

RELAYS

MULTIFUNCTION DIGITAL PROTECTION RELAY

For Overhead Lines with Voltages between 10 kV ~ 40,5 kV



RELAYS

Description

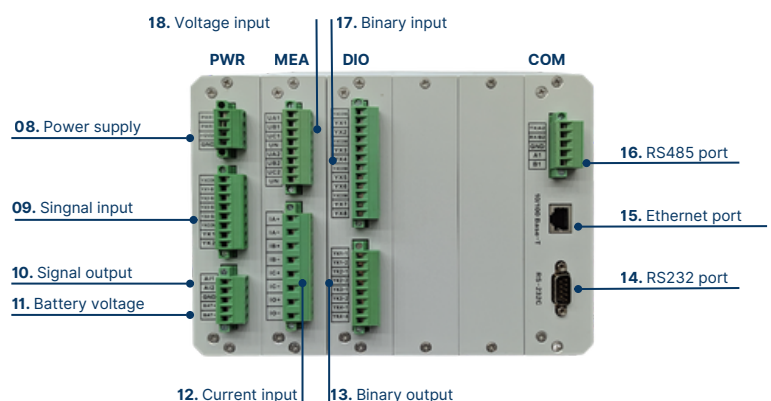
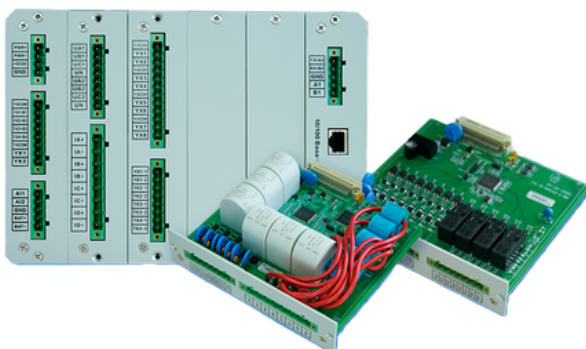
The Multifunction Digital Protection Relay is primarily used in overhead lines and cables, serving as the main component of feeder terminal units (FTUs), ring main units (RMUs), and primary switchgears (PSGs), providing functions such as protection, control, measurement, communication, data processing, and energy management.

Key functions include:

- **Fault recording function:** Capable of recording 10 fault records with a maximum of 10 seconds at a storage rate of 128 samples per cycle.
- **Load profile function:** Allows for checking the curve and historical data of up to 10 analog inputs.
- **Support for power quality analysis:** Capable of verifying the harmonic component ratio of up to 16 analog quantities in real-time.

Performance

- Combines protection, control, measurement and communication for overhead line and cable applications.
- Supports integration into feeder terminal units, ring main units and primary switchgear.
- Records up to 10 faults, with a maximum duration of 10 seconds at 128 samples per cycle.
- Provides load profile curves and historical data for up to 10 analog inputs.
- Analyzes harmonic components of up to 16 analog quantities in real time.
- Includes current and voltage inputs, eight binary inputs and four binary outputs, according to the specified configuration.
- Communicates through RS232/RS485 and Ethernet RJ45 using IEC 101/104, DNP3.0 and Modbus protocols.



Technical Specifications

Applicable to	Overhead Lines with voltages between 10 kV ~ 40,5 kV
Power supply	24 VDC (20 to 29 VDC)
Maximum power consumption	< 10 W
Frequency	50 Hz / 60 Hz
Analog input	4 Current
	6 US Voltage
	2 UO Voltage
Current Transformer input ratio	1A/5 A (Regular CT) or 0 to 333 mV (Electronic CT)
Voltage sensor input range	0 to 8 VRMS
Binary inputs	8
Binary input rated voltage	24 VDC or 115 VDC
Binary input threshold voltage	> 18 VDC
Binary input reaction time	< 20 ms
RTD/mA inputs	4 to 20 mA
Binary outputs	4
Binary output rated voltage	250 VAC

Ports

Debugging	Ethernet RJ45 (Front)
Communication	Serial RS232/485 Ethernet RJ45 (Back)
Protocols	IEC 101/104 DNP3.0 Modbus

IP Protection Degree

Front panel	IP54
Back panel	IP 20

Features

Dimensions	253 x 172 x 167 mm
Weight	3,5 kg
Operation temperature	-25 °C to +70 °C
Storage temperature	-40 °C to +85 °C

Protection functions

ANSI 50/50N	Instantaneous overcurrent
ANSI 51/51N	Time overcurrent
ANSI 67/67N	Directional overcurrent
ANSI 64N - SEF	Sensitive earth fault
ANSI 68	Power oscillation
ANSI 46	Negative sequence overcurrent
ANSI 59	Overvoltage
ANSI 27	Undervoltage

ANSI 81O	Overfrequency
ANSI 81U	Underfrequency
ANSI 81R	Frequency Rate of Change
ANSI 79	Synchronism-Check
ANSI 25	Synchronization Check
Additional	Inrush Restraint Element Cold Load Pickup Hot Line Tag
Protection setting groups	5

