

# ZPAS Control Overseas

REMOTE SUPERVISING AND AUTOMATION SYSTEM

[ 2007 ]

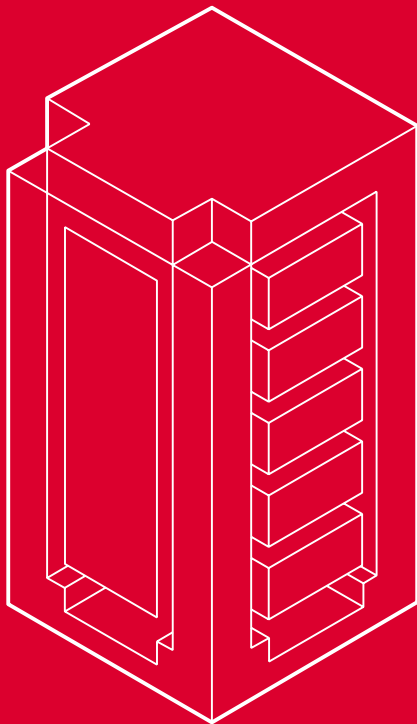


**ZPAS**  
net

connections for you

# ZPAS

G R O U P



## Philosophy of the ZPAS Group

As a manufacturer, we operate in accordance with our well-established reputation of a reliable and trustworthy business partner offering customers top-quality products, short lead times and reasonable prices.

These are the main assumptions of our business philosophy.

The capital of the ZPAS Group is not only its modern machines, but also its highly qualified personnel. Our employees are young, creative and innovation-minded. Advanced production technologies are supported by well-planned management of all manufacturing processes.

In January 2007, the ZPAS trade mark received a new visual identification and an advanced tool supporting the company's functional organisation: ZPAS launched the implementation of an ERP-class integrated IT system Infor ERP LN.

Customers expect us to supply well-designed solutions and a comprehensive product portfolio meeting their requirements. Products developed for the IT, telecommunication and power industry sectors must have parameters and properties which meet challenging high-tech requirements. It is our objective to supply precisely such types of products.

The ZPAS Group, which pursues common and uniform goals and philosophy, integrates the product offer of ZPAS S.A. and ZPAS-NET Sp. z o.o. The motto of the ZPAS Group places an emphasis on the advantages of all products offered, the benefits of using them, the system of communication with customers, partnership, technical consulting and high level of customer service from the very first contact until order fulfilment. This shows our attitude towards customers whose requirements we want to meet at the highest level possible.

We are a Polish company supporting and promoting the high quality of Polish products and services.

We focus on advanced technologies, young and well-qualified staff and dynamic operations.

## CONTENTS

### ZPAS CONTROL OVERSEE

About the company .....	4
Introduction .....	8
Oversee 1-Wire - network system for the measurement and supervision of environmental conditions using the 1-Wire technology .....	9
Oversee M-bus - network system for the measurement and supervision of environmental conditions using the M-bus bus .....	10
Oversee System communication solutions .....	11
Data recording and archiving .....	11
Visualization software .....	12
Sample applications of monitoring systems .....	13
System for monitoring environmental conditions in server rooms, data communication and power enclosures, and industrial facilities .....	13
Monitoring system in access cabinets .....	14
System for supporting facilities security and access control .....	14
Utility billing system .....	15
System for controlling heating, ventilation and air conditioning inside modern office and residential buildings .....	16
Automation of unconventional renewable energy sources .....	16
Monitoring of facilities and devices for animal husbandry .....	17
Monitoring of temperature and humidity in transport .....	18
NPM /Network Power Manager/ – power strip with remote control .....	19
Microprocessor panel G1 for fan control .....	20
List of available Oversee M-Bus System elements .....	21
List of available Oversee 1-Wire System elements .....	22

## ABOUT THE COMPANY



General view of the upper section of the manufacturing plant in Przygórze

### ZPAS Group

Since the very beginning of its business activity in 1973, ZPAS has produced a variety of industrial cabinets and enclosures. Initially, the Company operated as the Experimental Department of the Power System Automation Institute (IASI) in Wrocław, to become a part of the Research and Manufacturing Centre for Power System Automation (CNPAE). After 1989, the management of the Company undertook actions aimed at privatisation, which resulted in the establishment of a private joint-stock company at the end of 1991. On 1 June 2004 a separate company called ZPAS-NET was spun off from ZPAS, taking over a part of the plant's production.

The line of products manufactured in the plant located in Przygórze incorporates important supporting elements of advanced telecommunications, IT and electric power systems. Thanks to new technologies and advanced design solutions, ZPAS developed a uniform and comprehensive product portfolio which makes it possible to join the previously separated groups of products in the IT and power industries.

At the beginning of the 1990s, the Company shifted its key business from the power industry into the telecommunications sector, winning a number of customers e.g. among ICT system integrators and providers. Thanks to ongoing technological development, large outlays on new investments and the implementation of quality management systems based on ISO standards in mid 1990s, ZPAS S.A. reached 50% export rate of its products within just a few years, becoming one of Poland's major exporters. Our products are highly valued by many well-known



Bird's eye view of the manufacturing plant in Przygórze

firms using ZPAS products in their most technologically advanced solutions (e.g. Lucent, Ericsson, Siemens, Areva, Anixter, Polkomtel and European Organisation for Nuclear Research - CERN). Currently, the ZPAS Group markets a very broad range of equipment (mainly enclosures) designed for performing important functions in a variety of industries using electronic communication.

### Quality and the environment

ZPAS S.A. holds both ISO 9001:2000 Quality Assurance System Certificate and ISO 14001:2004 Environmental Management System certificate. More detailed information about the Company is available on the Company's website at [www.zpas.com](http://www.zpas.com).

## ABOUT THE COMPANY



Lower section of the manufacturing plant in Przygórze – Metal Working Plant



Seat of the Company's Management Board

### Sales agencies

The Company has around a dozen sales agencies all over Poland. A detailed list is available at [www.zpas.pl](http://www.zpas.pl).

ZPAS products are also sold abroad through a network of sales representatives and trading partners in Austria, Belarus, Belgium, Bosnia and Herzegovina, Cyprus, Denmark, France, Germany, Greece, Hungary, Iceland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Morocco, the Netherlands, Norway, Portugal, Russia, Slovenia, Spain, Sweden, Switzerland and Ukraine. Detailed information on foreign sales representatives is provided on request by the international trade section of the Company's Marketing Department.

### ZPAS offers:

- 19" and 21" data communication enclosures (including server cabinets, telecommunication cabinets, EMC enclosures and others – both in floor-standing and wall-mounted versions),
- empty power cabinets (without electrical devices),
- customised cabinets,
- products made of stainless acid-resistant steel.

