


MULTIFUNCTION DIRECTIONAL PROTECTION RELAY (DPM) TECHNICAL SPECIFICATIONS

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	MULTIFUNCTION DIRECTIONAL PROTECTION RELAY (DPM)	
	TECHNICAL SPECIFICATIONS	Rev. No: + Rev. Tar: 13.02.2017


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1 PROTECTION FUNCTIONS

ANSI Codes	Explanation
50/51	3 phase overcurrent
50/51N	Earth overcurrent
67P	3 phase directional overcurrent
67N	Earth fault directional overcurrent
67N	Derived earth fault
51V	Voltage controlled overcurrent
37	3 phase undercurrent
46	Negative phase sequence overcurrent
27/59	Phase under/over voltage
59N	Residual over voltage
47	Negative over voltage
32	Directional power (active/reactive, under/over power)
32N	Wattmetric earth fault
81U/O	Under/over frequency
81R	Rate of frequency
49	Thermal overload
46BC	Broken conductor detection I2/I1
79	Auto reclose
50BF	Circuit breaker failure detection

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2 FEATURES

2.1 General

Blocking logic	
Functional test	
CB control local/remote	
CB supervision	
CB fail	
Trip circuit supervision	
94/86 Trip Condition	
Cold load pick up	
68 Inrush blocking	
Switch on to fault (SOTF)	
VT supervision (VTS)	
CT Supervision (CTS)	
4-20mA Analog input	
Events recording	1000
Fault recording	25
Disturbance recording	Total storage time: 18 seconds Time duration: 0.2-6 seconds per one record
Setting group	8
Auxiliary timers	8
Logic equation	AND, OR and NOT gates (8 equations)

2.2 Measurement

Measurements	RMS and Fundemantal Current/Voltage Phase angles Frequency Energy Metering Instant Max Currents Demand
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2.3 Communication


Communication	IEC 60870-5-103 Modbus RTU and TCP IEC 61850 including GOOSE, MMS (Level A Certificate, KEMA) STP, RSTP
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2.4 Time Synchronisation

Time synchronisation	IEC 60870-5-103 SNTP IRIG-B Synchronization
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2.5 Setting and Configuration

Setting and configuration	HMI with LCD screen and buttons Web interface (via ethernet ports) Communication protocols
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3 TECHNICAL DATA

3.1 Dimensions


Description	Value
Width	156 mm
Height	178.5 mm
Depth	250 mm
Weight	3.75 kg

3.2 IP Class of Enclosure

Description	Value
Front	IP52
Rear	IP20

3.3 Measurement Current and Voltage Inputs

Description	Value	
Rated frequency	50/60 Hz	
Current inputs	Rated current, In	1/5 A
	Thermal withstand	
	Continuous	20 A
	For 1 s	500 A
	Dynamic current withstand	1250 A / 10 ms
Voltage inputs	Rated voltage	57 to 130 V
	Voltage withstand	
	Continuous	260 Vac
	For 10 s	300 Vac
	Burden	Resistive 200 K 0.016 W / 57 V 0.084 W / 130 V 0.338 W / 260 V

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3.4 Auxiliary Power Supply


Description	Value
Nominal auxiliary voltage	(48-240) Vac, (24-240) Vdc
Operating range of auxiliary voltage	(38-264) Vac, (22-264) Vdc
Nominal frequency for AC voltage	50 / 60 Hz
Interreption time in the auxiliary voltage without resetting the relay	> 10 ms at 24VAC
	> 10 ms at 24VDC
Burden	< 10 W (AC)
	< 8 W (DC)

3.5 Binary Inputs

Description	Value
Number of inputs	8 (18 option)
Nominal voltage	(24-240) Vac, (24-240) Vdc
Operating range	(21-264) Vac, (21-264) Vdc
Threshold	15 Vdc / Vac
Reaction time	< 9 ms
Current drain	< 1 mA

3.6 mA Input

Description	Value
Number of inputs	1
Suported current range	4..20 mA
Operation accuracy	±2%

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3.7 Output Relay Characteristics

Description	Value
Number of outputs	8 (10 option)
Rated voltage	250 Vac
Max switching voltage	400 Vac
Rated current	8 A
Make and carry for 0.5 s	30 A

3.8 RS485 Interface

Description	Value
Connection	2 wire, optional termination resistor
Cable	Shielded twisted pair
Baudrate	Max 115200 bps


3.9 Ethernet Interfaces

Interface	Type	Data rate	Isolation
Front	Standard Ethernet CAT 5 cable with RJ-45 connector	100 Mbits/s	700 V 1 min
Rear	2 ports, Shielded twisted pair CAT 5e cable with RJ-45 connector	100 Mbits/s	1.2 kV 1 min

3.10 Fiber Optic Interfaces

Connector	Type	Wavelength	Data rate
LC	Single mode	1300 nm	155 Mbits/s
LC	Multi mode	850 nm	125 Mbits/s

There are two fiber optic ports. Each of the above type can be use.

