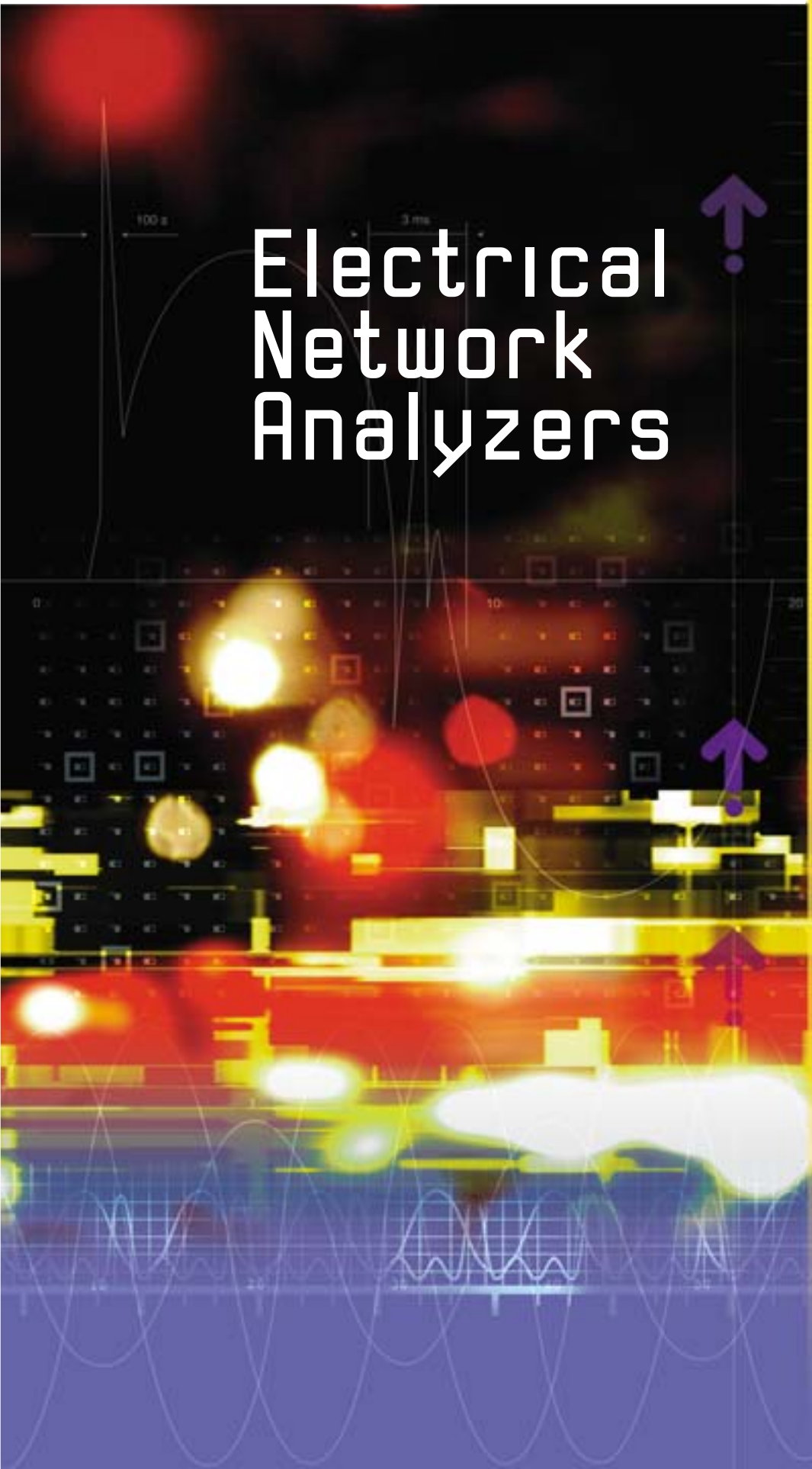
ENERDIS®
CHAUVIN ARNOUX GROUP

Electrical Network Analyzers

TEST THE QUALITY OF YOUR ELECTRICAL INSTALLATIONS



Presentation **Network Analyzers**

ENERDIS, A GLOBAL SOLUTION FOR MONITORING NETWORKS, STATIONS, AND HVA / HTB INSTALLATIONS

ENERDIS, renowned specialist in metering, monitoring, and management of electrical networks, is extending its product and service offer to energy quality and disturbance measurement for stations, networks and in HVA / HVB installations:

- *Do you worry because your process is particularly sensitive to supply voltage fluctuations and to generated or received disturbances?*
- *Do you fear that if your equipment malfunctions or shuts down, you could experience serious operating losses or your installations could become less safe?*
- *Do you wish to discuss the quality of your energy supply with the network supplier or manager using factual data as a basis?*

The new range of MAP network analyzers launched by Enerdis enable you to measure the magnitude of disturbances very precisely and help you diagnose the origin and the causes. Its associated software increases MAP's performance and reliability by enabling you to get to the heart of the problem, understand and remedy it.

Through its product offer and along with its expertise and services adapted to your needs, **ENERDIS** is engaged in controlling the quality of your electrical energy.

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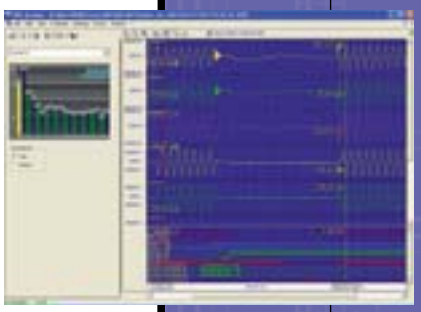

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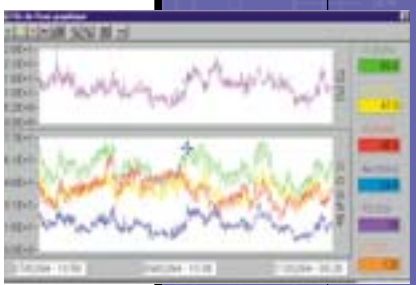
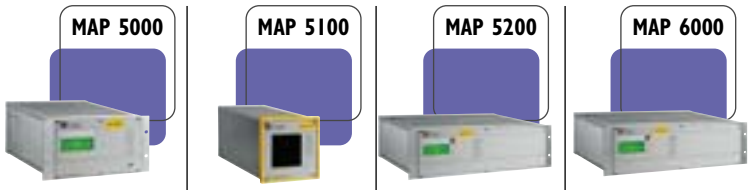