### ZPAS-NET offers:

- structural cabling elements and telecommunications accessories,
- fibre optic distribution frames,
- outdoor cabinets,
- low-voltage cabinets and switchgear with electrical devices,
- dispatch and control desks,
- mimic boards,
- ZPAS Control Oversee - system of supervising climatic conditions in server rooms, data communication and power cabinets, and elements of building and industrial automation.

## ABOUT THE COMPANY



## ABOUT THE COMPANY



## INTRODUCTION

Nowadays, the progress made thanks to the development of telecommunications, electronics and measuring technology, enables the creation and application of modern solutions within the scope of managing data acquired by monitoring the technical and environmental parameters of the facilities. Thanks to the internet, it is possible to implement less expensive and less complex systems for data acquisition and secured data sharing. As part of the ZPAS Control OVERSEE system, we offer two basic technological/hardware solutions for acquiring data from the facilities:

- **Control M-Bus System** – based on the M-Bus bus and the ModBus RTU transmission protocol
- **Oversee 1-Wire** – based on the 1-Wire bus and its elements

The above systems may be integrated into one ZPAS Control OVERSEE software platform.

This solution was designed for computer system users to provide them with an overview of conditions available in given facilities. The simplicity of use and the ease of implementation make this System a perfect solution for monitoring facilities (e.g. server rooms) scattered around distant locations.

### ZPAS Control Oversee

It is a comprehensive solution which enables the construction of inexpensive and reliable systems of remote supervision with measurement and control functions. The system is scalable and fully independent of hardware, database and system platform. Its structure can be easily expanded with new devices, communication technologies and presentation elements. The range of devices offered by ZPAS-NET working in the M-Bus and 1-Wire bus standard was designed for comprehensive supervision of the operation of industrial facilities equipped with digital automation device systems.

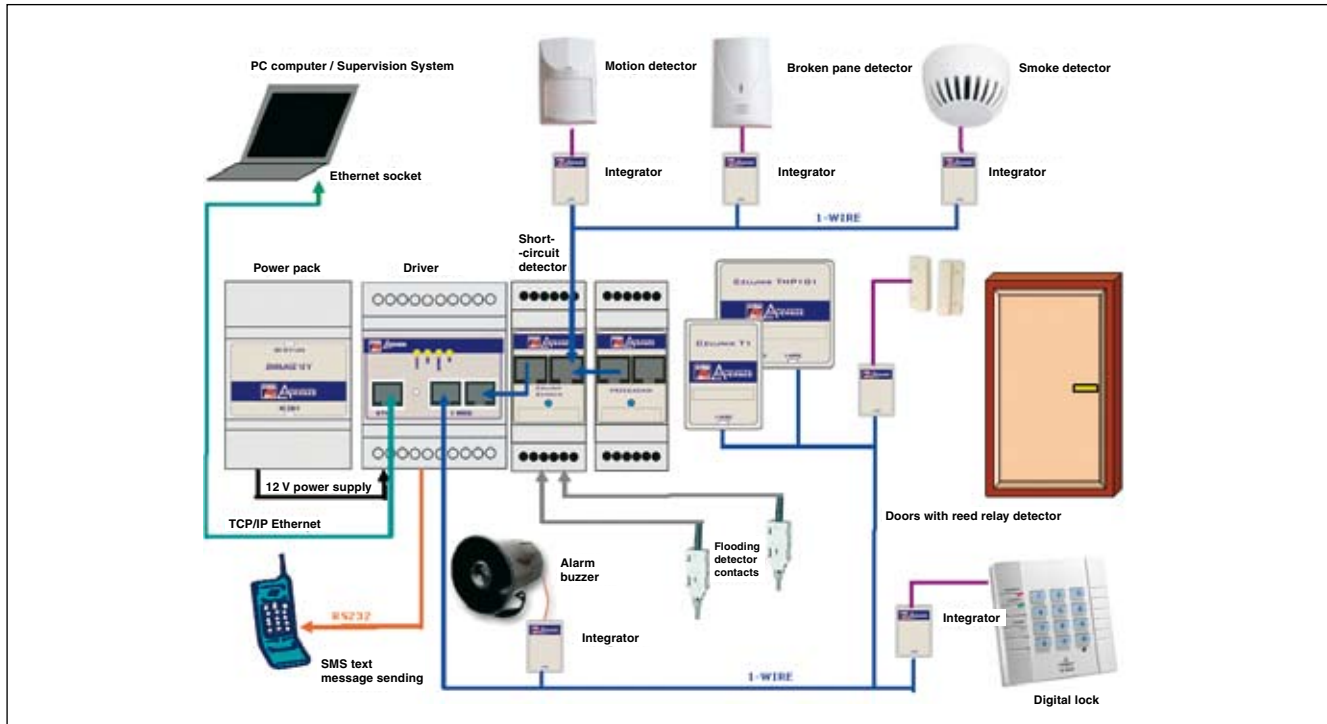
### Oversee Software

This software is intended for remote supervision and control of industrial facilities fitted with digital automation device systems. It allows the integration of any number of independent, geographically scattered facilities, their organization into any network structure and their central management. Oversee Software may be used to create operator panels, making it possible to visualize current and archive states, the remote modification of settings and the configuration of local automation systems.



## OVERSEE 1-WIRE

### Network monitoring system using the 1-Wire technology



The following several factors convinced us to design a range of devices working on a common single-wire 1-Wire bus:

- the need to constantly monitor environmental conditions and electric quantities in facilities (e.g. server rooms, data communications cabinets and other facilities with electronic devices which need to be provided with appropriate working conditions),
- the possibility of quick and easy installation,
- the reduction of costs of the applied bus.

Multiple devices working in the slave mode may be connected to a single master bus. Each slave device has a unique 64-bit address, which ensures its easy identification, even in a large network. The 1-Wire type component network may be directly connected to a PC unit or a driver using a single communication bus.

