

RELAY

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# FEEDER AND RECLOSER PROTECTION RELAY

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



# FEEDER/RECLOSER PROTECTION RELAY

## Description

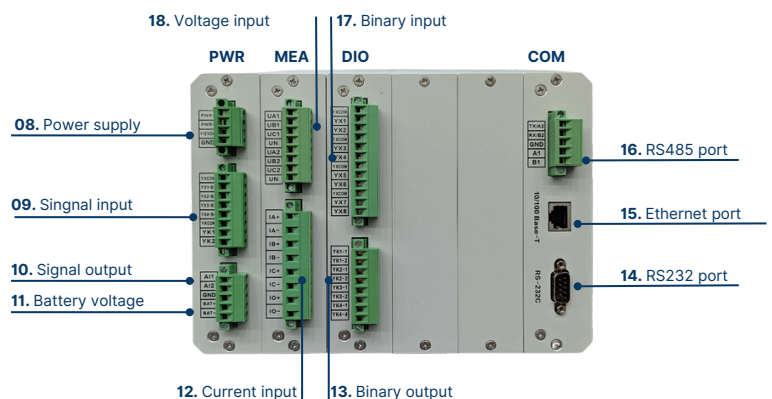
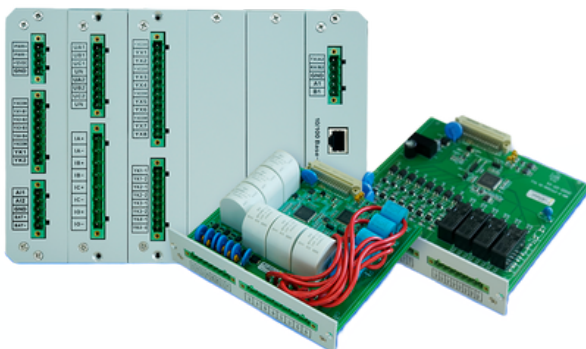
The feeder protection relays are primarily used in overhead lines and cables, serving as the main components of feeder terminal units (FTUs), ring main units (RMUs), and primary switchgears (PSGs), providing functions such as protection, control, measurement, communication, data processing, and energy 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

- The tester utilizes a digital filter through Fourier transform to measure capacitance, dielectric losses, and other parameters with high precision.
- Featuring a touch-sensitive LCD display that is user-friendly, each process is clearly displayed thanks to the graphical interface.
- Data storage: Test results can be saved and viewed at any time, displaying the date and time of the tests conducted.
- Equipment data can be exported via USB disk and viewed and managed on any PC using specific software.
- The tester is easy to operate, with the measurement process controlled by a microprocessor. Once the appropriate measurement method is selected, measurements can be performed automatically.
- The model is equipped with a standard capacitor and high-voltage power supply integrated, making it convenient for on-site testing and reducing the number of cables required.
- In case the tester operator accidentally receives an electric shock, the equipment will immediately cut off the high voltage to ensure operator safety.



## 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

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## IP Protection Degree

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Front panel	IP54
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Back panel	IP 20
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## Features

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

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

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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 Successful 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)

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

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LCD	10 lines x 20 characters
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LED's	16 Programmable
	Fault Indicators

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Buttons	10 Programmable
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Access security	Password
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## Front panel

### Operation buttons

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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

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OPEN

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CLOSE

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## LED's

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Self Check

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Pickup

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Trip

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Under-voltage

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Over-voltage

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Reclose reset

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Reclose cycle

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Reclose lockout

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Syn. Check

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Over-frequency

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Under-frequency

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A-phase Overcurrent

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B-phase Overcurrent

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C-phase Overcurrent

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Earth fault

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Sensitive earth fault

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Instantaneous (AC fail alarm)

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Door open

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Programmable LED

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### Programmable buttons

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EF ENABLED

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SEF ENABLED

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RECLOSE ENABLED

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HOT LINE TAG

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CONTROL LOCKED

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GROUP A PROTECTION

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PROGRAM 1

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PROGRAM 2

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Authorization

Authorization level:  
Administrator  
Engineer  
Operator  
Viewer

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## 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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