CHOOSING A NETWORK ANALYZER

MAP RANGE



		MAP 5000	MAP 5100	MAP 5200	MAP 6000
Installation					
Format	Rack 19"	double unity		simple unity	simple unity
	1/2 Rack 19"	simple unity			
	Slot-in		144x144		
	Plate Mounting		144x144		
Voltage inputs (4 U inputs)		100 Vac, 400 Vac	100 Vac, 400 Vac	100 Vac, 400 Vac	55 to 400 or 600 Vac
Current inputs (4 I inputs)	Direct on internal shunt	1, 5 or 10 A		1, 5 or 10 A	1, 5, 10 or 20 A
	Direct on external shunt		1, 5 or 10 A		
	On clamps	0 to 2 V	0 to 2 V	0 to 2 V	0 to 2 V
Sampling					
Sampling frequency		12.8 kHz	12.8 kHz	12.8 kHz	37.5 kHz
Frequency for rapid transients				1 MHz	1 MHz
Memory					
SDRAM		16 Mbytes	16 Mbytes	16 Mbytes	16 Mbytes
Flash		8 Mbytes	8 Mbytes	8 Mbytes	8 Mbytes
		+8 Mbytes, +16Mbytes, +24 Mbytes	+8 Mbytes, +16Mbytes, +24 Mbytes	+8 Mbytes, +16 Mbytes, +24 Mbytes, +56 Mbytes	+8 Mbytes, +16 Mbytes, +24 Mbytes, +56 Mbytes
Input(s) / Output(s)					
Logic inputs		4	8	8	8
				+8	+8
Binary outputs		4	4	4	
				+4	+4
Analogue inputs		4	4	4	
Analogue outputs			4	4, 8 or 16	4, 8 or 16
Communication					
RS485 port		COM 1	COM 2	COM 2	COM 2
Ethernet port		1	1	1	1
Optical infrared port		via RS232 COM 1	via RS232 COM 1	via RS232 COM 1	via RS232 COM 1
External modem (GSM or RTC) V34 bis					via RS232 COM 3
Internal Modem		COM 2		COM 1	COM 4
USB Port		1	1	1	1
Optical fiber (ST2)		1	1	1	1
Internal clock					
External synchronization					
GPS synchronization					
DCF synchronization					
Auxiliary power supply					
UPS 30 min		1	1	1	1
Accuracy					
RMS measurements		0.2 %	0.2 %	0.1 %	0.1 %
		0.1 %	0.1 %		
Energy (EN 60 687)		0.5 S	0.2 S	0.2 S	0.2 S
Internal clock		15 ppm	15 ppm	15 ppm	15 ppm
Strong points					
		• Fault recordings • En50160 • IEC 61 000-4-30	• 144*144 format • Metering • Harmonic measurements	• Transient analysis • Memory • E/S	• Disturbance analysis • Multiple communication • Sampling frequency

In standard Optional

NRGCENTER

	NRG CENTER Configuration & monitoring	OPTION 1 Advanced analysis	OPTION 2 Metering	OPTION 3 Management	OPTION 4 Configuration tool kit
Multi-measure					
Voltage and current, per phase and global	■				
Frequency	■				
THD-U and THD-I	■				
Energies: max / min / avg	■				
P, Q, S	■				
Power Factor	■				
Cos phi	■				
Voltage and current, vectorial representation	■				
K Factor	■				
Voltage qualimetry					
Rapid changes	■				
Slow changes	■				
Voltage dip	■				
Long interruptions / Short interruptions	■				
Long-term flicker (120 mn) / Short-term flicker (10 mn)	■				
Frequency fluctuations	■				
Unbalance	■				
Voltage harmonics up to the 63rd order	■				
Voltage interharmonics		■			
Symmetric network components		■			
Network impedance		■			
Graphic data representation on ITIC curve (CBEMA)		■			
Analysis as per standards in effect or defined by user					■
Current qualimetry					
Current harmonics up to the 63rd order		■			
Current interharmonics		■			
Overcurrent		■			
Metering					
Tariff			■		
Metering in the 4 quadrants			■		
Sub-metering			■		
Testing and management of solicited power			■		
Line/transformer compensation loss			■		
Recording					
Recording waveforms		■			
Recording disturbances		■			
Recording transients		■			
Event correlation	■				
Triggering on thresholds or external signals		■			
Remote control signals (up to 4 frequencies)		■			
Generating COMTRADE files		■			
Alarms					
Programming alarm as per a criterion (threshold, duration or hysteresis)	■				
Programming alarms as per many criteria (threshold, duration and hysteresis)		■			
Automatic sending of alert message via PC	■				
Displaying a pop-up alarm		■		■	
Automatic sending of alert e-mail or SMS via PC		■			
Automatic sending of direct e-mail or SMS (add. card)				■	
Management					
Using standard reports	■				
Creating customized reports					■
Graphic interface: standard display screens	■				
Graphic interface: customized display screens		■			■
Displaying multi-station data transfers and in real time	■				
Task management (rate, continuous)	■				
Multi-site network access (via server)				■	
Manage user: definition and configuration					■
Remote firmware and configuration update	■				
NT/XP/2000 operating system and safety	■				

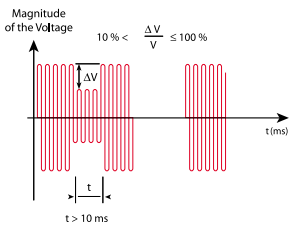
KEEPING UP WITH CURRENT

For many years now, load modifications, disturbances generated by certain equipment, and externally caused faults have been observed on electrical networks. All these sources of supply voltage degradations are harmful to the operating of electrotechnical material and equipment.

What are these disturbances? What are their causes and consequences?

SLOW CHANGES AND INTERRUPTIONS

Voltage magnitude is generally the energy distributor's primary contractual engagement.
And yet, abnormal changes can reach a near 0 level.

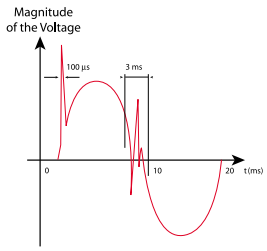


The energy distributor sets the nominal change range of the network voltage at ± 10 % of the line voltage

Generated faults	• Supply voltage dips and swells • Mini interruptions < 10 ms • Short < 3 min and long interruptions > 3 min
Causes linked to disturbing equipment	• Strong loads connected to the network and the power of the short-circuit at a supply point is insufficient. • High-power motors, transformers and capacitance assemblies • Internal fault in the electrical installation
Causes linked to the electrical supply network	• Atmospheric phenomena and accidental short-circuit • Transport and distribution network management uncertainties
Parameters to measure	• Magnitude and duration of the change

RAPID CHANGES

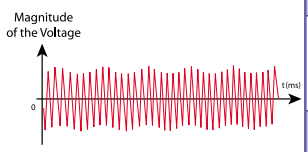
Measuring transient swells requires digital analyzers with high sampling frequency.



Generated faults	• Transient swells (<10 ms)
Causes linked to disturbing equipment	• More or less inductive load commutations that produce high-frequency transient swells • Commutation with 2 thyristors that provoking a short-term short-circuit between the 2 phases
Causes linked to the electrical supply network	• Atmospheric phenomena (lightning)
Parameters to measure	• Maximum magnitude and duration of the transient

RAPID FLUCTUATIONS IN VOLTAGE (FLICKER)

The discomfort felt by the flicker of light intensity is measured by the flicker value.
Effects on people: headaches, irritability, epileptic seizure, etc.…

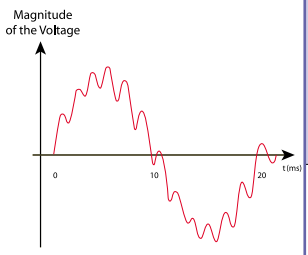


Generated faults	• Changes in light intensity • Flickering on computer screens
Causes linked to disturbing equipment	• Arc furnaces, laser printers, air conditioning systems
Causes linked to the electrical supply network	• None
Parameters to measure	• Short-term (Pst) and long-term flicker (Plt)

EVENTS...