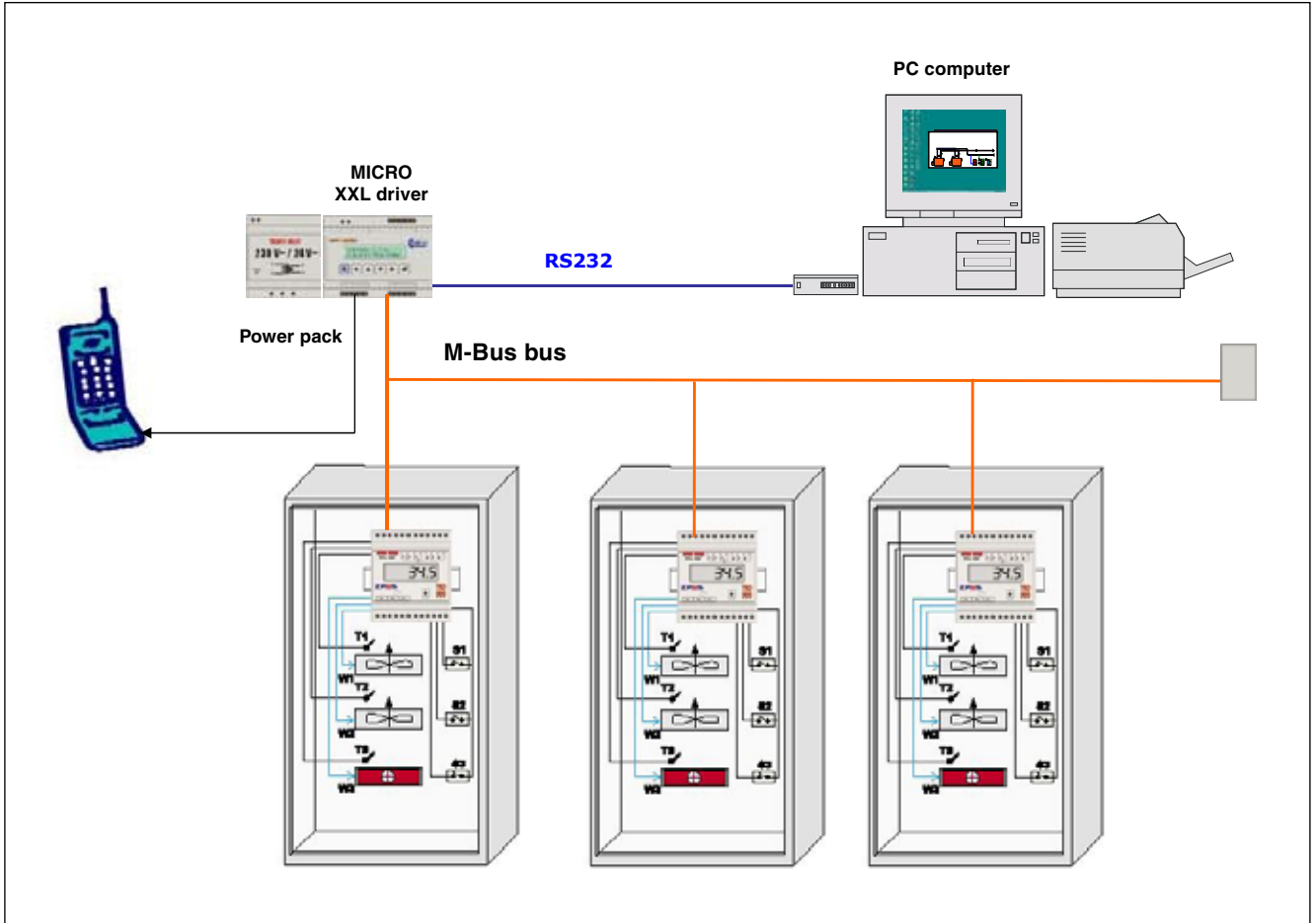
Furthermore, this technology allows the construction of larger networks of any topology without the use of concentrators. In typical networks, the length is limited to 200 m. As a result, the separating system and the additional power system are needed if the network is to be expanded. This system allows the cable length to increase to ca. 500 m. In case there is a need to separate a sub-network, the 1-Wire switch devices may be used here.

Due to the diversity of used components, the availability of materials and their low prices, the 1-Wire networks are becoming extremely useful in the monitoring of server rooms, data communications cabinets and in the construction of intelligent building systems.

It should be emphasised that our technology is reliable and highly functional when cooperating with the ZPAS Control Oversee monitoring system, which enables data gathering, processing and sharing, with the use of available state-of-the-art solution

## OVERSEE M-BUS

### Network monitoring system using the M-Bus bus



A wide range of devices working in the ModBus RTU communication protocol is available. They allow the realization of a complete and autonomous control, monitoring and alarm system.

Oversee M-Bus is a system based on the elements of digital automation system, which enables the construction of efficient, inexpensive and reliable measurement/control systems. It is intended for use in professional systems for managing environmental conditions in server rooms, outdoor access cabinets, data communications enclosures, power cabinets, mimic boards and industrial facilities. The open and free configuration allows the Oversee M-Bus system to be used in an intelligent building, heat engineering, water and waste management, calculating individual costs of heat energy consumption in multi-family buildings and many other areas.

The design of automation systems based on the Oversee M-Bus system is easy, thanks to the use of universal hardware elements and software modules intended for control using typical performance devices. The system includes central units, data transmission converters, object modules, temperature and humidity sensors, smoke, motion, shock and access detectors, as well as performance modules. The communication between the central unit and object modules is based on the standard M-Bus bus with additional control feature.

The Oversee M-Bus system offers attractive software for graphical visualization in the Windows environment. The RAM memory used in drivers enables multi-channel recording and archiving of data in the facility. They may be read from the driver on demand or via the master system.

## OVERSEE SYSTEM COMMUNICATION SOLUTIONS

The Oversee system comprises devices and software. Due to the diversity of tasks to be performed, they differ from each other in the applied communication solutions.

With the Ethernet and Internet networks used by the software, the user is offered an inexpensive and quick access to the monitored facility. When the redundancy of connection with the facility is of importance, the system makes it possible to use the telephone network and the GPRS transmission.

Given the diversity of devices, the system uses the ModBus RTU and 1-Wire transmission protocols.

