Yes (Trip Output) • Current tap: 0.35 to 20.00 x Is (step 0.01 x Is) • Time delay: 0.00 to 600.00 min (step 0.01 s) • Activation level: 100%	• Deactivation level: 95% • Timing accuracy: ±40 ms or ±5% • Instantaneous Deactivation
	Function SOTF	• Function enable: No/Yes (Trip Output) • Time delay: 0.00 to 600.00 s (step 0.01 s) • Activating Condition: Breaker Position or Close Command • Drop out Time: 0.00 to 600.00 s (step 0.01 s) • Trigger Mode: Selectable from pickups	Not Available
	Setting Group	2 Setting Groups	
MONITORING and CONTROL FUNCTIONS	**Function 50BF**	• Function enable: No/Yes (Alarm Output) • Time delay: 0.00 to 600.00 s (step 0.01 s) • Open breaker activation threshold: 8% In • Open breaker reset threshold: 4% In	Not Available
	Function TCS	• Function enable: No/Yes (Alarm Output) • Time delay: 0.00 to 600.00 s (step 0.01 s) • Single-input or dual-input mode selection	Not Available
	Function IH2	• Function enable: No/Yes • Current tap: 5 to 100 % (step 1%) • Minimum fundamental current level: 0.35 to 1.00 x Is (step 0.01 x Is)	
MEASUREMENTS and RECORDINGS	**Current Measurement**	• For Phase Currents: True RMS or DFT (Selectable) • For Neutral Current: Measured from Earth Current Inputs and Calculated from • Three Phase Currents	• For Phase Currents: True RMS or DFT (Selectable) • For Neutral Current: Measured from Earth Current Inputs and Calculated from • Three Phase Currents
	Current Accuracy	• For Phase Currents: <5% • For Neutral Current: 2 × Phase Current Accuracy	
	Sampling	• 5 kHz (100 samples per cycle)	
	Event Recording	• Up to 100 Event Records	
	Disturbance Fault Recording	• 10 Fault Records • 100 samples/cycle	• 10 Fault Records • 20 samples/cycle
INPUTS and OUTPUTS	**Inputs**	• 1 External (Remote) Trip Input: 230 V AC ± 20% • 2 Configurable Digital Inputs: 20-110 V AC/DC	Not Available
	Outputs	• 1 Striker Tripping Coil Output - 24 V DC, min. 55 mJ - Trip impulse duration is 20 ms • 1 Flag Indicator Output - 24 V DC, min. 10 mJ - Trip impulse duration is 20 ms	
		• 3 Digital Outputs: 2 Configurable Digital Outputs, 1 Dedicated Watchdog Output	Not Available
COMMUNICATION INTERFACES	**Human Machine Interface**	• Character LCD (16×2), 9-keys Keypad	
	Front USB Port	• USB Mini-B • Serial communication with desktop application for configuration and monitoring	
	RS 485 Port	• Modbus RTU, IEC 60870-5-103	Not Available
RATINGS	**Nominal Frequency**	• 50 or 60 Hz	
	Self Powering from Current	• Three Phase self-power level: 0.35 × Is min • Single Phase self-power level: 0.45 × Is min	
	External Power Supply	• 20 -150 V AC/DC	Not Available
	Transformer Rating	• 8 to 896 A depending on specific CT model	
	Battery Supply	• Standard Powerbank	
		• Internal Commissioning Battery (optional) • LS14500 3.6 V Li-SOCl2	Not Available
ENVIRONMENTAL CONDITIONS	**Operating Temperature**	• -40 to 70°C	
	Storage Temperature	• -40 to 85°C	
	Relative Humidity	• 0,93	
MECHANICAL CHARACTERISTICS	**Case Type**	• Metallic box	
	Mounting	• Panel Mounted	
	Dimensions	• Width: 265 mm • Height: 125 mm • Depth: 50 mm	• Width: 171 mm • Height: 125 mm • Depth: 43.5 mm
	Weight	• 950 g	• 650 g
	Enclosure Protection	• IP54	• IP40



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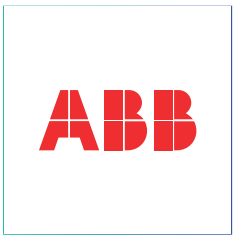
References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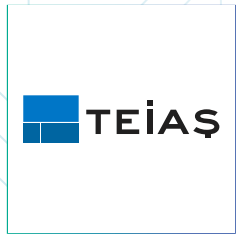
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