EnergyTeam®

Innovative services and integrated solutions for energy consumption efficiency

20 YEARS 1996 2016

20 years at the service of Energy Efficiency

Energy Efficiency

Energy: a precious and vital stream with a major influence on our lives

The awareness of this condition and the growing worldwide demand for this primary asset require urgent management policies in order to achieve the highest level of energy efficiency. Our mission is to develop products and services aimed to the exploitation of the most important, ecological and economical available resource that is Energy Efficiency, often hidden in our unconscious daily wastes.

Our solutions together with the data management system "Energy Sentinel®", allow Energy Managers, energy professionals, energy consulting firms (ESCOs in particular) and all those companies wishing to be compliant with the ISO 50001:2011 certification, to monitor in an effective way their energy consumptions.

A constantly growing and developing Company

Energy Team was founded in 1996 and thanks to good instincts and passion, the company started developing and providing efficient solutions for the effective use of energy resources. Energy Team has never stopped growing both in ideas and size and currently counts 70 employees, allocated in different business areas (more than 50% in Technical and R&D area). After the consolidation of National Market, we are moving towards foreign markets.

10.000 customers guarantee, more than anything else, reliability and results brought by Energy Team solutions.

Energy Efficiency as a factor of competitiveness on the global market

According to over 1020 feedbacks on the level of customers' satisfaction in our services and solutions, we have obtained the following results.

Can you quantify the improvement in your Company's energy performance following the implementation of a monitoring system? (1020 customers)	
Performance Improvement	**Answers**
5%	23,79%
5% - 10%	50,54%
10% - 15%	13,24%
>15%	12,43%

The role of monitoring in energy management systems

Measurement → **Data analysis and consumptions reduction** → **Energy efficiency**

Comprehension of real energy flows and needs

Detection of consumptions not necessary for production processes. Wastes Reduction. Interventions with BAT

Planning strategy aimed to energy efficiency continuous improvement

Plan	Do	Check	Act
Establishment of Objectives and Action Plans aimed to Energy Efficiency	Implementation of energy Action Plan through all its steps	Monitoring and measurement of all Actions that affect both economic andenergetic performances	Taking actions to continuously improve the performance of the Energy Management System

The key to each Management System which provides "continuous improvement" principle (Kaizen), according to ISO 50001:2011 standard

Our solutions

THERMAL ENERGY, ELECTRICITY, COMPRESSED AIR, GAS, ETC.

We have the right monitoring solution for all energy utilities. Our innovative services and integrated solutions, will help you achieve high Energy Efficiency.

DATA PUBLICATION

Your energy data will be just a click away. Our powerful web based software collects precious information from all your measuring devices, ready for online publication and analysis.

ENERGY ANALYSIS

Analyze all data acquired by the monitoring system to detect and evaluate potential savings that can be achieved improving your energy management and upgrading your monitoring solutions.

Successful stories with global partners

8,8% — Chemical company

Higher productivity, important economic savings, loads' reorganisation on more convenient time bands.
The most important results were obtained on those energy utilities connected to power factor correction, compressed air production, lighting and elimination of waste of energy.

8% — Food manufacturing company

Higher production efficiency achieved by some changes in the timing of the production chain, waste management and maintenance processes.
The Energy Management System helped the Company achieve the UNI CEI EN ISO 50001:2011 certification.

6% — Automotive components company

Important reduction in compressed air costs and optimised production cycles to lower water and gas consumption.
The Energy Management System helped the Company achieve the UNI CEI EN ISO 50001:2011 certification.

40% — Satellite tv broadcasting headqarters

A monitoring campaign on energy used by the HVAC system helped increase equipment efficiency, reduce peak consumption and waste of energy with 40% reduction on annual Energy expenses.
The Energy Management System helped the Company achieve the UNI CEI EN ISO 50001:2011 certification.

11% — Fast food restaurants

Typical multisite approach: 84 restaurants were monitored on daily and nighttime energy consumption to reduce waste of energy from HVAC and lighting systems.
The Energy Management System helped the Company achieve the UNI CEI EN ISO 50001:2011 certification.

Solutions and systems for energy efficiency

Energy Sentinel Web®
Energy Management & Monitoring software
Your Energy data Online Anywhere, Simple.

CLOUD

X-METER
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PULSE

STEAM

WATER

TRANSFORMER 1

VOLTAGE/CURRENT

GSM/GPRS - LAN

NG-GATEWAY
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NG-9-96
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VOLTAGE/CURRENT

ELECTRICAL CABIN 1

EASY-4 HALL
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PHOTOV

RS-485 - LAN

COMPRESSOR ROOM

NG-RIO

REFRIGERATION UNIT

NG-TH169

FURNACE

MOTORS

X-METER
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NG-9 PLUS
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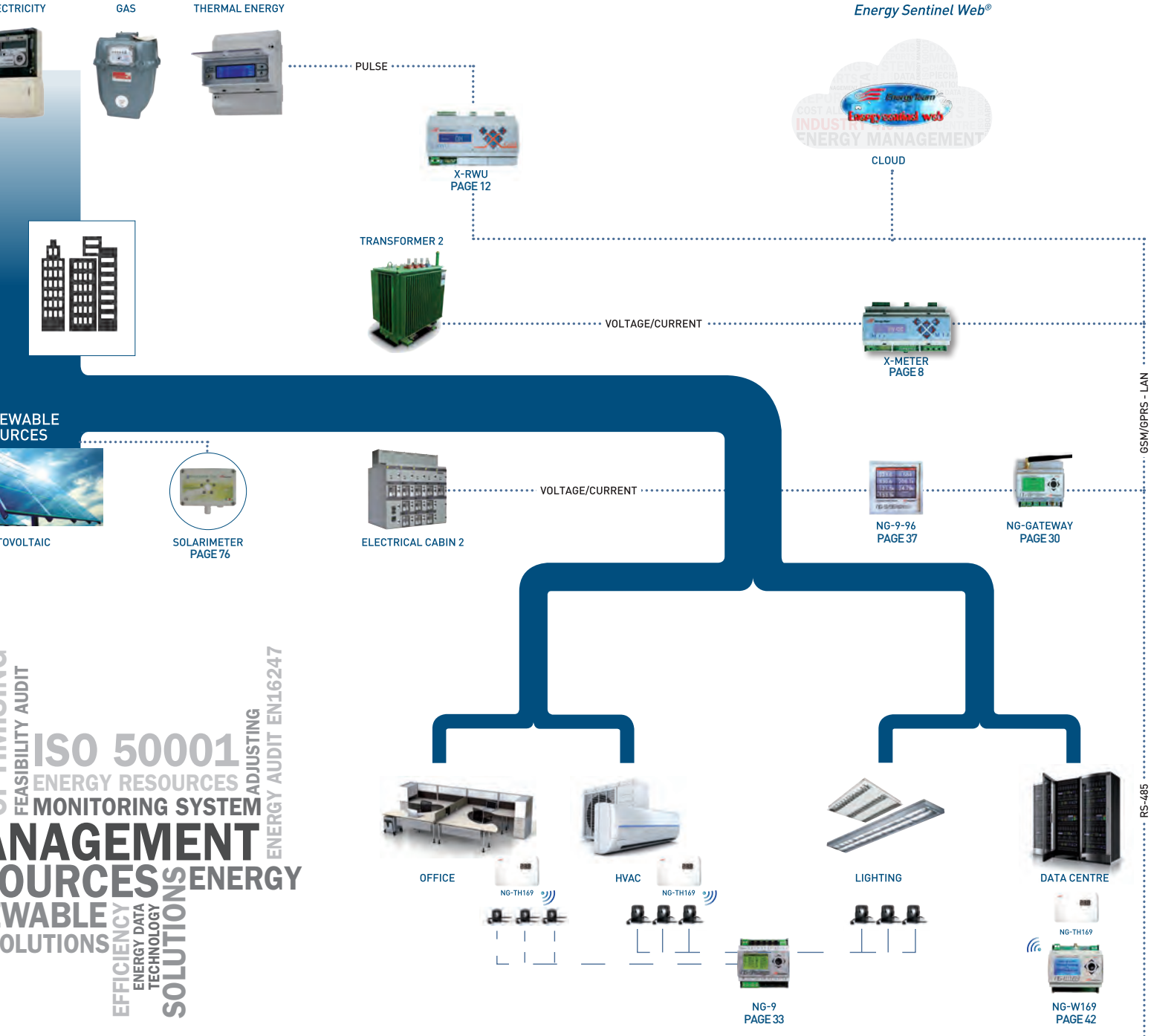
ENVIRONMENT
ENERGY EFFICIENCY
METERS GAS WATER
ENERGY MA
AWARENESS
ENMS IMPLEMENTATION
ENERGY CONSUMPTION
ELECTRICITY
FLASH AUDIT CONTROL
RESO
RENEV
ENERGY MANAGEMENT SO
OPTIMISING

ACQUIRE: Power, Energy, Flow, Temperature, Humidity, Status,
Analogic Signals, Digital Signals.



SEND: ALARMS (STATUS AND THRESHOLDS EXCEEDANCE), ACQUIRED DATA, DRIVES (PLANNED THRESHOLDS)

From typewriters to Facebook

It was May 1996 and energy Team's adventure had begun a few months back. One morning, an envelope landed on my desk, a proper post delivered one with an order inside it; a typewriter sheet, the kind you'd imagine great journalists handle.
Well, that was the last time we have received a typewritten order, the last post of a world that was slowly disappearing and, it was with great respect that we photocopied it and placed the original one in our desks' bottom drawer to be kept as one would a relic.
It has been a while now, since that May 1996 when Internet was for niche users only. A lot of water has flowed under the bridge since then, nowadays, with social networks, cloud servers and big data exchanges leading the technological revolution, Energy Team joined the evolution process and it is ready to face the changes.

Technology evolves at the speed of light, changing the way we live and work.
We find ourselves in a digital world with pulsing data streams and this change has a deep impact on our lives, from our daily routine to our Companies.
Industry 4.0 means a further step ahead in our companies, a development started long ago with steam engines during the first industrial revolution.
Industry 4.0 is a new approach to industry production, based on smart machinery, connected to the Internet, the Internet of Things.
The connection between pre-existing devices and cost effective sensors for environmental and electrical parameters will make data acquisition and analysis possible together with their integration into production processes aimed to product improvement as well as maintenance costs reduction and energy wastes elimination.

A better knowledge of the product leads to grow and improve customers' satisfaction and loyalty. Industry 4.0 is a crucial step to keep our Companies competitive in both domestic and International markets.

Energy Team is ready for this revolution and, together with you we want to be leading actors on this new stage while keep carrying our 20 years' worth of experience. We are ready to look at the feature, aware of those lessons learned from the past, honouring them like that old letter we keep in our drawer.

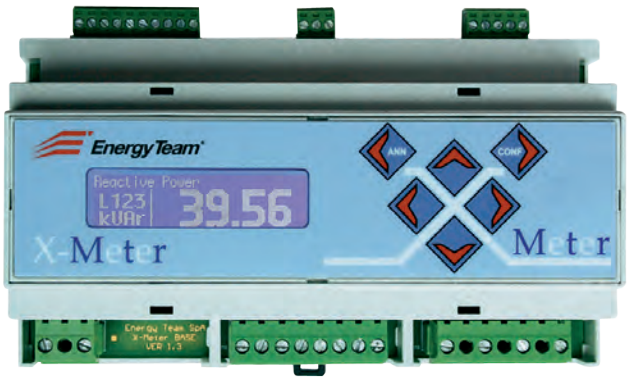
Maurizio Bianchi
Roberto Rocchi
Luigi Galli
Luciano Telli
Stefano Ferrario
Andrea Vassalli

Index

X-Meter DIN

Electrical mains analyzer and Datalogger in a single instrument

Available in two versions: 5A(**) or with voltage inputs (***)



- Bidirectional Meter (Imported/delivered power)
- 50 true measurements
- Measurements in true value (true RMS)
- Measurements on 4 quadrants
- Graphic display, font size can be set
- Full and clear indications of measurements
- 6-key keyboard with buzzer
- Configurable pulsed outputs of all measured quantities
- Configurable alarm outputs of measured quantities
- Graphic display of Voltage, Current, Power and COS*f* for the last 3 days
- 12 Power Totalizators on 4 quadrants that can be reset using a password
- Indication in Euros of absorbed and delivered power
- Clock and Calendar
- Container of DIN rail 46277 (9 modules)
- Removable clamps to make installation easier
- Temperature probe inside the instrument
- Software TA and TV inversion function
- Expansion and modularity (memory, digital inputs, GSM/GPRS modem, Ethernet, email, quality of supply).

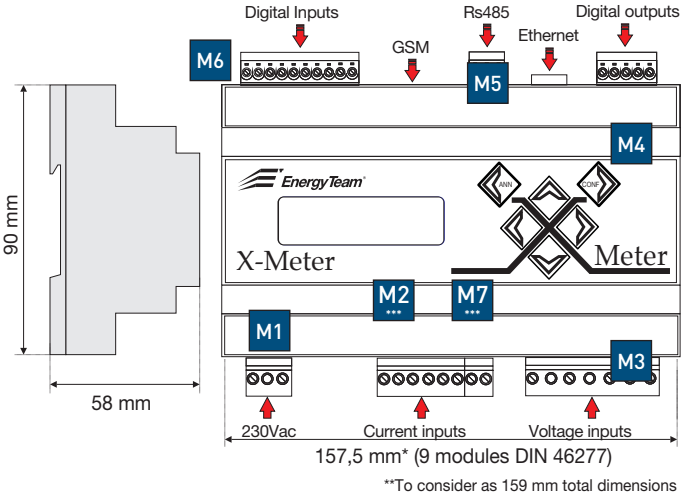
Options

XM1 - Memory Extension and Communication
XM2 - 232/485 - USB/485 Bridge
XM3 - 8 Digital Inputs
XM4 - GSM/GPRS
XM5 - Ethernet
XM6 - Harmonics recording

Clear advantages:
The cost of the device is comparable to that of other simple multifunction instruments but the X-Meter has better initial features (graphic display, pulsed outputs for absorbed power, short time storage of consumption levels) and it also can be upgraded and implemented to become a Power Quality device with no need to replace it. Create your X-Meter according to your exact needs, see the optional modules.

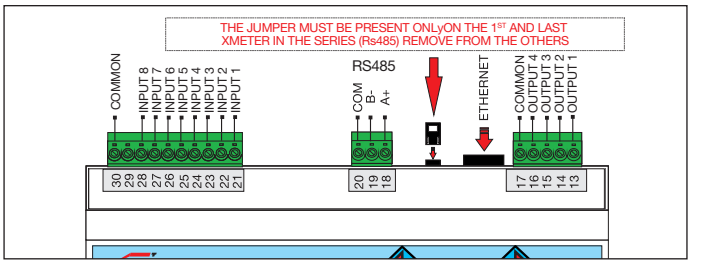
Measurements on 50/60Hz g4rid	
Voltage	Vac
Active Power	W
Reactive Power	VAr
Apparent Power	VA
Distorting Power	VA
Three-phase equivalent current	A
Mains current	A
Cos*f*	
Power factor	
Active power delivered	Wh
Active power absorbed	Wh
Inductive reactive power	VArh
Capacitive reactive power	VArh
Frequency	Hz
Precision	+/- 0.25% of full scale Meas. Val. +/- 0.50% of full scale Deriv. Meas. Val.
Power supply	
Power voltage	100-250 Vac / 100-350 Vdc
Frequency	50-60 Hz
Consumption	5 Va
General	
Voltage inputs N.3	100 o 400 Vac
Current inputs	(**) 3 current inputs with 5ARMS voltage output (***) 3 inputs in specific current for sensors with 1VtRMS voltage
Pulsed outputs N.2 (Act/React)	
Optomos outputs (N.1 Min N.1 Max)	100 mA / 24 Vdc
Protection rating	IP 20
Weight	400 gr
Dimensions LxHxW 9 DIN modules	157.5 x 90 x58 mm
Graphic	Display
Operating temperature	-10°C + 55°C
Relative humidity	95% non-condensing

Dimensions and Terminal boards



M1	**Power supply** - Maximum cable section: 2 mm2 (16AwG)
M2**	**Current input**- Maximum cable section: 2.5 mm2 (14AwG)
M7***	**Voltage signal inputs** (current measurements) Maximum cable section: 0.75 mm2 (14AwG)
M3	**Voltage inputs** - Maximum cable section: 2.5 mm2 (14AwG)
M4	**Digital outputs** - Maximum cable section: 0.75 mm2 (18AwG)
M5	**FS485** - Maximum cable section: 0.75 mm2 (18AwG) Belden 9841
M6	**Digital inputs** - Maximum cable section: 0.75 mm2 (18AwG)

I/O Serial Connections



XM1 - Memory Extension and Communication

This module is essential for the instrument to communicate with the Energy Management software and to considerably improve the instrument's memory thus allowing the user to store all measurements for as long as 250 days with15 seconds integration time for the following values: line voltage and phase voltage, three-phase line current, three-phase active power, three-phase reactive power, three-phase power factor. Enable the instrument's RS485 communication port to connect the X-Meter to your PC and connect a series of devices together.

XM2 - 232/485 - USB/485 Bridge

The 232/485 Bridge conversion module with 230Vac power supply (in a 4 DIN module container), can be used to convert 485 signal coming from X-Meter's into 232 serial towards the PC's communication port (also available as USB/485). The USB connection's isolation ensures your PC maximum protection from disturbances or voltage surges coming from the field. This unique module was designed with industrial features and does not require any bulky external power supply as it is self-powered.

XM3 - 8 Digital Inputs

XM3, with 8 self-powered (12Vdc) digital inputs, is ideal for acquiring status and pulses coming from other meters (gas, water, compressed air, etc.) it is also possible to file data from various acquisition channels separately and inquire any of them with a software (not included - with XM1 enabled on the device).

XM4 - GSM/GPRS

GSM/GPRS modem module (together with the XM3) to make the device send emails and SMS's for alarms and status coming from the field. This module allows the remote reading of the X-Meter for online data publication service through our website. Accessed with a user ID and password to read your data that can also be converted into Excel and Access format and downloaded to your PC. This function is available with XM1 function enabled.

XM5 - Ethernet

This Ethernet card inside the device allows the X-Meter to be connected to the corporate network or intranet from various data collecting instruments and monitoring stations through an IP address. This function is only available with XM1 and Energy Management software enabled.

XM6 - Harmonics recording

Module for harmonics measurement up to the 25th which also allows data storing.

XM7 - Annual programmable clocks

This firmware module for programmable clocks with perpetual annual calendar lets the user enable 4 optomos outputs on the X-Meter DIN for automatic management of set utilities' switching ON and OFF (i.e. lights, motor, HVAC, etc.). Each X-Meter can manage up to 12 daily profiles, 2 special periods and 20 special days. Each profile defines 8 status changes within 1one day (24 hours) for each one of the 4 loads. Connect up to 128 X-Meter's for up to 512 loads' management. This function is only available with XM1 enabled.

XM8 - Galvanically Isolated analogic Channel

1 DIN module for voltage or current signals interfacing to the X-Meter's inputs for data visualisation and storage. The X-Meter can power up to two XM8 modules and any additional one must have its own 12Vdc power supply (not included).There are 11 possible interface configurations for voltage and current signals with 0,5% full scale precision guaranteed.

XM9 - PT100-500-1000 probe interface module

1 DIN module for PT100, PT500 and PT1000 temperature probes interfacing with the X-Meter's inputs to visualise and file the temperature data acquired. The X-Meter can power up to two XM9 modules and any additional one must have its own 12Vdc power supply (not included). 0,5% full scale precision guaranteed.

XM10 - Room temperature

This device acquires room temperature data (-10 °C +65°C ± 1.5°C) to send them to the X-Meter's for visualisation and storage. XM10 is suitable for wall fitting and the X-Meter can power up to two XM10 modules and any additional one must have its own 12Vdc power supply (not included). It is particularly suitable to monitor and manage room temperature in Data Centres, LV/MV panels, warehouses, etc.

XM11 - Room temperature and humidity

This device acquires room temperature and humidity data to send them to the X-Meter's for visualisation and storage. XM11 is suitable for wall fitting and the X-Meter can power up to two XM11 modules and any additional one must have its own 12Vdc power supply (not included). It is particularly suitable to monitor and manage room temperature and humidity in Food industry. Humidity Range (Relative Hum 0-100%) ±2% accuracy within the 10 to 90% range. Temperature Range (-10°C +65°C) ±0,8°C accuracy (±0.3°C at 25°C).

XM14 - Power quality

This module lets the user record voltage swells and values with 10 ms integration. XM14 can also measure and store harmonics up to the 25th, both voltage and current. An alarm can be set in advance to send and alert enabled when micro interruptions occur.

XM15 - Load interface relay module

To use the 4 outputs and manage the 220Vac single phase standard loads, they must be connected to an XM15 module. The module is 220Vac powered and the 4 relays are entirely independent and each one of them can manage loads up to 16A.

XM18 - Loads management

The 4 outputs' management is carried out by a sophisticated software that makes it possible to intervene and manage the loads to eliminate or reduce power usage according to the thresholds agreed with the Electricity supplier.

Monitoring Software

Energy monitoring and management software.
Visit our website www.energyteam.it/en/ for further technical information.

Openable current transformer with voltage output

CODE Item Energy Team	Internal Dimensions Pass-through (mm) [Ø]	External Dimensions (mm) [WxHxD]	Full scale (A)	Class
XXXXTA	24	46 x 66 x 34,2	50	1
XXXXTA	24	46 x 66 x 34,2	100	1
XXXXTA	24	46 x 66 x 34,2	150	1
XXXXTA	24	46 x 66 x 34,2	200	1
XXXXTA	24	46 x 66 x 34,2	250	1

List of Measurements

Direct measurements for single-phase

- Phase-neutral voltage L1-N
- Phase-neutral voltage L2-N
- Phase-neutral voltage L3-N
- Phase-phase voltage L1-L2
- Phase-phase voltage L2-L3
- Phase-phase voltage L3-l1
- Line Current L1
- Line Current L2
- Line Current L3

Single-phase derived measurement

- Bi-directional active power L1 (positive=imported (Q1 and Q4), negative=exported (Q2 and Q3)
- Bi-directional active power L2 (positive=imported, negative=exported)
- Bi-directional active power L3 (positive=imported, negative=exported)
- Bi-directional active power L1 (positive=imported (Q1 and Q4),
- Bi-directional active power L2 (positive=imported),
- Bi-directional active power L3 (positive=imported),
- Distorting power L1 (indication of presence of current harmonics)
- Distorting power L2 (indication of presence of current harmonics)
- Distorting power L3 (indication of presence of current harmonics)
- Apparent Power L1
- Apparent Power L2
- Apparent Power L3
- Power factor L1
- Power factor L2
- Power factor L3

Main measurements of three-phase system

- Three-phase equivalent voltage phase-neutral
- Three-phase equivalent voltage phase-phase
- Three-phase equivalent current
- Three-phase active power (positive=imported (Q1 and Q4), negative=exported) / Bidirectional
- Three-phase reactive power (positive=imported (Q1 and Q2) / Bidirectional

Secondary measurements of three-phase system

- Three-phase equivalent distorting power
- Three-phase equivalent apparent power
- Three-phase equivalent power factor
- Calculated neutral current
- Neutral-centre voltage ideal star N-0
- Frequency (measured on voltage input L)

Integrated power values of three-phase system

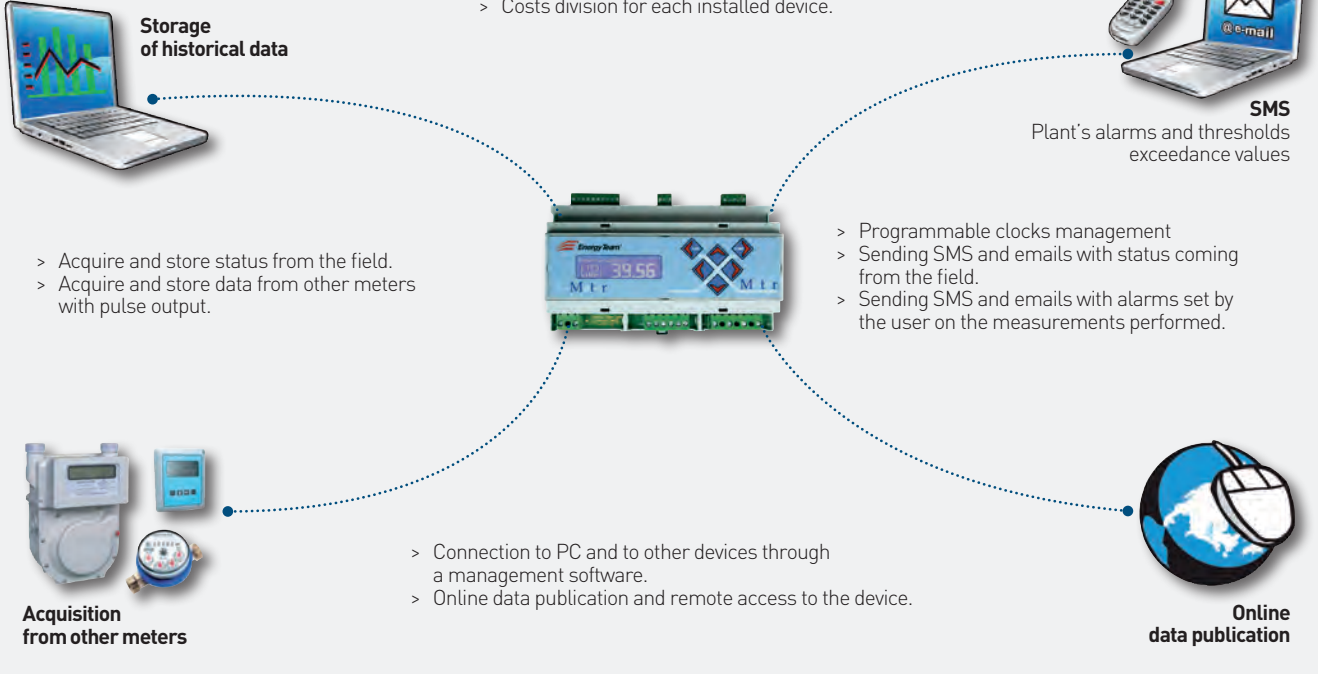
- EImported active power (Q1 and Q4)
- Imported active power (Q1 and Q4)
- Exported active power (Q2 and Q3)
- Imported reactive power (Q1)
- Imported reactive power (Q2)
- Imported reactive power (Q3)
- Imported reactive power (Q4)
- Imported active power (Q2 and Q3)
- Imported active power (Q1)
- Imported active power (Q2)
- Imported active power (Q3)
- Imported active power (Q4)

Compliance

Applied standards

- EN 55011(class A)
- EN 61000-4-2 -EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-11
- EN 61000-4-3
- EN 61000-4-4
- EN 60204-1

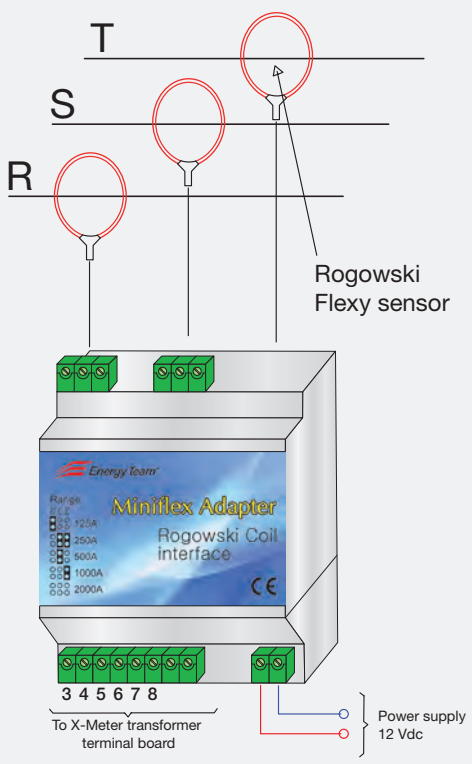
Instrument potential



Rogowski Flexy sensor

The non-intrusive flexible current sensor provides the ability to measure alternating current in any installation with a full rejection of DC component, very low power consumption, no saturation problems, very low temperature influence and very good linearity.

- Flexibility
- Magnetic sensor
- Hole for sealing the sensor and prevent tampering



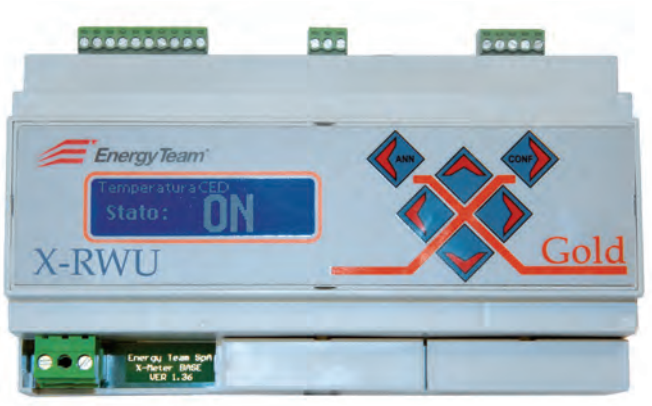
Safety precautions

the current flexible sensor has been designed and tested to fulfill IEC 61010-1:2001/EN 61010-1 61010-2-32 safety standard.

Electrical Features	
Typical Voltage Output EoutRMS	100uV/A @50Hz
Frequency Range	50Hz - 60Hz
Accuracy	+/- 1% of range
Linearity (10% to 100%)	+/- 0.2%
Max. Temperature Coefficient	+/- 0.05%
Position sensibility (junction Cable)	+/- 2%
Electrical Safety	
Isolation	Double Isolation
Protection class	Protection class
Overvoltage Category	1000V CAT III / 600V CAT IV
Pollution Degree	2
Dielectric Rigidity	IEC/EN 61010-2-32:2002, 5.4kV 50Hz

X-RWU

Datalogger



Options

XM2 - USB/485 interface
XM4 - GSM/GPRS
XM5 - Ethernet
XM7 - Annual programmable clocks
XM8 - Galvanically Isolated analogic Channel
XM9 - PT100-500-1000 probe interface module
XM10 - Room temperature
XM11 - Room temperature and humidity
XM15 - Load interface relay module
XM 18 - Loads management

- Graphic display, font size can be set
- Each channel can be configured individually
- 8 self-powered digital inputs at 12 Vdc
- 4 digital optomos outputs (100 mA - 24 DC)
- 1 Mb internal flash memory
- RS485 Communication port
- 6-key keyboard with buzzer
- Clock and Calendar
- DIN 46277 container (9 modules)
- Removable clamps to make installation easier
- High modularity (GSM modem, LAN card, analogue channels, temperature, programmable timers).

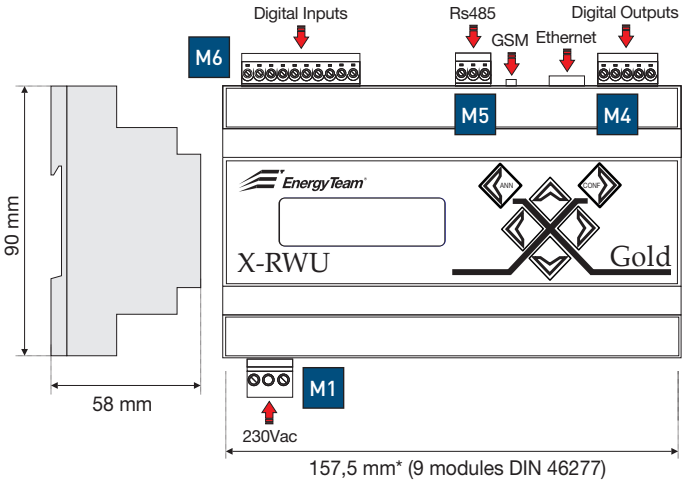
Monitor, Store, Manage

- System status
- Alarms
- Analogue measurements (4-20mA, 0-10V, etc.)
- Process temperature
- Room Temperature
- Data acquisition from various meters

Compliance - Applied standards

- EN 55011(class A)
- EN 61000-4-2 -EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-11
- EN 61000-4-3
- EN 61000-4-4
- EN 60204-1

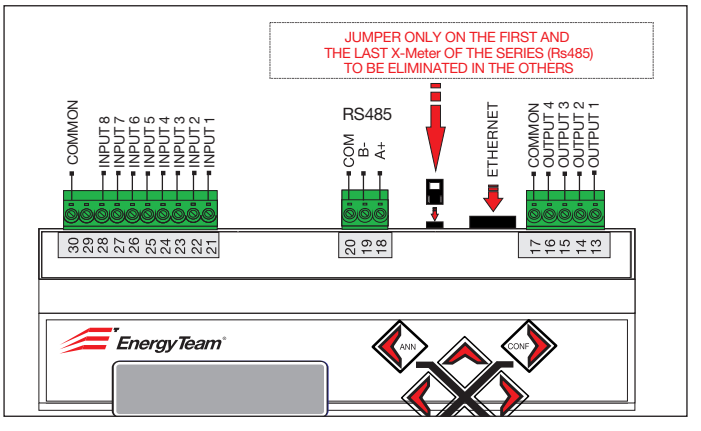
Dimensions and Terminal boards



* Consider 159 mm

M1 **Power supply** - Maximum cable section: 2 mm2 (16AWG)
M4 **Digital outputs** - Maximum cable section: 0.75 mm2 (18AWG)
M5 **Rs485** - Maximum cable section: 0.75 mm2 (18AWG) Belden 9841
M6 **Digital Inputs** - Maximum cable section: 0.75 mm2 (18AWG)

Serial I/O connections



Power supply	
Power voltage	100-250 Vac
Frequency	50-60 Hz
Consumption	5 Va
General	
8 Digital inputs	
Digital input frequency	10 Hz Max.
4 Optomos outputs	100 mA/24 Vdc
Protection rating	IP 20
Weight	400 g
Dimensions LxHxW 9 DIN modules	157.5 x 90 x58 mm
Graphic	Display
Operating temperature	-10 °C + 55 °C
Relative humidity	95% non-condensing

XM2 - 232/485 - USB/485 Bridge

The 232/485 Bridge conversion module with 230Vac power supply (in a 4 DIN module container), can be used to convert 485 signal coming from X-RWU's into 232 serial towards the PC's communication port (also available as USB/485). The USB connection's isolation ensures your PC maximum protection from disturbances or voltage surges coming from the field.

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GSM/GPRS modem module to make the device send emails and SMS's for alarms and status coming from the field This module allows the remote reading of the X-RWU for online data publication service through our website.

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XM8 - Galvanically Isolated analogic Channel

1 DIN module for voltage or current signals interfacing to the X-RWU's inputs for data visualisation and storage. The X-RWU can power up to two XM8 modules and any additional one must have its own 12Vdc power supply (not included).There are 11 possible interface configurations for voltage and current signals with 0,5% full scale precision guaranteed.