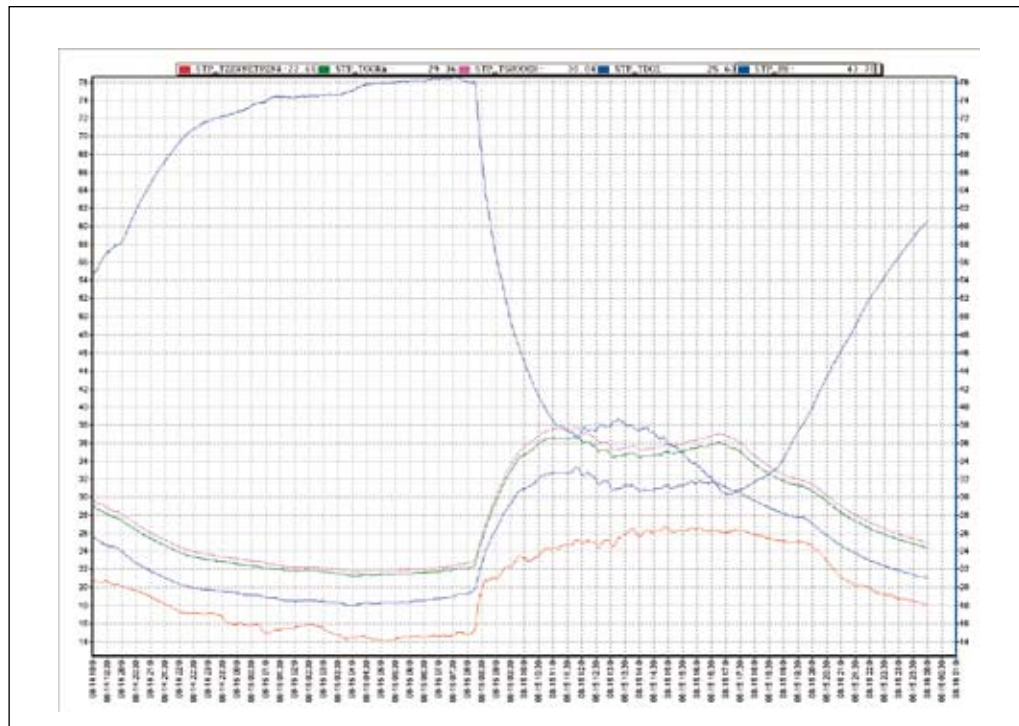
## DATA RECORDING AND ARCHIVING

Thanks to the system's flexibility, the user may choose the method and manner of recording and archiving. When it comes to monitoring, where the priority is to ensure uninterrupted recording of events taking place in the facility, we suggest to record data using dedicated concentrators. In case the power supply of the concentrators in question is additionally secured with UPS devices, those concentrators will safely store readings in the internal memory in an uninterrupted manner to provide their values when a need arises.

When continuity of data recording is of less importance (e.g. in case of outside temperature monitoring), one may use the devices recording the last measurement only.

The data gathered by the devices may be stored in the system. Depending on the needs, measurement values, alarms or other parameters of interest to the customer are recorded in the database. Dedicated software may be used to provide the user with the archived data.

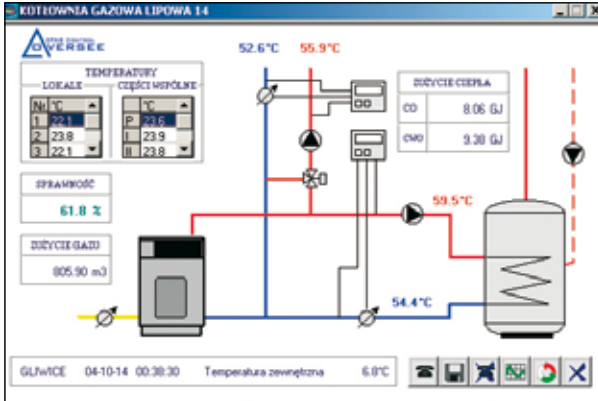
There is also the possibility of establishing direct connection with data concentrators and exporting archives from them to text files or a spread sheet.



## VISUALIZATION SOFTWARE

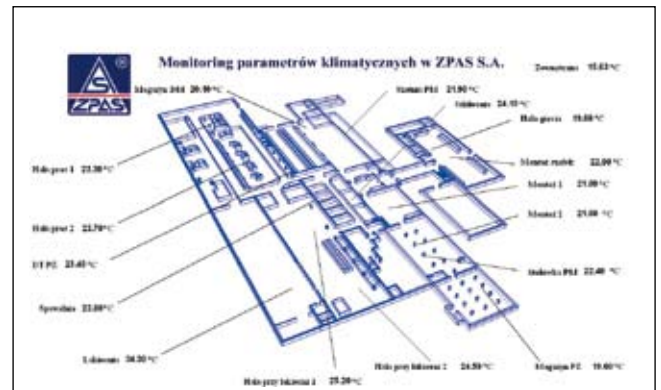
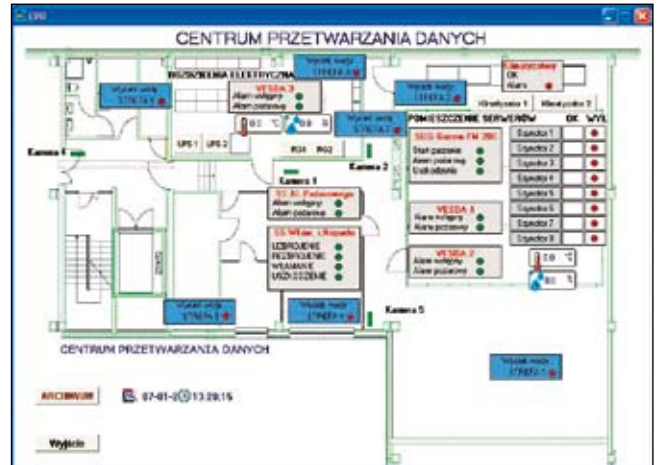
The graphical visualization software, working in the WINDOWS environment, enables periodical access to process data using telephone lines or constant access to the facility.

It allows the creation of user's own customised operator panels, enabling the visualization and monitoring of control and supervision systems from any location.



Depending on the needs, the system allows visualization and archiving of data recorded in the supervision center. Thanks to the possibility of establishing remote communication with the facility, the software enables graphical visualization of the current state and the import of process data archived in the central unit, in order to supplement archives on the master system hard disk. Data from the facility are recorded as plain text files. They may be later imported to databases and spread sheets, where further processing may take place, according to user specification. The package includes also an excellent record graph browser with great capabilities.

Mathematical processing and creation of new channels, based on available records and formulas, is a good example here. Connecting archives from various periods, which makes the analysis of changes in the technological process over long periods of time possible, is also available. The operator panels enable the evaluation of current state and behaviour of the facility from any location around the world.