HARMONICS AND INTERHARMONICS

Current consumed by the loads no longer has a pure sinusoidal shape.
The distortion in current implies a distortion in voltage and also depends on the source's impedance.

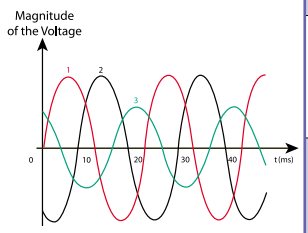


Harmonic: *sinusoidal waves (frequencies in multiples of 50 Hz) superimposed on the fundamental wave (50 Hz)*

Interharmonics: *signaling component superimposed on the fundamental wave (50 Hz). It is not a multiple of this fundamental (ex: 175 Hz)*

Generated faults	• Synchronization, commutation function problems • Untimely tripping • Armature temperature rise diminishing the life span of rotating machines, capacitors, power transformers, neutral conductors
Causes linked to disturbing equipment	• Equipment with powerful electronics: variators, inverters, static converters, light dimmers, welding units
Causes linked to the electrical supply network	• Propagation of harmonic pollution from customers supplied by the same electrical network
Parameters to measure	• Global THD • Harmonics order by order in % and RMS value

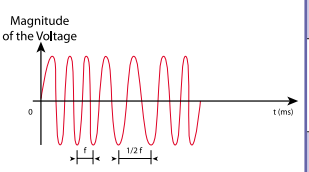
VOLTAGE UNBALANCE



Generated faults	• Current and voltage that is not phase-shifted 120° with different magnitudes
Causes linked to disturbing equipment	• Load absorbing energy in an unbalanced way on the 3 phases • Disconnection of a electrical power supply phase
Causes linked to the electrical supply network	• Disconnection of a electrical power supply phase
Parameters to measure	• Rate of unbalance, direct voltage or current, negative and zero sequence

FREQUENCY CHANGES

Frequency changes are observed on networks that are not interconnected and networks powered by generating sets.



In normal operating conditions, the average value of the frequency should fall within the 50 Hz ± 1 % interval

Generated faults	• Process stop
Causes linked to disturbing equipment	• Control fault from the autonomous source
Causes linked to the electrical supply network	• Following an overload on networks that is not interconnected or powered by generator sets
Parameters to measure	• Frequency F(Hz)

THE STANDARDS

For the electrical energy distributor, it is essential to deliver a quality product, i.e. a voltage at 50 Hz, that is sinusoidal, balanced three-phase, at a nominal value. The energy delivered needs to correspond to the user-customer's bill.
Many standards have been created to help distributors and users take steps to monitor and improve the quality of electrical networks.

The **EN 50160** standard provides the main characteristics of the quality of the voltage supplied to the customer's point of supply by the LV and MV public distribution network: frequency, waveform magnitude, and symmetry of the three-phased voltages during a defined observation period. It defines the limits or the characteristic values of the voltage that the customer has the right to expect.

The **IEC 61 000-4-30** was elaborated to measure the different voltage quality parameters and obtain reliable results that can be reproduced and compared regardless of the measurement instrument used and environmental conditions. This standard defines measurement methods for each parameter and how to interpret the results. It also specifies precautions to take in installing measurement instruments on live circuits.

QUIZZ

Test your knowledge with 3 questions.

❑ You are in a region that has a lot of storms; you have powered off the installation, which parameters need to be monitored?

- ☐ Voltage changes
- ☐ Transient phenomena
- ☐ Flicker

❑ You have untimely trip-outs, what could be the cause?

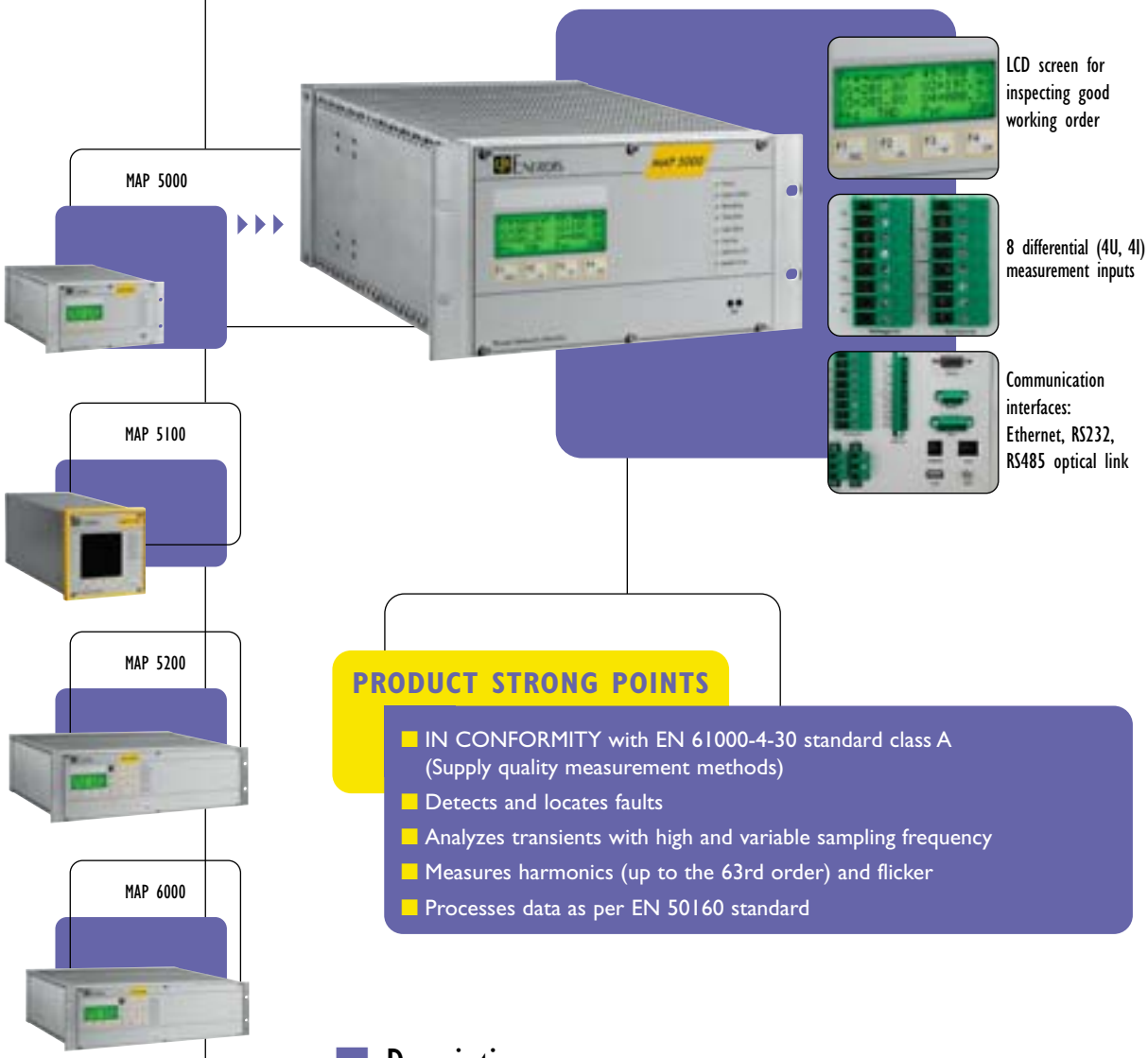
- ☐ Swells
- ☐ High rate of harmonics
- ☐ Unbalance in your installation

❑ You should test the quality of the supply in your installation, which standard is most widely used?