XM9 - PT100-500-1000 probe interface module

1 DIN module for PT100, PT500 and PT1000 temperature probes interfacing with the X-RWU's inputs to visualise and file the temperature data acquired. The X-RWU can power up to two XM9 modules and any additional one must have its own 12Vdc power supply (not included). 0,5% full scale precision guaranteed.

XM10 - Room temperature

This device acquires room temperature data (-10 °C +65°C ± 1.5°C) to send them to the X-RWU's for visualisation and storage. XM10 is suitable for wall fitting and the X-RWU can power up to two XM10 modules and any additional one must have its own 12Vdc power supply (not included). It is particularly suitable to monitor and manage room temperature in Data Centres, LV/MV panels, warehouses, etc.

XM11 - Room temperature and humidity

This device acquires room temperature and humidity data to send them to the X-RWU's for visualisation and storage. XM11 is suitable for wall fitting and the X-RWU can power up to two XM11 modules and any additional one must have its own 12Vdc power supply (not included). It is particularly suitable to monitor and manage room temperature and humidity in Food industry. Humidity Range (Relative Hum 0-100%) ±2% accuracy within the 10 to 90% range. Temperature Range (-10°C +65°C) ±0,8°C accuracy (±0.3°C at 25°C).

XM15 - Load interface relay module

To use the 4 outputs and manage the 220Vac single phase standard loads, they must be connected to an XM15 module. The module is 220Vac powered and the 4 relays are entirely independent and each one of them can manage loads up to 16A.

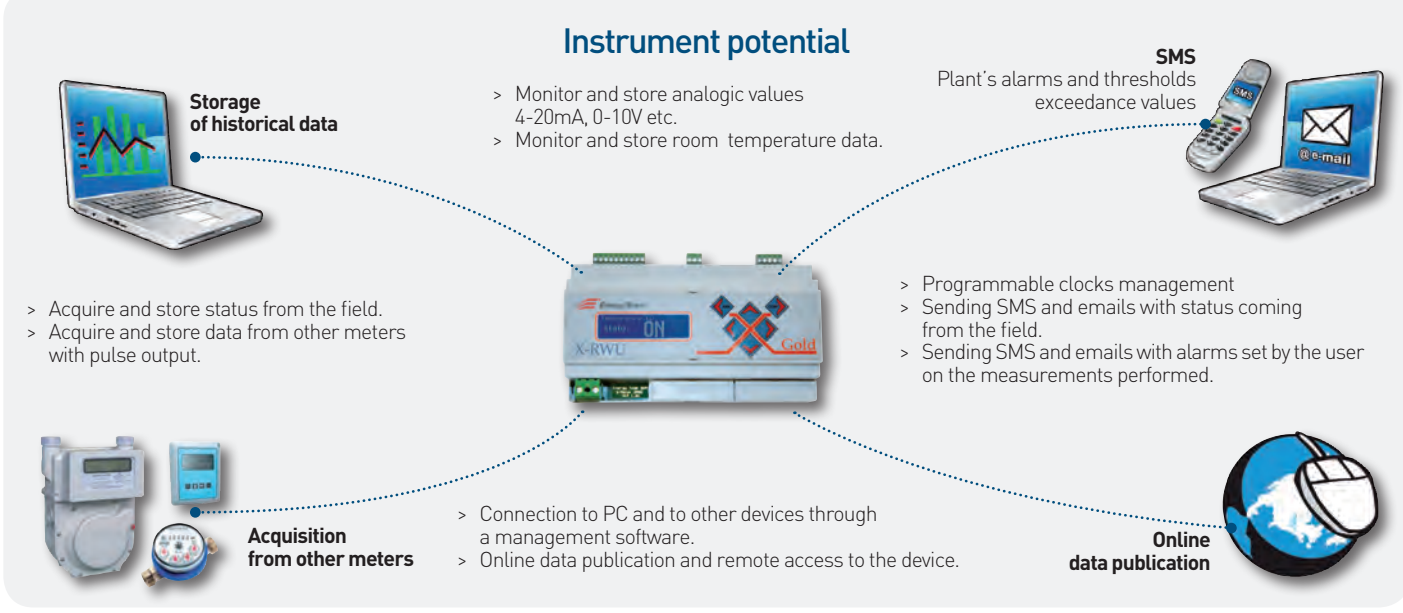
XM18 - Loads management

The 4 outputs' management is carried out by a sophisticated software that makes it possible to intervene and manage the loads to eliminate or reduce power usage according to the thresholds agreed with the Electricity supplier.

Monitoring Software

Energy monitoring and management software.
Visit our website www.energyteam.it/en/ for further technical information.

Instrument potential

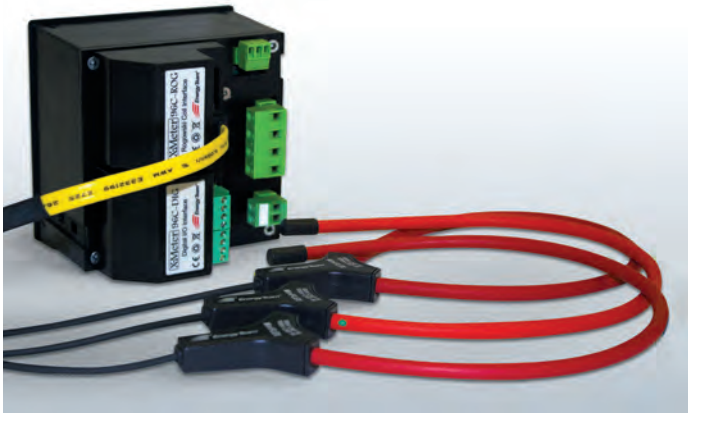


X-Meter 96C

Color LCD TouchscreenNetwork Analyzer for electrical panels. Current measurement with CT, 1V Clamp on and Rogowski coils.

General	References
Consumption	5 VA
Nr.3 Voltage Inputs	100-400 Vac
Nr.3 Current Inputs	SEE OPTIONAL MODULES
Inputs/Outputs	SEE OPTIONAL MODULES
Protection degree	IP 20
Weight	300 gr
Maximum size LxHxW (including terminals)	96 x 96 x 68 mm (83mm including modules)
Size of the recessed part LxHxW (including terminals)	91 x 91 x 65 mm
Display	LCD TFT 3.5" 320x240 pixel 262k colors
User interface	Icons with touchscreen
Working temperature	-10°C + 55°C
Relative humidity	95% without condensation
Accuracy	+/- 0.25% Full-Scale, Measured Value +/- 0.50% Full-Scale, Measured Value Derived
Power Supply	110-240 Vac / 48-120 Vdc
Frequency	50-60 Hz

- Bi-directional meter (Imported/delivered energy)
- 50 true value Measurements (RMS) on 4 quadrants
- The 96x96mm, 65mm deep (80mm incluging the modules) case can be inserted in standard panels.
- Graphic display: 3.5" LCD TFT, 320x240pixel, 262k colors, with resistive touchscreen, for a clear and readable displaying of measurements.
- Graphic displaying of voltage, Current, Power and COSφ data from the last 3 days.
- 12 Power Totalizers on 4 quadrants that can be set to zero.
- Indication in € for absorbed and delivered Energy.
- TA to TV conversion function.
- Temperature probe within the instrument.
- Clock and calendar.
- Optional module available with 4 Open Collector inputs and 2 Optomos Clean contact outputs, (with independent mass reference).
- Different current measurement modules available:
  - with 5A CT's
  - with Rogowski probe from 10 to 2000 A, Ø 100 mm.
  - with Calmp-on 1V TC's. Øint: 24 mm, up to 200A.
- Serial port: RS485
- Protocol: Modbus and ETPRO



Optional modules available

- Module for Current measurement 5A max (with CT's).
- Module for Current measurement 125÷2000A (with Rogowski probes).
- Clamp-on module for Current measurement with 1A CT's.
- I/O module: 4 Open-collector Inputs + 2 Optomos Outputs (clean contact), with independent mass reference.

NOTE: 1 Current Measurement Module and 1 I/O Module can be added on one instrument at the same time.

Applied Standards

- EN 55011(Class A)
- EN 61000-4-2 -EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-11
- EN 61000-4-3
- EN 61000-4-4
- EN 60204-1

List of Measurements

Rear view: terminals, optional modules and mounting brackets

Count of Exported Active Energy and relative cost

Direct measurements for single-phase

- Phase-neutral voltage L1-N
- Phase-neutral voltage L2-N
- Phase-neutral voltage L3-N
- Phase-phase voltage L1-L2
- Phase-phase voltage L2-L3
- Phase-phase voltage L3-L1
- Line current L1
- Line current L2
- Line current L3

Single-phase derived measurements

- Bi-directional active power L1 (positive=imported (Q1 and Q4), negative=exported (Q2 and Q3)
- Bi-directional active power L2 (positive=imported, negative=exported)
- Bi-directional active power L3 (positive=imported, negative=exported)
- Bi-directional reactive power L1 (positive=imported (Q1and Q4)
- Bi-directional reactive power L2 (positive=imported)
- Bi-directional reactive power L3 (positive=imported)
- Distorting power L1 (indication of presence of current harmonics)
- Distorting power L2 (indication of presence of current harmonics)
- Distorting power L3 (indication of presence of current harmonics)
- Apparent power L1
- Apparent power L2
- Apparent power L3
- Power factor L1
- Power factor L2
- Power factor L3

Main measurements of three-phase system

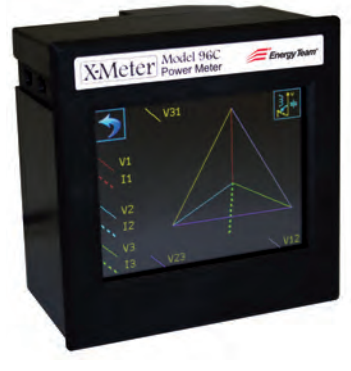
- Three-phase equivalent voltage phase-neutral
- Three-phase equivalent voltage phase-phase
- Three-phase equivalent current
- Three-phase active power (positive=imported, negative=exported) Bidirectional
- Three-phase reactive power (positive=imported) Bi-directional

Secondary measurements of three-phase system

- Three-phase equivalent distorting power
- Three-phase equivalent apparent power
- Three-phase equivalent power factor
- Calculated neutral current
- Ideal Neutral-center star Voltage, N-0
- Frequency (measured on voltage input L)

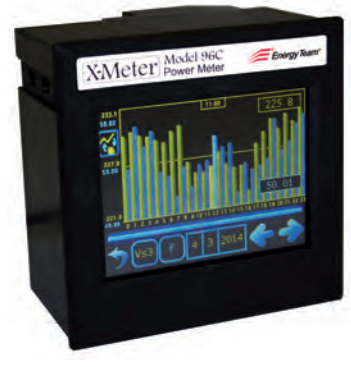
Integrated Energy values of t hree-phase system

- Imported active Energy, Bench 1
- Exported active Energy, Bench 1
- Imported Inductive Energy (Q1), Bench 1
- Exported Capacitive Energy (Q2), Bench 1
- Exported Inductive Energy (Q3), Bench 1
- Imported Capacitive Energy (Q4), Bench 1
- Imported active Energy, Bench 2
- Exported active Energy, Bench 2
- Imported Inductive Energy (Q1), Bench 2
- Exported Capacitive Energy (Q2), Bench 2
- Exported Inductive Energy (Q3), Bench 2
- Imported Capacitive Energy (Q4), Bench 2



Phase diagram of the plant

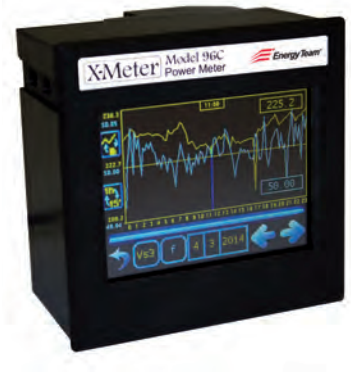
Page of Electrical Measurements: Phase-Neutral voltage



Hourly chart bar of the measurements in the historical archive

Setup, page 1

Page of Electrical Measurements: Three-phase system



Line graph of the measurements in the historical archive

Options X-Meter 96C

96C-TA5 - Current Interface

Currents measurement module: three 5A max inputs for CT connection.

96C-ROG - Rogowski sensors Interface

Current measurement module for Rogowski connection: selectable range 125-250-100-1000-2000A with a keypad ,entire measurement chain's precision guaranteed (analyser+Rogowski coil): class 1.

96C-CC1 - 1Veff Current Interface

Current measurement module for 3 CT's (24mm diameter) with 1V output and fixed flow from 25 to 200A. Entire measurement chain's precision guaranteed (analyser+Rogowski coil): class 1.

96C-DIG - Digital I/O Interface

II/O module with 4 open collector inputs for clean contacts and two 24Vac or 100mA max Optomos outputs and independent mass reference.

XM1 - Memory Extension and Communication

This module is essential for the instrument to communicate with the Energy Monitoring software and to considerably improve the instrument's memory thus allowing the user to store all measurements for as long as 250 days with15 seconds integration time for the following values: line voltage and phase voltage, three-phase line current, three-phase active power, three-phase reactive power, three-phase power factor. Enable the instrument's RS485 communication port to connect the X-Meter 96C to your PC and connect a series of devices together.

XM2 - 232/485 - USB/485 Bridge

The 232/485 Bridge conversion module with 230Vac power supply (in a 4 DIN module container), can be used to convert 485 signal coming from X-Meter 96C's into 232 serial towards the PC's communication port (also available as USB/485). The USB connection's isolation ensures your PC maximum protection from disturbances or voltage surges coming from the field.

XM6 - Harmonics recording

Module for harmonics measurement up to the 25th which also allows data storing.

XM7 - Annual programmable clocks

This firmware module for programmable clocks with perpetual annual calendar lets the user enable 4 optomos outputs on the X-Meter 96C for automatic management of set utilities' switching ON and OFF (i.e. lights, motor, HVAC, etc.). Each X-Meter 96C can manage up to 12 daily profiles, 2 special periods and 20 special days. Each profile defines 8 status changes within 1one day (24 hours) for each one of the 4 loads. Connect up to 128 X-Meter 96C's for up to 512 loads' management. This function is only available with XM1 enabled.

XM8 - Galvanically Isolated analogic Channel

1 DIN module for voltage or current signals interfacing to the X-Meter 96C's inputs for data visualisation and storage. The X-Meter 96C can power up to two XM8 modules and any additional one must have its own 12Vdc power supply (not included).There are 11 possible interface configurations for voltage and current signals with 0,5% full scale precision guaranteed.

XM9 - PT100-500-1000 probe interface module

PT1000 temperature probes interfacing with the X-Meter 96C's inputs to visualise and file the temperature data acquired. The X-Meter 96C can power up to two XM9 modules and any additional one must have its own 12Vdc power supply (not included). 0,5% full scale precision guaranteed.

XM10 - Room temperature

This device acquires room temperature data (-10 °C +65°C ± 1.5°C) to send them to the X-Meter 96C's for visualisation and storage. XM10 is suitable for wall fitting and the X-Meter 96C can power up to two XM10 modules and any additional one must have its own 12Vdc power supply (not included). It is particularly suitable to monitor and manage room temperature in Data Centres, LV/MV panels, warehouses, etc.

XM11 - Room temperature and humidity

This device acquires room temperature and humidity data to send them to the X-Meter 96C's for visualisation and storage. XM11 is suitable for wall fitting and the X-Meter 96C can power up to two XM11 modules and any additional one must have its own 12Vdc power supply (not included). It is particularly suitable to monitor and manage room temperature and humidity in Food industry. Humidity Range (Relative Hum 0-100%) ±2% accuracy within the 10 to 90% range. Temperature Range (-10°C +65°C) ±0,8°C accuracy (±0.3°C at 25°C).

XM14 - Power quality

This module lets the user record voltage swells and values with 10 ms integration. XM14 can also measure and store harmonics up to the 25th, both voltage and current. An alarm can be set in advance to send and alert enabled when micro interruptions occur.

XM15 - Load interface relay module

To use the 4 outputs and manage the 220Vac single phase standard loads, they must be connected to an XM15 module. The module is 220Vac powered and the 4 relays are entirely independent and each one of them can manage loads up to 16A.

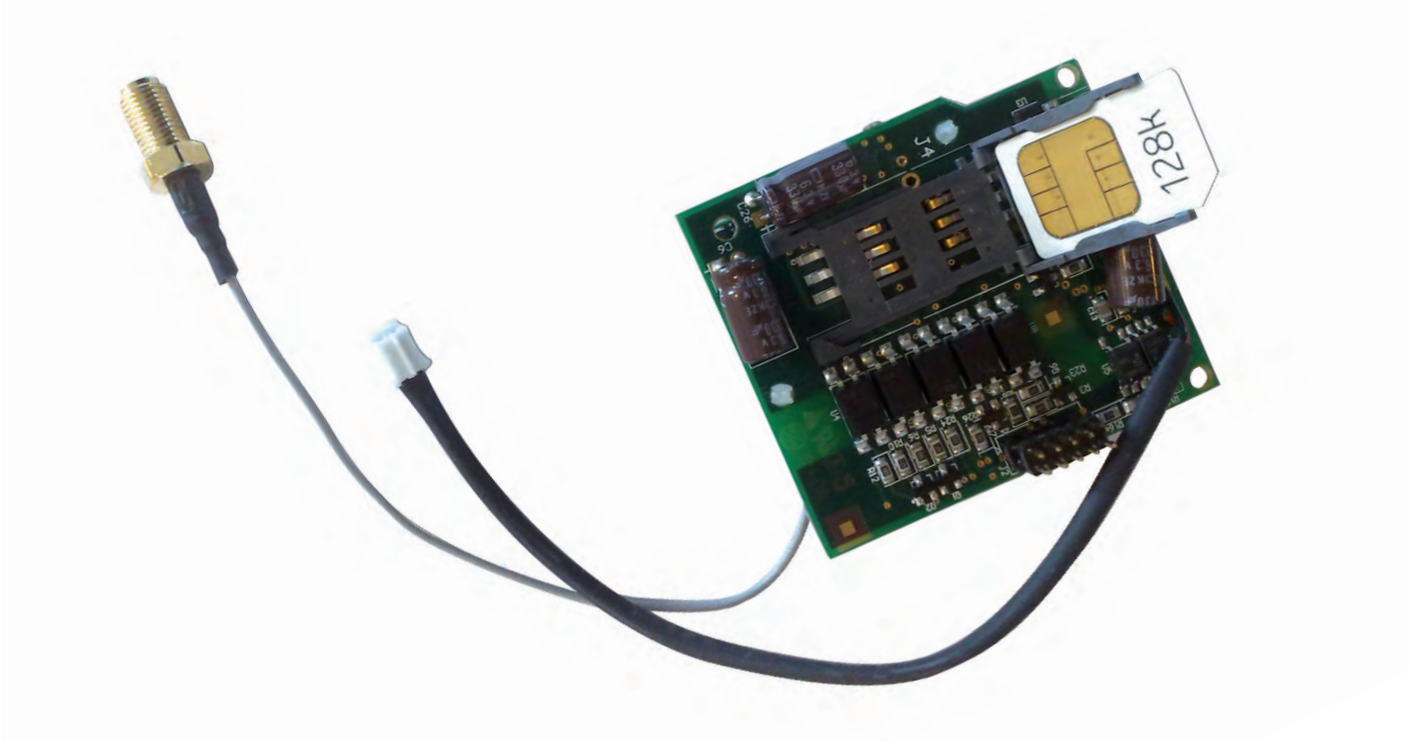
Monitoring Software

Energy monitoring and management software. Visit our website www.energyteam.it/en/ for further technical information.

XM4

GSM/GPRS Module

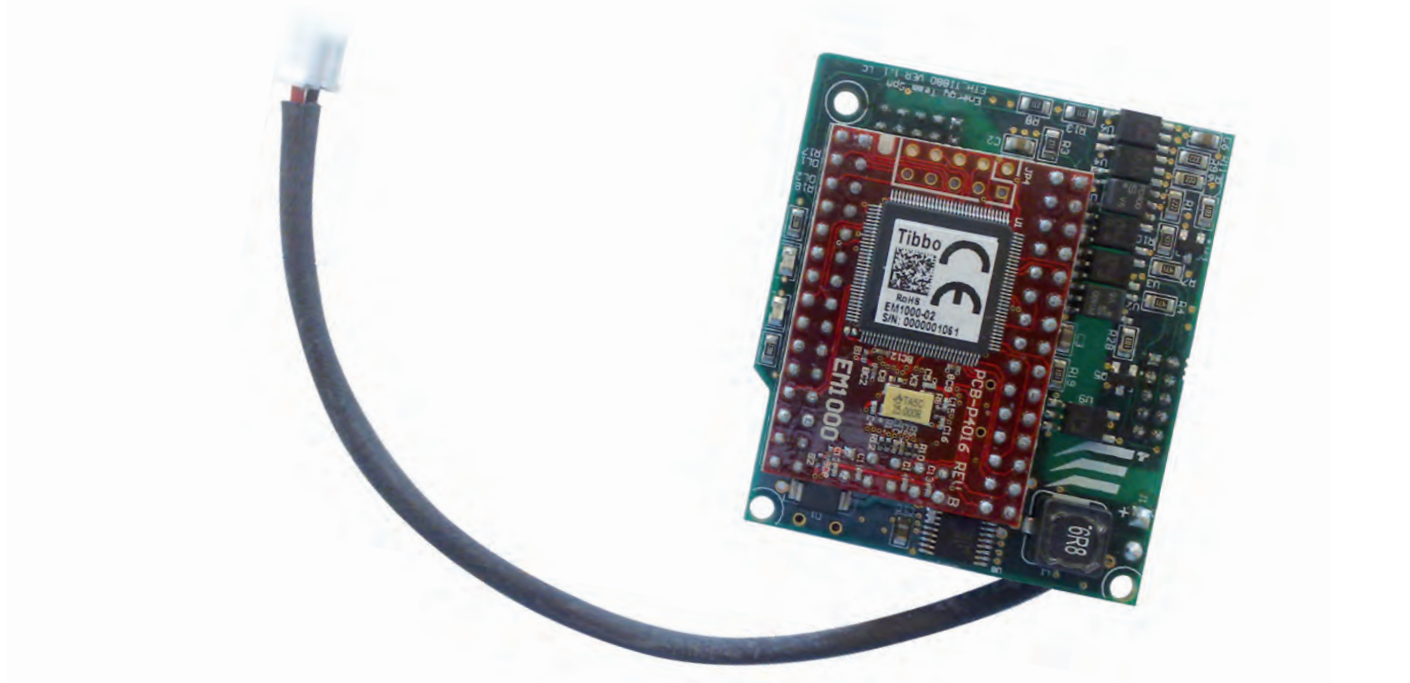
GSM/GPRS Modem module to add to the X-Meter to enable the sending of emails and SMS for set status and alarms coming from the field. This module also allows remote visibility of the X-Meter for online data publication. Get your User id and Password and access our website www.energyteam.it/en/, to see your data anytime and anywhere. This option can only be enabled together with XM1 memory extension module.



XM5

Ethernet Module

This Ethernet card inside the device allows the X-Meter to connect to the corporate network and access the device from various data collection points and monitors stations with an IP address. This option can only be enabled together with XM1 memory extension module and the Energy management software.



XM8

One DIN module for analogic signal acquisition

XM8 devices read analogic current or voltage signal to convert it into pulsed output with a 0 to 5Hz frequency. 0.5% precision guaranteed on the full scale and 2.5 KV galvanic isolation between the inputs and the other connections. XM8 allows acquiring one of the following signals:

Type	Range	Type	Range
Voltage	0V to +1V	Current	+4 to +20mA
Voltage	0 to +5V	Current	0 to +20mA
Voltage	0V to +10V	Current	-20 to +20mA
Voltage	-1V to +1V		
Voltage	-5V to 5V		
Voltage	-10V to +10V		

IMPORTANT: The range and type of measurement are defined during the order phase. Any subsequent variations will require recalibration at our laboratory

Power supply	12 Vdc
Consumption	0.85 W / 71 mA
Precision	0.5 % del F.S.
Operating temp range	-10+50 °C
Galvanic Ins. inputs/output imp.	2.5 KV
Screw terminal board Max	1.5 sq.mm.
Max voltage applicable at inputs	50 Vdc
Max current applicable at inputs	100 mA
No. T and C input configurations	9
Type of pulsed output	0/5 Hz
Weight	60 gr
Width	17.5 mm
Height	60 mm
Protection rating	IP20
Container type	1 Mod. DIN

Applications

When added to the X-Meter/RWU, XM8 allows acquiring analogic measurements coming from meters, Temperature values, and other sensors used in the industrial sector for production or environmental monitoring.

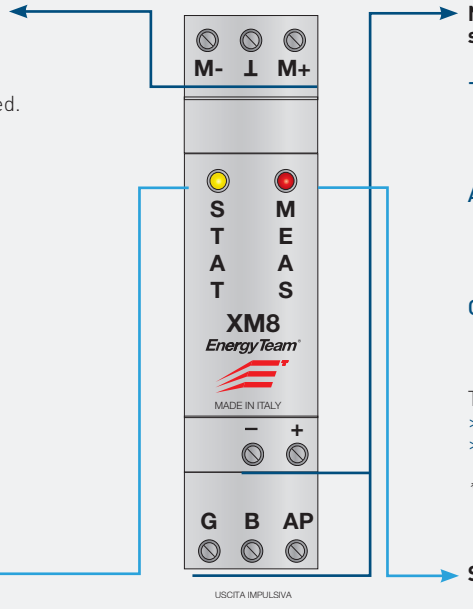
Notes for input connection

M- This is the negative input and is connected to the negative output of the source to be measured.

M+ This is the positive input and is connected to the positive output of the source to be measured.

⊥ Ground terminal connecting the shielding.

Type of cable to use:
> 9841 Belden cable
> one pair plus 18 AWG shielding
> maximum length 10 meters



Notes for connecting power supply and outputs

- + Power supply 12 Vcc
The X-Meter device can supply up to 2 modules (XM8-9-10) on terminals 29 (+) and 30 (-).

AP Pulsed output positive terminal
> for X-Meter terminals from 21 to 28
> for RWU terminals EA-ER-SE-G SG-W

G Pulsed output negative terminal*
> for X-Meter, terminal 30
> for RWU terminals C1/2/3

Type of cable to use:
> single pole cable, max 1.5mm²
> max distance 500 meters

** connected inside the terminal*

Stati

The yellow "STAT" light comes on with everypulse received from the analogic source.

When the yellow and red LEDs are lit, there is an anomaly.

Status

The red "MEAS" LED is steady when the input measurement exceeds the range.

When the yellow and red LEDs are lit, there is an anomaly

XM9

One DIN module for temperature acquisition from probes Pt100/500/1000

XM9 collects temperature data using PT100, PT500 or PT1000 probes and converts the values in pulsed output with 0 to 5Hz frequency. The minimum value on the measurement scale will imply a 0Hz (0 pulses per second) output pulse frequency while the full scale will mean a 5 Hz (5 pulses per second) output pulse frequency. The probes that can be used may be 2, 3 or 4 wires, even with shielded cable. There also is a 2.5 KV galvanic isolation between the inputs and the other connections.

Measurement accuracy

±0.5°C tolerance guaranteed on output pulses measurement within - 40°C and 150°C. The highest precision is obtained through 4 wire shielded cable resistance temperature detectors.

Applications

When added to X-Meter/RWU, XM8 allows acquiring precise and reliable room and production Temperature for both production or environmental monitoring.

Power supply	12 Vdc
Consumption	0.85 W / 71 mA
Precision	0.5 % del F.S.
Measurement range	-40 +150 °C
Galvanic Ins. inputs/output imp.	2.5 KV
Screw terminal board Max cable dim.	1.5 sq.mm.
No. Configurations	3
Type of pulsed output	0/5 Hz
Weight	60 gr
Width	17.5 mm
Height	60 mm
Protection rating	IP20
Container type	1 Mod. DIN

IMPORTANT: The range and type of measurement are defined during the order phase. Any subsequent variations will require recalibration at our laboratory.

Notes for input connection

A+ First power input PT, to connect to the red wire on the PT (or one of the two red wires on the PT if 2 are available).

M+ First PT measurement input, to connect to the second red wire on the PT (if 2 red wires are available) or to attach with the "A+" terminal (if only one red wire is available)

A- Second PT power input, to connect to the white wire on the PT (or one of the two white wires on the PT if 2 are available)

M- Second PT measurement input to connect to the second white wire on the PT (if 2 white wires are available) or to attach with terminal "A-" (if only one white wire is available)

⊥ Ground terminal for connecting the shielding.

Status

The yellow "STAT" light comes on with every impulse received from the analogic source.

When the yellow and red LEDs are lit, there is an anomaly.

Notes for connecting power supply and outputs

- + Power supply 12 Vcc
The X-Meter device can supply up to 2 modules (XM8-9-10) on terminals 29 (+) and 30 (-).

AP Pulsed output positive terminal
> for X-Meter terminals from 21 to 28
> for RWU terminals EA-ER-SE-G SG-W

G Pulsed output negative terminal*
> for X-Meter, terminal 30
> for RWU terminals C1/2/3

Type of cable to use:
> single pole cable, max 1.5mm²
> distance max 500 meters

** connected inside the terminal*

Status

The red "MEAS" LED is steady when the input measurement exceeds the range. When the yellow and red LEDs are lit, there is an anomaly.

XM10

Room temperature module

Power supply	12 Vdc
Consumption	0,85 W / 71 mA
Measurement range	-10+65 °C
Accuracy	±1,5 °C
Screw terminal board Max cable dim.	1.5 mm^2
Type of pulsed output	0/5 Hz
Weight	50 gr
Width	64 mm
Height	76 mm
Depth	26 mm
Protection rating	IP20
Container type	plastic

The XM10 module reads room temperature using an internal probe and converts the value in 0 to 5 Hz frequency pulsed output.

XM10 comes in a plastic container with two holes (D=4.75mm) for easy wall-mounting using screws.

Measurement accuracy

The temperature range that can be measured with XM10 is -10°C to +65°C with a guaranteed ±1.5 °C tolerance on output pulses measurement.

Correct use conditions

To measure room temperature, it should be installed at about 1.8 m, away from heat sources. A cable with two power supply conductors must be used for a module with a section of 0.5 mm2 and a section of no less than 0.22 mm2 for the pulsed output conductors. With this type of cable, the maximum length must not exceed 350 m.

XM10 module equipment and features

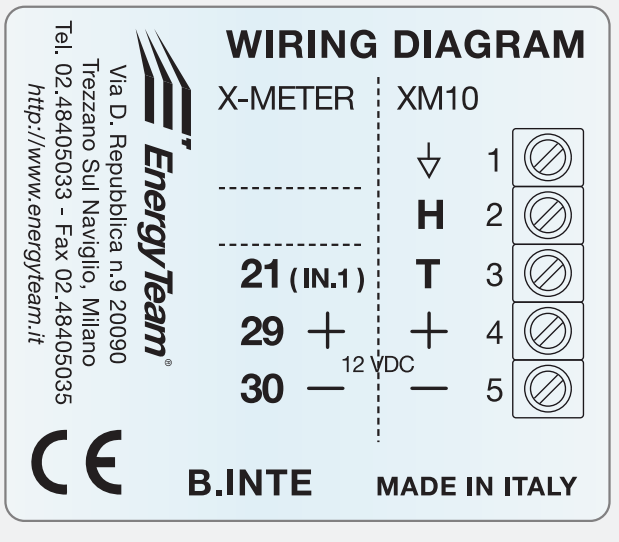
The module has two LEDs on the front panel:

- The RED LED is located on the front panel and flashes with every output impulse.It remains steady when the input measurement exceeds the range given above.
- The steady GREEN LED indicates that the device operation is in progress.

An upgrade from XM10 to XM11 can be done at any time, even by the customer, purchasing built in temperature and humidity sensor and installing in the device.

Applications

When added to X-Meter/RWU, XM10 allows acquiring room Temperature values in Offices, Data Centres, warehouses, shopping centres, etc.



Pulse

⏚ Pulsed output negative terminal*
- for X-Meter, terminal 30
- for RWU terminals C1/2/3

H Not used

T Pulsed output positive terminal
- for X-Meter terminals from 21 to 28
- for RWU terminals EA-ER-SE-G SG-W

- + Power supply 12 Vcc
The X-Meter device can supply up to 2 modules (XM8-9-10) on terminals 29 (+) and 30 (-).

** connected inside the terminal*

XM11

Room temperature and humidity module

Power supply	12 Vdc
Consumption	0,85 W / 71 mA
Temperature measurement range	-10+65 °C
Accuracy of the Temperature meas.	±0,3/±0,8 °C
Humidity measurement range	0% a 100%
Accuracy of the Humidity meas.	±2%
Screw terminal board Max cable dim.	0,5 mm^2
Type of pulsed output	0/5 Hz
Weight	50 gr
Width	64 mm
Height	76 mm
Depth	26 mm
Protection rating	IP20
Container type	plastic

The XM11 module reads room temperature using an internal probe and converts the value in 0 to 5 Hz frequency pulsed output.

XM11 comes in a plastic container with two holes (D=4.75mm) for easy wall-mounting using screws. The device has a single, 5-pole connector that can be removed, with screw terminals for power supply and pulsed output.

Measurement accuracy

The temperature range that can be measured with XM11 is -10°C to +65°C with a guaranteed ±0.8°C tolerance on output pulses measurement (i.e. ±0.3°C at 25°C.). Relative humidity measurement, goes from 0% to 100% with ±2% tolerance on output pulses measurement in the 10-90% range.

Correct use conditions

To measure room temperature, it is advisable to install the device at 1.8 m, away from heat sources and use a cable with two power supply conductors with 0.5 mm^2 section and, those for pulse outputs no smaller than 0.22 mm^2. With this type of cable, the maximum length must not exceed 350 m.

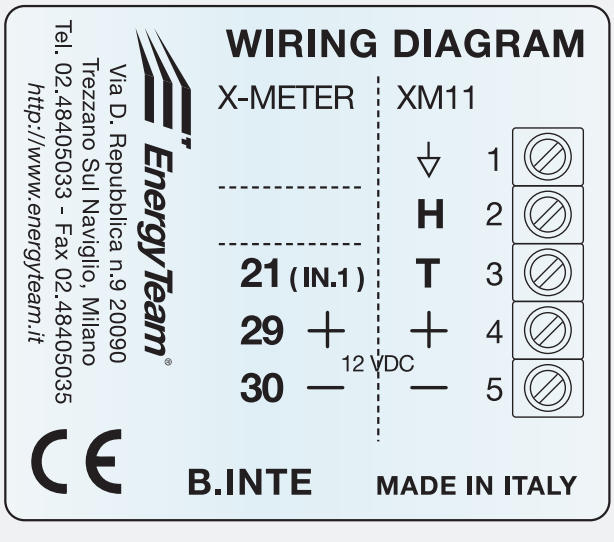
XM11 module equipment and features

The module has two LEDs on the front panel:

- The RED LED is located on the front panel and flashes with every output impulse. It remains steady when the input measurement (one of the measurements) exceeds the range given above.
- The steady GREEN LED indicates that the device operation is in progress.