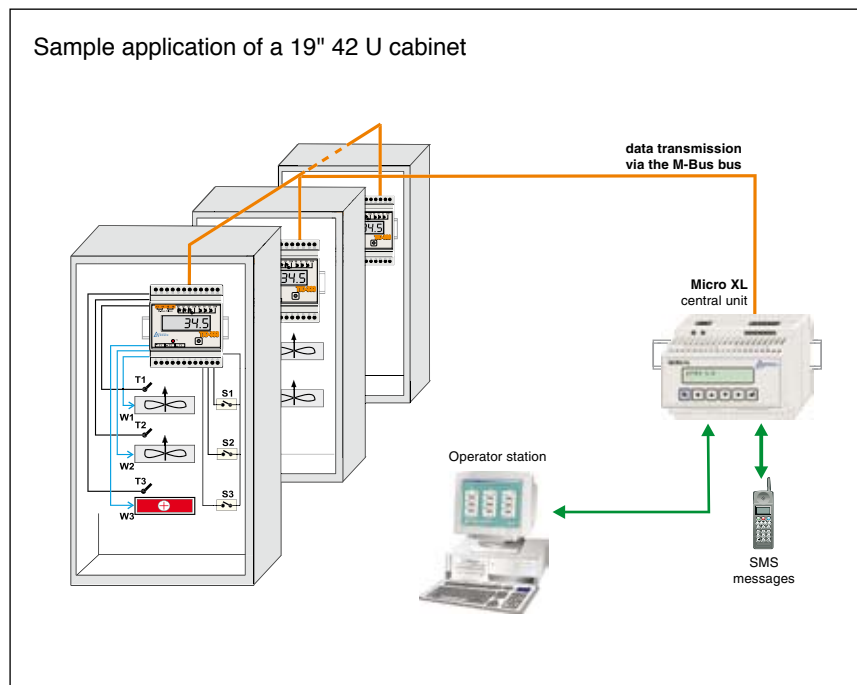
## SAMPLE APPLICATIONS OF MONITORING SYSTEMS

### System for monitoring environmental conditions in server rooms, data communication and power enclosures, and industrial facilities

The ZPAS Control OVERSEE system enables constant monitoring of environmental and technical parameters present in server rooms and notifying the administrators when set parameters and alarm states are exceeded. The microprocessor, a freely programmable Micro XL driver, records analog and two-state signals and once the limit parameters are exceeded, it notifies the administrator about the alarms and provides them via password-protected website.

#### System installation enables e.g.:

- monitoring of temperature and humidity values,
- monitoring of voltage values in the server room,
- monitoring of ventilation and air conditioning operation,
- flooding, fire and burglary detection,
- detection of other electrical and non-electrical values using measurement converters,
- notifying the administrator about alarms via SMS text messages and e-mail,
- optical/acoustic notification of alarm on the mimic board,
- communication with the facility, for example via the M-Bus bus, telephone network, GSM, GPRS, Ethernet, LAN, WAN,
- possibility of performing remote diagnosis,
- analysing archive data (event log),
- imaging of current and archive data, illustrating work states of the supervised facilities.



The administrator may preview conditions in the server room, using a normal web browser or dedicated software on the user's computer.

Depending on the application, the following may be monitored: temperature, humidity, presence of smoke, opening of doors, emergency battery voltage and so on, as well as auto-controlled devices (fans, air conditioners or heaters).

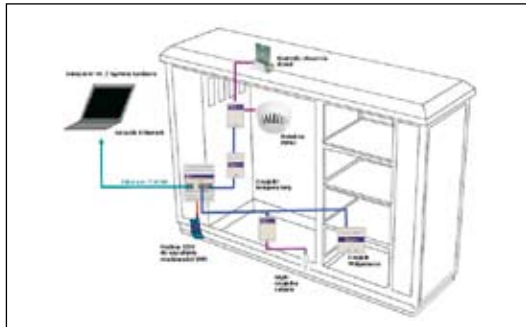
With its modular structure, the system may be expanded from the simplest application in a single (data communications or power) cabinet, through installations grouping numerous cabinets, to scattered systems equipped with broad communication mechanisms. Below several implementations of this solution are presented.

The above application, built using the TIO 333 module, enables constant measurement of temperatures, as well as the control of heater and fans in separate cabinet sections. This system may easily be expanded further. When supplemented with the M-BUS Master 10 Converter, it enables visualization and modification of values set using the PC computer. Further expansion of the system may be continued by connecting it to the Micro XL central unit, which functions as a data concentrator. Micro XL may communicate with the master system using phone modem, GSM/GPRS modem, Ethernet converter or direct RS232 connection.

## Monitoring system in access cabinets

The offered system includes the ST-50 controller, temperature and humidity sensors, as well a smoke and short circuit detectors. Thanks to the use of a flooding detector, the system informs also about flooding or permeating the expensive equipment in the cabinet. All alarm events may be immediately sent to the system administrator's address, via GSM modem or mobile phone connection, as SMS or e-mail messages. The controller used is also equipped with an Ethernet output, which enables its inclusion in the network infrastructure and fixed connection with the supervision center. The way the system reacts using redundant lines, the promptness of reaction and independence from power supply are vital assets when the system is used in special working conditions, such as access cabinets – distant data communications facilities.

The system itself is very flexible and easy-to-expand. As a result, it may be later expanded, along with growing demands of the user. What is more, devices from various manufacturers may be connected to the system, using the integrator module. The entire system may cooperate with the user's original software or a chosen monitoring system.



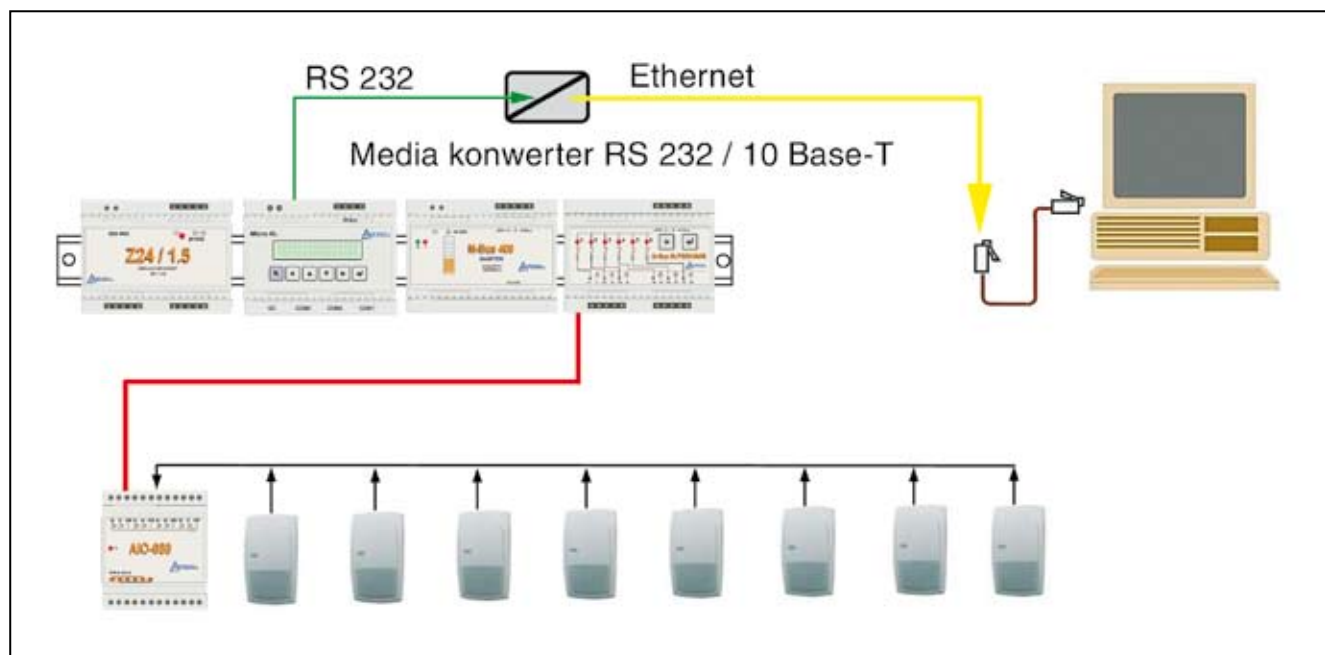
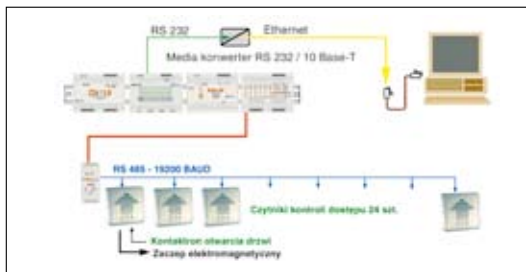
## System for supporting facilities security and access control