Measurements

Phase current	Ia, Ib, Ic, Io, IO	
Ground current	Ia, Ib, Ic, Io, IO	
Sensitive ground current	Ia, Ib, Ic, Io, IO	
Phase voltage (Power and Load side)	Ua, Ub, Uc, Ur, Us, Ut	
Three-phase current DFT/RMS	Ia, Ib, Ic, Ir, Is, It	±0,5% (0,1~1,2 In)
Residual current DFT/RMS	Io1, Io2	±0,5% (measured), ±1,0% (calculated)
Line voltage (Power and Load side)	Ua, Ub, Uc, Ur, Us, Ut	±0,5% (0,05~2,00 Un)
Residual voltage (Power and Load side)	Uo1, Uo2	±0,5% (measured), ±1,0% (calculated)
Active power (single and three-phase)	Pa, Pb, Pc, Pt	± 1,0%
Reactive power (single and three-phase)	Qa, Qb, Qc, Qt	± 1,0%

Apparent power (single and three-phase)	Sa, Sb, Sc, St	± 1,0%
Active energy (single and three-phase)	EPa, EPb, EPc, EPt	± 1,0%
Reactive energy (single and three-phase)	EQa, EQb, EQc, EQt	± 1,0%
Apparent energy (single and three-phase)	ESa, ESb, ESc, ESt	± 1,0%
Power factor (single and three-phase)	PFa, PFb, PFc, PFt	± 1,0%
Frequency	F (50Hz/60Hz)	± 0,02 Hz (0,8 ~ 1,2 Fn)
Synchronizing Difference	Voltage Frequency Angle	
Sequence Components of Three Phase Voltages	U1, U2, U0	± 1,0%
Sequence Components of Three Phase Currents	I1, I2, I0	± 1,0%
True RMS	Voltages & Currents	
THD	Voltages & Currents	
Harmonics	Voltages & Currents, up to 11th	
Battery voltage	VDC	
Demand	Currents Voltages Power Energy Power Factor Frequency Harmonics	
Additional	Power Quality Load Profile Disturbance Recorder Graphs for Analysis	

Control	Open Close Reclosing function (ANSI 79) Synchronization Check Function (ANSI 25) Battery Test Authorization Setting
Clear	Indications Events Fault records Disturbance records Power quality Load profile
Enable/Disable	Reclosing Protection functions Protection setting group Hot line tag
Monitoring	Protection Start Protection Trip Protection Alarm Measurement High Alarm and Warn
Monitoring	Trip Counter Limit Reclosing lockout Reclosing Operation Fail Synchronism Check Successfu Synchronism Check Fail AC Fail DC Fail Battery Low Alarm Door Open Alarm Device Internal Fault
Status	Open/Closed Local/Remote Reclosing function Synchronism Check Battery Activation Status
Recorders	Trip and fault counter
System Event Recorder	Last 10000 events
Fault Recorder	Last 1024 faults
Disturbance Recorder	Maximum 500 cycles x 10 (128 samples/cycle)

Load profile recorder	Last 30 days
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Distribution automation schemes	Loop automation Auto-changeover automation
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Users interface

LCD	10 lines x 20 characters
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LED's	16 Programmable
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	Fault Indicators
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Buttons	10 Programmable
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Access security	Password
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Front panel

Operation buttons

Keyboard buttons	Navigation and settings
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Menu	Back to main menu screen
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Clear	Delete storage info and registers
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L/R	Local/Remote mode
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Control buttons

OPEN

CLOSE

LED's

Self Check

Pickup

Trip

Under-voltage

Over-voltage

Reclose reset

Reclose cycle

Reclose lockout

Syn. Check

Over-frequency

Under-frequency

A-phase Overcurrent

B-phase Overcurrent

C-phase Overcurrent

Earth fault

Sensitive earth fault

Instantaneous (AC fail alarm)

Door open

Programmable LED

Programmable buttons

EF ENABLED

SEF ENABLED

RECLOSE ENABLED

HOT LINE TAG

CONTROL LOCKED

GROUP A PROTECTION

PROGRAM 1

PROGRAM 2

Authorization

Authorization level:
Administrator
Engineer
Operator
Viewer

Back panel

Terminals

Power supply (20 to 29 VDC)	PWR+, PWR-
Modem/radio power supply	+12VDC, GND
Signal input	YXCOM, YX1, YX2, YX3, YX4
Signal output	YKCOM, YK1, YK2
Analog input (2 channels from 4 to 20mA)	6 Voltage US
Battery voltage metering	BAT+, BAT-
Voltage inputs	UA1, UB1, UC1, UN, UA2, UB2, UC2, UN
Current inputs	IA+, IA-, IB+, IB-, IC+, IC-, IO+, IO-

Communication

RS232/485 terminal bar	TX/A2, RX/B2, GND
B-port for time synchronization	A1, B1
RJ45	10/100 Base-T
RS232 serial	RS-232C

We provide solutions for improvement of electrical energy generation, transmission and distribution efficiency, quality and reliability. With a highly specialized and experienced team in research, development and innovation, HVEX develops tailor-made solutions for Brazilian and foreign markets. Wide range of products with solutions focused on signal transduction, measurement, monitoring and protection.



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