EDS

Expert on-line diagnostic system for substation equipments

With more than 70 years of experience, ISA is a market leader in the development of equipments to satisfy the specific needs of the power utilities.

Our area of expertise includes:

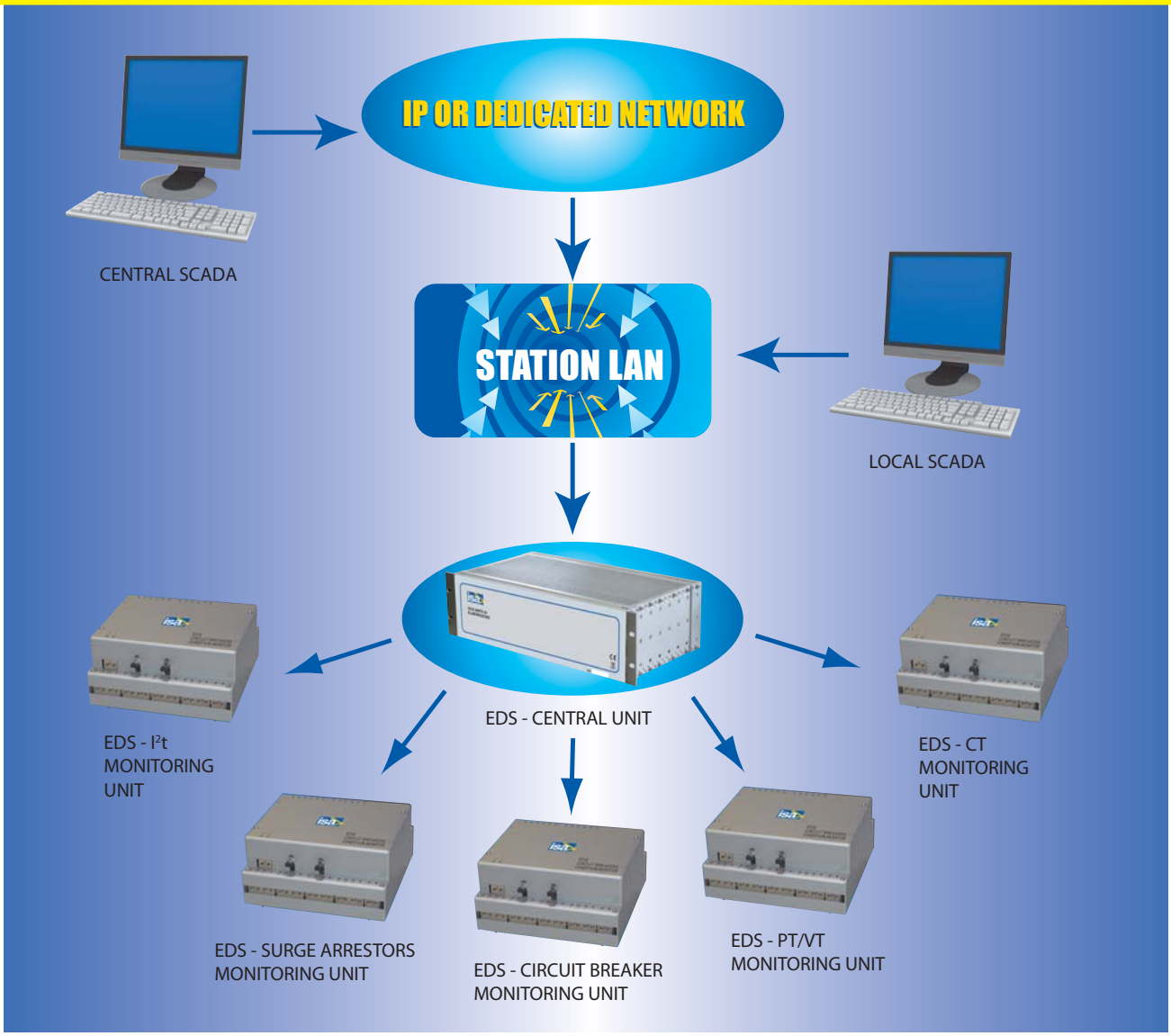
- **Protective relay testing**
- **Circuit breakers testing**
- **CT/PT testing**
- **Battery testing**
- **HV Surge arrestors (MOV's) testing**
- **Monitoring system for implementation of condition based maintenance programs**

EDS - Expert Diagnostic System for substation equipments, is a cost-effective on line diagnostic system used to monitor electrical equipments in the field. Each EDS device is intended to be apparatus-specific and can be mounted in existing cubicles or in optional cubicles available from ISA.