The access control systems are a closed group of subsystems composed of modern office and residential buildings. The solutions in the area of system elements available on the market, starting from proximity card readers to central system units, are an exclusive product group and products from various manufacturers are not compatible with one another.

The Oversee M-BUS automation elements may be used to build a system which supports peripheral devices from various manufacturers, equipped with the RS232, RS485 or M-Bus interface.

Efficient data gathering and archiving mechanisms implemented in the Micro XL driver software enable a simple method of adding extra features, which are not found in other systems. Examples include staff traffic analyses and integration of the data with, e.g., heating or lighting control systems or systems supporting facility security.

The above figure shows the method of installing proximity card readers in the access control system. The readers are connected to the M-Bus bus via the RS485 bus. The proximity card readers available from ZPAS are equipped with additional outputs, which may be used to connect a device signaling open doors and an EMC lock.



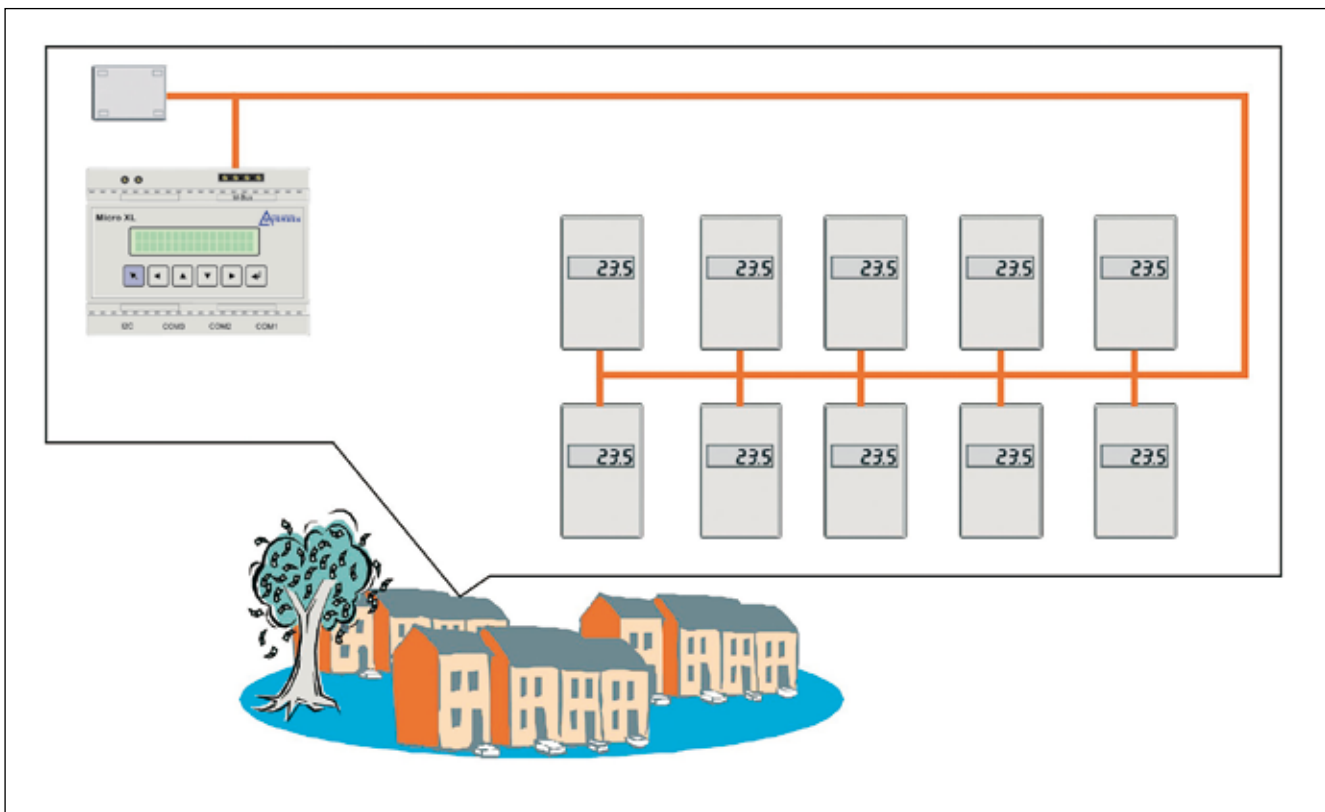
## Utility billing system

Growing prices of utilities and people's dissatisfaction with the currently used billing systems, especially in the case of heating, encouraged us to design and implement an electronic system based on the M-Bus modules described in this catalog. The access to accurate data for both the supplier and the receiver of any utility, allows a number of problems arising from the conflict of interest to be avoided.

The system enables constant reading of utility usage and its recording with the Micro XL driver, as well as the processing of recorded parameters using dedicated software and presentation of the results directly in the apartments.

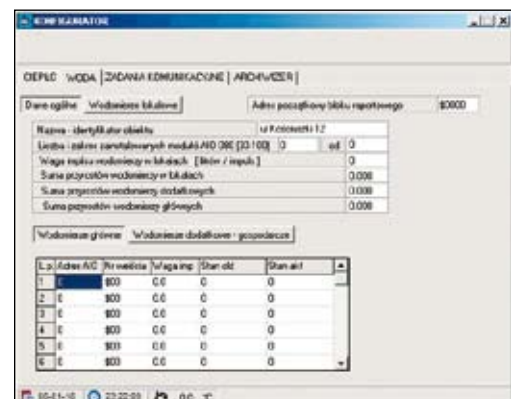
### Sample functioning of a system composed of:

- temperature sensor with a display,
- outside temperature sensor (also for shared building parts),
- impulse signal computers for water, gas and electric energy meters, etc.
- central unit (Micro XL driver),
- administrator software.