Applications

When added to X-Meter/RWU, XM11 allows acquiring room Temperature values in Offices, Data Centres, warehouses, shopping centres, etc.



Pulse

⏚ Pulsed output negative terminal*
- for X-Meter, terminal 30
- forRWU terminals C1/2/3

H Pulsed output positive terminal
- for X-Meter terminals from 21 to 28
- for RWU terminals EA-ER-SE-G SG-W not used

T Pulsed output positive terminal
- for X-Meter terminals from 21 to 28
- for RWU terminals EA-ER-SE-G SG-W

- + Power supply 12 Vcc
The X-Meter device can supply up to 2 modules (XM8-9-10) on terminals 29 (+) and 30 (-).

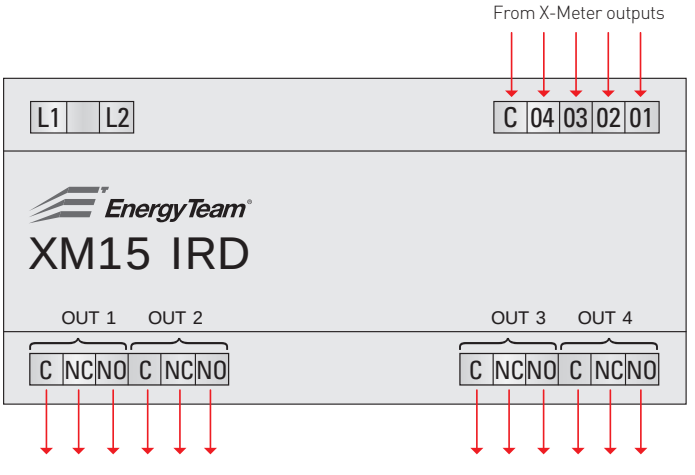
** connected inside the terminal*

XM15

Load interface relay module

The X-Meter counts 4 ON-OFF output activators to manage 4 outputs with 24Vac/Vdc maximum voltage and 100mA maximum current.
These outputs must be interfaced with an XM15 module to manage standard loads in a 220Vac single phase network.
XM15 is 220Vac single-phase voltage powered with 4 independent relays available (one for each X-Meter output) each one of them can switch a 250Vac and 16A current load.

Each relay has all three single interchange contacts (C, NC, NO) outputs (terminal board) available with two protection converters (275V) for voltage surges.
Each one of theXM15's 4 relays has a LED light indicating when active (or when the corresponding output on the X-Meter is active) and a manual test button for switching the interchange.



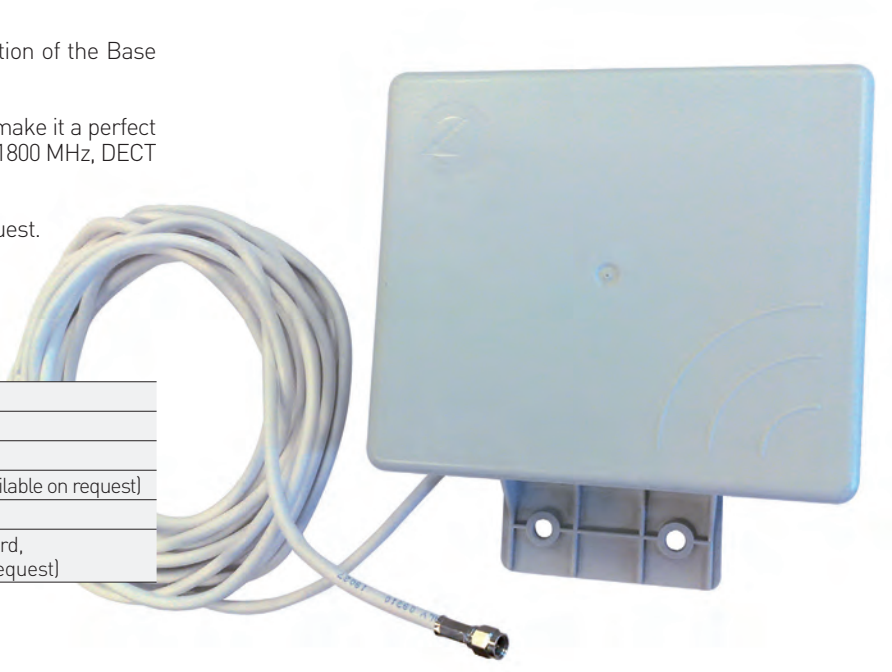
Hardware	
Power supply	230 VAC ±6%
Protection on Pwr Sup.	Fuse 5x20R, 50mA
Consumption	2,6VA MAX
Operating range	-10°C+50°C
Galv. Isolation Output	250V
No. outputs	4 relay 1 interchange-C,NC,NO
Max Switched Current	16A for each interchange
Protection on C. Switch.	275V
Guaranteed number of cycles	100.000
Type of control	Electronic / Man.
Signalling	Led
Mechanical	
Case	Flame retardant plastic
Protection rating	IP40 (front)
Dimensions	6TE 108 mm X 58 mm H
Installation	On DIN rail
Terminals	On screw terminals
Max cable section relay output	2,5 mm^2
Weight	350 gr
Relay Installation	CS Base
Terminal board type	Removable Polarized
Operation test	Manual
Usage conditions	
Operating temperature	-20 °C +65 °C
Relative humidity	90% non-condensing
Direttive applicate	
	EMC 89/336/EEC
	Emissions EN 50081-1 1992
	EN5022 CL.B
	Immunity EN50082-1 1992
	Safety EN61010

Compact Directional Antenna

The Compact Directional Antenna enlarges the direction of the Base Station, allowing long connections distance.

The small dimensions and low environmental impact make it a perfect solution for outdoor use in GSM Dual Band at 900 and 1800 MHz, DECT and for third generation devices.

12.5 m coaxial extension cables are available upon request.



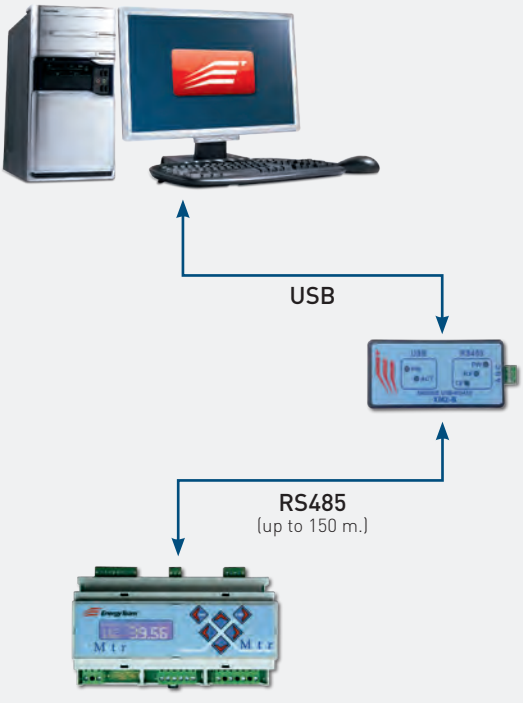
Gain	9.0 dBi
VSWR in band	< 2:1
Polarization	vertical
Connector	male SMA (other available on request)
Use	indoor/outdoor
Cavo	low loss (5m standard, other available on request)

XM2-B BRIDGE USB-RS485

The module can be used to convert the 485 signal coming from X-Meter to USB port on a Personal Computer. Galvanic USB connection isolation ensures maximum protection of the PC from disturbances or voltage surges coming from the field. Designed with industrial features. No bulky external power supply is needed as it is self-powered.

Power supply	Self-powered
Insulation	2.5 kV
Visual indicators	Power, Act, TX, RX
USB Cable	2m included
Dimensions	39x19x21 mm

Connection



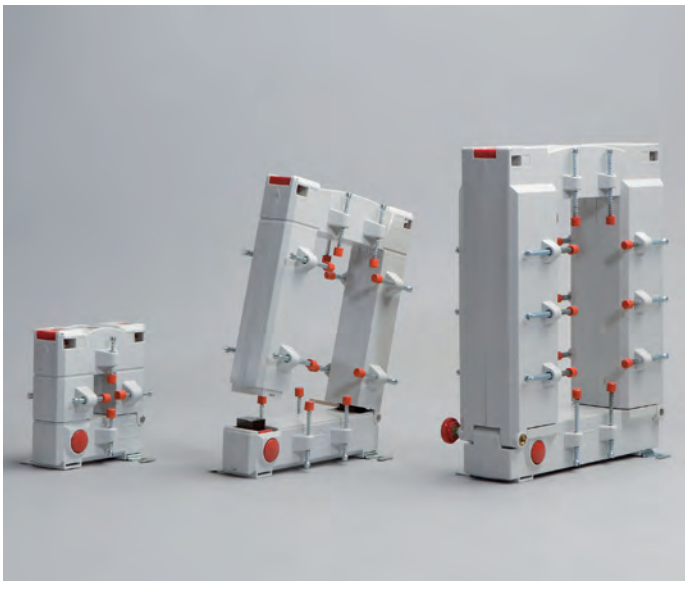
KBU

Split core current transformers

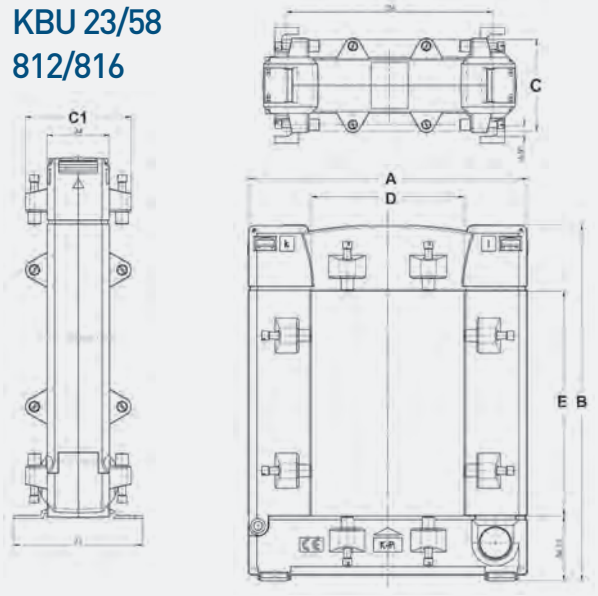
KBU CT split core transformers are the most complete and reliable on the market.

- Primary current: 100 to 5000A/Secondary current 5A.
- Accuracy 1% (Class 0.5 on request).
- Internal window area from 6 to 96 sq.cm.

A patented connection system also suitable for blocking the device on current bars as well, allows effortless intervention in all those situation where traditional CT's would be difficult to use for various technical issues or not very cost effective. This makes the installation of KBU CT's safe and quick.



KBU 23/58 812/816



Type	KBU 23	KBU 58	KBU 812	KBU 816
A	93	125	155	195
B	106	158	198	243
C/C1	34/58	34/58	34/58	64/79
D	20	50	80	80
E	30	80	120	160

Range of available clamp on CT's

Item code	Internal dim. L x h (mm)	External dim. AxBxC (mm)	Primary	Secondary	VA	Class
KBU 23 Sek.5A Kl.1						
80241	20x30	93X106X58	100	5	1,25	1
80243	20x30	93X106X58	200	5	1,50	1
80045	20x30	93X106X58	300	5	3,75	1
80046	20x30	93X106X58	400	5	5	1
KBU 58 Sek.5A Kl.1						
80064	50x80	125X158X58	500	5	5	1
80065	50x80	125X158X58	600	5	5	1
80066	50x80	125X158X58	750	5	5	1
80067	50x80	125X158X58	800	5	7,5	1
80068	50x80	125X158X58	1000	5	10	1
KBU 812 Sek.5A Kl.1						
80094	80x120	155X198X58	500	5	5	1
80095	80x120	155X198X58	600	5	5	1
80096	80x120	155X198X58	750	5	5	1
80097	80x120	155X198X58	800	5	7,5	1
80098	80x120	155X198X58	1000	5	10	1
80099	80x120	155X198X58	1200	5	10	1
80101	80x120	155X198X58	1500	5	15	1
KBU 816 Sek.5A Kl.1						
80140	80x160	195X243X79	1000	5	10	1
80142	80x160	195X243X79	1200	5	10	1
80144	80x160	195X243X79	1500	5	10	1
80146	80x160	195X243X79	1600	5	10	1
80148	80x160	195X243X79	2000	5	10	1
80150	80x160	195X243X79	2500	5	10	1
80152	80x160	195X243X79	3000	5	15	1
80154	80x160	195X243X79	4000	5	15	1
80157	80x160	195X243X79	5000	5	30	1

Shorting Blocks

For energy meters connections

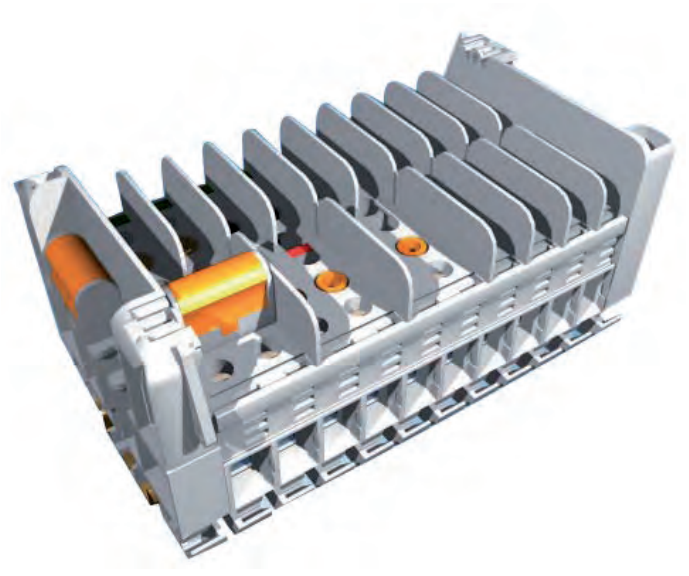
10E 6I-4T-EPI shorting block is an indispensable tool for connecting meters or measuring instruments on threephase lines downstream from voltage and current transformers. It is equipped with 10 clamps that are fully segmented longitudinally (between input and output) with sliding bridges contained in the block and able to integrate a visual signal in case of open circuit. In addition, three further sliding bridges are available to release the "cross connection" (between a terminal block and the next one) in order to make a local short-circuit for the current circuits. The terminal board is designed to meet the requirements of the new version of Standard EN 60947-7-x.

Use the shorting block to:
- Measure instrument sections
- Insert a sample unit, before or after the measurement instrument.
- Derivate using common outlets for all connection clamps
- Voltage from current input to the crimper through a jumper transfer.

During normal operations, voltage and current inputs are inserted on the lower part, below clamps 1-2-3-N and clamps R-RR, S-SS, T-TT.

The instruments are connected to the upper part of the shorting block. The vertical sliding bridges are closed while the ones with a horizontal slide are open.

Insert control units as follows:
- volt meters through normal 4mm pins on terminals 1-2-3 and N
- connect the measuring device's amperometric (R) to the two R sockets (the same goes for the other phases).



Nominal insulating voltage	800 V
Impulse withstanding	8 kV CAT IV
Maximum longitudinal current	76 A
Maximum transversal current	from 14A (@ 60 °C) to 32A (@ 30 °C)
Maximum cable section	1 x 16mm ≤ or 2 x 6mm ≤
Space between terminals	10.5 mm
Socket section	4 mm
Dimensions (mm)	128 x 67 x 61.5
Protection rating	IP20

According to EN 60947-7

Efficiency Terminal

Portable electrical mains analyser
Check your Energy Efficiency

Professional measuring instrument, indispensable for sampling:
- 50 electrical parameters
- Voltage sags
- Harmonics
- Digital values
- Equipped with Rogowski system
- Internal rechargeable battery: 8 hours of autonomy
- External power supply to recharge the battery
- Class 0.5

Reliable

Allow extremely precise measurement on three-phase and single-phase electrical lines with up to 250 days of continuous recording (with integration time of 15') of the following values: phase voltage, three-phase line current, three-phase active power, three-phase power factor detecting the various electric factors with an error of less than ±0,5% of the selected full scale. You can also sample different values and parameters by enabling the related options.

Versatile

The instrument's great flexibility allows extremely precise measurements within the selected scale of a wide range of electrical loads. The Rogowski current probes allow measuring from 5 to 2000 amperes while keeping the declared precision. It is the perfect instrument for all circumstances, to sample and analyze any load, from your mobile phone battery charger to the consumption of a melting furnace.

Operational

Easy programming of parameters and measurement ratios. USB port for quick and easy data transfer of data to a PC for data analysis. Complete and specific supply of 3 Rogowski current probes with measurement range from 1 to 2000 amperes and 4 silicone double insulated CAT III cables. All of them are supplied with 2.5m cables for ease of use.

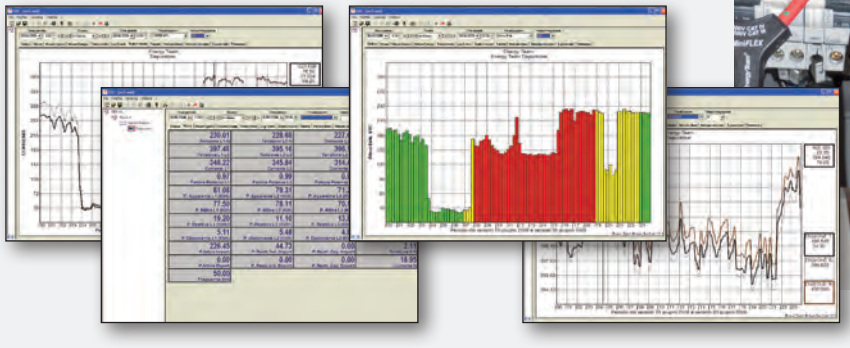
Portable

The device's small size, its battery lifespan and the ability to power it from an external module allow the user to perform measurements over long periods of time.

Basic device equipment

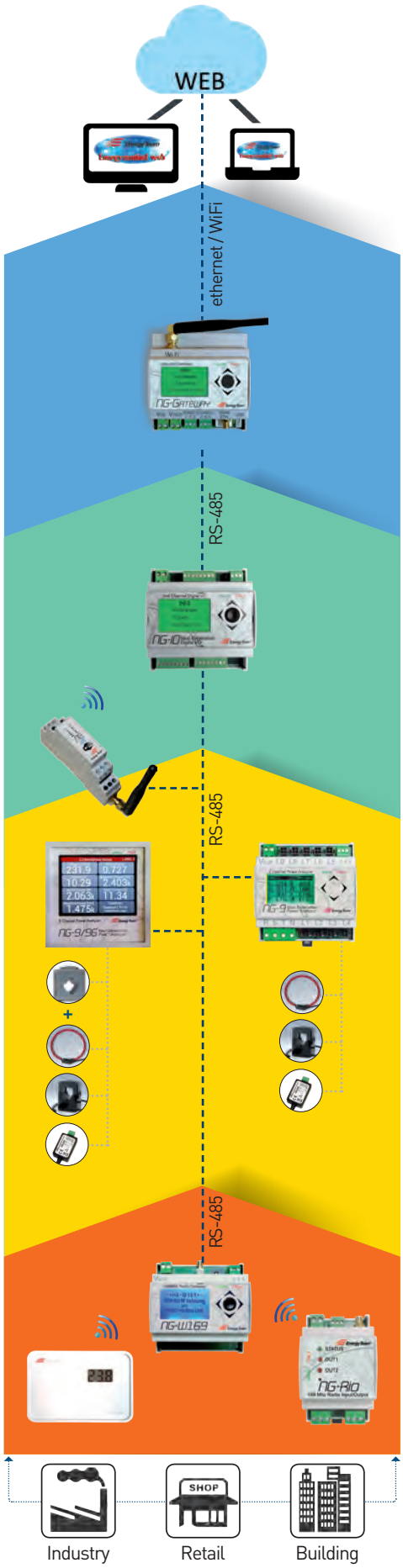
- 50 electrical measurements performed
- Recording of voltage swells and values with 10 ms resolution.
- Registration of up to the 25th harmonic on voltage and current.
- Graphic display, size of characters can be set
- USB port
- Measurements in true value (true RMS)
- Measurements on 4 quadrants
- Full and clear indications of measurements
- Simple and fundamental programming of the parameters and ratios of measurements through the keyboard.
- Graphic display for the last 3 days of: Voltage, Current, Power, Cosφ, Harmonics and THD.
- 12 Energy Totalizators on 4 quadrants
- Clock and Calendar
- 3Vac voltage inputs: 230V Phase-Neutral, 400V Phase-Phase
- Precision 0.50% of full scale (measured value)
- External connectors for inserting: 2 digital inputs (channels) through mini-DIN connector; USB to monitor data from the PC; Inputs for Voltage and Current; connector for external power supply.

Weight	800 gr.
Power supply	12 Vdc through internal lithium ion battery, rechargeable
Autonomy	8 hours. External power supply 230 Vac / 12 dc to recharge the battery
Operating temperature	from -10°C to +55°C
Relative humidity	95% non-condensing
Connecting cable	USB cable, 1.5 mt
Manuals	User manual
Compliance	EN 55011, (class A) EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11, EN 60204-1
Current probes	3 Rogowski current probes, flexible and operable
Tightening diameter	100 mm
Cable length	2.5 m Single and Three-phase measurement (from 1 to 3 sensors)
Full scale capacities	60, 125, 250, 500, 1000, 2000 Amperes
Cables for measuring voltage	n. 4 cables, silicone CAT II with double insulation, length 2.5 m
Compatibility	EN 50081-1 Class B, EN 50082-2, CEI 1000-4-2, CEI 1000-4-3, CEI 100-4-4, CEI 1000-4-8, CEI 1010-1, CEI 1010-2-032



NG Family

New Generation devices for a new concept of Energy Efficiency



NG-Gateway

Collect, store and send data to the Server

- Data storing and sending
- Ethernet
- Wi-Fi
- GSM/GPRS
- Dual RS-485
- Destinations/Protocols
  - MQTT
  - FTP/SFTP
  - Modbus TCP

NG-IoT

RS-485 /Wi Fi Converter

NG-9/96

Multifunction meter

- 3x 1 to 5A current inputs
- 6x free channels
- Three Multifunction Meters in 1 device

NG-W169

169Mhz Radio receiving module

NG-TH169

Room Temperature and Humidity 169MHz radio sensor

NG-IO

Digital Input/Output remote module

NG-9

9 lines network analyzer

- The world' smallest network analyzer
- Reduced installation time and costs
- Special sensors 1 to 8000 A
- High accuracy

Rogowski sensors

Split core current transformers

NG sensors

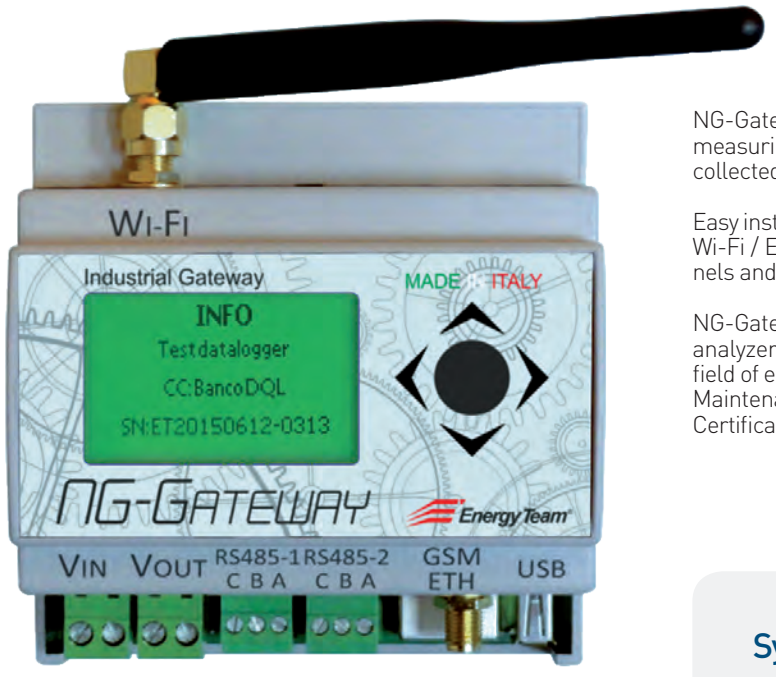
- Temperature
- Analogic signals
- Digital signals

NG-Rio

169Mhz outputs remote control

NG-Gateway

Collect, store and send data to the Server



NG-Gateway is ideal for acquiring and filing data from instruments measuring electricity, gas, water, steam, heat, ect. it then sends all the collected measurements to one or more servers for data publication.

Easy installation and configuration, together with reduced size, flexible Wi-Fi / Ethernet / GPRS connectivity, high number of managed channels and large memory, make NG-Gateway a unique product.

NG-Gateway, placed side by side with new generation Energy Team analyzers, becomes an essential tool for all users operating in the field of energy efficiency like Energy Managers, Production Managers, Maintenance Technicians, Energy Consulting firms, ESCO's, Energy Certifications (White certificates, Diagnosis, Audit, ISO 50001).

Power Supply	65 to 265 Vac or 60 to 120 Vdc
Sensors	tens of sensors and up to 1.600 measures with 2 RS485 isolated ports
Connectivity	Ethernet, with optional Wi-Fi and GPRS connection
Web server	Integrated for system configuration and data analysis *(optional)*
Wi-Fi	integrated module with detachable antenna that can be placed outside the panel
GPRS	quad band integrated module (850/900/1800/1900MHz) with detachable antenna that can be placed outside the panel
Dimensions	5 DIN modules
Internal memory	8GB storage memory to file up to 1600 channels for over 5 years' worth of data
TCP Modbus gateway	on two RS485 independent lines
LAN Wi-Fi authentication modes accepted	WPA2 - PSK - RS485 converter on two RS485 independent lines
Available options	- NG-Gateway-Wi-Fi (with Wi-Fi module) - NG-Gateway-GPRS (with GPRS module) - NG-Gateway-DMG (Generic Modbus Driver)
Protocols	FTP/SFTP, Modbus TCP, MQTT

System features

Extremely flexible system

The system can manage tens of sensors thanks to 2 integrated, RS485 isolated lines and Ethernet or Wi-fi connection.

High number of channels

The system can manage up to 1.600 measures, filing up to 5 years' worth of data.

Simplified management

Along with remote configuration, the display and joystick consent basic parameters' reading and local programming of the device with no need for a supporting PC.

Automatic data export

Together with a great volume of internal memory (over 5 years' worth of data), NG-Gateway manages automatic data export of all measurements, sending them to a FTP/SFTP server.

TCP slave Modbus

All instant data from the instruments can be acquired from other systems (i.e. SCADA, plc, bms) via TCP Modbus protocol.

High connectivity

The system communicates via Ethernet with GPRS and Wi-Fi optional modules.

Wide range of measurable quantities

Connect NG-Gateway to appropriate sensors via cable or wireless to acquire, manage and file any kind of physical quantity (electricity, water, gas, irradiation, temperature, etc.)

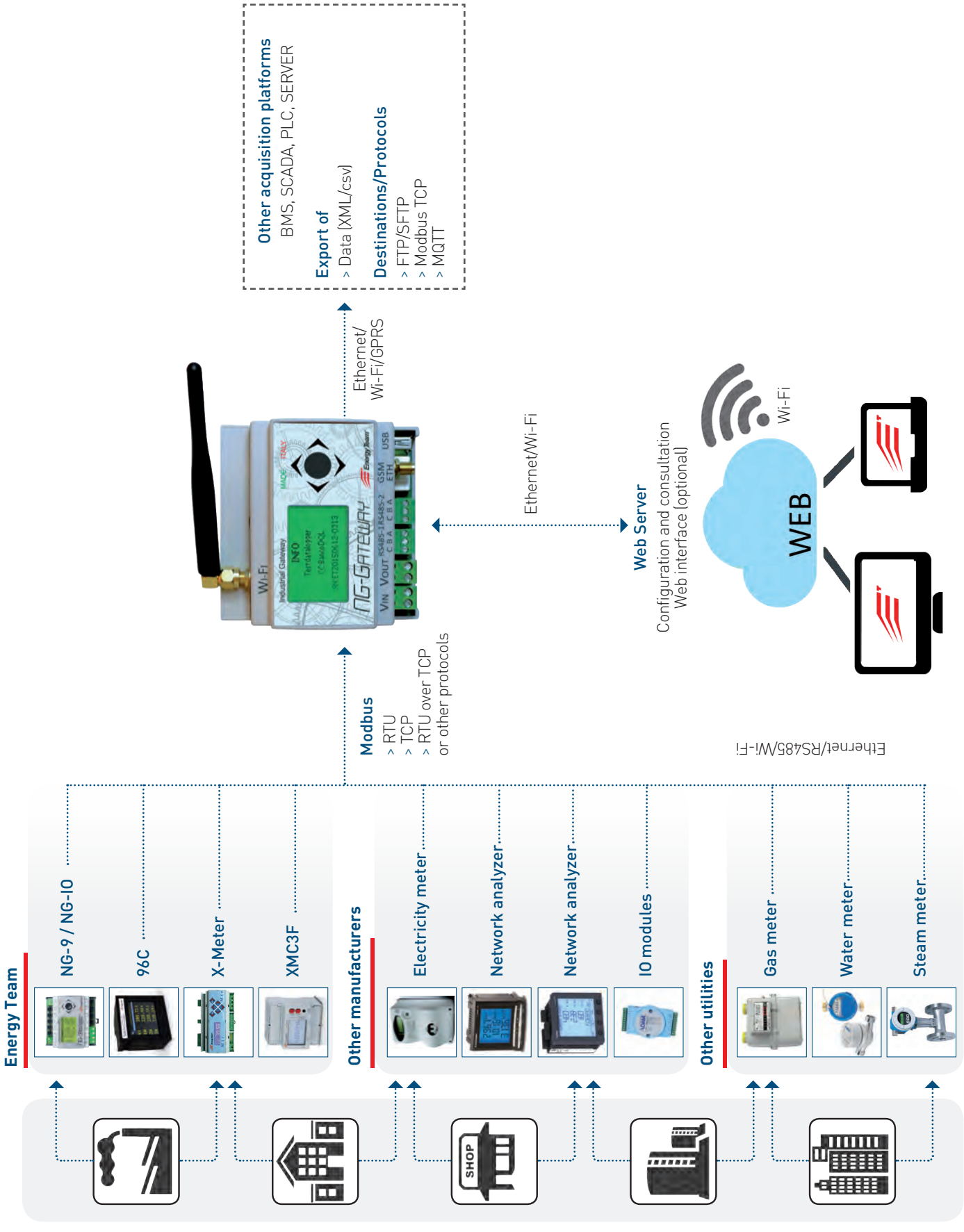
Double TCP Modbus gateway

This makes NG-Gateway work as protocol converter (TCP to RTU Modbus) thus allowing the independent use of both RS485 serials.

Double LAN-RS485 converter

This mode allows independent use of the two serials via TCP connection.

Complete solution for Collecting and Sending Energy Comsumption Data for system integrators



NG-IO

Digital Input/Output remote module

The ideal device to acquire status from the field, pulses from every meter and manage programmed switching ON and OFF of every kind of load both in civil, industrial and service sectors.

AC Power supply	90-250 Vac 50/60 HZ
DC Power supply	24-120 Vdc
Consumption	1.5 VA max (AC) or 1.5 W max (DC)
Dimension	5 DIN modules (88x90x60 mm)
Weight	95 grams
Display	128x64 pixel graphic with RGB LED display
Communication Interface	RS isolated with RTU Modbus protocol with selectable speed up to 115200 bps with programmable parity
Working temperature	between -10°C and +55°C
Inputs	8 active Inputs with 8 Vdc that can be interfaced with NAMUR contacts with 5Hz max Frequency
Outputs	4x24 Vdc Max and 100 mA optomos Outputs

NG-IO is a compact and sturdy device for digital Input/Output acquisition; it's equipped with specific characteristics for an efficient digital signal management.

The modular system, bearing particular characteristics not easily found on the market, is specifically designed for installers:

- A detailed display allows reading all measured parameters as well as specific diagnostic ones for a correct device setting.
- The 5 functions jog button allows local setting, checking or editing of all parameters with no need for any connected PC's.
- Unlike the majority of the devices available on the market that need an external power supply, NG-IO is equipped with an internal power pack that can be used with both AC (90-240 Vac) and DC (24-120 Vdc) without extra settings.
- The instrument's case is a compact 5 DIN modules (90x90x60mm), ideal to be inserted into electric panels without any adapter needed.
- The connectors are all screw terminals and are removable for ease of wiring and replacement.

NG-IO, a different approach to digital signals acquisition

- NG-IO measures, 1000 times per second, the resistance of all contacts wired on its 8 inputs. Unlike classical optoisolated inputs, this technology allows discriminating ON-OFF status as well as alarms for cut wires or shortcircuit or NAMUR passive circuits status (<1 Kohm and > 8 Kohm).
- NG-IO measures and shows on the display pulses' intervals and durations thus allowing a quick check directly on the field and easy setting of a debounce filter.
- Using NG-IO as pulses' counter will give you an overall meter and 4 partial ones that can be individually activated and set for a simpler pricing periods management.
- It is possible, for each Input, to specify its offset and variable gradient as well as pulses' weight (unit/pulse or pulses/unit), if dealing with meters. Read, via Modbus, instant and integrated values of the monitored quantity or pulses' pure number.
- There is a specific function for machinery monitoring, to measure its actual running times and utilisation percentage over time and use the data to plan correct maintenance activities.
- 4 optomos non polarised Outputs, with infinite actuation cycles, can be used as static control, command with self-return (monostable) or 0 to 5 Hz settable frequency generator.

NG-9

New Generation analyzer, 9 lines measured by a single device

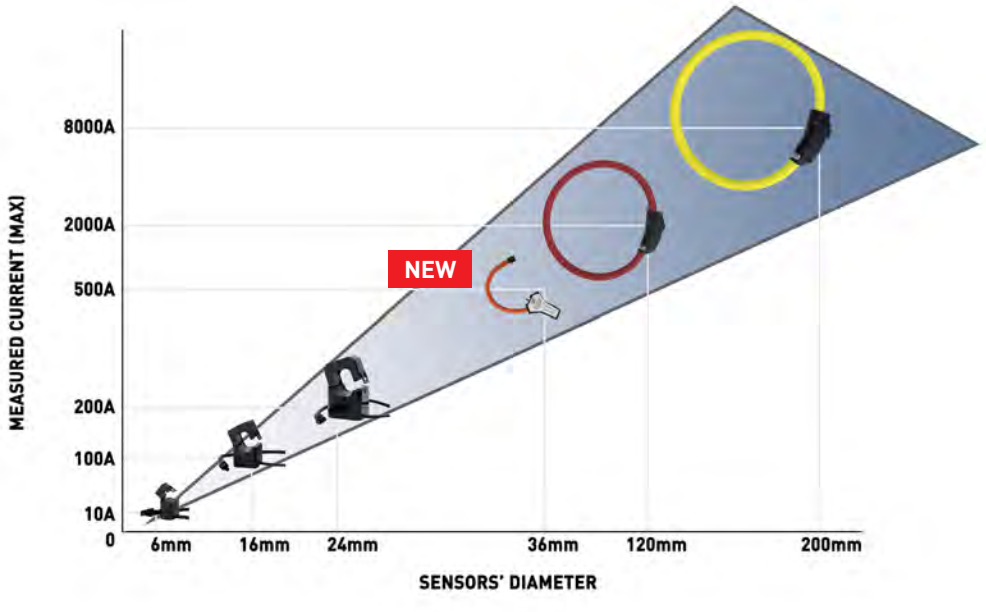
The world' smallest analyzer featuring 9 channels within only 9 cm.