EDS units are designed to continuously monitor the condition of:

- **High Voltage and Medium Voltage Circuit breakers**
- **Current and Voltage transformers**
- **High Voltage Surge Arrestors (MOV's)**

The EDS is easy to install and, once configured, operates continuously.



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EDS

EDS units are designed to operate reliably under extreme weather conditions and electrical interference found in normal substation operations. In particular:

- Modules mounted outdoors are IP 65 and designed to work over an extended temperature range (from - 40°C to + 85°C).
- Self-diagnostics continuously tracks the condition of the EDS and issues alerts if an abnormality is detected in the system.
- By the continuous monitoring of the key parameters, EDS detects malfunctions in early stage and issues prioritized alarms communicating abnormal conditions and guiding maintenance decisions.

EDS CENTRAL UNIT

The EDS Central Unit controls the main function of the monitoring system. The basic characteristics are:

. Execution of the monitoring of the various peripheral units
. Storage of the results in daily/weekly/yearly database that can be simply consulted
. Trend analysis of the SF6 density
. Possibility to modify the threshold parameters
. Possibility to remotely configure thresholds, zeroing measurements and so on
. Firmware Upgrade of the various peripheral units
. Remote interrogation from another PC via static IP (with password)
. Transmission of the measurements and the alarms to the Scada system
. It can be synchronized by a substation GPS and it can synchronize all the peripherals connected

Specification

AMD® low power LX800 500MHz Processor

- 24-bit TFT LCD interface
- Dual 100 Base-T Fast Ethernet
- Four USB 2.0 ports
- Four COM ports
- 8 GB solid state hard disk
- GPS Synchronization: IRIGB input output for system synchronization
- Connections: by means of connectors for optical fibre type ST multimodal 62.5 / 125 microns
- Power supply: 93.5 … 121 VDC
- Power consumption: 50W
- Physical realization: 3 U Rack 19''
- Remote Communication: Ethernet TCP/IP, RS232
- Protocol IEC60870-5-101 or DNP

FIELD MONITORING DEVICES

Circuit Breaker Condition Monitor

. Designed to easily fit into breaker control cabinets.
. Analysis performed on every breaker operation.
. Automatic fingerprint comparison of breaker characteristics.
. All measurements are sent to the EDS Central Unit for analysis.

Diagnostics also validate the information supplied by the gas monitor; only values determined to be valid are used in calculations made by the IDD.

The Circuit Breaker Condition Monitor acquires the following information:

. Auxiliary contacts opening and closing time
. Auxiliary contacts bouncing times
. SF6 Density trend
. Temperature
. Accumulated fault current during arcing time (I^2t)
. Open and close current profiles
. Mechanism operating time
. Battery voltage

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ICS SCHNEIDER MESSTECHNIK

SF6 Leakage Monitoring

Rapid variation and Slow variation. The derivative measure is performed once a day, overnight, when the temperature is more stable, at the programmed time; the time is synchronized by means of the clock input. The derivative is calculated on the average of a programmable number of values (for instance 100), as a difference of the readings over two or more days.

Optionally the following features are performed:

. Automatic fingerprint comparison of breaker characteristics
. Open and close current profiles
. Mechanism operating time
. Battery voltage

Current Transformers Condition Monitor

The Current Transformers Condition Monitor acquires the following information:

. SF6 Density trend measurement
. Temperature measurement

Potential Transformer Condition Monitor

The scope of the Potential Transformer Module is to measure
the accuracy of the PT's secondary voltage. The measurement is compared with the measurements taken simultaneously on other PT's of the same substation.

. Connections: on the PT secondary by means of isolation transformers
. High accuracy: ± 0,1% of the measurement ± 0,02% of the range in the temperature range 20°C to 25°C; ± 0,5% of the measurement ± 0,1% in the temperature range - 25°C to 60°C.
. Difference between two modules: ± 0,2% of the measurement ± 0,04% of the range.

MOV's Surge Arrestors Condition Monitor

The MOV's Condition Monitor checks the efficiency of the MOV's according to standard IEC 60099-5 A1 ED. 1.0 Diagnostic indicators of metal-oxide surge arresters in service. The Surge Arrestors Condition Monitor acquires the following information:

. The value of the total current and of the 3rd harmonic current; then it checks the values against the programmed thresholds, and raises an alarm when the maximum programmed threshold is surpassed.
. The number of discharges, along with the timing of the events.

WEIGHT AND DIMENSIONS

CENTRAL UNIT: 19" rack module

PERIPHERAL UNITS

I^2t monitoring peripheral unit:

- Weight: 2 kg.
- Dimensions: 21x20,5x11,5 cm.
- Enclosure: box to be mounted inside the cubicle.