- ☐ EN50160
- ☐ 61000-4-30
- ☐ ISO 14100

MAP RANGE

MV / LV Electrical Network Quality Analyzers



PRODUCT STRONG POINTS

- IN CONFORMITY with EN 61000-4-30 standard class A (Supply quality measurement methods)
- Detects and locates faults
- Analyzes transients with high and variable sampling frequency
- Measures harmonics (up to the 63rd order) and flicker
- Processes data as per EN 50160 standard

Description

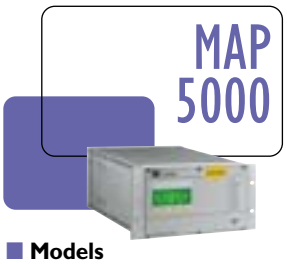
Slot-in or rack MAP range products measure all MV / LV electrical network parameters: RMS voltage and current; distorting, apparent, reactive, active power; energies; cos φ and power factor; THD-U and THD-I; harmonics up to the 63rd order and interharmonics; negative sequence unbalance in voltage and current, etc.

Via its NRGCenter software, MAP records and provides a complete, continuous and in-depth analysis of the quality of the supplied electricity according to standards in effect, and notably the NF EN 50160: voltage changes (dips, swells and interruptions), rapid changes (transient voltages), flicker or rapid voltage fluctuations, etc.

Different communication modes are available to provide remote data recovery for making in-depth analysis of all recorded parameters.

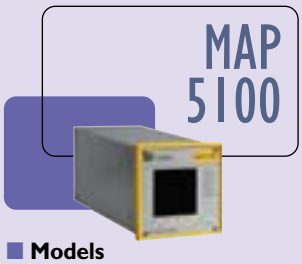
Digital and analogue inputs and outputs (in standard or as an option) make it possible to:
- monitor rotation speed, pressure and transformer temperature measurements
- display status (open or closed) of circuit breakers and protection relays
- meter energy
- test equipment (capacitor batteries, filters, generators, alarm system, etc.)

MAP 5000



- **Models**
  Simple unity (1/2 rack 19") or double unity (rack 19")
- **Current inputs**
  direct (1,5 or 10A) or with clamps
- **Flash memory**
  8, 16, 24 or 32 Mbytes
- **Sampling 12.8 kHz**
- **Inputs / outputs**
  4 logic inputs
  4 logic outputs
- **Communication**
  Ethernet Port optional
  USB Port optional
  Optical fiber (ST2) optional
  RS485 Port
  RS232 infrared optical port
  RS232 port for GSM or RTC external modem
  RTC internal modem
- **Internal clock**
  GPS receiver optional
  DCF receiver optional
- **Auxiliary supply**
  Internal battery
- **Accuracy**
  Class 0.2 or class 0.1

MAP 5100



- **Models**
  144x144 format or plate
- **Current inputs**
  (1, 5 or 10 A) or with clamps
- **Flash memory**
  8, 16, 24 or 32 Mo
- **Sampling 12.8 kHz**
- **Inputs / outputs**
  8 logic inputs
  4 logic outputs
  0 or 4 analogue inputs
  0 or 4 analogue outputs
- **Communication**
  Ethernet Port optional
  USB Port optional
  Optical fiber (ST2) optional
  RS485 Port
  RS232 infrared optical port
  RS232 port for GSM or RTC externe GSM or RTC external modem
- **Internal clock**
  GPS receiver optional
  DCF receiver optional
- **Auxiliary supply**
  Internal battery optional
- **Accuracy**
  Class 0.2 or class 0.1

MAP 5200

- **Models**
  Rack 19"
- **Current inputs**
  (1, 5 or 10 A) or with clamps
- **Flash memory**
  8, 16, 24, 32 or 64 Mbytes
- **Sampling 12.8 kHz**
  Rapid acquisition 1 MHz optional
- **Inputs / outputs**
  8 or 16 logic inputs
  4 or 8 logic outputs
  0 or 4 analogue inputs
  0, 4, 8 or 16 analogue outputs
- **Communication**
  Ethernet Port in standard
  USB Port in standard
  Optical fiber (ST2) optional
  RS485 Port
  RS232 infrared optical port
  RS232 port for GSM or RTC external modem
  RTC internal modem
- **Internal clock**
  GPS receiver optional
  DCF receiver optional
- **Auxiliary supply**
  Internal battery
- **Accuracy**
  Class 0.1

MAP 6000

- **Models**
  Rack 19"
- **Current inputs**
  direct (1,5,10 or 20A) or with clamps
- **Flash memory**
  8, 16, 24, 32 or 64 Mbytes
- **Sampling 37.5 kHz**
  Rapid acquisition 1 MHz optional
- **Inputs / outputs**
  8 or 16 logic inputs
  4 or 8 logic outputs
  0 or 4 analogue inputs
  0, 4, 8 or 16 analogue outputs
- **Communication**
  Ethernet Port
  USB Port
  Optical fiber (ST2) optional
  RS485 Port
  RS232 infrared optical port
  RS232 port for GSM or RTC external modem
  RTC internal modem
- **Internal clock**
  GPS receiver in standard
  DCF receiver optional
- **Auxiliary supply**
  Internal battery
- **Accuracy**
  Class 0.1

TO ORDER

Customized products

*For MAP 5000, specify: simple or double unity, MAP 5100: 144x144 format or plate

Model*	Current inputs	Flash memory	Sampling F = 1 MHz	Logic inputs	Logic outputs	Analogue inputs	Analogue outputs	Communication	Internal clock	Auxiliary supply	Accuracy
MAP 5200	10 A direct	32 Mbytes	OK	16	8	4	8	☐ Ethernet Port ☐ USB Port ☐ Optical fiber link (ST2)	☐ GPS Receiver ☐ DCF Receiver	OK	0.1
5000	1 A direct	8 Mbytes	OK	4	4	0	0				0.1
5100	5 A direct	16 Mbytes		8	8	4	4				0.2
5200	10 A direct	24 Mbytes		16			8				
6000	20 A direct with clamps	32 Mbytes					16				
		64 Mbytes									