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3.11 IRIG-B


Description	Value
IRIG time code format	B004
Modulation	Unmodulated
Logic Level	3.3V-5V
Current consumption	< 1 mA
Isolation	2 kV 1 min

3.12 LCD

Description	Value
Type	3.5" TFT, 320x480
Display color	262K
Active area	48.96mm x 73.44mm

3.13 Battery Backup


Description	Value
Type	3.6V 1F super capacitor
Battery life for RTC	30 days

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4 TYPE TEST

4.1 EMC


Description	Level	Standard
Emission		
Radiated emission	Class A	IEC 60255-26 CISPR22
Conducted emission	Class A	IEC 60255-26 CISPR22
Immunity		
1 MHz damped oscillatory wave	Communication: CM 1 kV	IEC 60255-26
	Other ports: CM 2.5 kV, DM 1 kV	IEC 61000-4-18
Electrostatic discharges		
Contact discharge	6 kV	IEC 60255-26 IEC 61000-4-2
Air discharge	8 kV	
Radiated radio frequency magnetic field	80 - 1000 MHz, 1.4 - 2.7 GHz, 80, 160, 380, 450, 900, 1850, 2150 MHz 10 V/m	IEC 60255-26 IEC 61000-4-3
Fast transient/burst	Communication: 2 kV	IEC 60255-26
	Other ports: 4 kV	IEC 61000-4-4
Surge	Communication: LE 4 kV	IEC 60255-26
	Other ports: LE 4 kV, LL 2 kV	IEC 61000-4-5
Conducted disturbance induced by RF fields	0.15 - 80 MHz, 27, 68 MHz 10 V	IEC 60255-26 IEC 61000-4-6
Power frequency voltage (50 Hz and 60 Hz)	Binary inputs: DM 150 V, CM 300 V	IEC 60255-26 IEC 61000-4-16
Power frequency H-field (50 Hz)	30 A/m continuous 300 A/m 1-3 s	IEC 60255-26 IEC 61000-4-8

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Description	Level	Standard
D.C. voltage dips	100% 10 ms	IEC 60255-26 IEC 61000-4-29
	60% 200 ms	
	30% 500 ms	
A.C. voltage dips	100% 0,5 c	IEC 60255-26 IEC 61000-4-11
	60% 10/12 c	
	30% 25/30 c	
D.C. voltage interruptions	100% 5 s	IEC 60255-26 IEC 61000-4-29
A.C. voltage interruptions	100% 250/300 c	IEC 60255-26 IEC 61000-4-11
D.C. Ripple	15% Ur_dc 100/120 Hz	IEC 60255-26 IEC 61000-4-17
D.C. gradual shut-down / start-up	Shut d. ramp 60 s 5 min off St up ramp 60s	IEC 60255-26

4.2 Product Safety Requirements

Description	Level	Standard
Impulse voltage	Communication, IRIG-B: 1 kV	IEC 60255-27
	Other ports: 5 kV	
Dielectric voltage	Communication, IRIG-B: 0.5 kV	IEC 60255-27
	Other ports: 2 kV	
Insulation resistance	500 Vdc	IEC 60255-27
Protective bonding	$\leq 0,1 \Omega$	IEC 60255-27
Thermal short time test		
Overvoltage VT, continuous	260 Vac	IEC 60255-27
Overvoltage VT, 10 s	300 Vac	
Overcurrent CT, continuous	20 A	
Overcurrent CT, 1 s	500 A	


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4.3 Climatic Environmental Conditions