Flexibility: Special sensors from 1 to 8000 A offer the highest flexibilty on the market.
Accuracy: 0,5 class on the entire measure chain.
Measurements: 160 parametres on LCD display and, on your own device, via Modbus-RTU.
Versatility: Possibility of using all range of Rogowski Sensors or Split Current Sensors on each instrumenton either single, three or mixed phase mode.

It does not exist anything like our NG-9 to compare to.

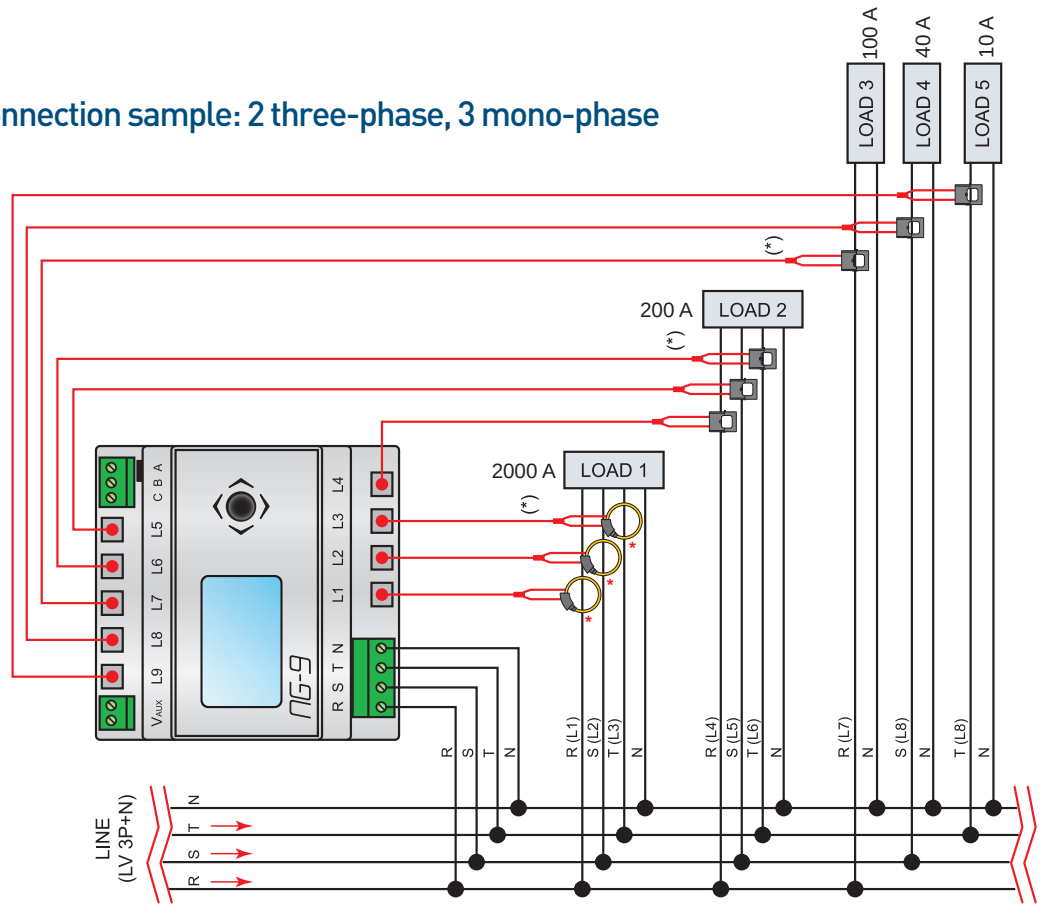
NG9 is an innovative metering solution, unique on the market. It offers flexibility and simplicity by reducing product and installation costs compared to other devices on the market.

- The world' smallest analyzer
- Save 85% on installation costs
- 160 parameters via RTU Modbus
- Special probes with 1 to 8000A range
- Combine split CT's and Rogowski coils
- 0,5 class instrument and sensors, accuracy guaranteed



NG-9 less time consuming, reduces installation costs and avoids plant shutdowns.

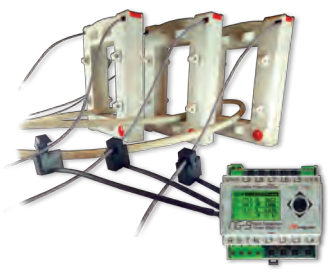
Connection sample: 2 three-phase, 3 mono-phase



Choose your configuration

- 3 three-phase systems
- 2 three-phase, 3 single-phase
- 1 three-phase, 6 single-phase
- 9 single-phase systems

Example of CT's application for secondary current measurement



Inputs	
Voltage	Each voltage input can be matched with a current channel to allow any type of three or single phase measurement
Number of channels	3
Maximum working voltage	430 Vpeak phase - neutral 300 Vac phase - neutral 520 Vac phase - phase
Current	
Number of channels	9 - Choose among the combination of current sensors listed below; each channel is selectable individually
Accuracy	Class 0,5
Sensor type 1 - Rogowski Sensor RG-2k	
Max. cable external diameter	100 mm
Selectable ranges by Joystick	2000 - 1000 - 400 - 200 - 100 A
Sensor type 1a - Rogowski Sensor RG-4k/ RG-8k	
Diameter	from 200 to 850 mm
End scale	from 4000 to 8000 A
Sensor type 1b – mini Rogowski Sensor RG-500 NEW	
Diameter	36 mm
Selectable ranges by Joystick	500 - 250 - 100 - 50 A
Sensor type 2 - CC 24	
Cable window	24 mm
Dimensions (LxHxW)	44,5 x 65 x 33,5 mm
Selectable ranges by Joystick	200 - 80 - 40 - 20 A
Sensor type 3 - CC 16	
Cable window	16 mm
Dimensions (LxHxW)	30 x 43,5 x 30 mm
Selectable ranges by Joystick	100 - 40 - 20 - 10 A
Sensor type 4 - CC 06	
Cable window	6mm
Dimensions (LxHxW)	16 x 32 x 26,4 mm
Selectable ranges by Joystick	1 - 2 - 5 - 10 A

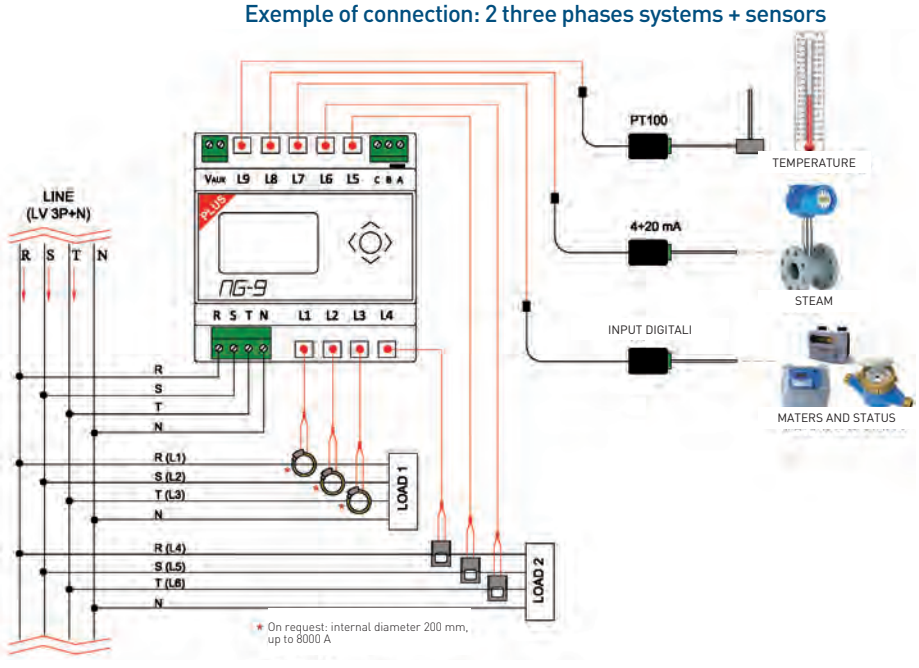
General	
Auxiliary power supply	The device allows AC or DC supply voltage in the limits specified below
AC supply voltage range	90 - 250 Vac 50/60 Hz
DC supply voltage range	24- 120 Vdc
Power consumption	1.5 VA max (ac) or 1.5 W max (dc)
Dimensions	5 DIN modules (approx. 88x90x60mm)
Weight	95 grams without external sensors
Display	128x64 pixels graphic display with multicolour RGB LED background
Keyboard	One 5 functions selector knob
Communication interface	Isolated RS-485 with Modbus RTU protocol, with selectable speed up to 115200 bps and programmable parity
Insulation 6 Kv	between Voltmetric input and Rs 485 and between Aux Alim. and Rs 485
Working temperature	between -10 °C and + 55 °C
Measurements	
Global Measures	Voltage L1-N, L2-N, L3-N, L1-2, L2-3, L3-1 Frequency (measured on Voltage 1 channel)
For each one of the device's 9 channels	Current, Peak current, Active power (bidirectional), Reactive power (bidirectional), Apparent power, Power factor, Working quadrant, Imported Active energy, Exported Active energy, Imported Inductive energy, Imported Capacitive energy, exported Inductive energy, Exported Capacitive energy.
For 3 possible three phase clustering	Equivalent line current, Three phase active power (bidirectional), Three phase reactive power (bidirectional), Three phase apparent power, Three phase power factor, Imported Active energy, Exported Active energy, Imported Inductive energy, Imported Capacitive energy, exported Inductive energy, Exported Capacitive energy.

NG-9 Plus Version

All the innovative features of NG-9 with new potential

- Connect sensors to acquire Temperature, Status, and Digital signals
- Measure up to the 15° Harmonic and THD on all 3 VOLTAGE channels
- Measure up to the 15° Harmonic and THD on all 9 CURRENT channels

Exemple of connection: 2 three phases systems + sensors



NG sensors

New Generation sensors, available for NG-9 PLUS

NG-AIN

This sensor provides the NG-9 system with an analogic ISOLATED voltage or current Input.

Flow range	±10V, 0-10V, ±20mA, 0-20mA and 4-20mA selectable straight from the instrument
Measure isolation	dielectric strength of 1kV between Input and instrument to simplify use and improve protection against disturbance and the system's overall security
Accuracy	on the entire measuring chain is 0,2% of the reading plus 0,05% of the flow
Measurement field	between 0 and 120% of the flow. Maximum permanent overload capacity 400% of the flow for current measurements and 100V (1000%) for voltage measurements

NG-DIG

This sensor provides the NG-9 system with an ISOLATED Input for digital signal acquisition from passive Outputs (PNP, NPN, OPTOMOS or electromechanical contacts) as well as active AC or DC Outputs from 12 to 110 Vdc or Vac.

Acquisitions	the system can acquire, ON-OFF static signals as well as pulses coming from meters up to 10Hz frequency with a minimum pulse's duration of 5 milliseconds (10 milliseconds for AC Input).
Measure isolation	dielectric strength of 1kV between Input and instrument to simplify use and improve protection against disturbance and the system's overall security

NG-RTD

This sensor provides the NG-9 system with an ISOLATED Input for Temperature measurement with RTD sensors (i.e. PT100). NG-9 PLUS is compatible with PT100 (standard), PT200, PT 500 and PT1000.

Measure isolation	dielectric strength of 1kV between Input and instrument to simplify use and improve protection against disturbance and the system's overall security
Accuracy	on the entire measuring chain is ±0,2% for readings between -100°C and +200°C, with a typical accuracy of ±0,1 % for readings between -20°c and +100°C.

NG-IoT

RS-485 /Wi Fi Transparent Converter

NG-IoT allows converting data flows from RS-485 Bus into Wi-Fi connection.

Thanks to a page created by the Web Server within the instrument, that can be read on any computer and mobile device bearing any kind of Operating System, it is possible to set all serial connections' parameters (Bitrate, Data Bit, Parity, Stop Bit) as well as Wi-Fi's (IP, Gateway, Subnet mask, Port, SSID, Password).

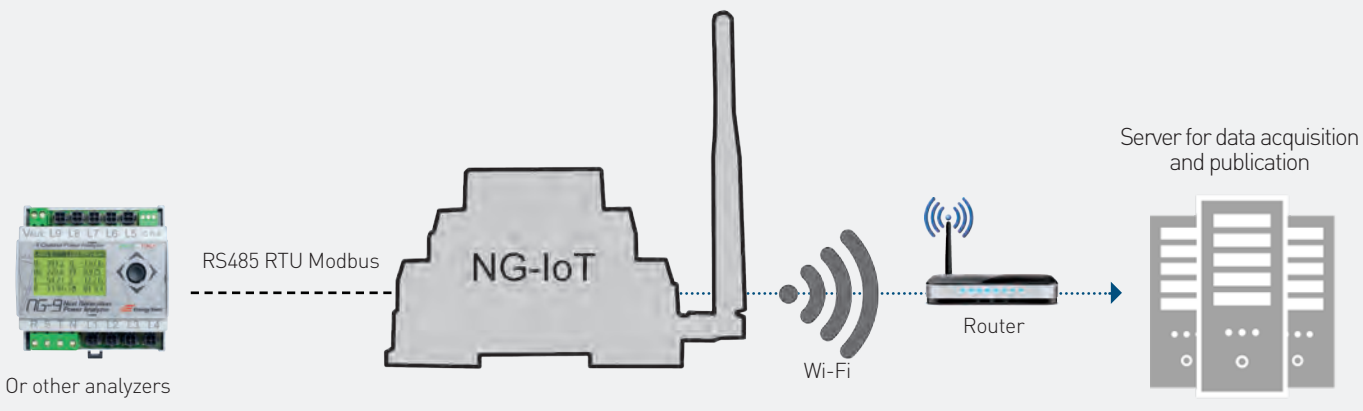
NG-IoT can be linked to the Wi-Fi network or operate through its internal Access Point; the device basically generates a Wi-Fi network to which the user has free access to set parameters and manage data flow.

SYSTEM FEATURES

All settings and configurations can be made via a Web page within the device itself and it can be read by any Browser on any computer and mobile device connected to a Wi-Fi network.

Transparent conversion of RS-485 data and to send them to the selected Port and IP address. *i.e. From RTU Modbus Protocol to Modbus over TCP Protocol.*

Box	single DIN module box (18x104x64 mm)
Power Supply	5÷25 Vac, 6÷35 Vdc (with no need for polarity)
Maximum absorbed power	2 VA
Standard serial interface	2-wires galvanic insulated RS-485. A termination resistor can be inserted
Available Bitrates	2400; 4800; 9600; 19200; 38400; 56000; 57600; 115200
Parity	Even, Odd o none
Data Bit	7 or 8
Stop Bit	1 or 2
Wi-Fi	802.11b/g/n with internal antenna and connector for an external one as well
Connection	Access Point function or Wi-Fi connection
LED signal of Wi-Fi network status	Yes
LED signal of Rx/Tx serial data flow	Yes
Reset / Default factory configuration button	Yes
Wi-Fi authentication	WPA2 - PSK / WPA / WEP



NG-9/96

Multifunction meter
Three Multifunction Meters in only 1 device
Measure 3 three-phase lines with a single instrument

96x96mm Multifunction meter with **Colour LCD resistive touchscreen, three 1 to 5A current inputs and 6 channels to acquire** energy data and other sources* (Temperature, digital and analogic signals).

- Bi-directional meter (Imported/delivered energy)
- 50 true value Measurements (RMS) on 4 quadrants
- The 96x96mm, 65mm deep case can be inserted in standard panels.
- Graphic display: 3.5" LCD TFT, 320x240pixel, 262k colors, with resistive touchscreen, for a clear and readable displaying of measurements.
- 84 Power Totalizers on 4 quadrants that can be set to zero.
- Temperature probe within the instrument.
- Clock and calendar.
- Current measurement modules available:
  - Rogowski flexy sensors Ø from 100 mm
  - Split Current Transformers
    Ø6 mm - max 10A
    Ø16 mm - max 100A
    Ø24mm - max 200A
- New Generation sensors
  Temperature measurement sensor NG-RTD
  Analogic voltage or current Inputs sensor NG-AIN
  Digital signal acquisition sensor NG-DIG
- Serial port: RS485
- Protocol: Modbus

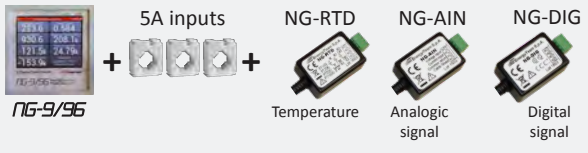
Applied Standards
- EN 55011(Class A)
- EN 61000-4-2 -EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-11
- EN 61000-4-3
- EN 61000-4-4
- EN 60204-1

Some possible configurations

3x THREE PHASE SYSTEMS

3x THREE PHASE SYSTEMS

1x THREE PHASE SYSTEM + OTHER CHANNELS



Three Multifunction Meters in only 1 device

OLD
version for 3 three phase systems

New Generation
version for 3 three phase systems

Flexibility and simplicity to reduce product and installation costs compared to other devices on the market

NG-9/96

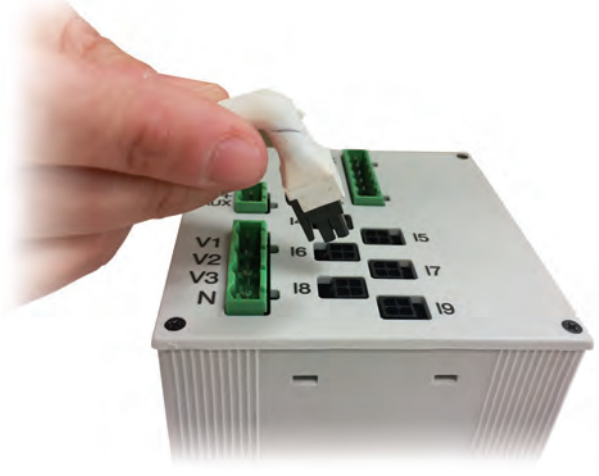
- 3x 1 to 5A current inputs
- 6x channels to acquire Energy data, Temperature, digital and analogic signals

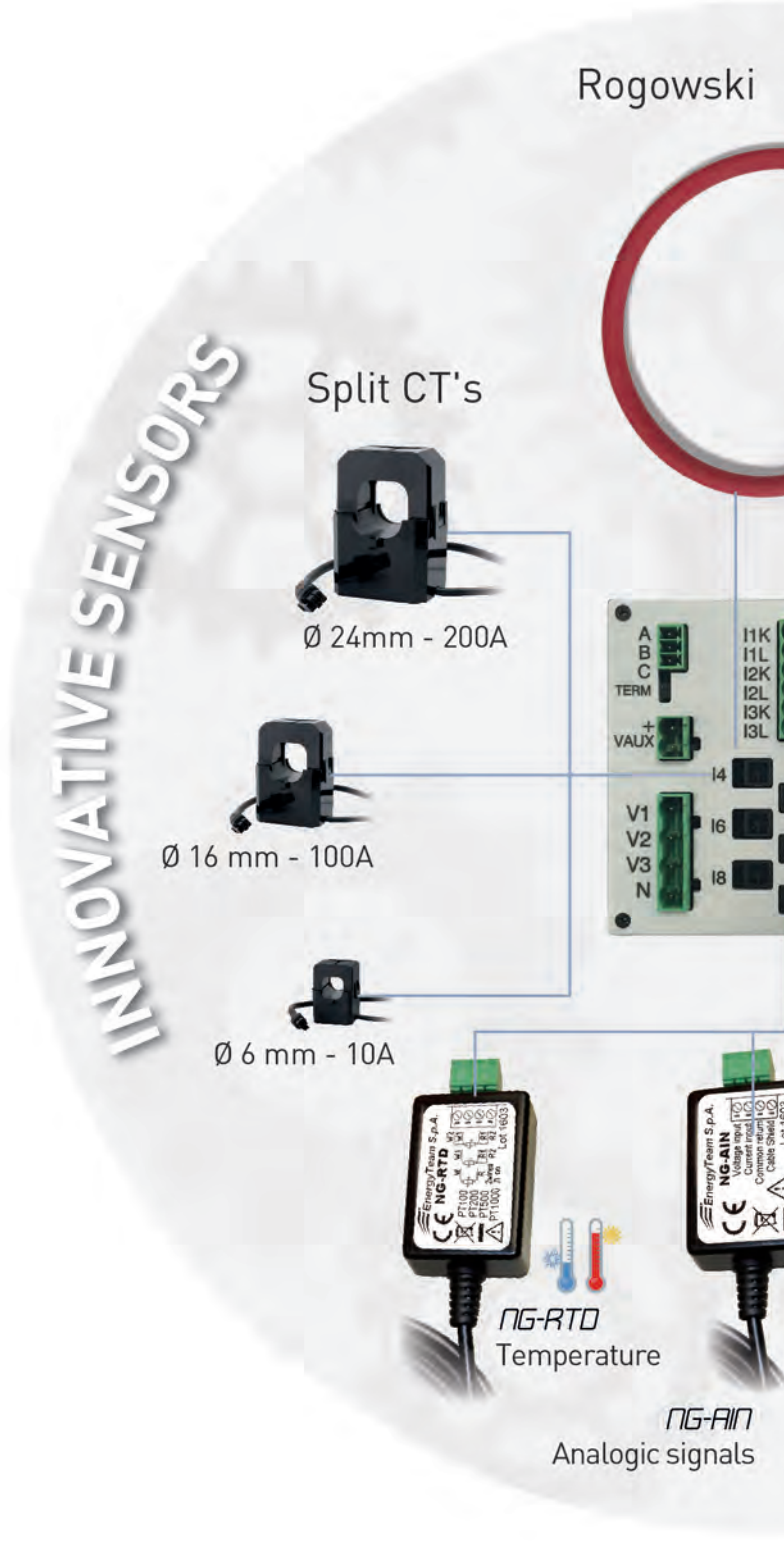
Sensor type 1 - Rogowski Sensor RG-2k	
Diameter	100 mm
Selectable ranges by Joystick	100 - 200 - 400 - 1000 - 2000 A
Cable length	5m
Sensor type 1a - Rogowski Sensor RG-4k	
Diameter	200 mm
Selectable ranges	200 - 400 - 800 - 2000 - 4000 A
Cable length	5m
Sensor type 1b - Rogowski Sensor RG-8k	
Diameter	200 mm
Selectable ranges	400 - 800 - 1600 - 4000 - 8000 A
Cable length	5m

Up to 850 mm diameter available upon request.

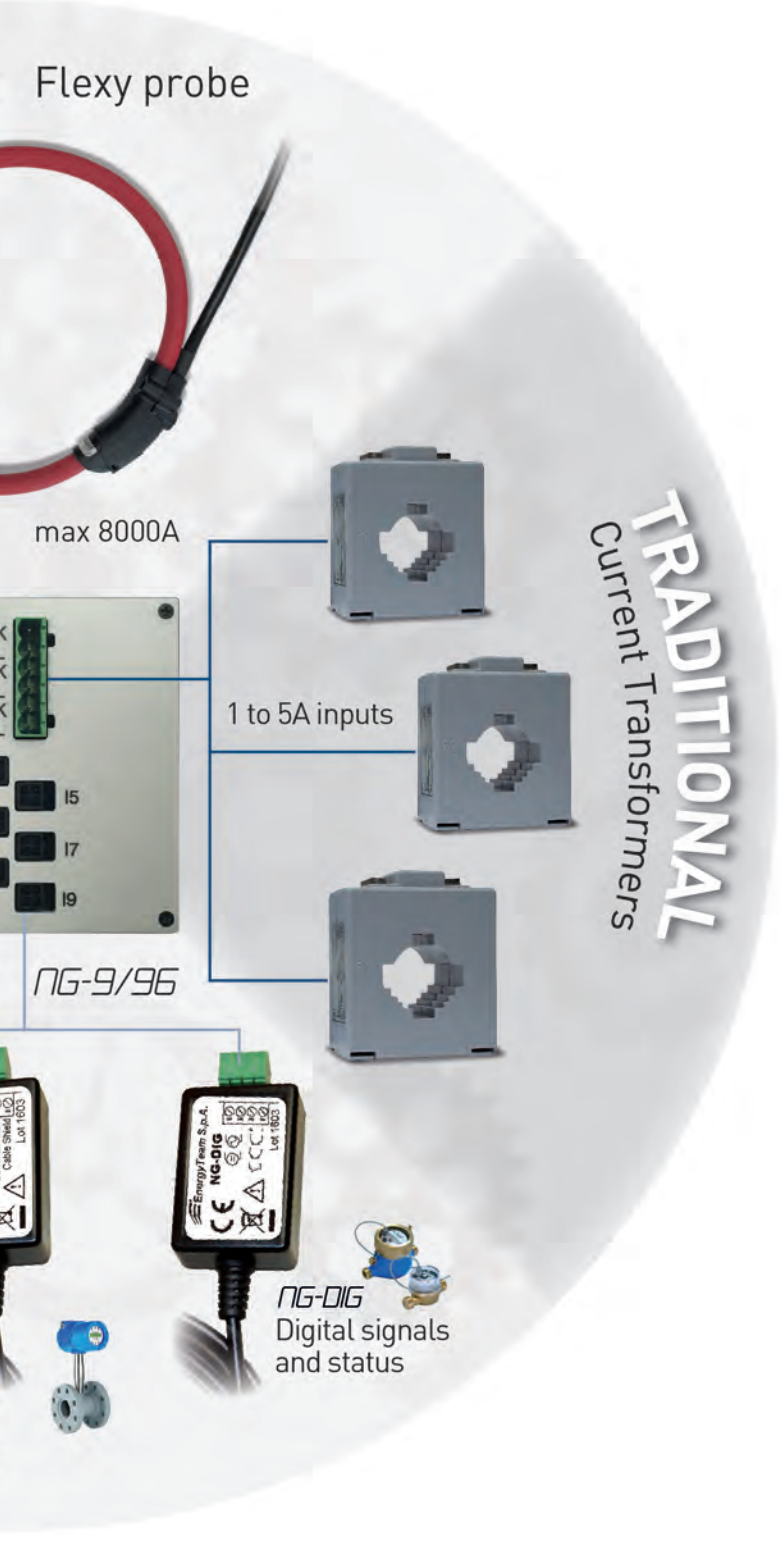
Sensor type 2 - CC 24	
Cable window	24 mm
Dimensions (LxHxW)	44,5 x 65 x 33,5 mm
Selectable ranges by Joystick	20 - 40 - 80 - 200 A
Cable length	2m
Sensor type 3 - CC 16	
Cable window	16 mm
Dimensions (LxHxW)	30 x 43,5 x 30 mm
Selectable ranges by Joystick	10 - 20 - 40 - 100 A
Cable length	2m
Sensor type 4 - CC 06	
Cable window	6mm
Dimensions (LxHxW)	16 x 32 x 26,4 mm
Selectable ranges by Joystick	1 - 2 - 5 - 10 A
Cable length	2m

Sensors extension	
Compatible with all sensors	
Cable length	4m





The most innovative Multifunction Meter in the world



NG-RTD	
This sensor provides the NG-9 system with an ISOLATED Input for Temperature measurement with RTD sensors (i.e. PT100). NG-9 PLUS is compatible with PT100 (standard), PT200, PT 500 and PT1000.	
Measure isolation	dielectric strength of 1kV between Input and instrument to simplify use and improve protection against disturbance and the system's overall security
Accuracy	on the entire measuring chain is ±0,2% for readings between -100°C and +200°C, with a typical accuracy of ±0,1 % for readings between -20°c and +100°C.

NG-AIN	
This sensor provides the NG-9 system with an analogic ISOLATED voltage or current Input.	
Flow range	±10V, 0-10V, ±20mA, 0-20mA and 4-20mA selectable straight from the instrument
Measure isolation	dielectric strength of 1kV between Input and instrument to simplify use and improve protection against disturbance and the system's overall security
Accuracy	on the entire measuring chain is 0,2% of the reading plus 0,05% of the flow
Measurement field	between 0 and 120% of the flow. Maximum permanent overload capacity 400% of the flow for current measurements and 100V (1000%) for voltage measurements

NG-DIG	
This sensor provides the NG-9 system with an ISOLATED Input for digital signal acquisition from passive Outputs (PNP, NPN, OPTOMOS or electromechanical contacts) as well as active AC or DC Outputs from 12 to 110 Vdc or Vac.	
Acquisitions	the system can acquire, ON-OFF static signals as well as pulses coming from meters up to 10Hz frequency with a minimum pulse's duration of 5 milliseconds (10 milliseconds for AC Input).
Measure isolation	dielectric strength of 1kV between Input and instrument to simplify use and improve protection against disturbance and the system's overall security

NG-9/96

List of Measurements

Direct measurements for single-phase

- Phase-neutral voltage L1-N
- Phase-neutral voltage L2-N
- Phase-neutral voltage L3-N
- Phase-phase voltage L1-L2
- Phase-phase voltage L2-L3
- Phase-phase voltage L3-L1
- Line current L1
- Line current L2
- Line current L3

Single-phase derived measurements

- Bi-directional active power L1 (positive=imported) (Q1 and Q4), negative=exported (Q2 and Q3)
- Bi-directional active power L2 (positive=imported, negative=exported)
- Bi-directional active power L3(positive=imported, negative=exported)
- Bi-directional reactive power L1 (positive=imported (Q1and Q4)
- Bi-directional reactive power L2 (positive=imported)
- Bi-directional reactive power L3 (positive=imported)
- Distorting power L1 (indication of presence of current harmonics)
- Distorting power L2 (indication of presence of current harmonics)
- Distorting power L3 (indication of presence of current harmonics)
- Apparent power L1
- Apparent power L2
- Apparent power L3
- Power factor L1
- Power factor L2
- Power factor L3

Harmonics and THD

- Harmonics up to the 15°, both Voltage and Current
- Voltage and Current THD

Main measurements of three-phase system

- Three-phase equivalent voltage phase-neutral
- Three-phase equivalent voltage phase-phase
- Three-phase equivalent current
- Three-phase active power (positive=imported, negative=exported) Bidirectional
- Three-phase reactive power (positive=imported) Bi-directional

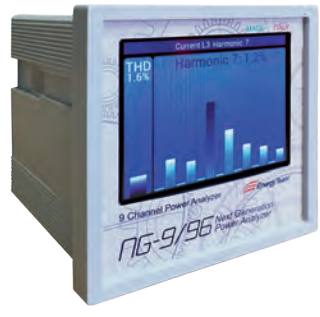
Secondary measurements of three-phase system

- Three-phase equivalent distorting power
- Three-phase equivalent apparent power
- Three-phase equivalent power factor
- Calculated neutral current
- Ideal Neutral-center star Voltage, N-0
- Frequency (measured on voltage input L1

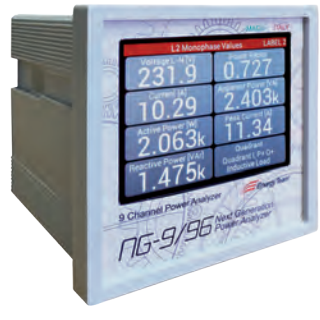
Integrated Energy values of 2 inputs

- Imported active Energy, Bench 1
- Exported active Energy, Bench 1
- Imported Inductive Energy (Q1), Bench 1
- Exported Capacitive Energy (Q2), Bench 1
- Exported Inductive Energy (Q3), Bench 1
- Imported Capacitive Energy (Q4), Bench 1
- Imported active Energy, Bench 2
- Exported active Energy, Bench 2
- Imported Inductive Energy (Q1), Bench 2
- Exported Capacitive Energy (Q2), Bench 2
- Exported Inductive Energy (Q3), Bench 2
- Imported Capacitive Energy (Q4), Bench 2

Keypad



Harmonics



Measurements

Inputs - Voltage	NG-9/96 Classic
Voltage	Each voltage input can be matched with a current channel to allow any type of three or single phase measurement
Number of channels	3 voltage inputs ranging up to 300V (phase-neutral) and 500V (phase-phase)
Maximum working voltage	300V (phase-neutral) and 500V (phase-phase)
Inputs - Current	**NG-9/96 Gold**
Number of channels: 9	3 inputs with selectable 1 to 5A range + 6 free channels for other sensors (clamp on CT's up to 200A, Rogowski sensors up to 8000A, digital and analogic signals and PT100)
Accuracy	0,5 Class on the entire measuring chain
General	**References**
Consumption	5 VA
Weight	300 gr
Maximum size LxHxW	96 x 96 x 75 mm
Size of panel inserting part LxHxW	91 x 91 x 65 mm
Display	LCD TFT 3.5" 320x240 pixel 262k colors
User interface	Icons with touchscreen
Working temperature	-10°C + 55°C
Relative humidity	95% without condensation
Power Supply	110-240 Vac / 24-120 Vdc
Frequency	50-60 Hz

NG-TH169

Room Temperature and Humidity 169MHz radio sensor

- No wires or cable
- 1 km transmission extension in open field with line of sight
- AA type batteries for over 5 years' long batteries lifespan
- High measurement accuracy
- Real time data visualisation
- Modern and understated design, suitable for any environment

- NG-TH169 uses radio broadcast to transmit measurements to the NG-W169 receivers, equipped with RS485 RTU Modbus.
- Batteries' lifespan up to 5 years with 300 daily sendings.
- LCD display for real time data visualisation.
- Low battery warning, 30 days in advance.

Measurement accuracy

Temperature range from -10°C to +65°C; with ±0.2°C tolerance guaranteed. As per relative Humidity, the range is from 0% to 100% with an output tolerance of ±2% within the 10% - 90% range.

Applications

Being extremely precise, reliable and convenient, NG-TH169 is specifically designed to be used in many different situations (i.e. Office, Data Centres, warehouses, etc.). The sensor is set for wall fitting.

General	
Power supply	3 Vdc, 2 x 1.5Vdc Alkaline, 1200 mAh
Consumption	100 µW / 30 µA
Measured Temperature range	-10°C ÷ +65 °C
Accuracy	±0,2 °C
Measured Humidity range	0% a 100%
Accuracy	±2%
Weight	60 gr
Dimensions	110x76x29 mm
Protection grade	IP20
Box type	ABS
Radio	169 MHz
Power	+15 dBm

NG-Rio

Loads' remote control

- 2 inputs for ON/OFF status and/or pulses from the connected meters (electricity, water, gas) and 2 relay outputs.
- Wireless connection to NG-W169, the Gateway with RTU Modbus RS458 serial. NG-Rio sends inputs' status to receive the outputs'.
- Wireless communication with other NG-Rio. A local input to control remote outputs.
- Automatic installation procedure for the 169MHz wireless network.
- 169MHz radio frequency band to cover distances up to 1 km. Particularly suitable for indoor installations.