Associated products

Operating Software NRGCenter
p.10

JVS Current Transformers
see Enerdis Catalogue

TCRO Current Transformers
see Enerdis Catalogue

MAP RANGE

MV / LV electrical network quality analyzers

Electrical specifications

Voltage Inputs
- 4 independent differential inputs
- Measurement range: 100 Vac (Ph-N) / 174 Vac (Ph-Ph)
  400 Vac (Ph-N) / 693 Vac (Ph-Ph)
- Accuracy class: 0.2 or 0.1
- Overload: 2 permanent Un
- Galvanic insulation: 2.5 kV
- Impedance: 10 kΩ per phase

Current Inputs
- 4 independent differential inputs
- Direct current inputs:

1, 5 or 10 A on internal shunt (MAP 5000 or MAP 5200)
1, 5, 10 or 20 A on internal shunt (MAP 6000)
1, 5, 10 A on external shunt (MAP 5100)
- Current inputs on clamps: 0 to 2 V
- Accuracy class: 0.2 or 0.1
- Overload: 3 permanent In
  20 In for 0.5 sec
- Galvanic insulation: 2.5 kV
- Impedance: 10 Ω

Logical Inputs
- Triggering voltage: 24 to 300 Vdc
- Consumption: 3 mA per channel / 70 mW per channel
- Insulation: polarity protection
  Galvanic insulation with optocouplers
- Minimum pulse: 0.1 ms
- Scanning frequency: 10 kHz

Logic Outputs (solid-state relays)
Outage power: 220 V – 2 A – 60 W
Insulation: galvanic insulation, free potential

Analogue Inputs
Sampling period: 100 ms
Scale Voltage: ± 10 V
Scale Current: ± 20 mA (with external shunts)
Scale Thermocouple: J, K, T

Analogue Outputs
Programmable scale: ± 10 V or 4-20 mA
Accuracy: 0.2 %

Digital Output
Type: RS 485
  Protocol: RTU Modbus
Type: RS 232
  Protocol: Y modem
Type: Ethernet
  Protocol: TCP/IP
Type: RTC modem
  Speed: up to 115 Kbits

Auxiliary supply
24 to 60 Vdc (± 10%)
100 to 240 Vac (± 10%)

Environment

Operating temperature:	-10 to 55°C
Storing temperature:	-20 to 70°C
Relative humidity:	< 90 % without condensation
Installation category:	300 V cat III
Pollution degree:	2
Protection level:	IP 52 (front panel)

Conformity to Standards

Measurements
- EN 61000-4-30: Voltage quality measurement method (RMS values Class A)
- EN 61000-4-7: General guide on harmonic and interharmonic measurements
- EN 61000-4-15: Test and measurement techniques: flickermeter
- EN 62053-22: Electricity metering equipment (Class 0.2S or 0.5S)
- EN 62053-23: Reactive energy meters (class 2 and 3)

Safety (Low Voltage Directive)
- EN 61010-1: Safety rules concerning electrical equipment for measurement, testing and laboratory use
- EN 60950: Safety for data processing instruments

Communication:
- EN 61107: RTU Modbus optical communication

Electromagnetic compatibility:
- EN 61326-1: EMC regulations regarding electrical equipment for measurement, control and laboratory

Including:
- EN 61000-4-2: Electrostatic discharge immunity test Level 3 (Air 8 kV / Contact 4 kV)
- EN 61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test Level 3 (10 V/m)
- EN 61000-4-4: Electrical fast transient/burst immunity test Level 4 (2kV)
- EN 61000-4-5: Surge immunity test Level 4 (common mode 2 kV, differential 1kV)
- EN 61000-4-6: Immunity to conducted disturbances, induced by radio-frequency fields Level 3 (3 Vrms)
- EN 61000-4-8: Power frequency magnetic field immunity test Level 4 (30 A/m)
- EN 61000-4-11: Voltage dips, short interruptions, and voltage variations immunity tests Level 0 (duration 0.5 period – 100 % U)
- EN 61000-4-12: Oscillatory waves immunity test Level 3 (common mode 2.5 kV / diff. Mode 1.0 kV)

Mechanics

Mass: 4 kg (MAP 5000 and 5100)
6kg (MAP 5200 and 6000)

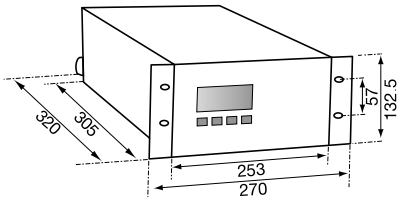
Connection: 4 mm^2 for U and I
2.5 mm^2 for inputs / outputs

Mounting: Slot-in (MAP 5100)
Rack (MAP 5000, 5200 and 6000)

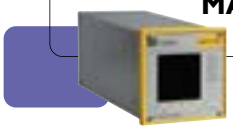
Dimensions (in mm)

MAP 5000

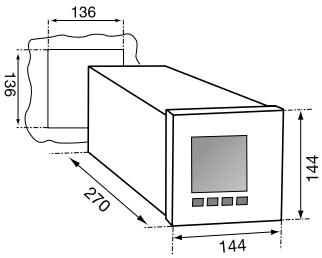
Mass: 4 kg



MAP 5100

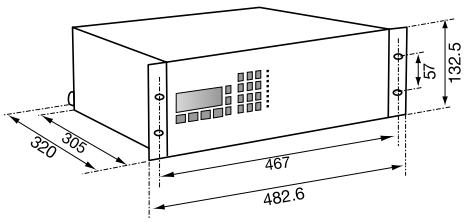


Mass: 4 kg
Mounting: slot-in model

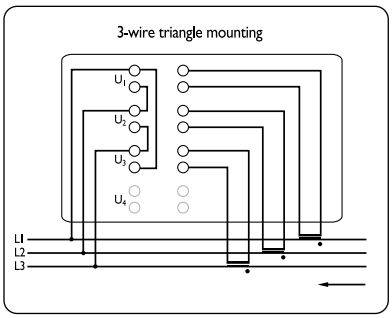


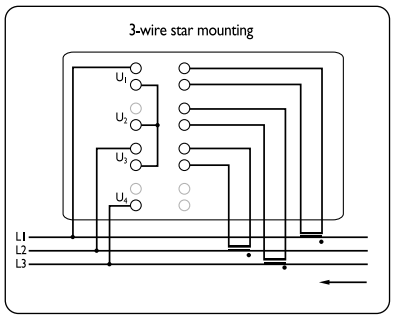
MAP 5200 and 6000

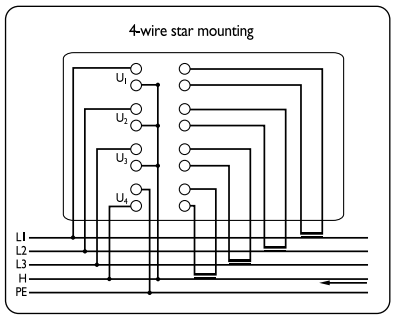
Mass: 6 kg



Electrical connections







NRGCENTER SOFTWARE

Data processing and report publishing software for the MAP range

PRODUCT STRONG POINTS

- ANALYSIS and DIAGNOSIS according to standards in effect.
- FAST DATA ANALYSIS.
- EASY TO USE.