The illustrated system enables independent calculation of heating costs, billing data archiving and documentation, remote maintenance and control using data communication network. Sending text messages concerning an apartment or another facility may be activated for mobile phone users. The system may be expanded to protect facilities and buildings against gas explosion.

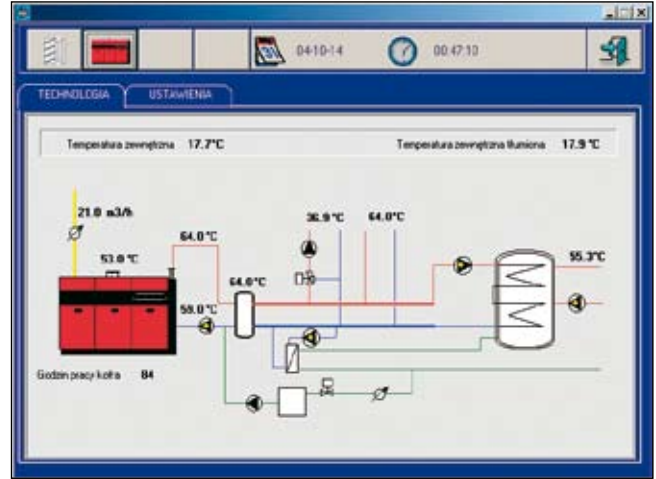
The measurement, recording and billing processes take place continuously and independently of any external factors. The system administrator is notified with a proper message about each fault or unauthorized interference.



## System for controlling heating, ventilation and air conditioning inside modern office and residential buildings

Modern office and residential buildings are equipped with a number of installations. With their proper operation and mutual integration the users may enjoy high comfort and notable financial benefits.

Thanks to its modular structure, the Oversee M-BUS system is perfect for both single-family and large office buildings. The concept of controlling the above installations is based on the measurement and interpretation of temperature values – air temperature outside and inside the building. Depending on the building's thermal characteristics, technical parameters of heat source, air conditioners and ventilation devices, appropriate control settings are selected for individual installations and a proper event sequence is programmed. The top priority is to make the installations cooperate and not compete with each other. This will provide the users with notable savings. One may easily imagine where non-integrated heating and air conditioning installations operate simultaneously without any effect for the user whatsoever (except, of course, wasted energy).



In modern building systems, it is also important to provide the maintenance services with quick access to information on irregularities in the installation operation.

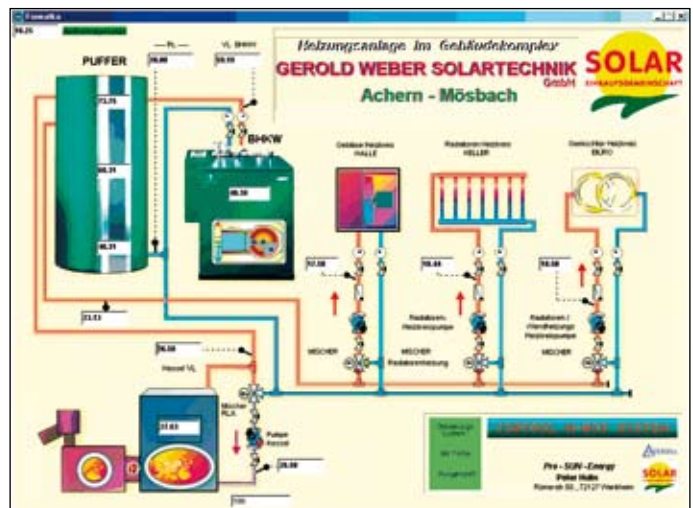
The system equipped with air quality sensor may turn the ventilation on when the air humidity level and the carbon dioxide content in the air has exceed a set value.

The figure shows a visualization of local boiler room and ventilation system operation. The owner is notified about emergency states by SMS messages sent to designated responsible people and by mimic signaling on visualization displays.

## Automation of unconventional renewable energy sources

One of the most interesting applications of the Oversee M-Bus system is the control of unconventional heat sources, including solar photovoltaic cells, being used as a source of electric power. Its excess may be sold to public power grid. The other application is the control of hybrid heating systems based on renewable energy sources.

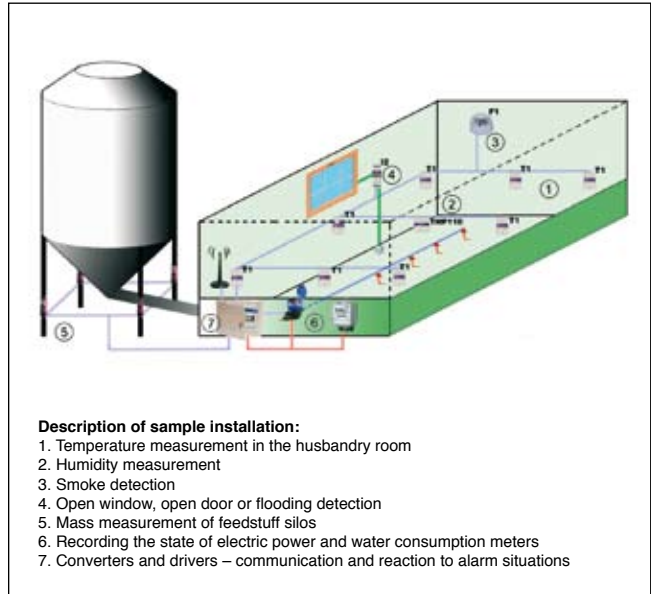
The system which controls solar photovoltaic cells, used as a source of electric power, controls instantaneous user needs for electric power. If there is no demand, the excess power is "put" into public power grid. The electric power meter operates as follows: when the electric energy is transferred from public power grid, amounts due for the consumption of this utility are charged; if the power moves in the opposite direction, amount due are deducted from the user's bill accordingly. In many European Union countries, this method of settling accounts with the electric power supplier is very popular and the state subsidizes the construction of alternative energy sources. Oversee M-Bus has already been used in more than ten installations for photovoltaic cell control installations in Germany.



## Monitoring of facilities and devices for animal husbandry

Experience in optimum resource management in companies becomes more and more important in plant farming and animal husbandry. Knowledge on feedstuff, electric power or energy consumption, combined with constant supervision of temperature and humidity conditions, allows proper resource management, which may translate into animal health, low tax deductible expenses and, as a result, higher production profitability. The wide range of devices in our offer enables free expansion of monitoring to secure property and protect against fire and burglary. The software enables the consolidation of data from various facilities, even remote ones, and their quick processing for the purpose of visualization using properly prepared forms, graphs and tables.