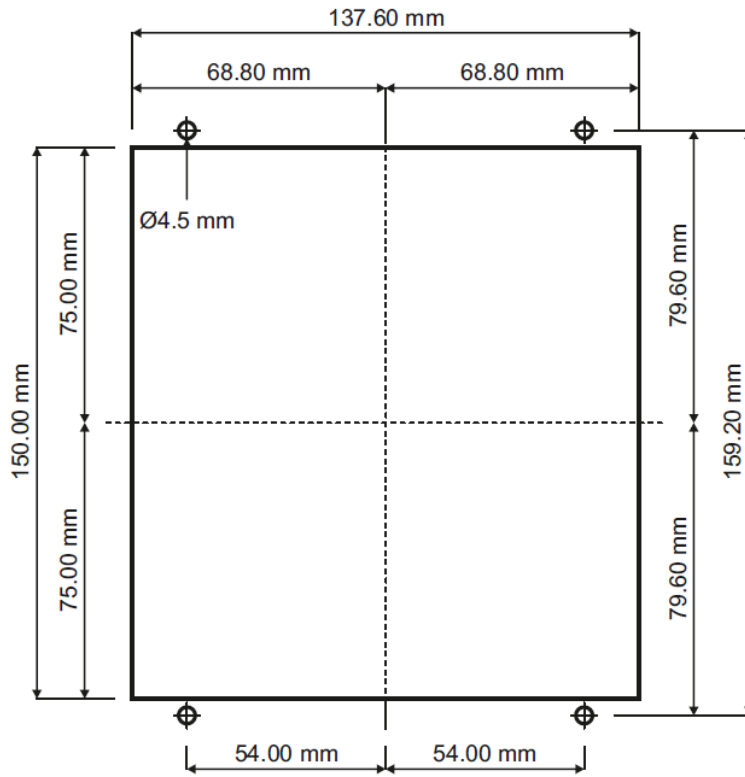
Description	Level	Standard
Dry heat operational	+85°C 16h	IEC 60255-1 IEC 60068-2-2 Test Bd
Cold operational	-25°C 16h	IEC 60255-1 IEC 60068-2-1 Test Ad
Dry heat storage	+85°C 16h	IEC 60255-1 IEC 60068-2-2 Test Bb
Cold storage	-40°C 16h	IEC 60255-1 IEC 60068-2-1 Test Ab
Change of temperature	-25°C +85°C 3 hours 5 cycles	IEC 60255-1 IEC 60068-2-14 Test Nb
Damp heat steady state	+40°C 93% 56 days	IEC 60255-1 IEC 60068-2-78 Test Cab
Cyclic temperature with humidity	+25°C +40°C 97% 93% 6 cycles	IEC 60255-1 IEC 60068-2-30 Test Db

4.4 Mechanical Environmental Conditions

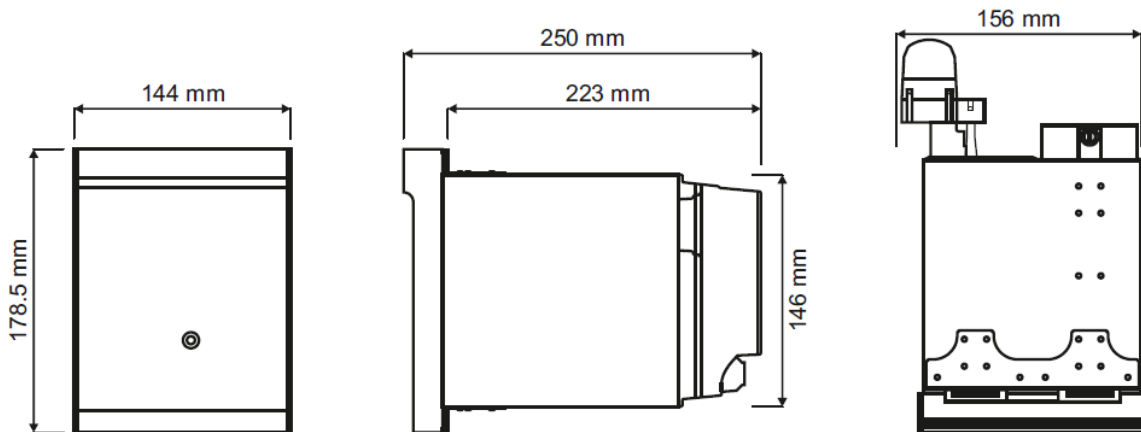
Description	Level	Standard
Vibration response	Class 1	IEC 60255-1 IEC 60255-21-1
Vibration endurance	Class 1	IEC 60255-1 IEC 60255-21-1
Shock response	Class 1	IEC 60255-1 IEC 60255-21-2
Shock withstand	Class 1	IEC 60255-1 IEC 60255-21-2
Bump	Class 1	IEC 60255-1 IEC 60255-21-2
Seismic (single axis sweep)	Class 1	IEC 60255-1 IEC 60255-21-3

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5 DRAWINGS



Cutout Drawings



General Dimensions