Description

Depending on the options selected, NRGCenter software makes it possible to:

- configure MAP,
- schedule parameter readings,
- display electric parameters (monitoring mode),
- read recorded data,
- analyze disturbances and transients,
- make EN 50160 analysis,
- print reports,
- send alerts by e-mail, SMS, …

Minimum configuration

PC platform
PC operating system: Windows 98, NT, 2000, ME, XP
PC processor: Pentium II
Frequency: 400 MHz
Memory: 128 Mbyte RAM
Hard drive space: 70 Mbytes

NRGCENTER

Configuration and monitoring

- Measuring network parameters by phase and in global (U, I, powers, energies, …)
- Displaying data in standard graphics and in real-time
- Configuring instrument, on-site or remotely
- Analyzing voltage for slow and rapid changes, interruptions, flicker
- Analyzing EN 50160
- Analyzing voltage harmonics
- Programming alarms
- Sending alert messages
- Generating pre-defined reports

MANAGING

Quantity of MAP	Reference
1 to 9	P01 5263 01
10 to 19	P01 5263 02
20 or more	P01 5263 03

OPTION 1

Advanced analysis:

- Analyzing current harmonics and voltage and current interharmonics
- Testing network impedance
- Measuring its symmetric components
- Measuring remote control signaling
- Recording waveforms and disturbances
- Programming multi-criteria for alarms
- Sending alert messages by e-mail or SMS

OPTION 2

Metering:

- Metering in the 4 quadrants
- Load curves
- Power testing and management
- Daily/ Monthly/Total energy index
- Managing tariff periods
- Measuring line/transformer-compensation

OPTION 3

Management:

- Managing access to multi-site networks
- Managing server data base
- Sending pop-up alarm messages
- Directly and automatically sending e-mail or SMS

OPTION 4

Configuration tool kit:

- Customized display screen in real-time
- Generating customized reports
- Managing customized user access

TO ORDER

Quantity of MAP to manage	Reference
One MAP	P01 5263 05
Many MAP	P01 5263 06

Quantity of MAP to manage	Reference
One MAP	P01 5263 07
Many MAP	P01 5263 08

Quantity of MAP to manage	Reference
One or many MAP	P01 5263 09

Quantity of MAP to manage	Reference
One MAP	P01 5263 10
Many MAP	P01 5263 11

Associated product

Network Analysers MAP Range p.6

NRGCENTER

Data processing and report publishing software for the MAP range

General specifications

Parameters as per EN 50160
- Network frequency
- Supply voltage value
- Slow and rapid changes in voltages
- Long and short voltage interruptions
- Voltage supply dips and asymmetries
- Harmonic voltages and interharmonic voltages
- Swells 50 Hz

Flicker
- Flicker measurement as per EN 61000-4-15: short-term flicker (Pst), long-term flicker (Plt)

Voltages and currents
- Average RMS and TRMS
- Peak value and crest factor

Powers/Energies
- Generated and consumed active power
- Inductive or capacitive reactive power
- Apparent power, power factor, cos φ
- Generated and consumed active energy
- Inductive or capacitive reactive energy
- Apparent energy

Harmonic breakdown up to the 63rd order
- Harmonics: current, voltage, power in relation to the fundamental and in absolute
- Phase shifting each harmonic
- Global THD and order by order
- Recognition of the direction of each harmonic order

Unbalance analysis in three-phase system
- System symmetry measurement: negative, zero and positive sequence components
- Phase shift
- Voltage and current in vectoral representation

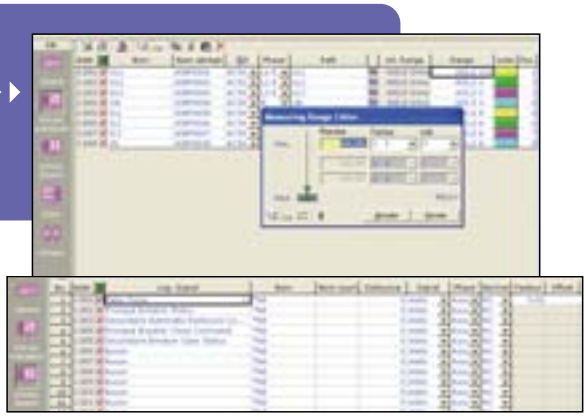
Network analysis
- "Short-circuit" event recording (faultograph function)
- Fault tracking, duration of phenomenon
- Network impedance analysis
- Remote control signaling analysis: frame definition and verification
- Checking the good working order of equipment (capacitor, filters, circuit breakers)

1 DISPLAYING PARAMETERS ON-LINE, continuously and in real time

(refreshed every second)
- View desired parameters: RMS values by phase and in total for voltages, currents, powers, and energies; power factor and cos φ; frequency; voltage and current unbalance; voltage and current harmonic V spectrum up to the 63rd order
- Display these parameters using the graphic editor: tables, histograms, phase diagrams

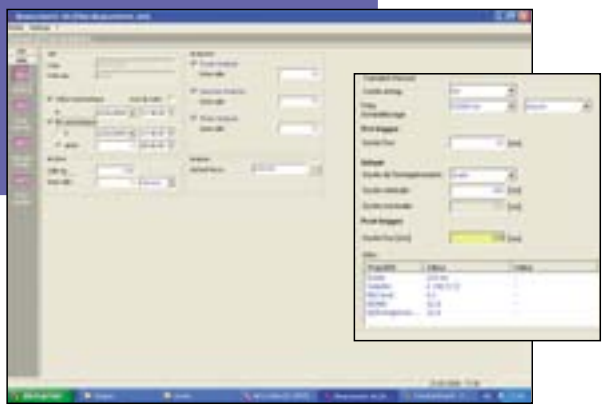
2 CONFIGURING

- Configure analogue/logic inputs and outputs
- Record all measured parameters in cyclic mode or triggered mode



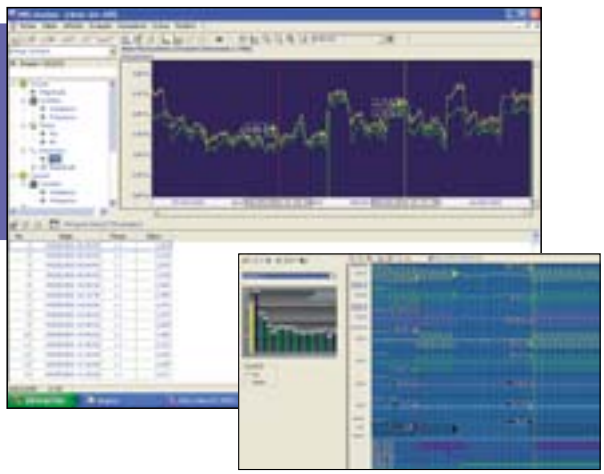
3 Continuous RECORDING

- Continuously monitor all desired parameters according to pre-defined detection thresholds: changes in voltage such as swells, dips, interruptions, under-voltages; or other quality parameters such as power factor, available powers, etc.
- Event recording and storing
- Triggering an action in parallel: send a message on a PC or close a relay when the threshold is passed