Applications

Local control of remote loads (e.g. ON/OFF) sending the information to the gateway (NG-W169) that, via RTU Modbus protocol, makes the data available; NG-Rio can manage loads' ON/OFF management with its output relays (e.g. lighting, HVAC, etc.). Reduce installation time and costs and avoid wire connection between the control panel and the load to monitor.

General	
AC power supply	100 ÷ 240 Vac 50/60 Hz
DC power supply	140 ÷ 340 Vdc
Consumption	< 0.2A @ 85Vac~265Vac, at full load
Protection	Over Current and Over Temperature
Dimensions	3 DIN modules (approx. 54x90x60mm)
Box	PC + ABS
Weight	100g
Front panel	GREEN LED for operative status signals RED LEDs for outputs status
Working temperature	-10 °C to +65 °C
Min 3 kV insulation between power supply and digital Input, relay Output and antenna connection	
Inputs	
Type	Clean contact – active 12 Vdc insulated digital pulse up to 30 Hz frequency and 15 milliseconds minimum pulses' duration
Connection (3,5mm pace)	Extractable polarized connector.
Outputs	
Type	C-NC-NO Relays
Flow	250V - 12A (500mW min)
Guaranteed cycles	250.000
Control	Internal, Electronic
Protection	275V Varistors for contacts' overvoltage
Connection (5mm pace)	Extractable polarized connector.
Frequency	169 MHz
Power	+15 /+21 /+27 dBm
Antenna connection	Female SMA

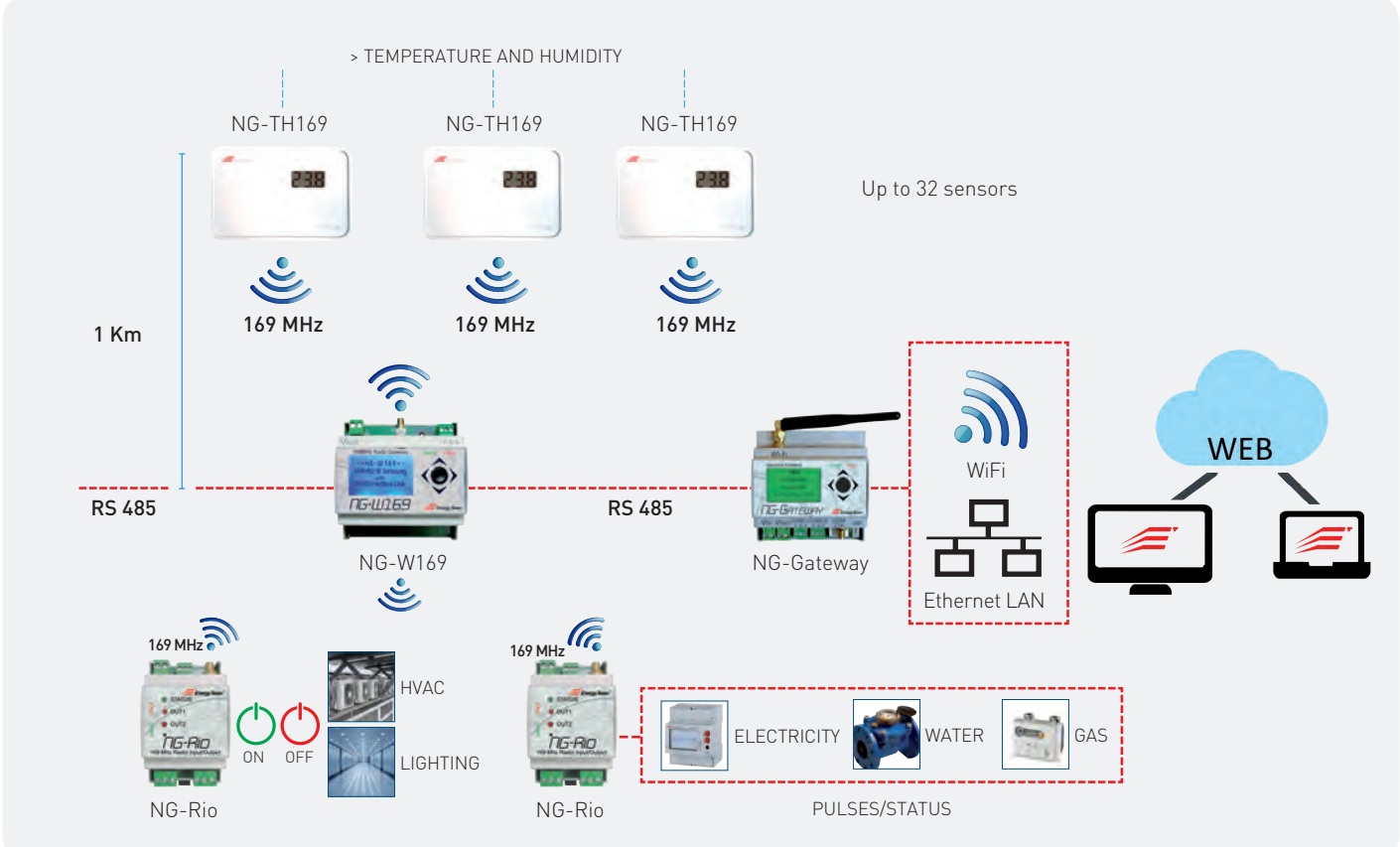
NG-W169

Radio receiving module. 32 channels ready to collect environmental parameters measured by RF 169Mhz sensors.

- All measurements received via radio are transmitted via RS485 RTU Modbus.
- The module can receive via radio and manage the "low battery" warning sent by the sensors 30days before.
- 1 joystick to set and read data on the display
- Graphic display with LED background allows local visualisation of all acquired measures, diagnosis and configuration of the 32 channels
- The new 169MHz radio frequency band allows covering distances up to 1 km; particularly suitable for the indoors.

General	
External power supply	The instrument works with both AC and DC voltage power supply within the limits below
AC power supply	90 - 250 Vac 50/60 Hz
DC power supply	24 - 120 Vdc
Consumption	1.5 VA max (ac) or 1.5 W max (dc)
Dimensions	5 DIN modules (approx. 88x90x60mm)
Box type	PC+ABS
Weight	95 g
Display	Graphic 128x64 pixel display with RGB LED background
Keypad	5 functions joystick
Communication interface	Isolated RS-485 with RTU Modbus protocol, selectable speed up to 115200 bps programmable parity
Isolation	6 kV between Aux power supply and RS485
Working temperature	-10 °C +65 °C
Radio	
Range extension	1 km
Frequency	169 MHz

"Everything that ties you down, is a limit" cut every wire and free yourself from all limits.



> Meters
> Applications
> Software

MID XMC3F

6A three-phase energy meter with RS485 Modbus RTU output

Power supply	
Self powered from tension lines	
Tension range	184 to 288 VL-N
Consumption (per phase)	3,5 VA - 1 W
Frequency	50/60 Hz
Tension	
Range (Modbus integrated communication)	3x230/400V to 3x240/415V 50/60Hz 4 wires
Current	
Maximum current Imax	6 A
RS485 Modbus communication	
Door	RS485
Protocol	Modbus RTU
Communication speed	300 to 57600 bps
Energy meters	
Communication speed	300 to 38400 bps
Unit load	1
Accuracy	
Class 1 active energy	as per IEC/EN 62053-21
Class 2 reactive energy	as per IEC/EN 62053-23
Class B active energy	as per EN 50470-3
SO output	
Passive optoisolated	
Maximum values	27 VCC - 27 mA
Pulse's duration	50 ±2ms ON time
Input rate	
Optoisolated active	
Maximum tension	276 VCA-CC
Metrologic LED	
Integration constant	1000 imp/kWh
Environmental conditions	
Working temperature range	-25°C to +55°C
Storage temperature	-25°C to +75°C
Relative humidity	max 80% with no moist
Degree of protection	IP51 front - IP20 clamps
General features	
Dimensions (WxHxD)	72x90x64 mm

- RS485 Modbus RTU integrated communication
- Suitable for 1 or 5A CT
- CT values programmable
- Bidirectional measurement on 4 quadrants for all types of energy and power
- Suitable for 4wires network with balanced or unbalanced load
- Energy pulses output
- LCD display
- Fully complying with EN 50470-1 EN 50470-3 regulation

Advantages

- Up to 30 instant measured parametres can be displayed, complete set of energy metres, total and partial metres included. Partial meters can be started, stopped or reset
- Suitable for CTs with both 1 and 5A secondary. CTs value programmable in field (1...10000)
- The meter indicates phases' sequencies and has a diagnostic function to report polarity and connectivity problems.

General features

4 DIN, compact energy meter for measuring energy in industrial and civil environments, RS485 Modbus RTU communication included. Apart from energy, the meter, measures other main electrical parameters and makes them available via integrated COM door. Visualise, on the LCD display, totalizers and instant power. The COM door allows the management of a meter connected to a remote station. These data will be transmitted on the RS485 line. The meter is designed complying with EN 50470-1 EN 50470-3 regulation. Active energy's precision refers to the IEC/EN 62053-21, class1 regulation. Reactive energy's precision refers to the IEC/EN 62053-23, class 2 regulation. The wide LCD backlit display and clear symbols, ensure an easy reading of status and indicated values. On the front panel there's the metrological LED. The clamps cover can be sealed to avoid any tempering.

MID XMC3F-80

MID 80A energy three-phase meter with integrated RS485 Modbus RTU output

Power supply	
Self powered from tension lines	
Tension range	184 to 288 VL-N
Consumption (per phase)	3,5 VA - 1 W
Frequency	50/60 Hz
Tension	
Range (Modbus integrated communication)	3x230/400V to 3x240/415V 50/60Hz 4 wires
Current	
maximum flow Imax	80 A
RS485 Modbus communication	
Door	RS485
Protocol	Modbus RTU
Communication speed	300 to 57600 bps
Accuracy	
Class 1 active energy	as per IEC/EN 62053-21
Class 2 reactive energy	as per IEC/EN 62053-23
Class B active energy	as per EN 50470-3
SO output	
Passive optoisolated	
Maximum values	27 VCC - 27 mA
Pulse's duration	50 ±2ms ON time
Input rate	
Optoisolated active	
Maximum tension	276 VCA-CC
Metrologic LED	
Integration constant	1000 imp/kWh
General features	
Dimensions (WxHxD)	72x90x64 mm

- Integrated RS485 Modbus RTU communication
- Direct connection up to 80A
- Two way measurement with 4 quadrants for all types of energy and power
- For 4 wires networks with balanced or unbalanced loads
- Energy pulses output
- LCD Display

Advantages

- Up to 30 instant measured parametres can be displayed, complete set of energy metres, total and partial metres included Partial meters can be started, stopped or reset.
- The meter indicates phases' sequences and has a diagnosis function to report polarity and connectivity problems.

General features

4 DIN, compact energy meter for measuring energy in industrial and civil environments, RS485 Modbus RTU communication included. Apart from energy, the meter, measures other main electrical parameters and makes them available via integrated COM door. Visualise, on the LCD display, totalizers and instant power.
The COM door allows the management of a meter connected to a remote station. These data will be transmitted on the RS485 line.
The meter is designed complying with EN 50470-1 EN 50470-3 regulation. Active energy's precision refers to the IEC/EN 62053-21, class1 regulation. Reactive energy's precision refers to the IEC/EN 62053-23, class 2 regulation. The wide LCD backlit display and clear symbols, ensure an easy reading of status and indicated values. On the front panel there's the metrological LED. The clamps cover can be sealed to avoid any tempering.

Other meters

Water and Liquids

There is a whole range of measuring devices from single jet to multi-jet and WOLTMANN type, hot or cold-water meters, fully protected, wet or dry face and all of them come with pulse emitters or even just ready for telemetering with X-Meter or XRWU-GOLD.
The range of available diameters goes from DN13 to DN50 for single jet or multi-jet models and DN50 to DN300 for meter models. The litres/pulse ratio varies from 0.25 to 1000 (to be specified in advance). All models are MID approved according to the 2004/22/EC Directive (module B+D) and comply with EN 14154/2007 and OIML R49/2006 regulations.

All meters are certified for use with drinking water according to DM 174 (April 6, 2004). The following meters are also available:

- Electromagnetic capacity meters with diameters from 25 to 2000 mm, 0.2% precision, 180°C max temperature and pressure up to 300 bars
- PTB and MID certified calories counters.
  Thermal power up to 30,000 MW with precision >0.5%.

Gas

A wide range of turbine meters and quantometers is available. Cast iron, steel or aluminium body (based on pressure) and IP67 protection rating. All devices are equipped with pulse emitters for telemetering with X-Meter or XRWU-GOLD. Turbine fitted models are fiscal flow meters that detect the gas' volume (cubic meters) with pressures ranging from PN10 to PN100. The available diameters range from DN50 to DN600 with sizes from G65 to G16000. Perforated plate flow conditioners can be incorporated and they are oil lubricated.

Quantometers are non-fiscal gas meters that are very safe for the wide capacity range and operate on turbine principle. The rotation of the impeller is proportional to the gas flow and is recorded (Vb/m3) through a mechanical (QA) or electronic (QAe) meter. The self-greasing rolling bearing ensure perfect operation of the quantometer making it maintenance-free. Besides recording the total volume (Vb/m3), the QAe allows displaying instant flow (Qb/m3/h) and volume at a set date. Available diameters range from DN25 to DN500 with sizes from G10 to G16000. Pressure range from 1 to 100 bars based on the type of gas and the model. A removable version is also available, mounted on a special flanged adaptor.

Steam

Vortex flow meters are based on Karman principle and are used in various industrial sectors. Their use is widespread for measuring and recording Steam data. The versatility of this instrument is unbeatable since it helps resolve various problems with the system's flow rate measurement. They are designed, built and tested according to the strictest ISO 9001 quality standards in order to ensure excellent performance at any time, from ideal laboratory conditions to the most critical industrial processes. These meters do not have moving parts so do not require any maintenance.

They offer various output possibilities (4-20mA, impulse, frequency, etc.) and allow measuring process temperature between -200 to +400°C with nominal pressures up to PN250/Class 1500 and can be approved for use in ATEX type hazardous areas. They have a wide range of nominal diameters, from DN 15 to DN300 and are equipped with built-in temperature sensors for calculating the mass flow rate and heat.

ET-MS2500/ET-ML110

Electromagnetic meter with separate electronics

ET-MS2500 flanged Electromagnetic Sensor is a flow meter for liquids and electrically conductive volumes, caustic substances and mixed liquids and solids. Its main features are the absence of moving mechanical parts and internal electrical insulation that allow minimum load loss, maintenance prevention (with no solid debris causing damage) and extremely precise measurements since it is not influenced by physical parameters like the liquid's temperature, density and viscosity.

ET-ML110 also manages the signal generated by the meter's electrodes, allowing for very accurate measurements with stable performance over time in a wide range of flow rates. The converter can be installed separately from the meter thus making the installation easy even with lack of space. All models come with pulse output. The Electromagnetic Meter and Converter can be provided with MID004 upon request.

Body material	Painted carbon steel AISI 304 or 316 Stainless steel
Nominal diameters	DN 25 ÷ 2000
Nominal pressure	PN 16 Others upon request
Process attachments	Flange: UNI, ANSI, DIN, JIS Others upon
Flange material	Carbon steel AISI 304 or 316 Stainless steel
Liquid temperature	0°C ÷ 60°C with PP coating -5°C ÷ 80°C with hard rubber coating -20°C ÷ 100°C with PTFE coating compact version -20°C ÷ 130°C with PTFE coating separate version* *Contact the manufacturer for higher temperatures
Vacuum resistance	20 Kpa (absolute) at 100 °C (60/80°C for PP/hard rubber)
Coating material	Polypropylene (max. PN 16) Hard rubber PTFE Others upon request
Gasket material	No gasket vers. Lining PTFE-EBNITE FPM with lining in Polypropylene
Electrode material	AISI 316 Stainless steel Hastelloy B or C Platinum-Rhodium Titanium Tantalum Others upon request
Version - protection rating	Compact - IP 67 Separate (maximum 20m) - IP 68 Separate (maximum 500m) with pre-amplifier - IP 67 (IP 68 optional)

Case material	Nylon loaded fibreglass
Dimensions	120x120x55 mm
Protection rating	IP 65
Cables - Cable glands	Cable C018 (max. 20m) Standard no. 3 PG 11
Environmental temperature	0 to +50 °C
LCD Display	Alphanumeric display with 16 characters and 2 unlit lines
Keyboard for programming	3 internal keys
Impulse output/ frequency/alarms	2 programmable functions max 1250 Hz, 100mA, 40 Vdc
Output in current	n° 1 0/4...20mA - RL 800 Ω
Bidirectional measurement	YES
FS value	0,4 to 10m/s
Self-diagnostic function	YES
Empty pipe detection	YES
Galvanic separation	All outputs are separate from each other and from the power supply
Data logging	When there is a power outage the data is logged in an Eeprom
Programming outlet	Protected outlet for PC connection or laptop connection
EC Certification	EC certified instrument
Margin of error	Flow rate (volume) = ±0,1 % v.l. Out 4/20 mA = ±0,12 % v.l. Out Frequency = ±0,12 % v.l.
Repeatability	+/-0,2%
Power supply	90÷265 Vac - 45÷66 Hz; 10÷63 Vdc/15÷45 Vac - 45÷66 Hz
Consumption	5VA; 4VA (AC) / 3W max (AC)

ET-ML311

Thermal energy meter

ET-ML311 is designed to measure the thermal energy consumed in central heating and cooling systems. Physical heat is detected through an electronic reading of the quantity of water flowing through the meter (V) and the difference in temperature detected by the two high precision probes located on the output flow and on the return flow (ΔT). These two parameters are multiplied by the heat coefficient of the heat transfer fluid used and enthalpy, (K) to find Thermal Energy values.

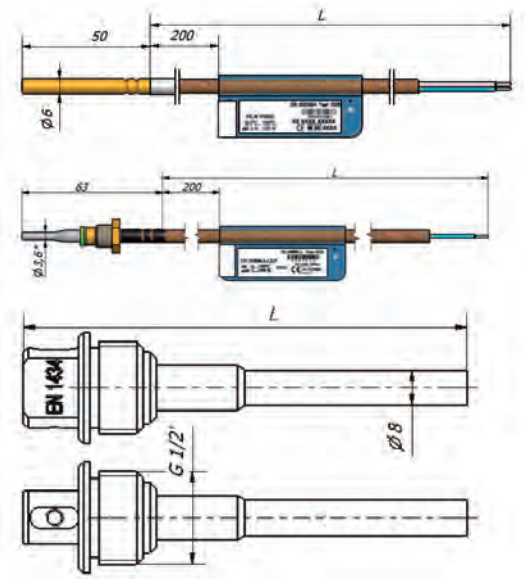
E= V*K*ΔT

Small and compatible with all types of flow meters (Turbine meters, Woltmann meters, Ultrasound and Electromagnetic meters), it interfaces directly with 2 or 4 wire PT100/500/1000 type probes and determines the correct temperature value using the algorithm stated in the EN60751 regulation. This allows extremely precise calculation of heating and cooling consumption. Upon request, ET-ML311 can be certified for "financial transactions" and complies with EN1434 (MID004) according to European Directive 2004/22EG.

Case	PPO sealable box
Protection rating	IP40/IP54 (with terminal covers)
Version	Stand-alone; Installation DIN rail (acc. DIN60715)
Display	4 lines x 15 characters (9 digit-total. 6 digit-istant.) backlit (blue upon request)
Language	6 programmable languages (I, E , S, F, D, P)
Special functions	Bi-directional; Double range; Diagnostic; Energy Saving; Hot-Cold Switch; Reset Inputs
Impulse outputs/Freq	Programmable functions/Open collector (2, 1250Hz, 100mA, 40Vdc - 12,5KHz opt.)
Digital/Analogue inputs	Programmable functions: 1 Analogue (Flow rate) 3 Impulses (Hot and cold, liquid and volume)
Current output	N°1, 0/4....20mA - RL=1000 (i.e. flow rate/power)
Serial port (opt)	RS232, RS485, MODBUS, BACnet MS/TP, M-bus, N2Open
Power supply	90÷265 Vac - 45÷66Hz or 18÷63Vdc/15÷45Vac - 45/66Hz optional
Precision	± 0,2%.v.l. Calculation update every second
Repeatability	Better than 0.1%

MID Temperature sensors

Couple of temperature probes for thermal energy monitoring with 6,5mm stainless steel sensor ready for lead sealing. 1/2 inch pipe connection.

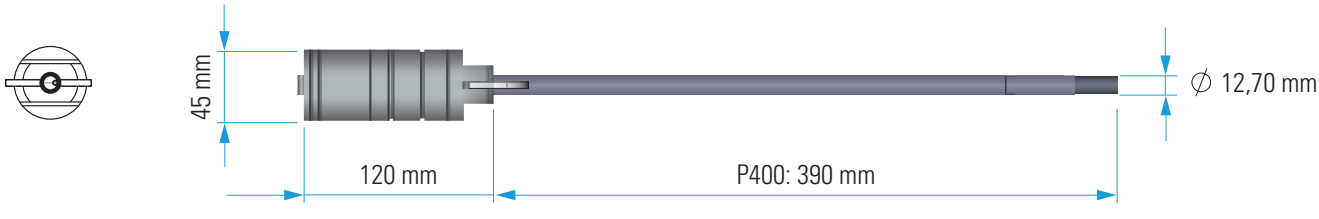


Wire connection	2 o 4 wire
Type of sensor	Pt500 (Pt 100 e Pt 1000 upon request)
Measuring	Temperature difference detected by the measurement of dual calibrated probes that are directly correlated to the quantity of thermal energy calculated by the meter to which they are connected
Difference measuring limits	Temperature difference limits: Δ θ = 3 to 100°K; 2 to 100°K special limits: θ = 0 to 150°K
Field of measurement	0 °C to 150 °K (180 °C upon request)
Field of measurement of the temperature difference	3 °C to 100 °K
Max temperature allowable for heat transfer fluid	150 °C (180 °C upon request)
Tolerance class	B in compliance with EN 60751
Cable length for 2/4 wire connection	3m, 5m, 10m Greater length in version with tip to cable
Type of cable for 2 wire connection	2 × 0,5 mm² unshielded (permanent connection)
Type of cable for 4 wire connection	4 × 0,35 mm² unshielded (permanent connection)
Max RMS value of the sensor current	0,5 mA
Response time t0.5	< 10 s
Total resistance of the signal load	0,22 Ω - with 3m cable (2 wires) 0,36 Ω - with 5m cable (2 wires) 0,72 Ω - with 10m cable (4 wires)
Environmental parameters	Room temp +5°C to +55°C Mechanical environment class M1 Electromagnetic environment class E1

ET Flow Sensor

Single probe for Compressed Air Flow Rate - Pressure - Temperature
Model suitable for installation with dry and filtered compressed air

Flow Sensor	
Measurement principle	Thermal Mass
Measurement Range	0(0,5) - 150 m/sec.
Precision	2% on calibration value
Reference Conditions	0°C, 1013,25 mbar
Compressed gas temperature range	0 to + 60°C
Gas	Compressed Air, Nitrogen and Inert Gases, non-condensing Gases
Pressure sensor	
Pressure Range	0 to 16 bar
Precision	+/- 1,5 % FSS Compensated
Temperature sensor	
Temperature Range	0 to + 60°C
Precision	> 10 m/sec +/- 1°C < 10 m/sec + 5°C
Data Outputs	
4-20 mA	(opz.) MODBUS RTU
Mechanical/ Room	
Length	400 mm
Attachments	G ½"
Pressure Range	PN 20 (greater pressures upon request)
Protection rating	IP52 display, IP63 connector
Room temperature range	-10°C to +50°C
Construction	Stainless Steel Anodized Aluminium - Silicone
Electrical connections	
Connector	M 12,5 pin female
Power supply voltage	12 to 24 VDC +/- 10% Class (UL)
Energy Consumption	2,4 Watt (no flow) 4,8 Watt (full flow) +/-10%
Power Supply	24 VDC
Connection cable	provided, 5m with M 12 connector; (opt.) 10m
Safety cable for anchoring	included
Calibration certificate	included



Scheda 40 standard per tubi in acciaio carbonio						
Size (inch)	DN	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)
2	50	52,5	2	688	4	1169
3	80	77,9	5	1516	9	2576
4	100	102,3	9	2610	15	4435
6	150	154,1	20	5924	34	10065
8	200	202,7	34	10259	58	17429
10	250	259,1	56	16756	95	28468
12	300	303,2	77	22953	130	38995
16	400	381,0	121	36237	205	61565
20	500	477,8	190	56996	323	96832

Scheda 10 standard per tubi in acciaio carbonio			
ID (inch)	ID (mm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)
2,2	54,8	4	1273
3,3	82,8	10	2908
4,3	108,2	17	4966
6,4	161,5	37	11057
8,3	211,6	63	18982
10,4	264,7	99	29709
12,4	314,7	140	42004
15,6	396,8	223	66794
19,6	496,9	349	104729

Gas

Consumptions Monitoring

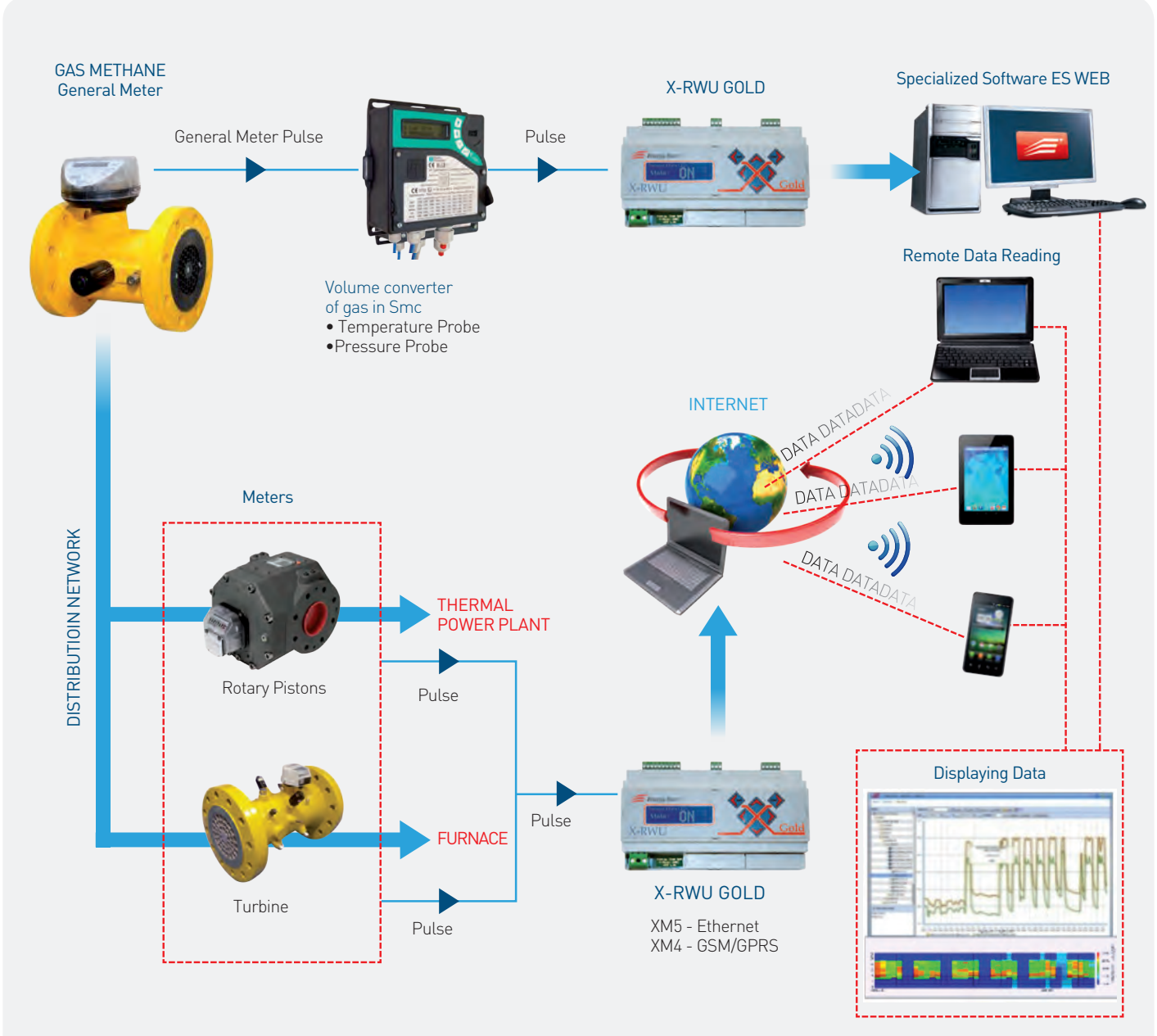
It is very important to monitor and manage gas consumption. A profitable energy management cannot only be based on the measurements coming from the meters, but it also needs information from various utilities.
It is essential to have additional measuring points within the distribution network in order to optimize consumptions allocation of the sub-utilities and check the provider's accuracy on billed amounts.
X-RWU GOLD can acquire store and process data from the main meter and sub-measuring points.
Ethernet or GSM/GPRS communication modules allow a remote reading of the instrument's data and their online publication.

Solution for Gas monitoring

X-RWU GOLD is an innovative Data Logger, designed for data acquisition, filing and management to analyse the actual consumption and the forecast loads profile. The device is extremely versatile and user friendly and it acquires data every 15 minutes with high storage capacity.

Data Displaying

- Data management and reading with Energy Sentinel Web®, the Energy Management Software
- WEB interface for Web Telemetering



Water

Consumptions Monitoring

It is very important to monitor and manage water consumption. A profitable energy management cannot only be based on the measurements coming from the meters, but it also needs information from various utilities.
It is essential to have additional measuring points within the distribution network in order to optimize consumptions allocation of the sub-utilities and check the provider's accuracy on billed amounts.
X-RWU GOLD can acquire store and process data from the main meter and sub-measuring points.
Ethernet or GSM/GPRS communication modules allow a remote reading of the instrument's data and their online publication.

Solution for Water Monitoring

X-RWU GOLD is an innovative Data Logger, designed for data acquisition, filing and management to analyse the actual consumption and the forecast loads profile.
The device is extremely versatile and user friendly and it acquires data every 15 minutes with high storage capacity.

Data Displaying

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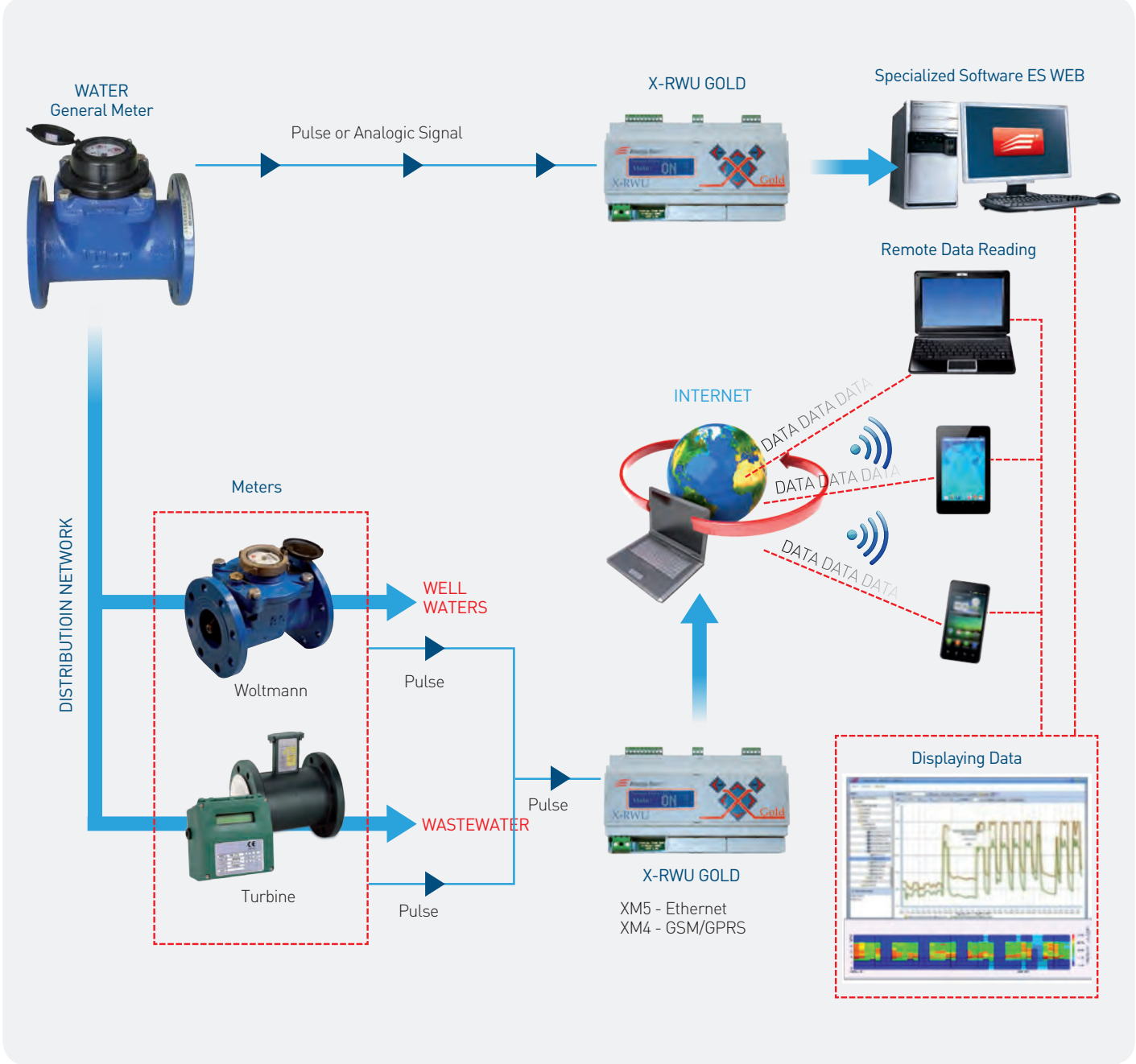
- WEB interface for Web Telemetering



Thermal energy

Metering and Monitoring

It is very important to monitor and manage thermal energy consumption. A profitable energy management for each plant's heating and cooling cycles is possible with a device that allows for fundamental data detection for physical heat calculation.
This lets the user check the provider's accuracy on billed amounts and calculate loads distribution evaluations in different thermal areas of the plant.