Circuit breaker monitoring peripheral unit:

- Weight: 2 kg.
- Dimensions: 21x20,5x11,5 cm.
- Enclosure: box to be mounted inside the breaker control box or in an external cubicle.

SF6 CT monitoring peripheral unit:

- Weight: 2 kg.
- Dimensions: 21x20,5x11,5 cm.
- Enclosure: stainless steel box to be mounted inside a cubicle.

Surge arrester monitoring peripheral unit:

This unit comprises 3 modules.

- Acquisition data module:
  - Weight: 2 kg.
  - Dimension: 21x20,5x11,5 cm.
  - Enclosure: stainless steel box to be mounted inside a cubicle.
- Three peripheral modules:(each including one CT and one surge arrester):
  - Weight: 3 kg.
  - Dimensions: 14,5x30,5x15 cm.
  - Enclosure: stainless steel box to be mounted inside a cubicle.

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PT monitoring peripheral unit:

- Weight: 2 kg (monitor only).
- Dimensions: 21x20,5x11,5 cm.
- Enclosure: box to be mounted in the PT box.

OPTIONAL CUBICLE:

Stainless steel box to be mounted outdoors.

- Cubicle for Circuit breaker monitoring unit:

Weight: 20 kg; dimensions: 500 x 450 x 250 mm.

- Cubicle for SF6 CT monitoring unit:

Weight: 20 kg; dimensions: 500 x 450 x 250 mm.

- Cubicles for surge arrestors monitoring unit:

Weight: 20 kg; dimensions: 500 x 450 x 250 mm.

Weight: 30,5 kg; dimensions: 500 x 700 x 250 mm.

- Cubicle for PT monitoring unit:

Weight: 20 kg; dimensions: 500 x 450 x 250 mm.

APPLICABLE STANDARDS

Electromagnetic Compatibility

Directive n. 2004/108/EC. Applicable Standard: EN61326 + A1 + A2.

Low-voltage directive

- Directive n. 2006/95/EC.
- Applicable standard: CEI EN 61010-1. The class, pollution degree and installation category of the various module are summarized in the following table.
- Inputs and outputs protection: different for each module, according to IEC EN 60529.
- Temperature and relative humidity: different for each module (see table available in technical specification).
- Altitude: less than 2000.

ORDERING INFORMATION

CODE	DESCRIPTION
10168	EDS - Central unit
90168	EDS - Circuit breaker monitoring peripheral unit
91168	EDS - CT monitoring peripheral unit
92168	EDS - Surge arrester monitoring peripheral unit
13168	EDS - Potential transformer monitoring peripheral unit
20168	EDS - I^2t monitoring peripheral unit with measuring CT's
30168	EDS - Circuit breaker (Magrini type) monitoring peripheral unit with SF6 transducer mounted in cubicle
31168	EDS - Circuit breaker (ABB type) monitoring peripheral unit with SF6 transducer mounted in cubicle
32168	EDS - Circuit breaker (Siemens type) monitoring peripheral unit with SF6 transducer mounted in cubicle
40168	EDS - SF6 monitoring peripheral unit with SF6 transducer mounted in cubicle
50168	EDS - Surge arrester monitoring kit (1 master and 2 slaves) mounted in cubicle
51168	EDS - Surge arrester monitoring kit (1 master) mounted in cubicle
52168	EDS - Surge arrester monitoring kit (1 slave) mounted in cubicle
60168	EDS - Potential transformer monitoring peripheral unit mounted in cubicle

SPARE PARTS

CODE	DESCRIPTION
14168	EDS - Surge arrester monitoring peripheral unit with CT and Rogowski coil
15168	EDS - Cubicle (IP65 standard compliant) - 500X700X250 mm wired with terminal block for surge arrester monitoring unit
16168	EDS - Cubicle (IP65 standard compliant) - 500X450X250 mm wired with terminal block for surge arrester monitoring unit
17168	EDS - Cubicle (IP65 standard compliant) - 500X450X250 mm wired with terminal block for SF6 CT monitoring unit
18168	EDS - Cubicle (IP65 standard compliant) for potential transformer wired with terminal block for potential transformer monitoring unit
19168	EDS - Cubicle (IP65 standard compliant) for circuit breaker wired with terminal block for CB
35168	EDS - SF6 Transducer for ABB circuit breaker
36168	EDS - SF6 Transducer for SIEMENS circuit breaker
37168	EDS - SF6 Transducer for MAGRINI circuit breaker

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