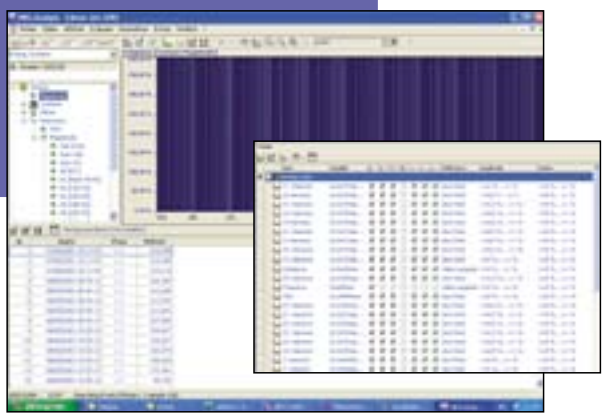
4 VIEWING data

- Display all recorded parameters in graphic or text format: harmonic distortion, viewing harmonic spectrum up to the 63rd order
- View RMS current, voltage, power values, etc.
- View transient recordings



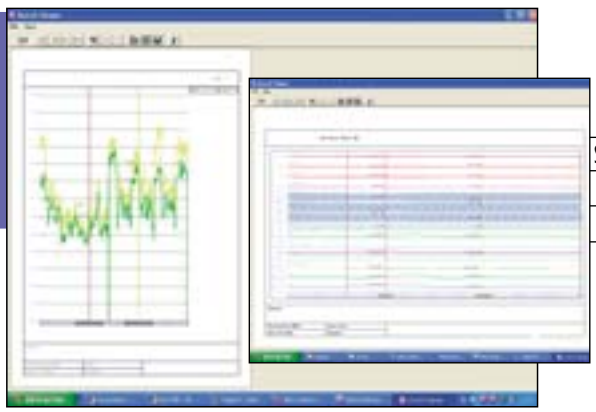
5 EVALUATING & ANALYZING recorded data

- Distribute duration-values for graphic event classification as per the CBEMA standard
- Analyze voltage networks according to the EN 50160 standard in effect
- Modify monitoring thresholds



6 CREATING reports

- Rapidly publish reports from a library of typical reports
- Create new reports according to needs automatically
- Create EN 50160 standard summary tables



ID16M RANGE

Voltage analyzer for MV / LV three-phase network

PRODUCT STRONG POINTS

- FAULT IDENTIFICATION AND SCHEDULING by type.
- RECORDING CAPACITY: 10 x 150-event measurement campaigns.
- RESULT ANALYSIS on PC.

Description

The ID16 analyzer monitors TRMS voltages on single or three-phase networks, detects and records interruptions, swells and under-voltages according to the programmed thresholds.

Programming and analysis of recorded events are carried out using WIN ID16 software.

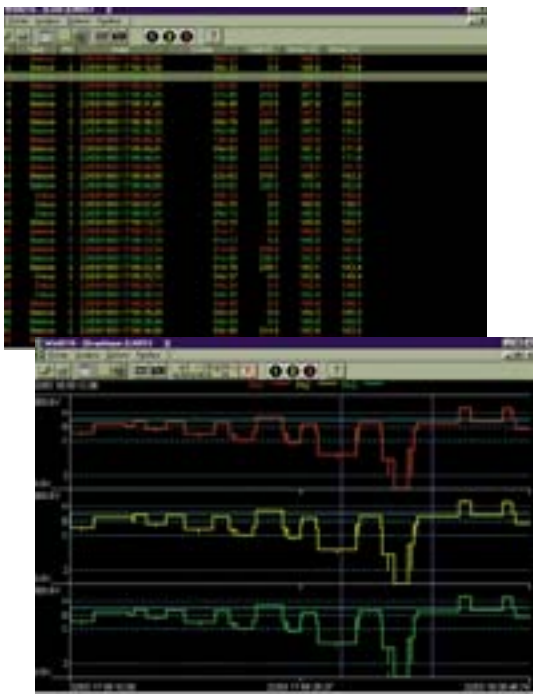
ID16M
Analyzer

Measures phase-to-neutral or phase-to-phase TRMS LV or MV voltage
High and low thresholds: ± 3 % to ± 30 % (step ±1 %)
Dip: - 30 % to -80 % (step ±1 %)
Interruption: - 80 %
Event length: 10 to 990 ms (steps ±10 ms)
Memory capacity: 1500 events or 10 campaigns
Front display: 4 line, 20 figure screen
Output: EIA 232/JBus™ 1200 to 38400 baud
Alarm output: 1 dry contact A/250 V

l'ID16M comes in a hard case containing:
- one ID16M instrument
- one WinID16 software
- measurement leads
- PC hook-up lead

WIN ID16
ANALYSIS SOFTWARE

- Programs fault detection threshold and fault type
- Uses multiple filters for recorded faults
- Sorts specific faults, classes then according to user-selected criteria
- Displays and analyzes many campaigns at the same time
- Communication on RTC via modem



T O O R D E R

Designation	Reference
ID16 in hard case	IND6 00001

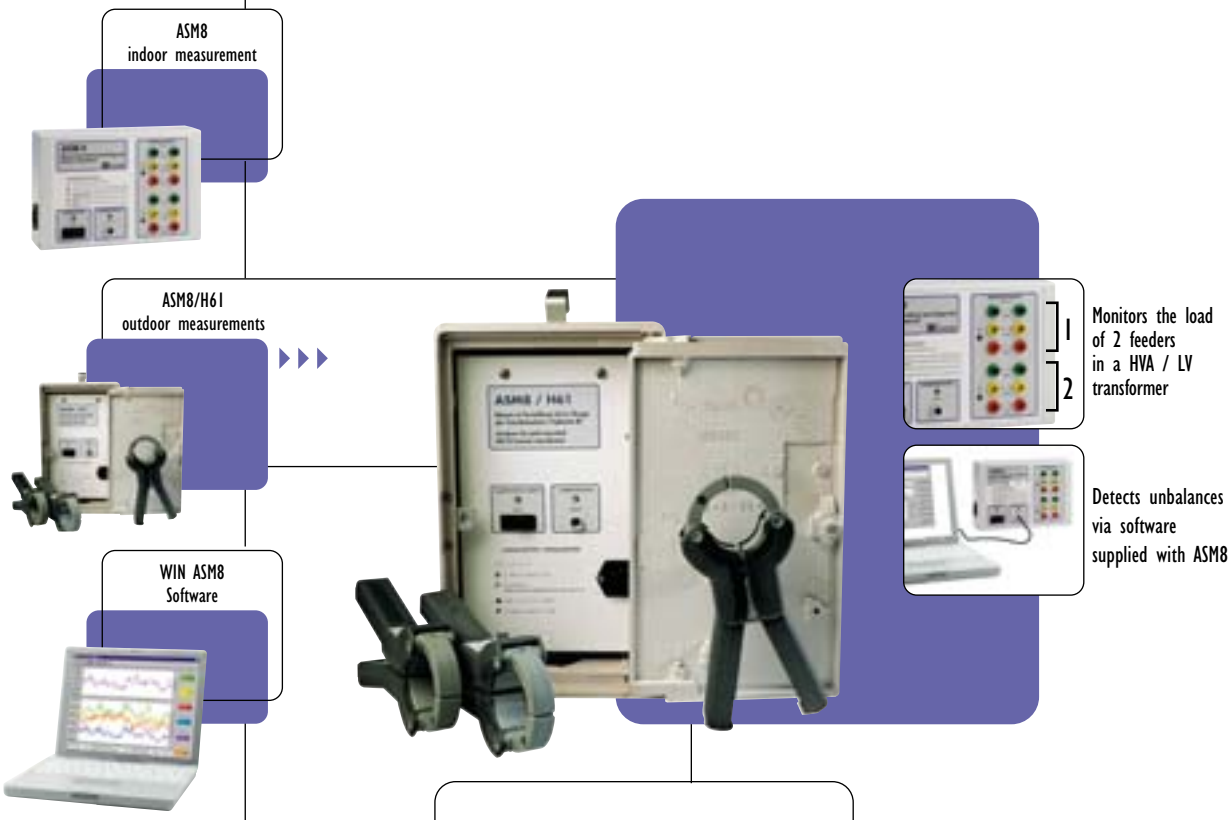
Designation	Reference
Win ID16 Software	LOGH 2001

