



Low-Cost Monitoring of Power Feeds in Unearthed IT Systems

The EarthSense insulation monitor has been designed to monitor insulation resistance in unearthed IT systems where high reliability of the supply is required, such as railway, industrial, marine and power applications.



EarthSense

Earth Insulation Monitor

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Information

The EarthSense insulation monitor serves as an early warning system by providing notifications when the impedance between an active phase conductor and earth has dropped below user customisable warning and alarm thresholds. Advanced notification of faults allows time and cost-efficient deployment of service personnel, reducing the likelihood of equipment failure or damage.

Features

- Sunlight readable LCD display
- Modbus Protocol on RS485
- Scheduled self-test function
- Monitoring of AC or DC busbars
- Remote test and reset

Benefits

- Remote monitoring of earth insulation on IT systems
- Allows early detection and removal of faults before problems occur
- Small footprint

Part Numbers

EarthSense Monitor (Universal AC Supply)	ESM1-A
EarthSense Monitor (DC Supply)	ESM1-B

Technical Specifications

Supply Circuit

Nominal supply voltage	Option A	85 - 264V AC
	Option B	9 - 36V DC
Frequency range AC		50 - 60Hz

Measuring Circuit

Operating Mode	continuous operation
Measuring principle	adaptive square wave injection
Nominal system voltage	0 - 650V AC / 0 - 650V DC
Maximum allowed system voltage	750V AC / 750V DC
Nominal Frequency	DC or 15 - 400Hz
System leakage capacitance	≤ 300uF
Response value (Alarm 1)	1 - 200KΩ
Response value (Alarm 2)	1 - 200KΩ
Relative uncertainty 1 - 50KΩ / 50 - 200KΩ	±1 KΩ / ±10%
Internal impedance at 50Hz	≥ 141KΩ
Internal DC resistance	≥ 141KΩ
Measuring voltage	±24V
Measuring current	0.17mA
Response time (0.5 x Ran and Ce = 1uF)	≤ 10s

Input Circuit

Control input (voltage free)	remote test / reset
Maximum current in control input	1mA
Maximum cable length	10m - 100pF/m
No-load voltage at the control input	3.3V DC

Output Circuit (Relay)

Relay configuration	2 x SPCO	
Operating principle	open or closed circuit principle	
Rated Voltage	250V AC / 30V DC	
Minimum contact rating	1mA at AC / DC ≥ 10V	
Contact data (IEC 60947-5-1)	AC12 at 230V	4A
	AC15 at 230V	3A
	DC12 at 24V	4A
	DC13 at 24V	2A
Electrical endurance, number of cycles	10000	

Environmental Data

Ambient temperature ranges	operation	-20 to +60°C
	storage	-30 to +80°C
	transport	-30 to +80°C
Climatic category (IEC/EN 60721-3-3)	3K5 (no ice, no cond.)	
Damp heat, cyclic (IEC/EN 60068-2-30)	6x24h cycle, 70°C, 95% RH	
Vibration, sinusoidal (IEC/EN 60255-21-1)	Class 2	
Shock, half-sine (IEC/EN 60255-21-2)	Class 2	

Insulation Data

Rated insulation voltage (EC/EN 60664-1)	600V
Rated impulse voltage (IEC/EN 60664-1)	6kV
Pollution degree (IEC/EN 60664-1)	III
Test Voltage (IEC 61010-1)	2.32KV, 50Hz, 2s

Approvals & Compliances

Product standard	EN/IEC 61557-8, IEC 60947-5-1
Other standards	EN 50121-4
Low Voltage Directive	2014/35/EU
Electromagnetic Compatibility (EMC)	2006/95/EC

Electromagnetic Compatibility

Interference immunity to IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61326-2-4
Radiated, radio-frequency, electromagnetic field IEC/EN 61000-4-3 Level 3, 10 V/m (1 GHz) / 3 V/m (2 GHz) / 1 V/m (2.7 GHz)
Surge IEC/EN 61000-4-5 Level 3, installation class 3, supply circuit and measuring circuit 1 kV L-L, 2 kV L-earth
Conducted disturbances, induced by radio-frequency fields IEC/EN 61000-4-6 Level 3, 10 V
Voltage dips, short interruptions and voltage variations IEC/EN 61000-4-11 Level 3
Electrostatic discharge IEC/EN 61000-4-2 Level 3, 6 kV / 8 kV
Electrical fast transient/burst IEC/EN 61000-4-4 Level 3, 2 kV / 5 kHz
Harmonics IEC/EN 61000-4-13 Level 3
Interference emission IEC/EN 61000-6-3, IEC/EN 61000-6-4
High-frequency radiated IEC/CISPR 22, EN 55022 Class B
High-frequency conducted IEC/CISPR 22, EN 55022 Class B

General Data

Mean Time Before Failure	200,000 hrs
Duty time	100%
Dimensions (W x H x D)	36 x 90 x 60mm
Weight	0.250kg
Mounting	DIN
Degree of protection housing / terminal	IP30 / IP20