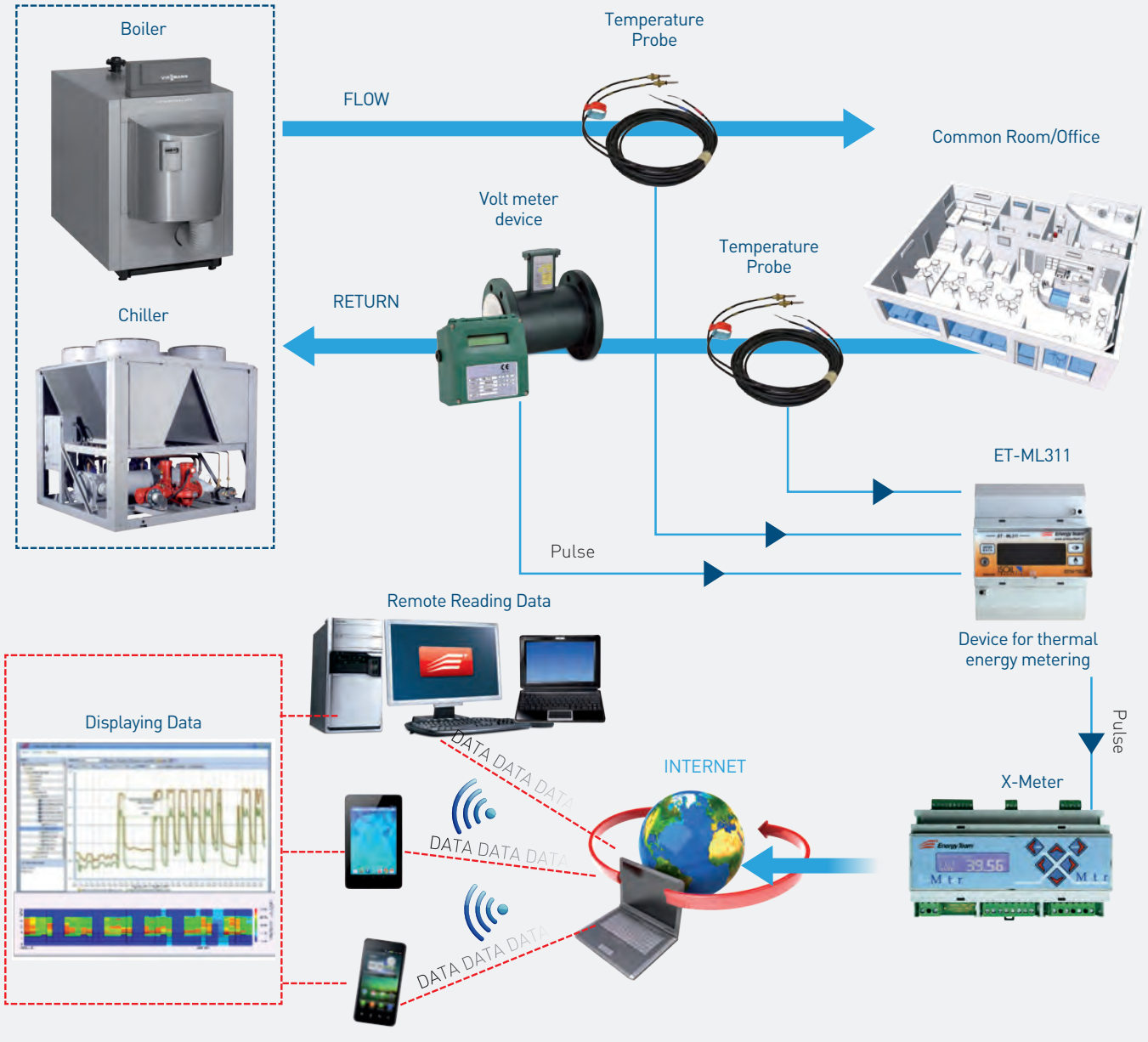
Monitor flow and return temperatures with suitable temperature probes and monitor the heat-transfer fluid's flow to track the parameters' profile in time.

Thermal Energy
=
Flow × Heat specific of transfer fluid ×Temperature Difference

ET-MLX311 metering device for Thermal energy supplies data to the data logger (X-Meter) to be filed and processed to define each measured quantity's profile. Its WEB interface makes both online data publication and remote reading possible.

Data Displaying

- Data management and reading with Energy Sentinel Web®, the Energy Management Software
- WEB interface for Web Telemetering



X-Meter for electric cabinet

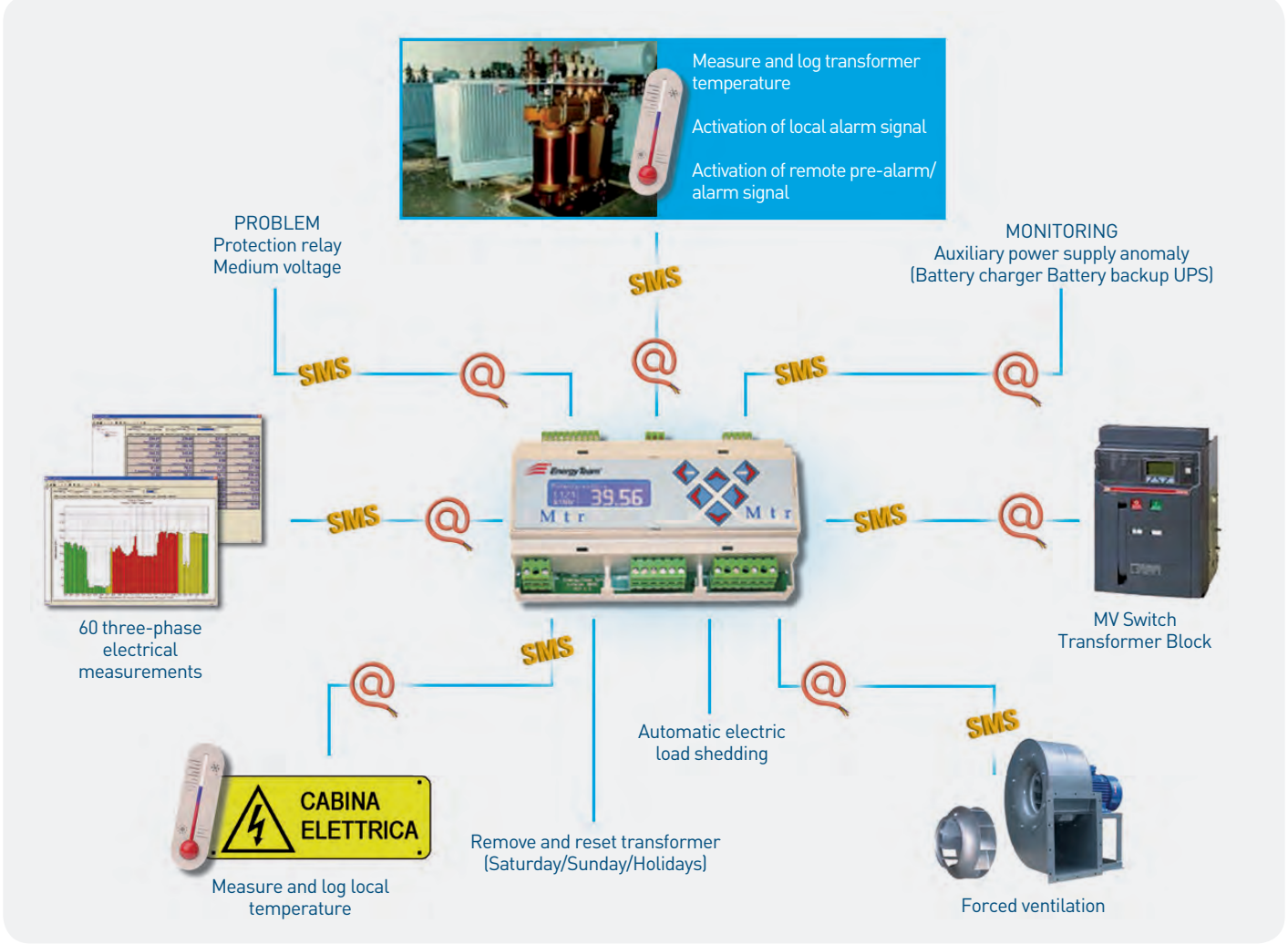
Monitoring and alarms management system

The proper operation of a MV/LV transformer inside an electrical cabinet protects the user against any failures that could cause production or processing lines to stop and much more..

It is therefore essential to monitor the transformers' operating temperature, and room temperature of the cabin, and the electrical parameters. Temperature is a direct indicator of the load's conditions of the transformer and its operating condition. The transformer's regime depends on the output current, room temperature and auxiliary cooling ventilation conditions. Temperature is an element of stress and degradation, for resin insulation and a factor of chemical-physical alteration in mineral oil insulation for oil transformers. These insulators undergo a gradual ageing process that can be greatly accelerated should temperature exceed certain set-point values normally found acceptable for proper operation. A low load operating transformer means higher energy loss and a transformer operating at a power higher than 85% of its plate rating means wasting an even greater amount of active energy. Monitoring these situations means performing a series of considerations and interventions including the one for significant energy savings.

X-Meter's alarms management and electrical factor monitoring system allows:

- Measuring and filing the transformer's temperature and activate a local "transformer's high temperature pre-alarm"
- To activate a local "transformer's high temperature alarm signal"
- To activate pre-alarm/cabin alarm remote signal.
- To activate a local visual-acoustic alarm.
- To activate the transformer block, turning the MV general transformer switch on the medium voltage cabin panel.
- Measuring and filing the transformer's room temperature and activate local supplementary ventilation (if available).
- To activate forced ventilation of the transformer cabin.
- Measuring and filing 60 electrical parameters and harmonics and micro-interruptions of the electrical network at 10ms intervals.
- Sending an SMS to pre-set numbers on the cabin's pre-alarm status.
- Emailing pre-set addresses on the cabin's alarm status.
- To activate a sequence of non-privileged load shedding (set by the user) upon reaching the pre-set "high temperature"level.



X-Meter Air

Monitoring solutions to cut the costs of compressed air production.

PHASE 1

Scheduled monitoring

To better understand the compressed Air System and Central' state of health.

Collect the following data:

1 Running times with and without Load operation
2 kWh quantification of consumption during different Phases-Number with/without Load cycles
3 Compressed air's flow with Partial/Total values for the system's efficiency (kWh/m3 and €/m^3)
4 Charge losses in the System – Dew Point detection and incidence measurement
5 Compressed Air leaking
6 Working Temperature's evaluation

PHASE 2

Analysis - Simulation

Report in which achievable energy and economic savings are listed

A Costs quantification
B Identification of critical aspects
C Pre-configuration of different scenarios highlighting energy and economic savings

PHASE 3

Monitoring - Prevention

Monitoring System supplied

A To maintain, in the long run all economic benefits obtained and prevention of faults/ anomalies /troubles
B Web platform connection with real time data
C Free "Alerts" setting

OUTCOME

Possible 20-50% Compressed Air utilization costs reduction

X-Meter for Data Centres

Alarms monitoring and management system

Discovering in the morning that the Data centre is down is the kind of surprise that IT managers and frankly all other Company employees, hope not to experience! The damage, apart from the obvious of not being able to work, can be considerable.

Here's some of the main causes:
- UPS failure
- Temperature rising beyond the limits manageable by the devices in the room
- Power failure beyond the autonomy limits of the UPS unit
- Failure of the Data Centre's HVAC system
- Differential breaker in the main panel switching itself following lightning or network disturbance
- Circuit breaker in the main panel switching itself following overloads or short circuits
- Server temperature alarm.

Preventing these conditions is not possible but being able to intervene promptly would allow quickly restoring the correct conditions of operation and eliminating or limiting certain damage.
The X-Meter, with 8 inputs, can manage PT100 temperature probes and temperature and humidity sensors. With a GSM modem enabled, it also sends SMS's and emails for the each set alarm.

X-Meter one device, many features:

- One instrument performing 50 measurements
- Monitoring function for general electrical meters
- Electrical mains analyzer
- Supply quality: micro-interruptions and harmonics (opt.)
- Diagnosis and alarms management, even on electrical measurements
- Storing of Data Centres temperature and humidity data
- Office lighting management with set timers (opt.)
- Storing of energy consumption data (see the instrument's datasheet for further information)
- € indication of consumed energy costs
- Telemetering of the consumption data online (opt.)
- Connection to the corporate network (opt.)

Energy monitoring for the service industry. Banks and Retail branches

In the last years, the service industries as well, have shown high interest in Energy Efficiency solutions, to understand their accurate and precise energy consumption and relate it to their actual requirements.

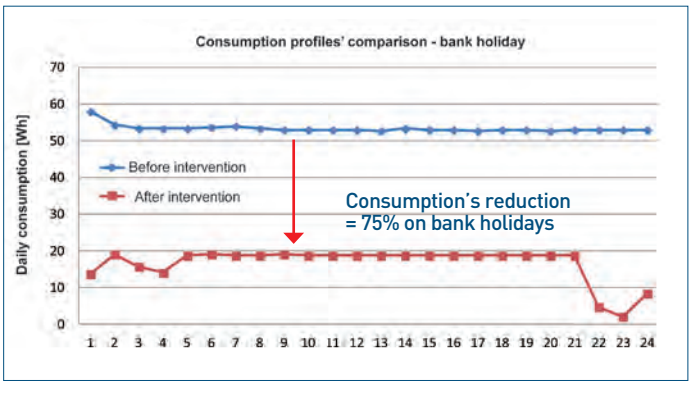
Being aware of this circumstance leads to urgent management policies aimed to obtaining the highest energy efficiency level possible, especially regarding those daily hidden wastes we're unaware of.

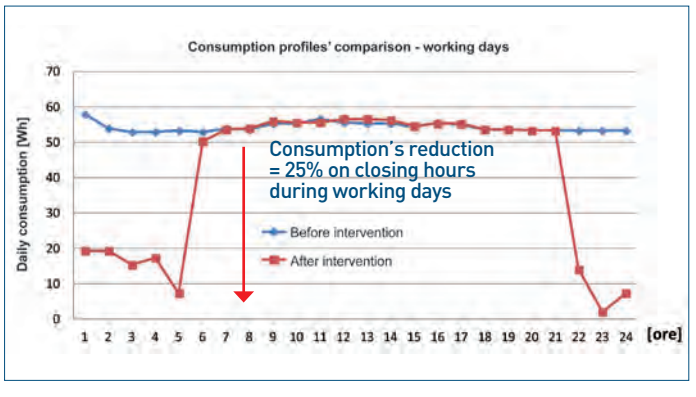
Energy Team has achieved important results in Bank and Retail branches.

The installation, of our energy consumption monitor, control and management systems, in 3500 bank branches represents, the most significant WORLDWIDE action ever accomplished in banking sector.
Retail sector (branches) showed the same interest and, here as well, Energy Team can count hundreds of shops managed with the very same philosophy we applied to bank branches.

See, here below, some brief and salient data on the benefits brought by a structured monitoring campaign.

Achieved results in Bank sector

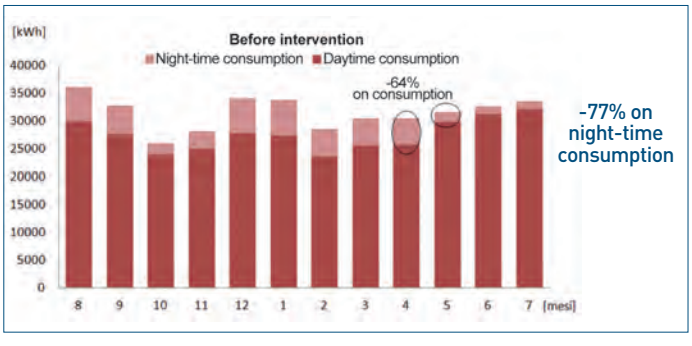


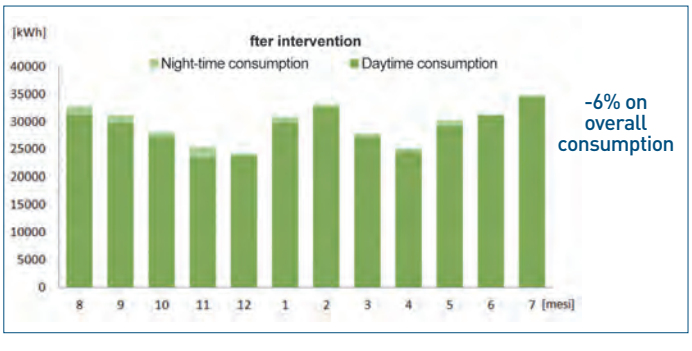


Average Energy Saving per branch: 12%

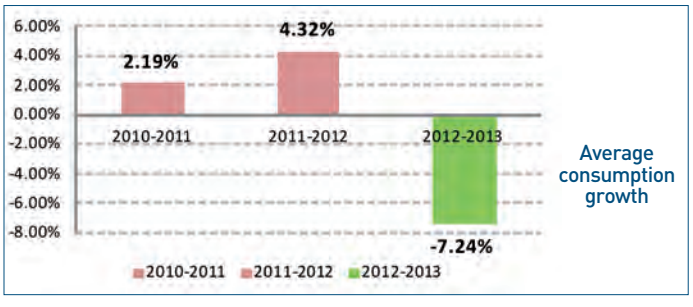
Payback time: 11 months

Achieved results in Retail sector





Each branch's energy savings positively affect the whole Company. After installing the monitoring system, all consumptions decrease.



Average monthly Energy Saving per branch: 7%

Payback time: 5 months

Constant monitoring of energy consumption related to actual needs and waste detection.

Instant identification, with a SMS or email alert, of the ideal consumption's threshold (previously set) exceedance.

ON/OFF

Loads management with ON/OFF set profiles.

Monitoring system

Electricity,
Gas, Water

X-Meter Master with XM1+XM3+ XM4 GSM/GPRS integrated for the Main Switch

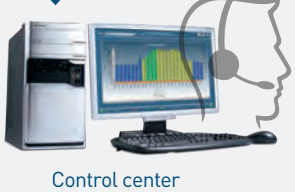
HVAC

Lighting

Other utilities

Room temperature and humidity

Exterior Temperature and Humidity



Control center

Direct measurements up to 100A with pulses output

Clock modules with 4 Optomos XM7 output for ON/OFF profile selection (signboard, boiler, HVAC/PdC, indoor lighting) + Alerts

Energy monitoring for the service industry. Supermarkets.

Low Temperature (LT) and Normal Temperature (NT) fridges covering.
Energy Team, with its monitoring and AUDITING activities, offers the best solutions for energy efficiency.

Industrialised countries have 3 to 5% of their energy consumed by supermarkets. One of the major waste of energy is due to constant opening of fridges doors.

Monitoring of hundreds of branches
-Low temperature Unit consumptions
-Normal temperature Unit consumptions

The proposed intervention includes: covering of deck fridges, fans and lights replacement and technical intervention for the Unit optimisation.

Energy saving for Coolers (Normal temperature) and freezers (Low temperature): 40%

↓

Payback time: 2 years

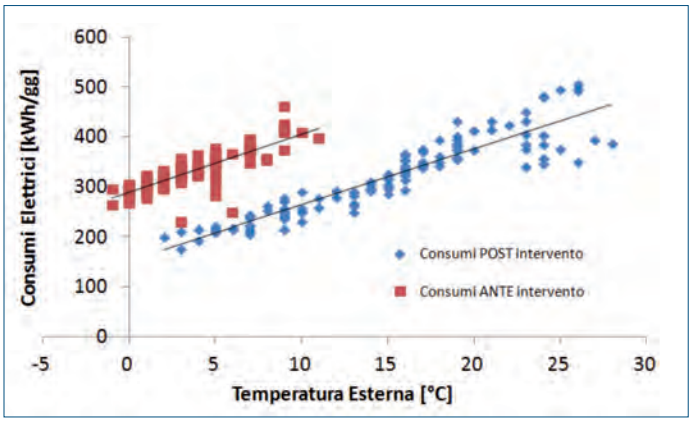
↓

Impact of Coolers and Freezers on general consumption: 50%

↓

20% reduction on overall energy expense

Closing the coolers fridges brings many advantages:
- Lower consumption
- Improved goods' shelf life
- Lower maintenance costs
- Lower compressors wear out



Coolers' central unit consumption [kWh/day]

Branches' cost centers monitoring

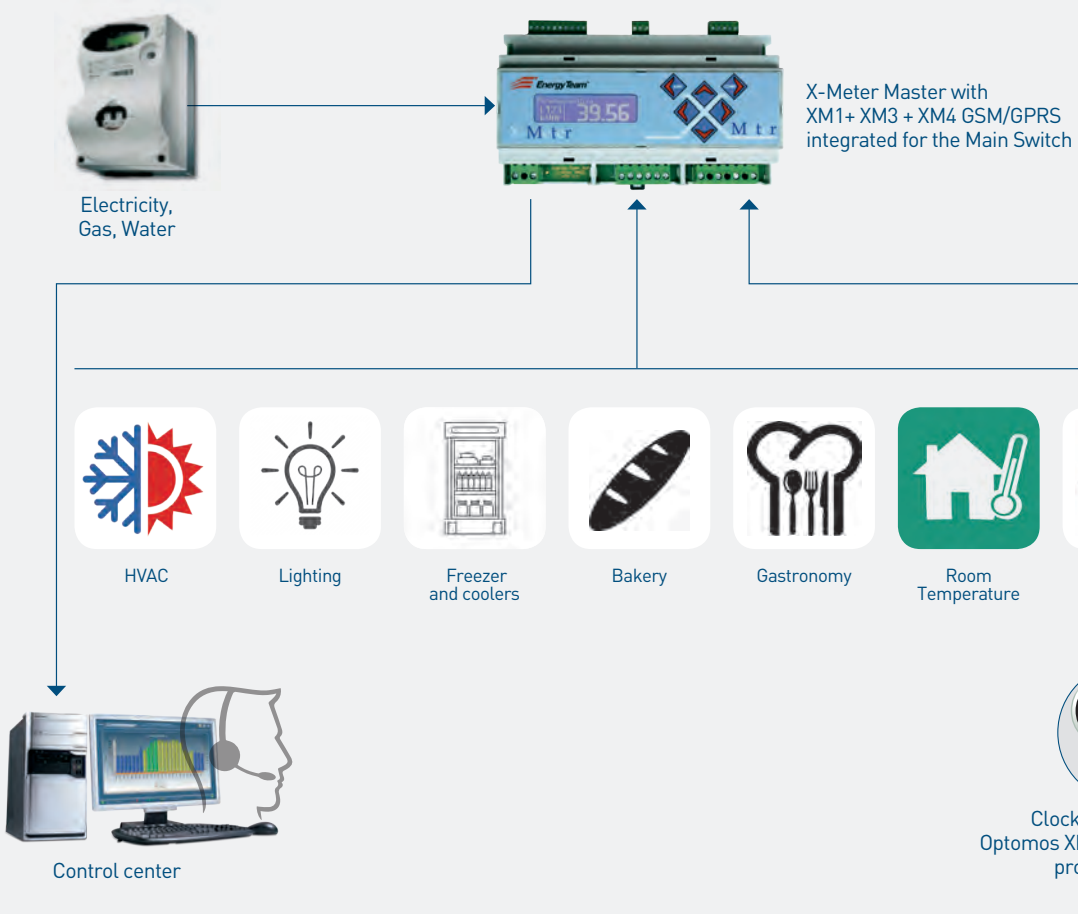
Constant monitoring of energy consumption related to actual needs and waste detection.

Instant identification, with a SMS or email alert, of the ideal consumption's threshold (previously set) exceedance.

ON/OFF

Loads management with ON/OFF set profiles.

Monitoring system



Complete and integrated solutions for energy, temp monitoring for Data Centres

Technical issues to solve

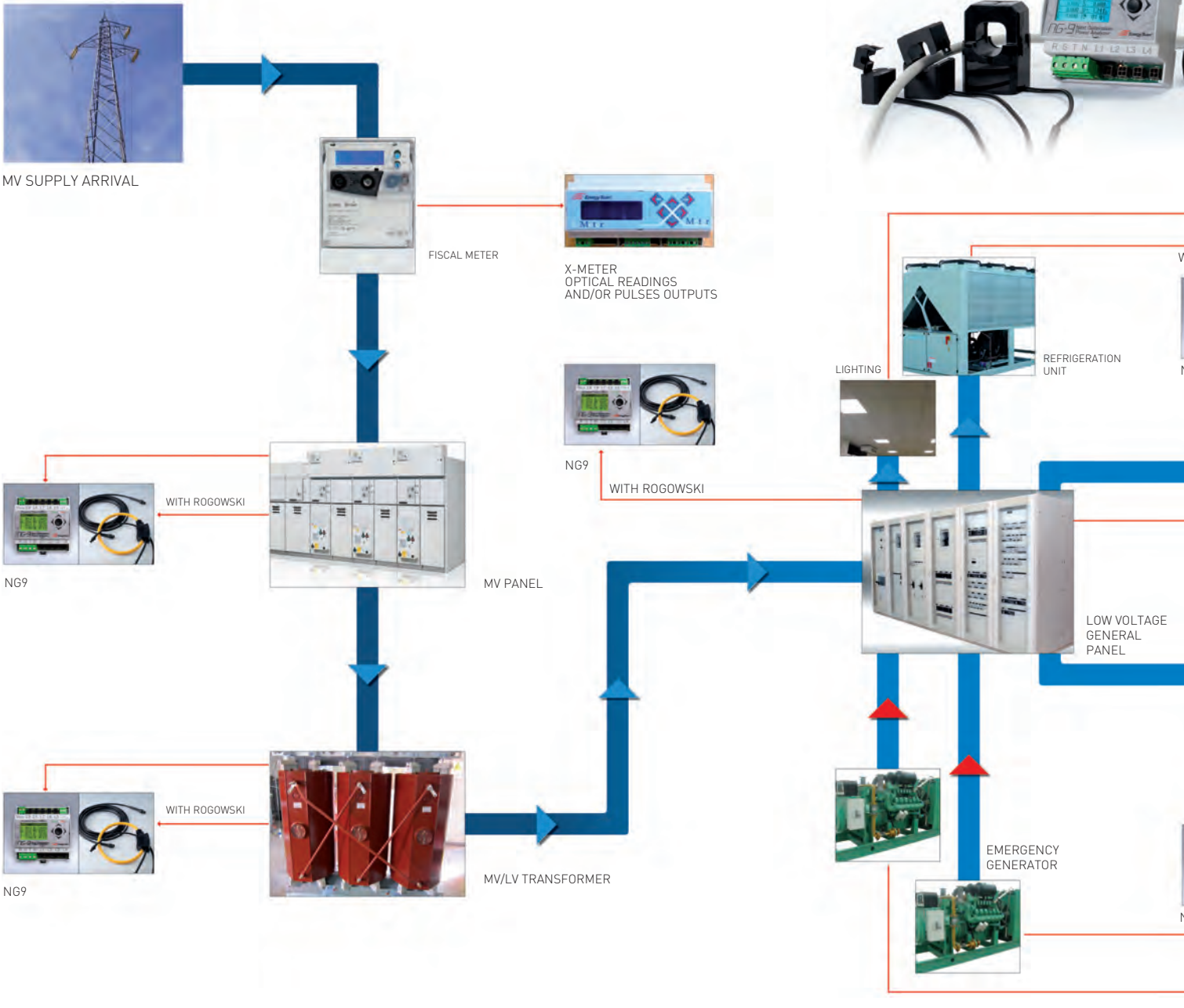
- Realize electrical measurements without cutting electrical power from the Racks.
- Realize extremely reduced, non invasive plants interventions.
- Find room to allocate measuring instruments without adding any more electrical panels.

Advantages

- Creation of a consumptions archive for every single Rack in order to define a trend, a base line for all future technical/economical evaluations.
- Verify new servers' consumption reliability if coherent with what stated in the manufacturer's data sheets.
- Analyze various electric parametres to foresee future possible anomalies in order to intervene before any failure should occur.

NG-9: New Generation analyzer, 9 lines measured

- Reduced Size: The world' smallest analyzer
- Easy installation: time and costs reduced by 85% avoiding plant shutdown
- Measurements: 160 parametres on LCD display and, on your own device, via Modbus-RTU.
- Flexibility: Special probes from 1 to 8000 A offer the highest flexibilty on the market.
- Versatility: Possibility of using all range of Rogowski Coils or Split Current Sensors on each instrument on either single, three or mixed phase mode.
- Accuracy: 0,5 class on the entire measure chain.

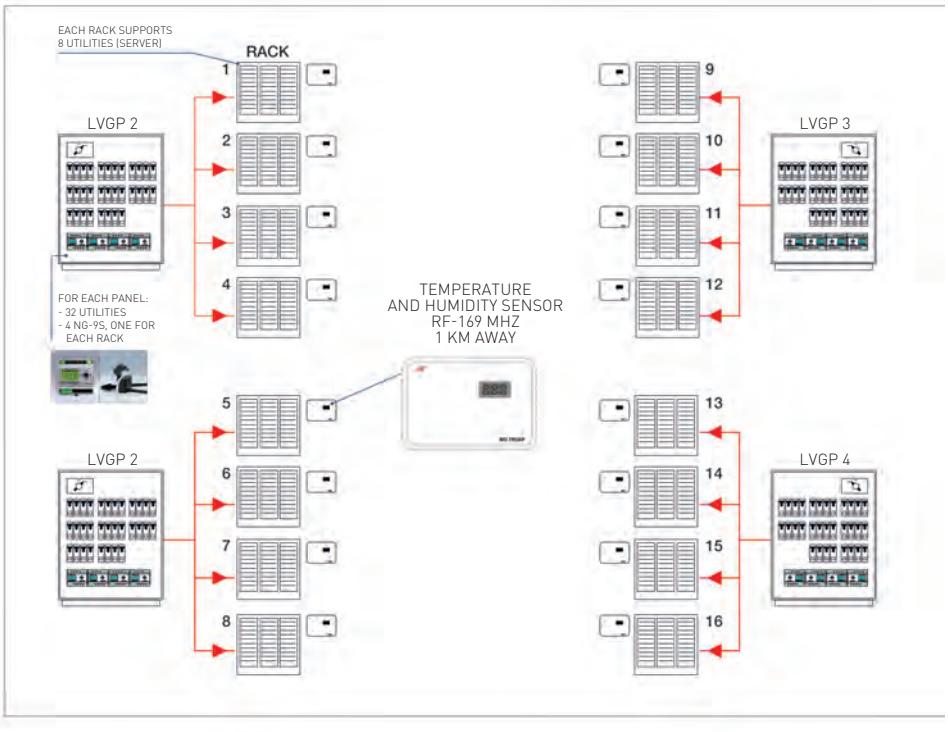


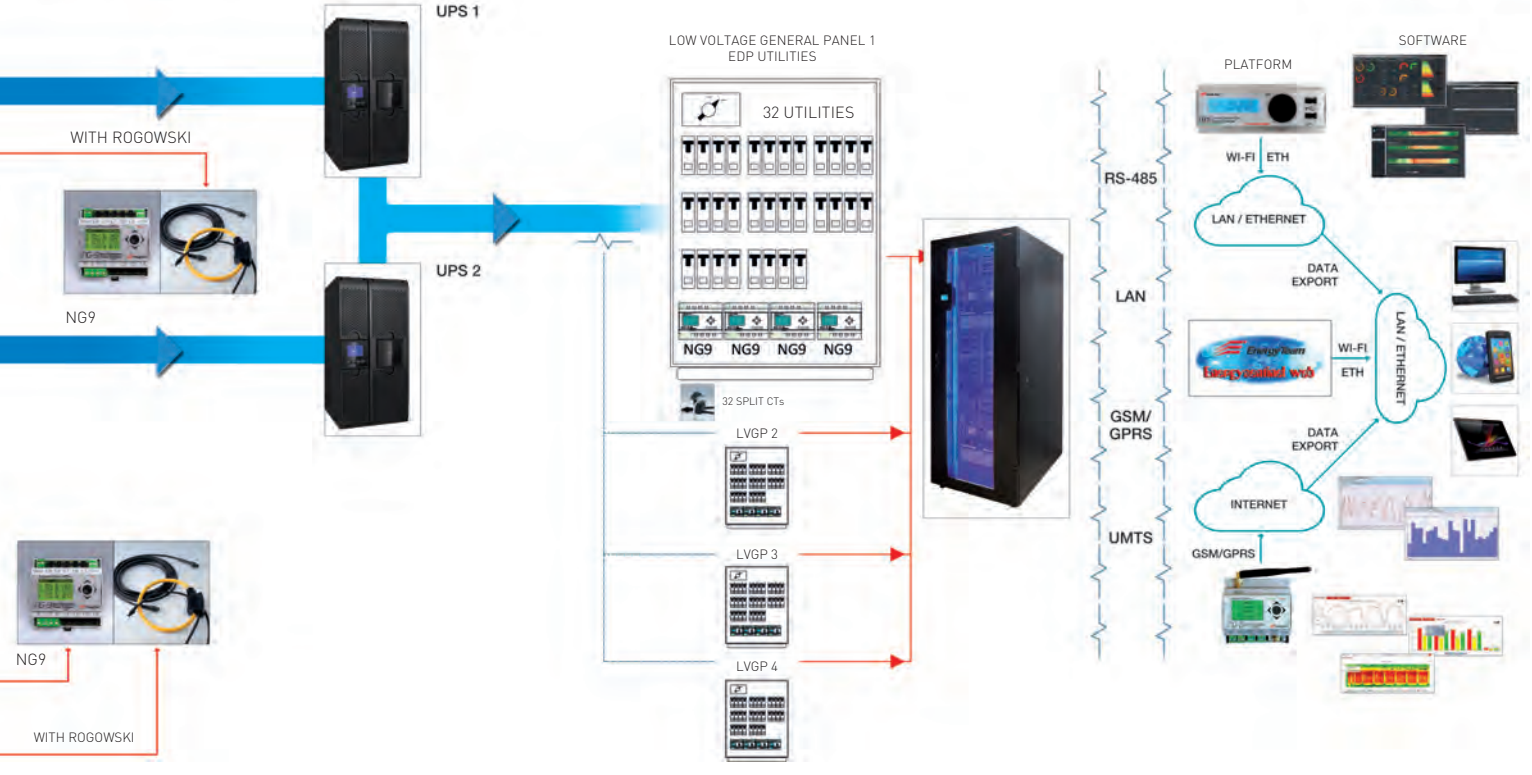
erature and humidity

Choose your configuration:

- 3 three-phase systems
- 2 three-phase, 3 single-phase
- 1 three-phase, 6 single-phase
- 9 single-phase systems

It does not exist anything like our NG-9 to compare to.



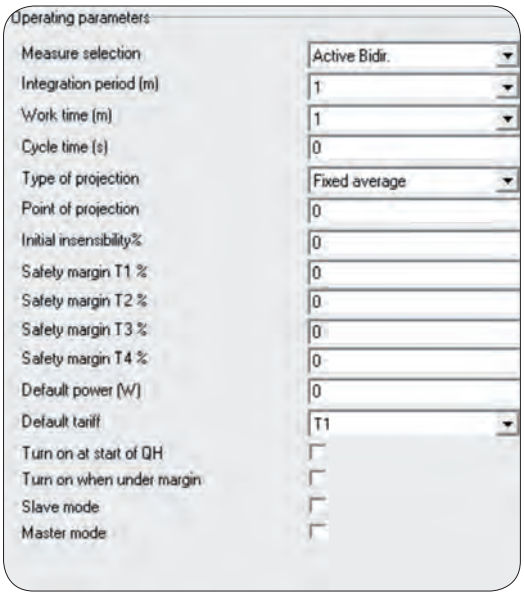


Loads management

Combine X-Meter or XRWU- Gold with the optional XM15 and XM18 modules to create complex loads release logic in order to prevent exceeding the set values agreed with the energy supplier.