Associated product

ASM8: Current load curve analyzer
p.16

ASM8 RANGE

Current load curve analyzer for HVA / LV tansformers



PRODUCT STRONG POINTS

- PRODUCT SET UP without network shut-down.
- OPERATES INDEPENDANTLY on battery (ASM8/H61).
- CASING SEALED for outdoor measurements (ASM8/H61).

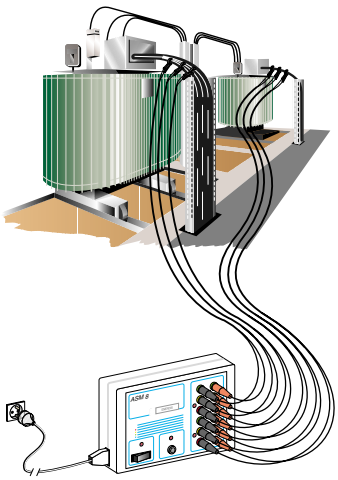
Description

ASM8 and ASM8/H61 record the current on each phase for a period of 8 days.
They calculate the current in the neutral and determine the unbalance for up to two feeders. The integration period is 10 minutes for RMS measurements and 1 minute for maximum current.
You can load measurements in the memory for subsequent display on a PC WinASM8 operating software.

ASM8

Designed to meet utilities' requirements, the ASM8 is a management and optimization tool for all industrial networks. With its 6 inputs, the instrument can monitor the load of 2 different transformers.

It is supplied with a leather carrying case and six 500/1A clamps, leads and WinASM8 software.

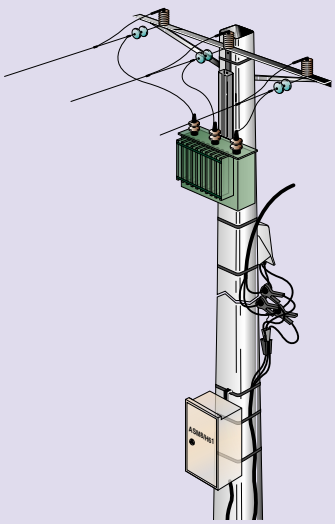


Designation	Reference
ASM8 with clamps	ASM8 0002
ASM8 with 6 clamps 500/1A	ASM8 0001
1 x C174 clamp 300/1A	P01 1203 28
1 x C175 clamp 500/1A	P01 1203 29

ASM8/H61 portable

The ASM8/H61 is a portable version designed for measuring runs on LV power distribution transformers up to 160 kVA and is installed under pole-mounted power transformers.

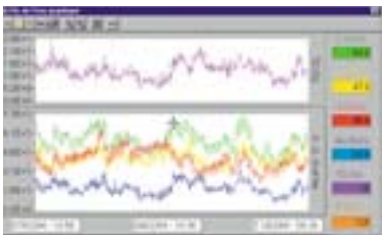
It is supplied with a carrying case and 300/1A clamps (3 for 1-feeder model, 6 for 2-feeder model), leads and WinASM8 software.



Designation	Reference
ASM8/H61 1 feeder with 3 x 300/1A clamps	AS8P 1000
ASM8/H61 2 feeders with 6 x 300/1A clamps	AS8P 1001
ASM8/H61 1 feeder with 3 x 500/1A clamps	AS8P 1002
ASM8/H61 2 feeders with 6 x 500/1A clamps	AS8P 1003
5/1A current clamp adapter	ACCV 1000

WIN ASM8 Analysis software

- ASM8 and ASMO/H61 initialization and programming
- Remotely reads measurement campaigns
- Displays tables, histogram or load curve
- Displays max values for 1 min
- Monitors values for 1sec and 1 min
- Saves measurement campaigns



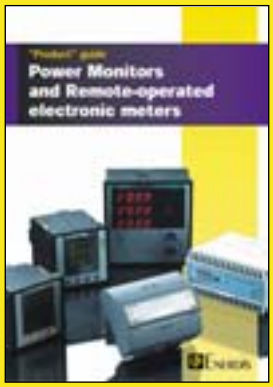
Designation	Reference
WinASM8 software for ASM8 and ASM8/H61	LOGH 2002

TO ORDER

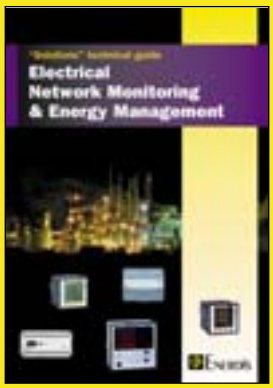
Associated products

ID16M
Voltage analyzer
p.15

C173
Current clamps
see Enerdis Catalogue



ENERDIS
"Product" guide
Power Monitors
and Remote-operated
electronic meters



ENERDIS
"Solutions" technical guide
Electrical Network
Monitoring & Energy
Management

OUR NEW PRODUCTS...

ENERDIS, dedicated to giving you the best in energy quality and management as well as electrical installation monitoring and safety, is also capable of meeting your needs in the following domains:

- **Reactive energy compensation**
- **Protection relay testing (any type and function)**
- **HVA / HVB circuit breaker testing**
- **Tariff metering calibration**

REAL ON-SITE MEASUREMENT SERVICE

ENERDIS also is a technical team that carries out, on-site, all types of measurements you require for network provisioning, maintenance and safety.

906 211 090 - Ed 01 - 03/2004 - Characteristics and pictures are not contractual

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