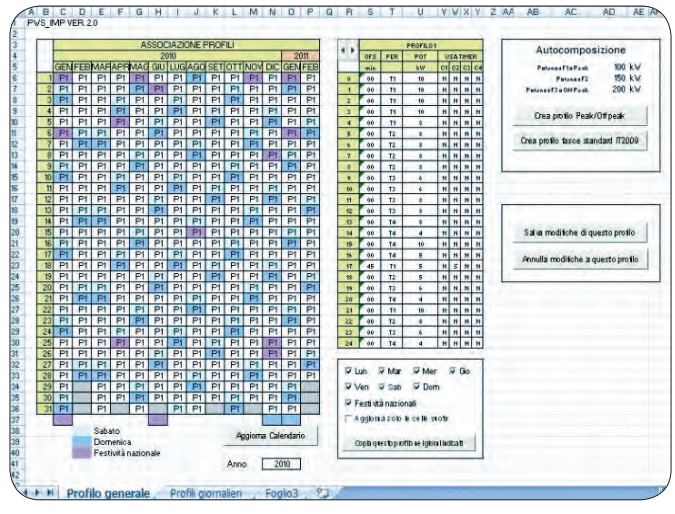
This is possible thanks to a sophisticated algorithm that manages the opening/closing of a set list of loads based on a priority list. From a strictly technical point of view, X-Meter and XRWU-Gold must, above all, be able to measure the general power at the point of delivery. This is possible in two ways: reading the pulses produced by a meter (fiscal or non-fiscal) or measuring the power directly at the delivery point downstream from the voltmeter transducers and ammeter transducers - (only with X-Meter). Setting thresholds and priorities allows the user to activate one of the instrument's four outputs that controls the XM15 module. This module contains 4 relays with two change-over contacts each, used to stop or re-insert the 4 connected loads.

With more than four loads, use additional instruments connected together; like the first one does, they measure power at delivery point and can manage the loads' release to prevent overproduction. The selectable integration period goes from 1 to 60 minutes (the default set is 15) and loads management will always be carried out based on the average value of the chosen integration period. The average may be "fixed" or "variable" since sometimes, the band synchronization signal, is not available.



Programming window.

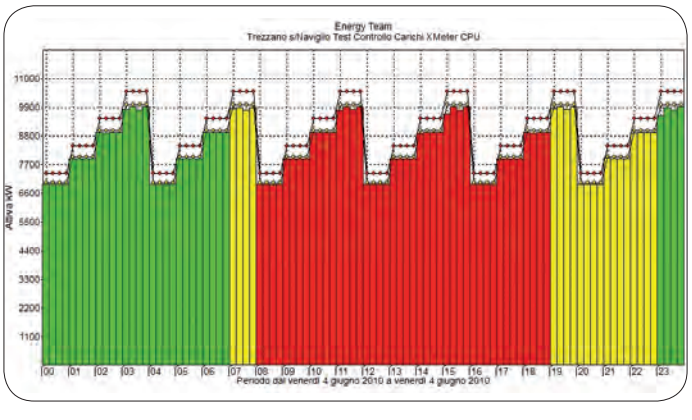
The following parameters, among others, can be configured: Work period, Cycle Time, Initial insensitivity, Safety margin, Default power/tariff, Release/Return power, Minimum operating time, Minimum rest time, Priorities, Work, Force ON, Force OFF. This detailed parametrization allows the user to configure every situation and meet all possible needs. A special Excel application lets the user prepare, save and send profiles to the device.



Excel profile configurator.

Load management is done using the forecasting method. The release is commanded when the forecast total consumption during the integration period (obtained by projecting the current absorption curve to the end of the period), is beyond the set limit. The special algorithm allows maximum use of the available energy within the integration period, penalizing the minimum loads enabled on tripping. Loads' release is commanded as late as possible, based on the energy that can be recovered with it being powered off, based on the weight of the load itself.

To avoid dangerous absorption swells , caused by the simultaneous restarting of multiple loads, the system provides a gradual loads reintegration. The system also allows controlling those loads that, in order to be dropped or restarted, require certain system conditions. For these loads, the user can avoid the device to intervene if the related loads do not allow it (crucial for managing utilities whose operations are linked to certain work phases).



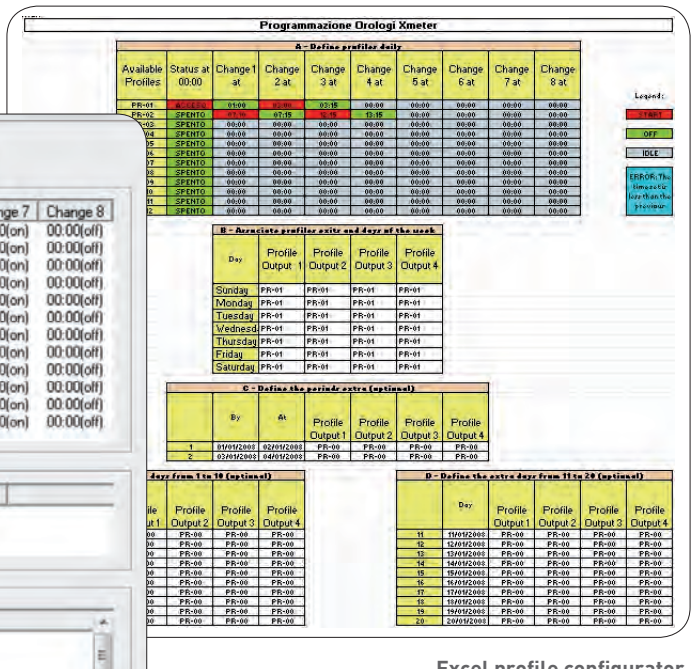
Power trend graph with load management.

Programmable clocks

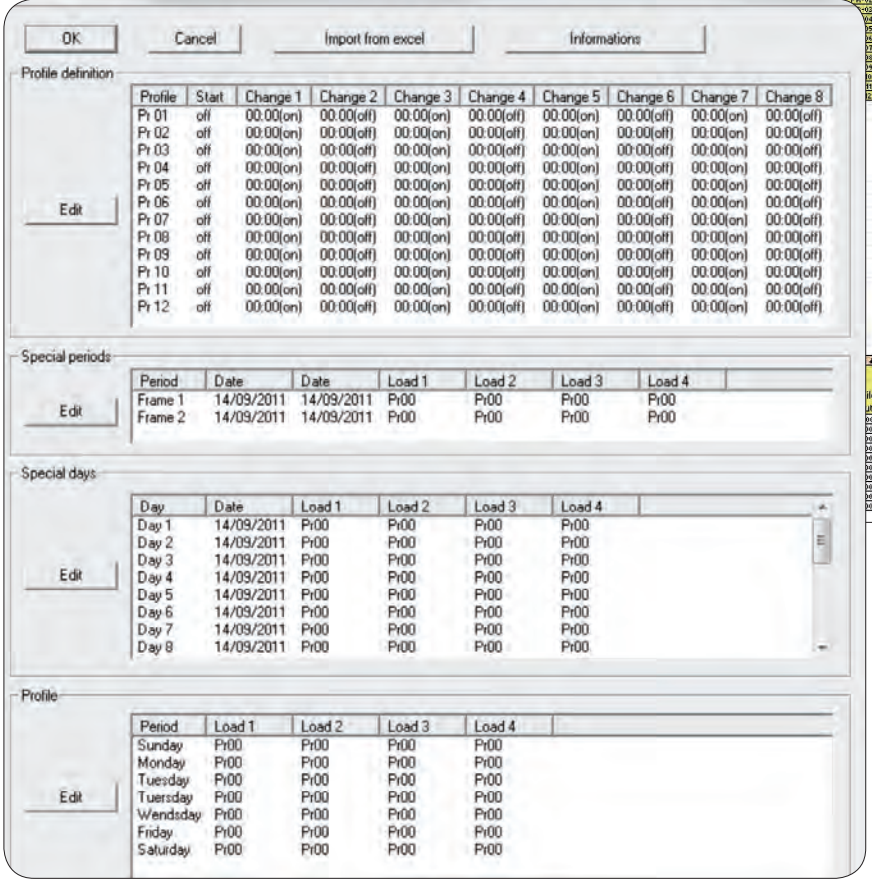
Combine X-Meter or XRWU- Gold with the optional XM7 and XM15 modules to activate the programmable clocks function that allows the user to switch the 4 local outputs on and off with a set (and completely customisable) weekly schedule.

It is possible to set 12 profiles with 8 daily operations among weekdays, holidays and special days of the week. In addition to these repetitive periods, the user can define up to 2 special periods (set by a starting and end date) and 20 special days during which the user can apply a profile of their choice for each load. Special periods and days are applied only for the year in which they are defined while weekly rules can be set perpetually. During special periods it is also possible to define two particular modes: always-on and always-off.

Apart from manual data entry, (shown in the chart below), it is also available an Excel application that allows the user to intuitively set various profiles to send the configuration to the X-Meter.



Excel profile configurator.



Programming window.

Energy Sentinel Web

Your energy data online, anywhere, simple.

Energy management and monitoring software.

Access your energy data anytime you need to with Energy Sentinel Web. The **application server**, with its user-friendly web pages, allows simple and intuitive data analysis on all acquired data guaranteeing extreme reliability and data security. Rely on Energy Sentinel Web for a complete plant control and the system to reach the highest Energy Efficiency performance (KPI) possible.

Energy Sentinel Web is designed to be **multi-user and multi-site** and has the following functions:

- **Display data on the Web** with any browser (Internet Explorer, Chrome, Safari, Firefox).
- **Check the stored data** by accessing anytime with private User-ID and Password, without installing additional programs.
- **Configure multiple accounts** (Admin, User, etc.).
- **Data management from several devices**, even far from each other.
- The **versatility of the platform** allows integration of other manufacturers devices and instruments through the implementation of their system protocol.
- The **consultation interface** is optimized for **IPad and tablets**.

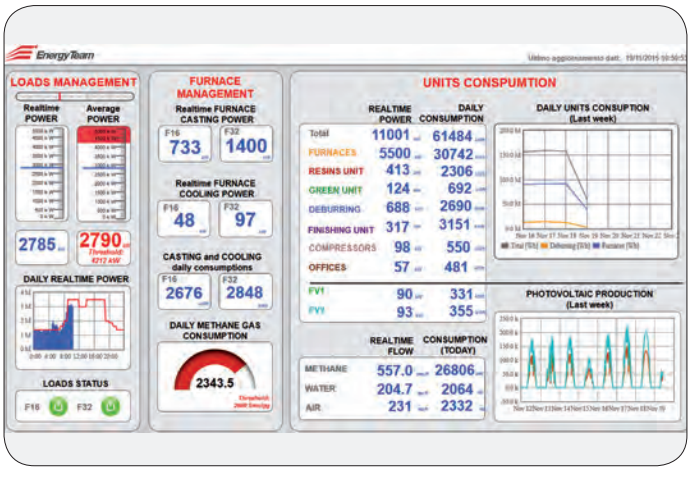
Energy Sentinel Web with its simple and intuitive graphic interface allows to:

- Create and **compare charts**, histograms and diagrams
- **Compare data** with different full-scale values
- Create mathematical modules to create **virtual channels**
- Display **real time data** with dedicated synoptic pages
- Display **fully configurable** graphs
- Display periods **summaries**
- **Visualise consumptions and costs in band diagrams**
- Display a **set period's historical data** in linear/piles diagrams with the aid of four vertical axis.
- **Export data in CVS format for Excel** charts.
- Create and set groups and subgroups of data coming from the various monitored systems (unlimited number of levels)
- Set **alarm thresholds**, sending SMS and emails should the values exceed
- Set and display the **tariff**
- Set **alarms** for contacts closing and opening or **threshold** values with hysteresis.

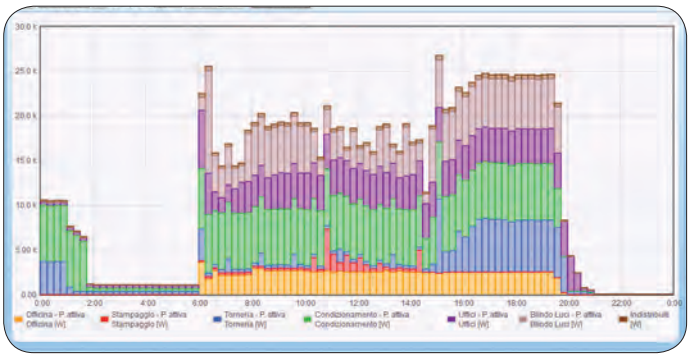
DASHBOARDS module

Energy Sentinel Web lets users create personalised dashboards to monitor and manage all main parameters coming from the field to view the data from any device connected to Web Server.

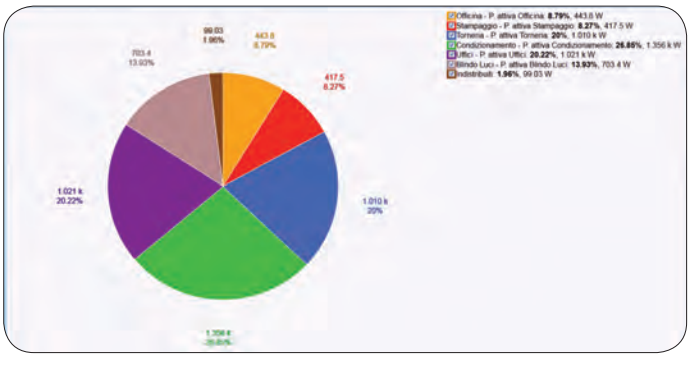
Fully customisable dashboards for all monitored loads



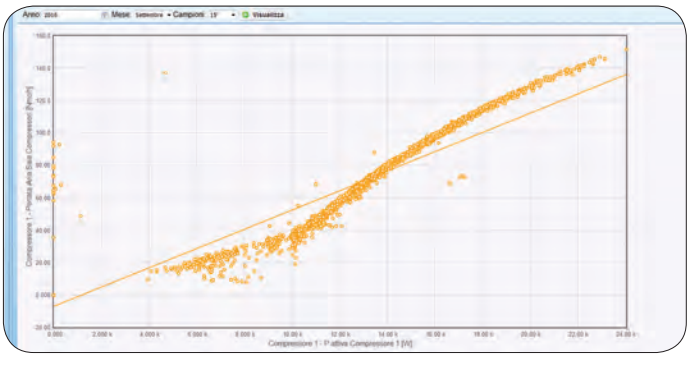
SCADA - monitoring and data acquisition



Pile chart



Pie chart



Scatter plot chart

The Federal Office for Economic Affairs and Export Control has helped drive Germany's transition to renewable energy for many years. The promotion of efficient and economic use of energy and the further expansion of renewable energy are this Office's main activities and Energy Sentinel Web made it to their list of "tools" to achieve ISO 50001 certification.

BAFA APPROVED

Bundesamt
für Wirtschaft und
Ausfuhrkontrolle

Smart Energy Management & Reporting

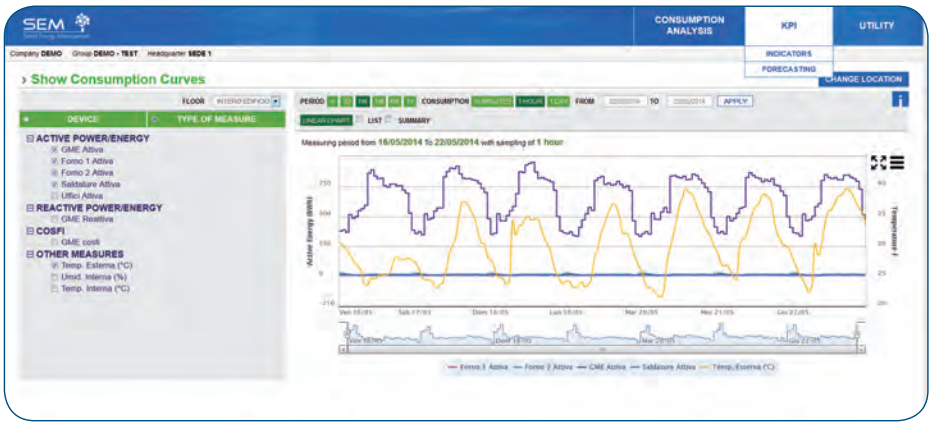
Smart Energy Management (SEM) is a web software which allows to create a complete energy management system. It is a practical, intuitive and user-friendly tool to control energy consumption of various utilities (Electricity, Temperature, Gas, Water, etc.).

The SEM platform helps monitoring and comparing energy consumption data from different channels and periods. Choosing a specific period of time, it provides data analysis in different types of charts, for csv export.

Every day, thanks to the monitoring system it is possible to analyse the data acquired and detect any discrepancies with the set benchmark.

Periodically, thanks to standard and customized reports you can check energy consumption's improvement of different sites. Control your system's performance comparing different periods and monitoring EnPIs (Energy Performance Indicators).

Finally, plan strategies aimed to constantly improve the performance of the System.



Standard reports

Periodically receive various kind of reports in order to manage energy consumption of your system.
Compare consumptions of previous periods of time and evaluate energy gap among real data and forcasting.

- Daily alerts
- Weekly performance control
- Monthly recap of energy consumption.

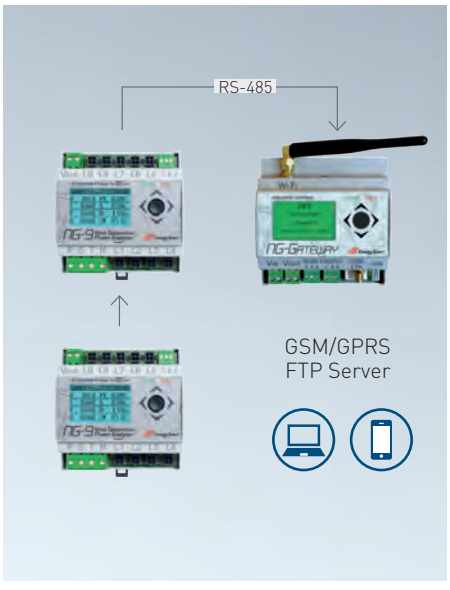
Customized reports

Reports can be realized based on specifics needs. For example it is possible to introduce environmental parameters or compare homogeneous clusters.

- Performance control of Energy consumption related to temperature data
- Periodical comparison of energy consumption of different clusters
- EnPIs tracking in long periods.

INSTALL
THE WORD' SMALLEST 9 LINES ANALYZER

CONNECT
THE DEVICE TO ANY NETWORK THROUGH THE MULTIFUNCTIONAL GATEWAY



1

- Identify your needs and create the most suitable solution to get extremely precise measurements.
- Use all range of Rogowski Sensors or Split Current Sensors (Ø6,16,24 mm) on each instrument on either single, three or mixed phase mode (1 to 8000 A).
- Each current sensor can be connected to the device with one-way electrical connectors without using additional cables, scissors and screwdrivers.
- Installation costs reduced by 85%.
- No need for plants shutdown.
- Simple, safe and fast installation.

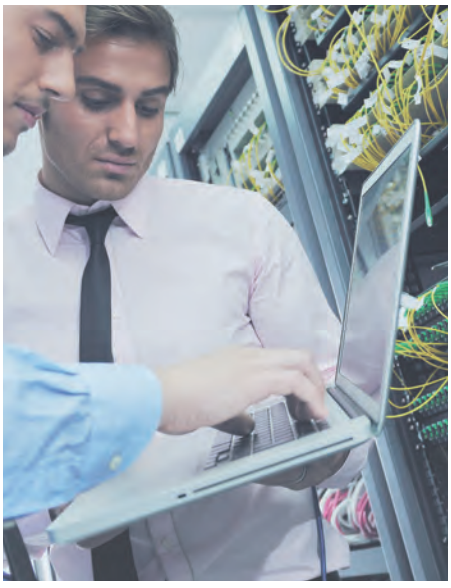
2

- Make NG-9 communicate to the network and create reports, connecting it to NG-Gateway.
- NG- Gateway, thanks to its RS485 serial, continuously reads data from the instruments connected and store them in its internal memory.
- NG- Gateway is a GSM/GPRS Gateway with RS485 serial. It stores data from Modbus instruments and sends them in XML format to a FTP server..

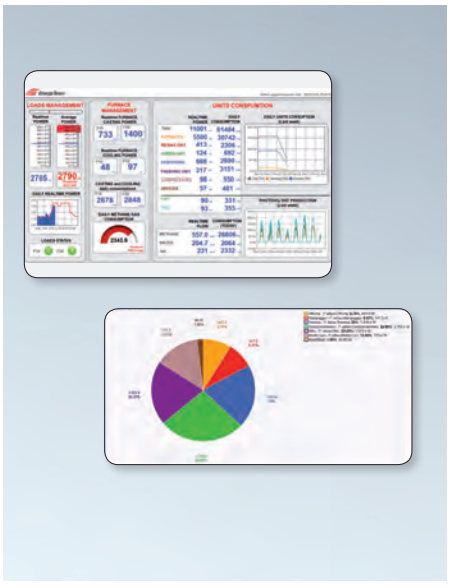
It does not exist anything like our NG-9 to compare to.

PLAN
YOUR CONFIGURATION

SETUP
DEVICE BY REMOTE



START MONITORING
YOUR ENERGY CONSUMPTION



3

- Identify your needs and define the right configuration.
- Complete the data sheet and let us understand your utilities and loads.
- Create the most suitable solution to get extremely precise measurements.
- Specialized technicians will guide you through the whole procedure.

4

- Specialized technicians will setup your device by remote.
- Get your User's ID and Password to access our web platform and read your data.
- Start using NG-9, collect data and manage your energy consumption.

5

Your energy data online, anywhere, simple.

Energy Sentinel Web is designed to be multi-user and multi-site

- Display data on the Web with any browser
- Access the platform at anytime with private User-ID and Password
- Data management from several devices
- Consultation interface optimized for IPad and tablets.

Simple and intuitive graphic interface

- Create and compare charts
- Compare data with different full-scale values
- Create mathematical modules to create virtual channels
- Display real time and historical data with dedicated synoptic pages
- Visualise consumptions and costs in band diagrams
- Export data in CVS format for Excel charts.

The first step to improve your energy efficiency is to be aware of your Energy consumption.

Instruments & Applications

Photovoltaics

Photovoltaic system management software

Energy Management and Monitoring Software

Energy Sentinel PV

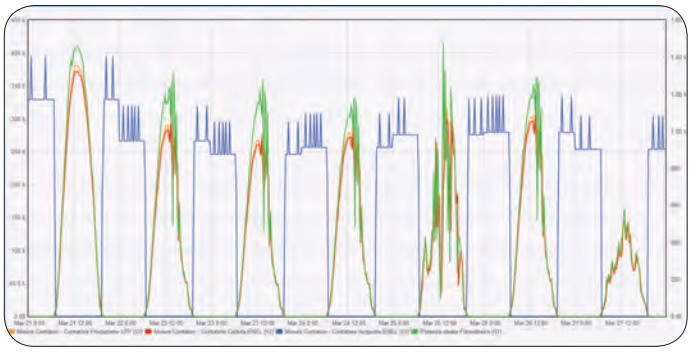
Energy Sentinel PV allows the user a constant monitoring of all the essential information needed for photovoltaic systems production management. The system includes an application server installed on a Linux based industrial concentrator (fan less, with operating temperature -20° +75° C) to acquire data from various devices (string control, solarimeters, pyranometers, inverters, fiscal meters, weather stations) within the photovoltaic system. Once the data is collected, stored and analysed according to standard or customizable models, it is possible to identify:

- inverters' efficiency
- mismatching and string efficiency
- photovoltaic system efficiency
- photovoltaic system performance
- inverters' anomalies
- parallel panel anomalies (with CM2)
- discharger failure.

Besides online consultation, this information can be used to generate early warnings through SMS and email.
The standard alarms are:

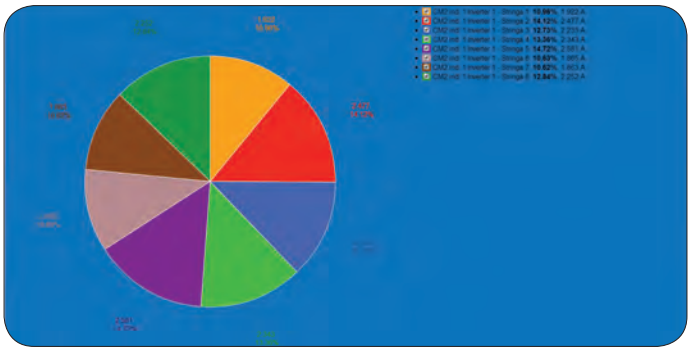
- string current control
- field panel temperature
- inverter connection control compared to irradiation
- inverter failure status control
- opening/closing of contacts
- thresholds exceeded
- devices' communication failure.

The web display is divided into two main areas: real time data and historical data. Configure the real time data page (selecting specific settings i.e. which fields to view) to read the values and view them in a pie chart. Select a period to display the related data in bars/columns charts with two vertical axis for data comparison among different full-scale values outputs. The data displayed can be arranged in charts or exported in CVS format for Excel. The consultation interface is also optimized for iPad and tablet.



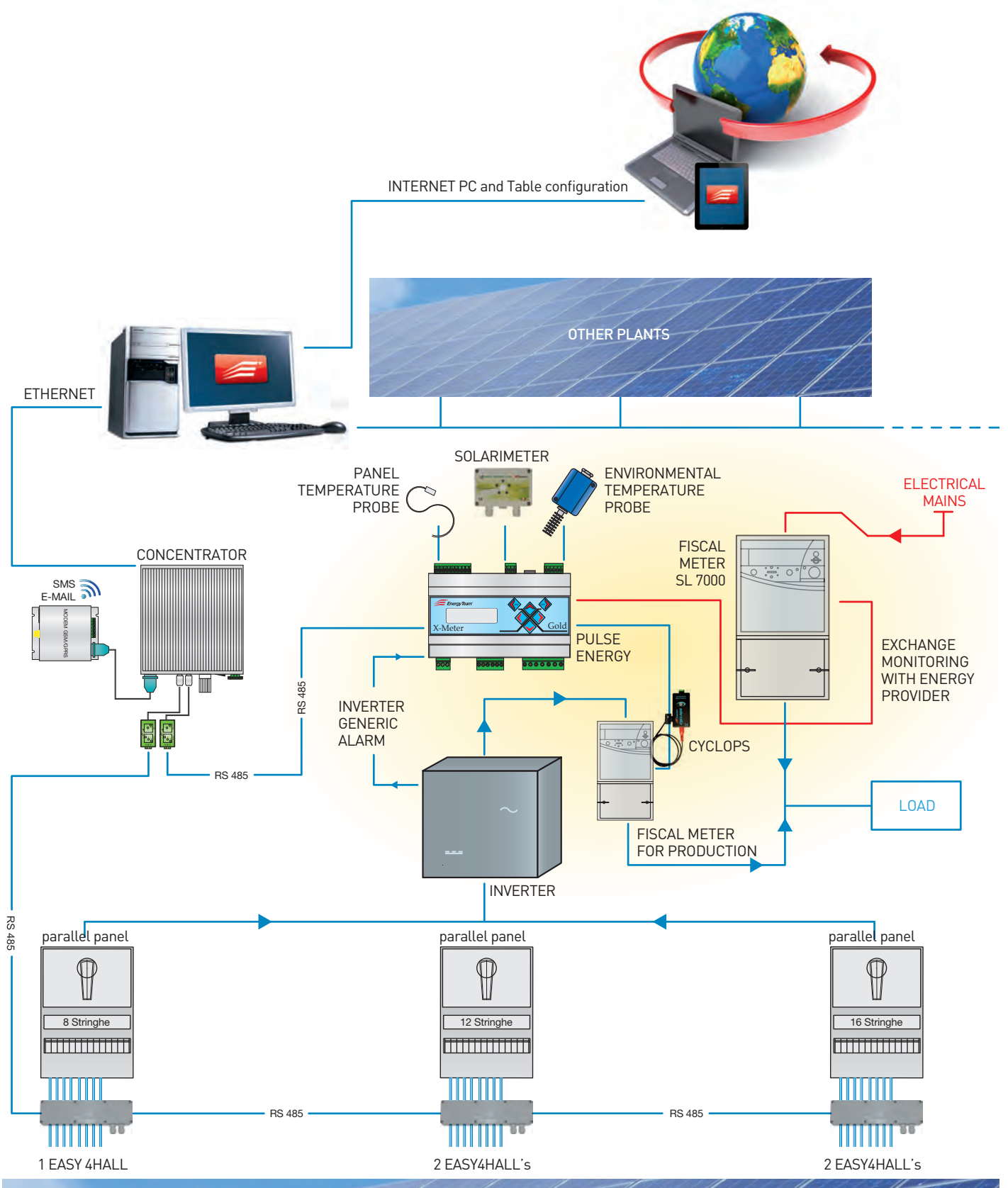
Energy acquired, produced and consumed on Energy Sentinel PV.

Synoptic system graph on Energy Sentinel PV.



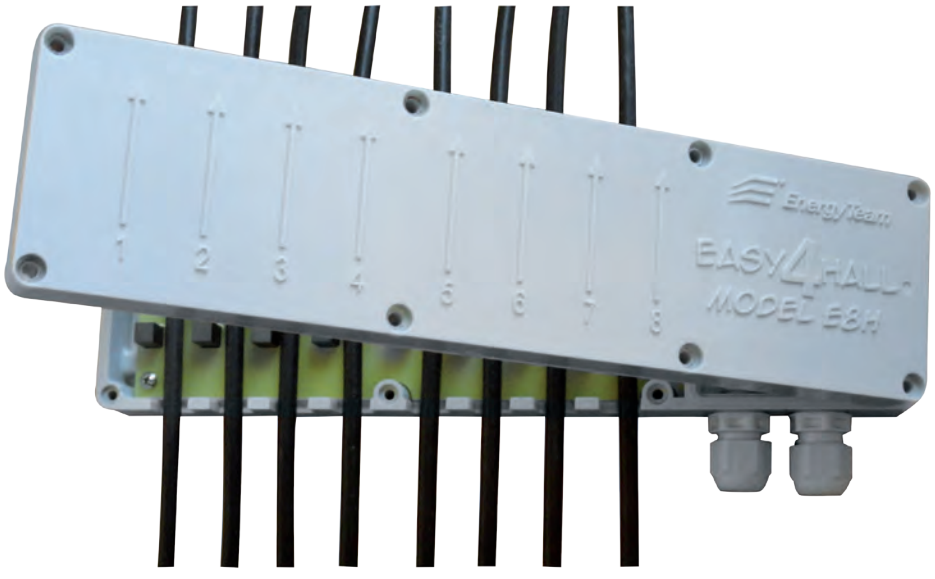
Pie chart produced on Energy Sentinel PV.

Assembly diagram



Easy4Hall

Split core outdoor multichannel device for string current measurement in photovoltaic systems



All solutions currently available on the market are open modules or devices with low degree of humidity protection, designed to be installed inside of closed and waterproof electrical panels. These devices take up much space and are not compatible with installations in pre-existing electrical panels; it is almost impossible to monitor existing systems with the devices currently available without replacing the parallel electrical panels with existing strings. In most cases, the increased volume of new panels makes the installation not possible.

- Easy to install
- Minimum impact for installations on pre-existent plant
- No need for recertification of existing panels
- No need for plant shut down during installation
- Precise and accurate data reading without stopping or disconnecting any strings or terminals
- Monitor up to 8 strings per module
- Integrated Modbus communication module
- The lack of terminals and physical connections on the strings eliminates all preventive maintenance
- Can be used outdoor with no need for any waterproof cases
- No electrical contacts with existing circuits, maximum electrical safety and low electromagnetic susceptibility
- The most simple and cost effective solution on the market
- Patent request registered.

The device is made up of two rectangular half-shells.
The bottom half-shell holds half the magnetic circuits of the sensors and has comb-shaped grooves to insert and hold the cables in place; it is designed to be coupled with precision to the remaining part of the magnetic circuits located in the top half.
The top half of the shell is divided into two compartments: the first one containing magnetic elements with a thin air-gap and a magnetic field sensor inside to measure the induced flow and directed it from the magnetic circuit.
To get the required degree of insulation, magnetic and electronic circuits in the first compartment of the shell are embedded with epoxy resin while the accessible side for sensor connection and data output is properly protected.

- Measures up to 8 string currents without interrupting the connection.
- Current readings using Hall sensors and14 bit analogic/digital converter.
- Internal temperature measurements in Celsius degrees (from -30°C to +80°C, 1°C accuracy).
- 16 bit microcontroller technology.
- Power supply 12/24Vdc, 500mA max.
- Temperature and current data sent through RTU Modbus on insulated RS485 serial port (with the possibility of internal jumper terminations).
- Select the data to acquire and Modbus protocol parameters (baud rate, parity, address, stop bit).
- Enter "Config. Mode" laying a magnet (included) on the container for 5 seconds and select Modbus parameters writing the special registries.
- Printed plastic container, double PG9 cable glands, insulating resin and O-rings on the lock give the device its IP65 rating.
- Current reading range: +/-16 A.
- Minimum accuracy: 100mA.
- Dimensions (without cable gland): 244x64x37mm.

General	
Dimensions	6244x64x37 mm (with cable gland) (244x84x37mm)
Weight	About 150g
Case material	Grey polycarbonate
Protection rating	IP65
Power supply	12-24Vdc, 500mA max (5W)
Operating temperature	From -20 a +75°C
Cable to use	BELDEN 9841 (1 pair + shield, multi conductor, low capacity)
ModBus Connection	Through 2 terminals (double connection)
Features and Performance	
Current measurement	8 direct currents +/- 16A, Hall effect technology
Internal Temperature	From -30°C to *80°C, accuracy 1°C
Communications	Slave RTU Modbus on galvanically insulated RS485
Configurable parameters	Baud rate (1200-2400-4800- 9600-14400-19200-28800-38400-57600-115200), parity (None, Even, Odd), stop bit (1 or 2), address (1-247)
Select operating mode	Through magnetic key and Modbus registries
Signal operating mode	Through audible signal (buzzer)
Installation characteristics	Optional wall-mounting brackets

CM2 Solar PV String Controller

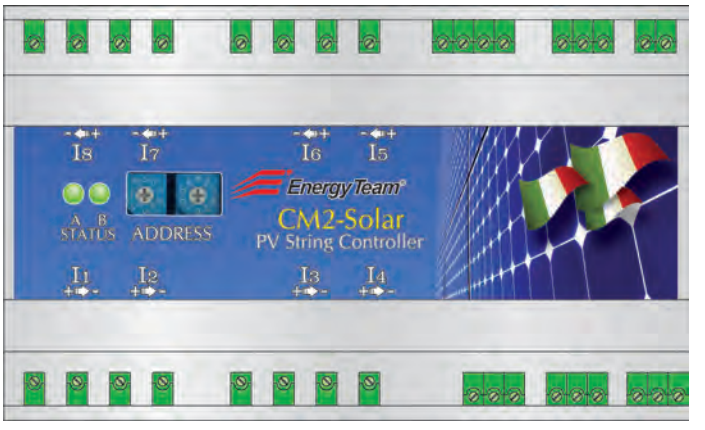
CM2 SOLAR PV String Controller module continually monitors produce energy levels detects any inefficiency for a prompt intervention should any fault in the system occur. Despite its small size (only 9 DIN modules), the device has the following functions:

- Measures 8 string currents up to 10 A with voltage up to 1000 VDC
- Measures temperature (-30°C to +75°C)
- Detects 3 logic status through 3 optically isolated inputs (e.g., discharger status, switch status, etc.)
- Acquires 2 environmental parameters at impulse level (solarimeter, panel temperature, environmental temperature)
- Monitoring of 1 load through an open collector output
- Feed-through connections with cable with sections up to 4 mm2
- Measures string voltage through dedicated external module (XM20, optional)
- Modbus-RTU communication on 3 wire RS-485
- Creates a network of devices with the RS-485 connection

The standard RTU Modbus makes the following information available:

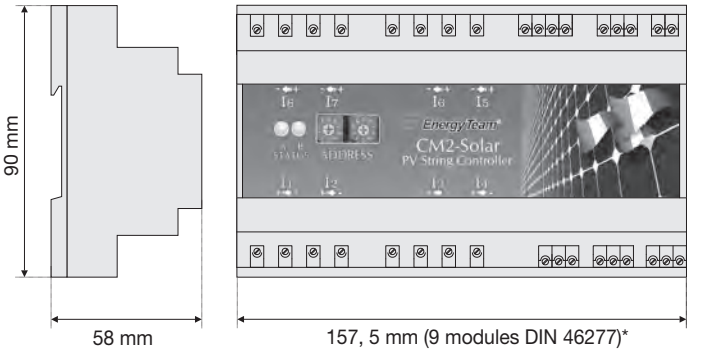
- Instant values of the 8 string currents
- Average value of the 8 string currents at the last interval between 2 requests
- Maximum value of the 8 string currents for the last interval between 2 requests
- Status of the 3 digital inputs
- 2 digital environmental parameter inputs
- Implementation of an output
- Instant, average and maximum values of the string voltage (with XM20 optional module)
- Temperature measurements (-30°C +75°C)

CM2-Solar transforms ordinary parallel string panels into new generation String Boxes while taking up limited space and saving on installation costs; it's the most versatile String Controller solution on the market.
The data sent to CM3 Log, the concentrator, are available (online or locally) on the SMT-Solar software to be displayed online, processed, viewed as charts and filed to be used to evaluate the actual system's efficiency and establish the real production levels compared to the forecast ones.

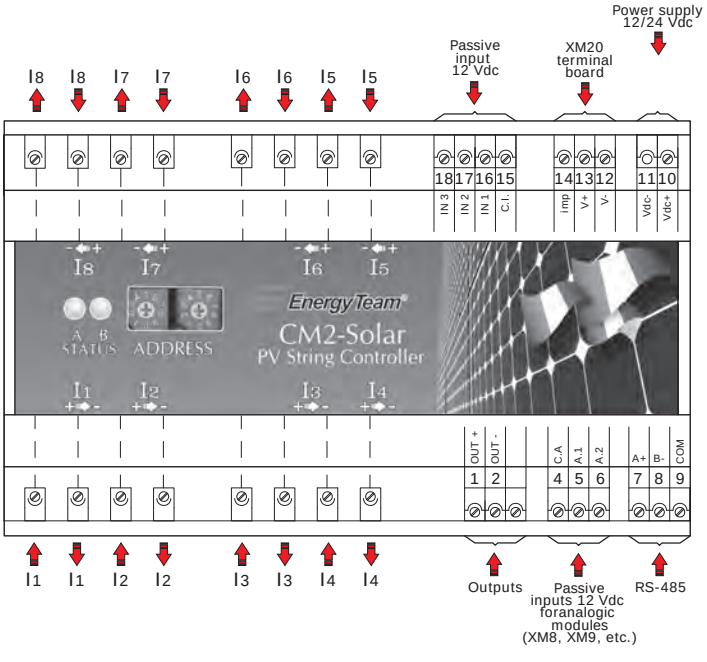


Power supply	12 Vdc
Number of strings	8 Strings
Max current for each string	up to 10 A
String input voltage	0 to 1000 Vdc
Measurement field Circuit temperature	from -30 °C to +75 °C
String input voltage	1 external hardware input
Optically isolated inputs	3 passive non polarized inputs 12 Vdc
Environmental parameter inputs	2 passive inputs, 12 Vdc
Outputs	1 open collector output from 100 mA - 50V
Communication	RS-485 with MODBUS-RTU
Node address	1-99 selected via dipswitch
Visual indicators	LED Power and communication indicator
Max section of string cable	4 mm^2
Max cable section from terminals 1 to 18	fino a 0.75 mm^2
Connection type	Single screw terminals for string input and output
Footprint	9 DIN module plastic container (157 mm)
Environmental protection	IP20
Consumption	3 W
Weight	500 gr

Dimensions



Inputs/Outputs



XM 20

Photovoltaic plant continuous voltage reading module

The XM20 device reads a continuous analogical voltage signal up to 1000VDC and converts it into a 0-5 Hz pulsed signal compatible with the standard input signals for CM2 Solar or XRWU GOLD/X-Meter.
Guaranteed precision of 0.5% of full scale.
A special feature of this device, besides its extremely small size with a single DIN module, is the internal galvanic insulation equal to 4 kV between the measuring field circuit and the pulsed output circuit.

Power supply	8 to 24 Vdc
Consumption	0.85 W, 71 mA
Precision	0.5 % of full scale
Visual indicators	over range and pulsed output
T° Operating range	-20 to +70 °C
Output field galvanic insulation	4 kVdc
Max connection cable section	1.5 mm^2
Max measured range	0 to +1000 Vdc
Pulsed output range	0 to 5.0 Hz
Weight	60 g
Module width	17.5 mm
Module height	60 mm
Protection rating	IP20
Container type	1 DIN module

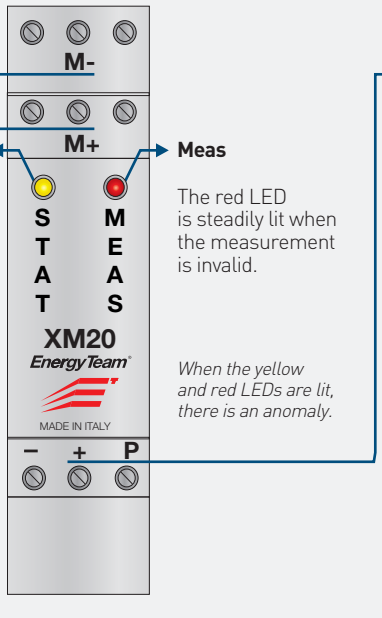
Connection notes

M- Terminal to connect to the negative pole of the connection bar.

M+ Terminal to connect to the positive pole of the connection bar.

Stat

The yellow LED flashes in proportion to the measured value.



Meas

The red LED is steadily lit when the measurement is invalid.

When the yellow and red LEDs are lit, there is an anomaly.

Notes for connection of power supply and outputs

– + Power supply 12 Vcc
Wire to the CM2 Solar \3(+) and 12(-) terminal or to terminal 29(+) 30(-) on the X-Meter.

P Pulsed output.
Wire to CM2 Solar (14) input or to one of the inputs (21 - 28) on the X-Meter.

Parallel panel with Integrated String Control systems

Parallel String panels fully complying with CEI EN60439-1+A1 regulation. Combine with CM2, the String Controller, to achieve maximum integration between the parallel panel and the String Box Control.

The Parallel Panel family with integrated String Control system SBC8 - SBC12 - SBC16 - SBC24 Strings, are ideal products to face the challenge of time and reliability required in photovoltaic systems.
These products meet all quality standards, show attention to details and materials used; they also went through strict tests during their project phase to ensure their reliability to be maintained for their entire lifespan.

The parallel string panels with CM2 remote control for photovoltaic systems are provided inside an IP65 fibreglass container with a door. The panels are ready for wall-mounting, grey and available for 8, 12, 16 and 24 strings systems. Their extremely small size is their main feature.

They include

- Switch disconnectors for minimum voltage coil and auxiliary status contact
- Surge protection from indirect lightning strikes with remote signalling and removable module
- Protective fuse and related disconnecting switches
- Common step bars
- Multi-polar distributor

The panels can be combined with

CM2 remote control modules with the following features:
- Power supply 12-24 Vdc
- of 8 strings measurement
- Up to 12 A per string
- Measures temperature range (-30°C +80°C)
- 3 inputs (1 for remote signalling discharger + 1 for switch + 1 available)
- 1 open collector output
- 2 environmental parameter inputs
- 1 XM20 module input
- RS485 interface
- Dimensions: 9 DIN modules.

XM20 modules for measuring string voltage:
- Power supply 8-15Vdc
- Voltage measurement up to 1000 VDC
- 0.5% tolerance
- Pulsed output 0.5 Hz
- Dimension: 1 DIN module.

12VDC 1.25A power suppliers.

SBC8 - SBC12 - SBC16 - SBC24 Strings

Cyclops photoreceiver

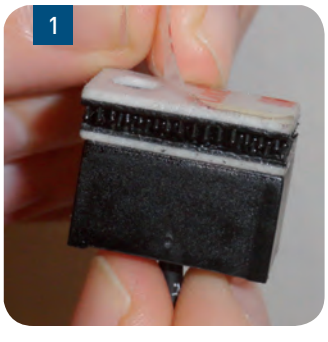
A precise watchful eye on Electrical production and/or consumption

Cyclops photo receiver detect the amount of the Energy produced, consumed and counted from any meter equipped with an optical output (Red and yellow LED). The Photo receiver converts light signals from active energy, emitted by the LED, into pulses. Plants energy consumption can be monitored once the pulses are acquired by the data logger (X-RWU).

Combine the Cyclops with an X-Meter and an XM3, CT's or Rogowsky and Voltmetric probes to acquire and record pulses coming from bi-directional meters. The Cyclops acquires the measurements directly from the same LED used for the instrument's calibration; this guarantees the accuracy of the measure itself.

The installation of the device is simple, quick and non-invasive. Apply a small probe, equipped with a photoreceiver to the meter and connect it to the Cyclops that will then send pulses to an X-RWU or an X-Meter (equipped with XM3).

How to install Cyclops



General	
Dimensions	39 x 78 x 23 mm (module) 22 x 14 x 12 mm (photoreceiver)
Weight	30 g.
Case material	Plastic
Protection rating	IP20
Operating temperature	-20° ÷ +70°C
Relative humidity	95% non-condensing
Other features	External probe with photodiode Cable L = 50 cm
Electrical	
Power supply	+12 ÷ +24 Vdc
Consumption	33 mW / 2,8 mA,
Visual indicators	1 LED, flashes with pulse received
Output	Open Collector: VMAX = 28 Vdc; IMAX = 100 mA
Output pulse length	Settable to 50 o 100 mSec.
Power cable	Sez. 0,25 mm^2 (AWG 23); LMAX = 500 m Sez. 0,50 mm^2 (AWG 20); LMAX = 500 m

Examples of meters compatible with the photoreceiver

ISKA | LANDIS + GYR | ACTARIS SL7000 | GET2A | GET3A | GET4S | GIST | GISS

Solarimeter

Solar irradiation sensor with PT100 Temperature probe, digital and analogic outputs (4-20 mA) and RTU GSL-IT-DA Modbus

The composite sensor of this solarimeter can detect solar irradiation and temperature and send the data to a data logger through its outputs than can be either set as digital pulsed or analogic (4-20mA). The sensor allows precise detection of two fundamental parameters to evaluate the performance of photovoltaic plants: irradiation and panels' operating temperature.

it is only taking panels' operating temperature into account that it is possible to define the plant's real performance and detect the causes for actual data varying from theoretical values.

The sensor, in a waterproof IP65 module with optical glass protection acquires solar irradiation data. Within the module The sensor's temperature is also detected, for accurate compensation.

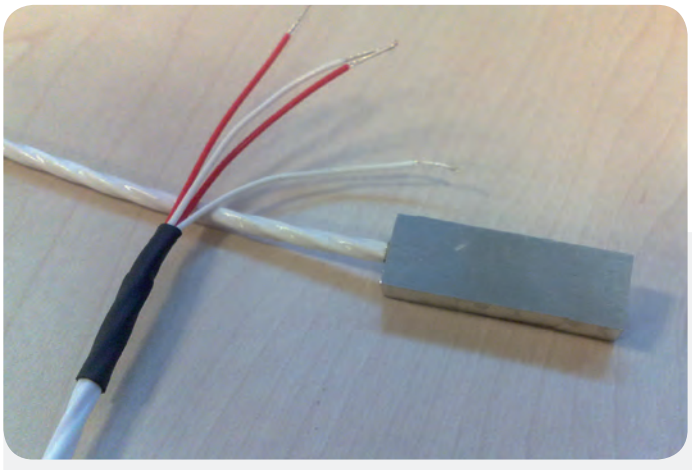
Temperature data are acquired by a PT100 probe connected outside the module. All connections can be implemented: 2,3 or 4 wires (4 wires, 2mt PT100 probe OPTIONAL)

The instrument's pulse digital outputs allow direct connection to X-Meter's or X-RWU's. The outputs can also be set as analogic 4-20mA to connect the device to any process controller or data logger.

Standard insulated RS-485 serial ports are also available and can be used to read the measured values using Modbus RTU protocol (NOT INCLUDED for the basic model).

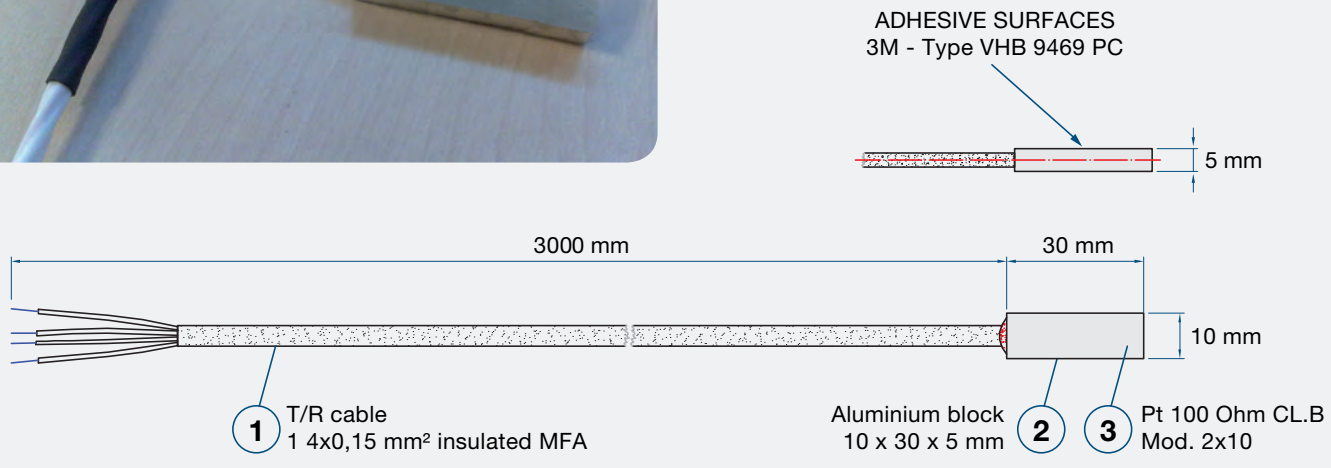
General	
Dimensions	120x80x45 mm
Weight	265 grams
Case material	Polycarbonate for the case, polyamide for the accessories
Protection rating	IP65
Power supply	12 to 24 Vdc, absorption 1W without current loop
Operating temperature	-20°C ÷ +70°C
Relative humidity	90%
Other features	Equipped with anti-condensation device
Irradiation	
Sensor	Photodiode
Measurement range	0-1200 Watt/m^2
Precision	2.5% in sunny conditions with irradiation of 100 W/m^2
Temperature	
Sensors used	2, 3 or 4 wire interface for PT100 (Optional PT100 probe)
Connection	Waterproof cable gland with terminal internal board
Measurement range	-40°C to +180°C
Precision	±2°C in the entire measurement
Digital outputs	
Type	Open drain circuit, voltage-free and protected against voltage surges
Frequency	from 0 to 5 Hz
Pulse duration	100ms
Maximum voltage	30Vdc
Maximum current	50mA
Irradiation output features	240 W/m^2/Hz (0 W/m^2 a 0 Hz)
Temperature output feature	44°C/Hz (-40°C a 0 Hz)
Current outputs	
Type	Active current source 4-20 mA with common negative and limiter
Irradiation output features	75W/m^2/mA (0W/m^2 a 4 mA)
Temperature output feature	13,75°C/mA (-40°C a 4 mA)
Serial port	
Interface	RS-485 Half-duplex, 2 wires plus shielding
Devices that can be connected	128
Speed	2400 o 115200 bps selectable
Parity	Even, odd, none, none +2 stop bits
Protocol	Modbus RTU (OPTIONAL not available in basic model)
Insulation	2500 Volt

Panel temperature probe



4 wires PT100 probe with sensor protected by a 10x30x5 mm anodized aluminium block. MFA Insulated cable (3m 4x0.15 mm2) and double-sided mounting adhesive for the sensor.

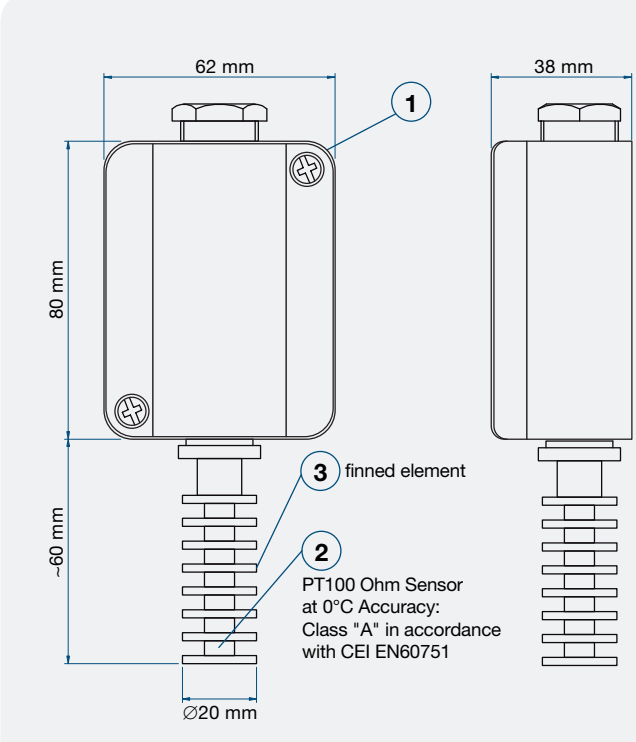
Class "B" thermocouple according to CEI 60751 standards.
Maximum temperature 200°C



Outdoor temperature probe

4 wires PT100 probe with sensor protected by an anodized aluminium finned element. Cables housed in a plastic IP65 box.

Class "A" thermocouple according to CEI 60751 standards.
Maximum temperature: 80 °C.



Services

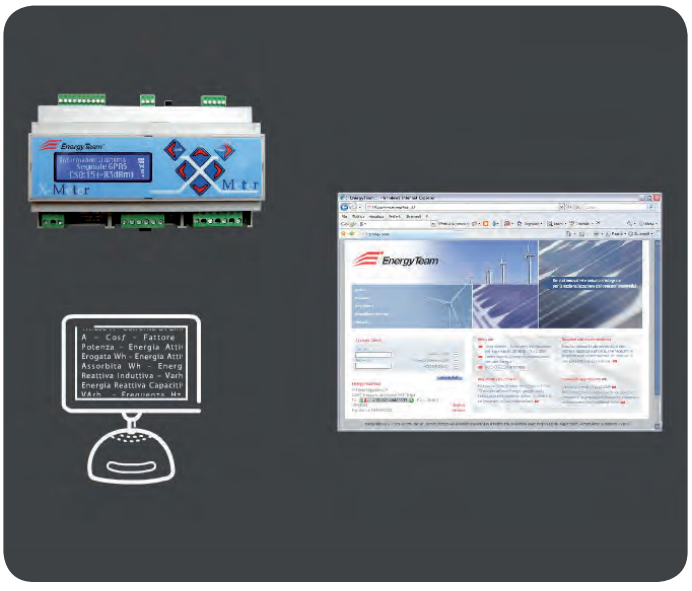
Remote readings

Among all other services, Energy Team provides remote meter readings to allow each customer to consult their consumption data online. Energy Team currently offers remote readings of energy consumption data (i.e. electricity, water, gas, steam) to thousands of users. Remote reading can be performed via GSM, GPRS or Ethernet depending on particular needs and the type of data logger.

The following activities are performed daily:
> verification of successful remote reading
> data integrity check
> transfer of data to the website.

The following activities are also performed periodically:
> database management and maintenance
> project management
> other activities.

Assistance and Maintenance contract includes repair of all covered devices, replacement of the devices in the event of failure as well as telephone assistance. All activities performed by Energy Team include remote reading, data storage, management, transmission and publication.



Certifications

Certificate for Mexico

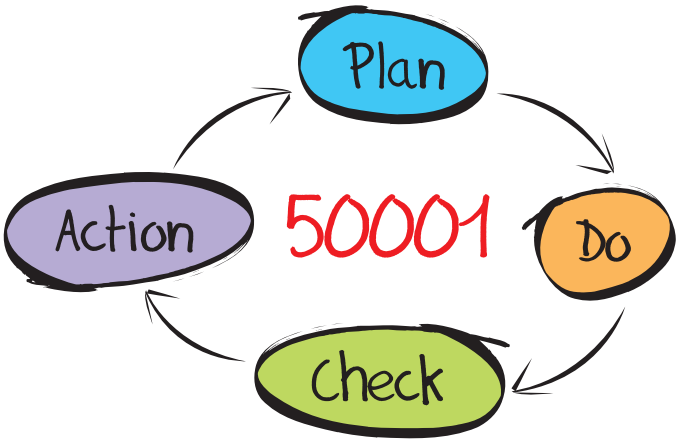
ISO 50001:2011

LL-C (Certification)

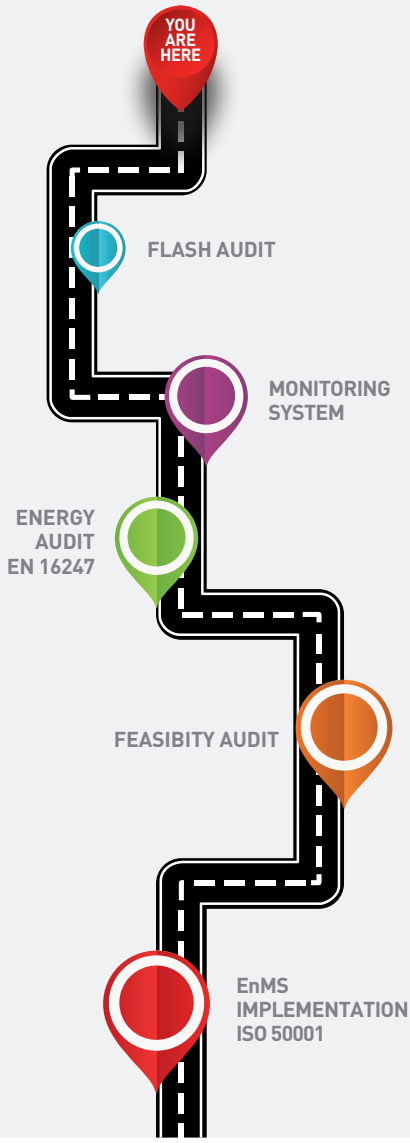
Added value services

Added value services for Energy Efficiency

The same way, during our adolescence years we look for a way to fully express our potential imagining what we'll be when we grow up, Energy Team, on its 15th year of activity, begun researching an innovative Business Model to develop alongside the historical Energy monitoring core business.
The first challenge was to establish the awareness in the precious amount of information (not only energy-related ones) which were left at our customers' for "raw data" analysis according to their interests/capability.
It was therefore quite clear that the first step needed to be that of creating a new unit to guide our customers to reach a higher awareness in their Energy cost centers management; we needed to provide a simple path for the users to follow leading them to the target of improving their ENERGY EFFICIENCY.



Energy Management System road map
From Flash audit to ISO 50001 Energy Management System



UNI CEI EN ISO 50001:2011 gives the best picture of the steps to take to define an Energy Management System; this path is clearly represented by the 4 phases of the Deming Cycle (PLAN-DO-CHECK-ACT):

- Energy Review
- System Implementation / feasibility projects
- Energy performance review
- Analysis of the results to find further possible improvement targets.

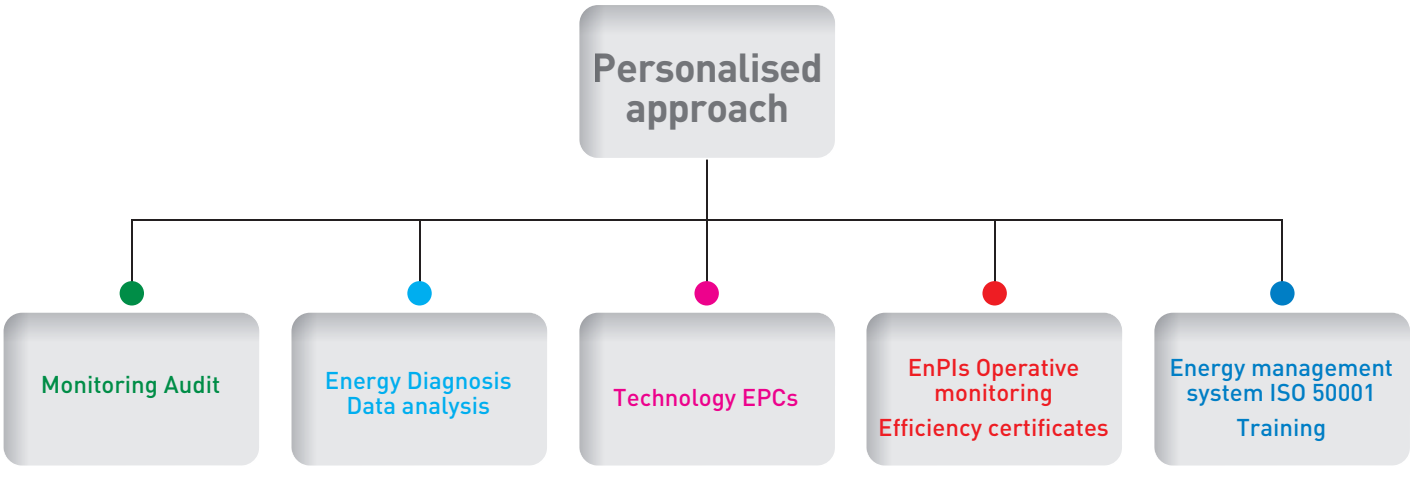
The benefit of this method is enhanced by the "continuous improvement" principle stated in the regulation that disconnects Energy Efficiency from one-off activities to be included into a constant and continuous management path.
A good management of the energy cost center could lead to 25% annual saving (especially for high consuming Companies) making it a strategic move to improve the company's competitiveness on the market.

All these thing considered, together with Energy Team's will to tie closer relationships with its customers, brought, in 2012, a new Business Unit to life; the first achievement of the new born "Efficiency Team" was the ISO 50001 achievement for the Company's Energy Management System in 2012 - we practice what we preach!

Our Business Model

Production Industry

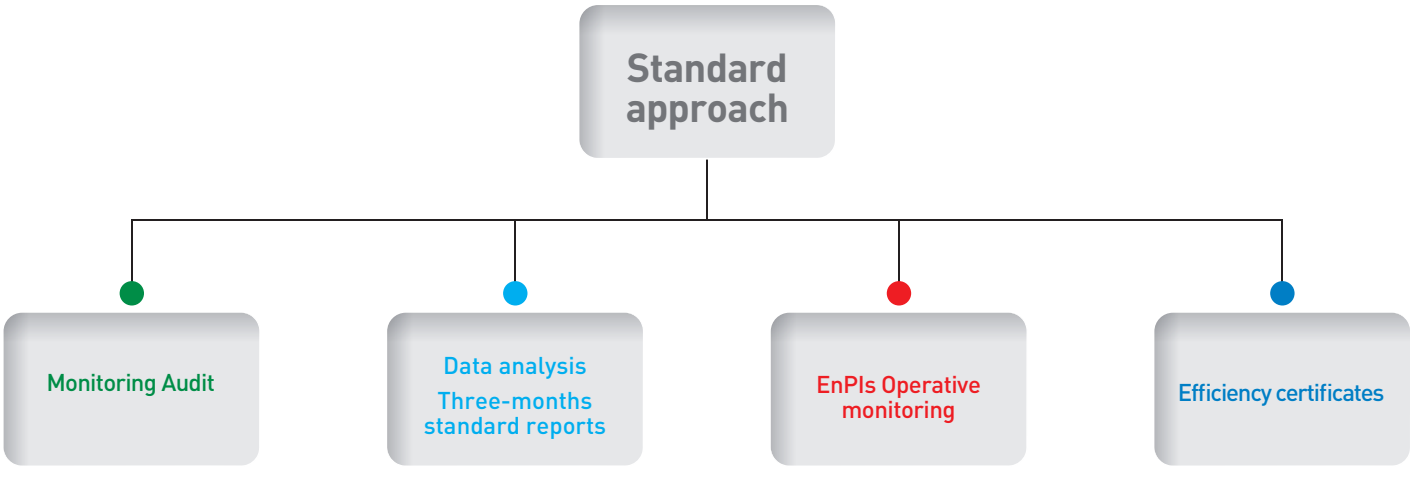
Each industry sector has its own needs, different from time to time.
Energy Team approaches this challenge starting with a precise strategy based on the current situation of the Company's Energy model to set a virtuous path leading to the systematic management of the Energy cost center (ISO 50001).



Service	Description
Monitoring Audit	After having received all energy and plant structure information, we proceed with an accurate evaluation of the most suitable monitoring solution for the Energy diagnosis.
Data analysis Energy Diagnosis UNI CEI EN 16247	With the information gathered during site inspections and energy measurements, we draw the Customer's energy model highlighting the Performance Indicators (Overall, per Area, per Energy use, per plant) and the intervention plan both Technological and Managing.
Technology EPCs	Should the customer not be able to afford the investment for one or more efficiency projects, Energy Team operates as ECSo for their implementation while sharing the income from the saving with them.
EnPIs Operative monitoring Efficiency certificates	Thanks to the same system used during the Energy Diagnosis phase, it is possible to compare the performance from before and after the intervention thus quantifying the efficiency level. This information can be used for obtaining Energy certificates.
Energy management system ISO 50001 Training	Energy Team supports its customers even after the Diagnosis phase is completed, throughout the achievement and certification of their Energy management System with specific consulting activities and training sessions.

Single-Multi point Service industry

The complexity of the majority of the Service Industry's plants and the relative easiness in spotting its opening-closing profiles lets us approach our potential customers with more standard solutions than the Production Industry's.



Service	Description
Monitoring Audit	The Measuring System proposed in simplified for the Customers 'plant low complexity and studied for cost minimisation. The standard monitored utilities are usually LIGHTING, HVAC, MAIN LINE.
Data analysis Three-months standard reports	With the data from the Measuring System and all information from the sites, we produce three-months reports with the following parameters: - Energy Performance Indication for all monitored loads; - Highlighting of wastes of Energy; - Comparison between current performance and BAT (Best Technology Available) for a possible upgrade.
EnPIs Operative monitoring	- Detection of Performance Indicators' acceptable thresholds and alert settings for their exceedance; - Comparison with Internal Benchmarks (i.e. January 2017 vs January 2016); - Comparison with External Benchmarks (i.e. per sector, per consumption steps)
Efficiency certificates	When possible, the comparison between different Energy Performance are used to obtain energy certificates.

Efficiency Team Business Unit

2011

- The Efficiency team was born
- Development of models of Added value Services

2012

- Energy Team achieves ISO 50001 certification
- Introduction of AUDIT/REPORTS services

2013

- Energy Team staff certified as Lead ISO 50001 Auditors
- Energy Team becomes an ESCo

Qualification

2 SECEM certified EGE's
3 EVO certified CMVP's
6 ISO 50001 Lead Auditors
ISO 50001
UNI CEI 11352
ISO 9001
BS OHSAS 18001

2015

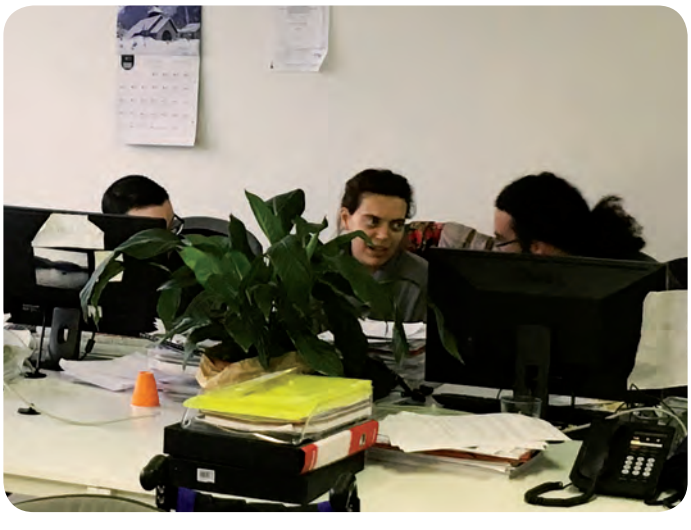
- Energy Team closes the first EPC contract
- 161 Energy Diagnosis complying with UNI CEI 16247:1/2/3/4 for €42Mln worth of projects and €21Mln/year savings.

2014

- The Efficiency Team grows and aquires specific skills (Energy certificates, Compressed air)
- Flash Audits and Air Audits
- ESCO UNI11352 certification achieved
- Energy Team presents its first Energy Certificates/ISO 50001 projects

2016

- Business training development
- Team consolidation with 12 engineers



Notes

Notes

SOCIO FIRE 2018 Azienda - Ente

TECHNOLOGICAL PARTNER

ENEA
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

Certified Company
ISO 9001- ISO 50001
UNI CEI 11352

20 YEARS 1996 2016

20 years at the service of Energy Efficiency.

QR Code

Energy Team S.p.A.
Via della Repubblica, 9 - 20090 Trezzano sul Naviglio (Milano) - Italy
Tel. +39 02 48405033 - Fax +39 02 4840503 - www.energyteam.it

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