Monitoring, in its broad sense, should be considered from the point of view of technical possibilities, selection of measurement elements and the method of processing the data, being gathered that way.



### Sample monitoring areas:

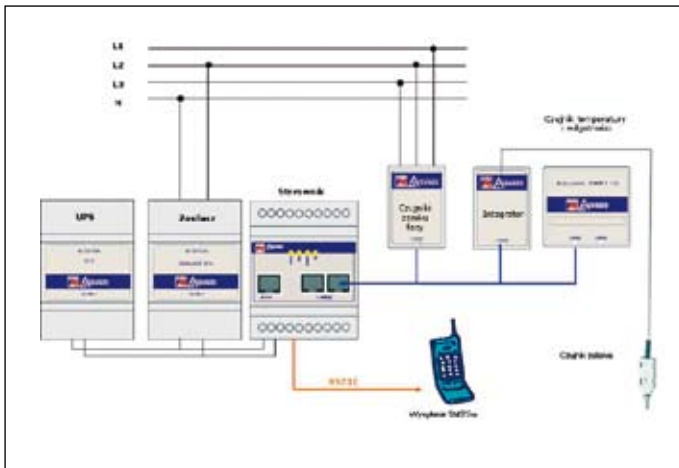
Mass measurement of feedstuff silos. The issue of silo mass measurement should be considered from the point of view of installing proper measurement scale mechanics and electronics, i.e. extensometer sensor with converter system.

In order to reduce costs incurred due to expensive extensometer systems of measurement sensors, a special truss was designed. The truss connects 8 silo supports and transfers silo weight to four support points. Two of the four points will be replaced with permanent bearings. As a result, the entire measurement will involve the installation of two extensometer sensors only.

Signal from the extensometer sensor is sent to the MW1 extensometer input module and then to converter module 0-20 mA. The converter is equipped with a communication output to the 1-Wire bus, which enables the extensometer measurements to be included in the network of 1-Wire interface devices. The figure shows a sample truss.

The silo weight installation will require a calibration only once.

Thanks to the special structure of the sensors, changes in environmental conditions (high and low temperatures, humidity) do not influence the conducted measurements.



Monitoring of industrial facilities for environmental conditions available there is another sector where we provide our services. It is a well-known fact that appropriate microclimate in husbandry rooms and feedstuff storage conditions, preventing the formation of microtoxins and fungi, have a significant influence on the husbandry process.

The measurement system was designed on the basis of temperature sensors and humidity sensors, which communicate via the 1-Wire bus. Supplying power to connected devices and the communication between them was possible with the use of a two-wire bus. The sensors are connected using the RJ45 contacts. Their connection may be parallel or of different topology, e.g. bus or star.

The measurement devices are read out by the ST-50 controller.

Equipped with the 1-Wire bus communication input for reading 1-Wire measurement devices out, it enables alarm definition, SMS and e-mail message sending, as well as configuration via the internet. With the ZPAS Control Oversee master system connected, it is possible to create extensive mechanisms for supervising conditions, for example, inside husbandry room, in feedstuff storehouses and finished product warehouses.

## Monitoring of temperature and humidity in transport

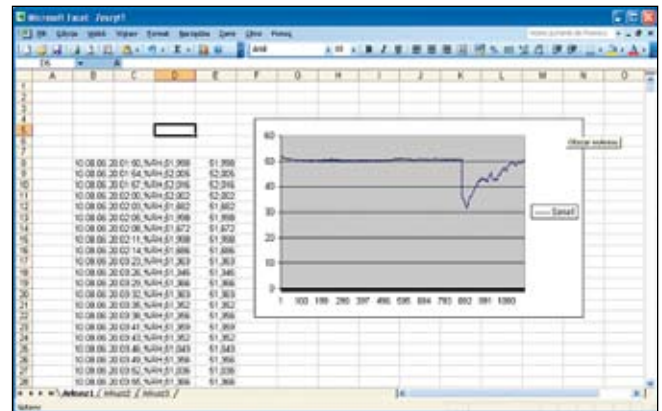


When Poland joined the European Union, the number of regulations requiring the manufacturer and the distributor to ensure proper storage and transport conditions for the products increased. In addition, good production practice necessitates constant monitoring of environmental state in production and storage facilities and also during the transport of offered products. Particular restrictions concern the sales of food and pharmaceutical products, as well as animal slaughter and meat storage, where people's health and life are at stake.

The measurement and recording of environmental conditions are among the most important tasks in the following sectors: pharmaceuticals, food industry, chemical industry, textile industry, petrochemical industry, founding, as well as plastic and rubber processing.

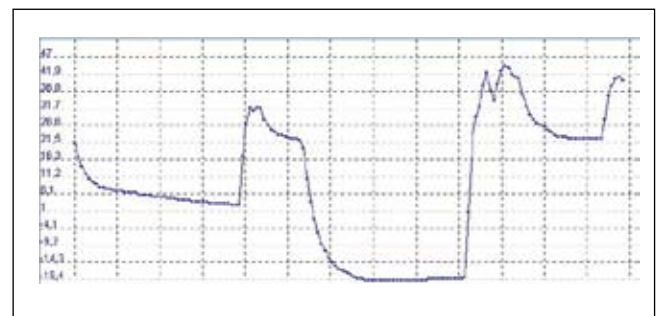
Although the examination of non-electric values using electronic measurement devices is not a problem in itself, their recording, further processing and archiving has been troublesome until recently. The currently available recorders are difficult to install and they often cannot operate without additional external power supply. Their sizes are also still large, which, consequently, hinders their "discreet" operation.

In order to meet the expectations, ZPAS-Net company offers temperature recorders and temperature/humidity recorders which are small in size (diameter of just 15 mm), equipped with their own power supply, which lasts 10 years or a million measurements. Moreover, the mechanical, thermal and chemical resistance of the enclosure is high. The devices offer wide configuration possibilities for the conducted measurements and their protection via user password. Access to information recorded in the sensor is secured by a special 1-Wire converter being connected to the USB or RS232 input of a PC-class computer, depending on the version. All data may be quickly visualized and archived using simple software. Export of data to any text editor or spread sheet is also available.



### The recorders comply with requirements of appropriate legal acts concerning the food and pharmaceutical sector:

- The Minister of Health's order dated February 28, 2000 on the sanitary conditions and hygiene regulations to be observed in relation to production and sale of food, substances and additional permitted substances,
- The Ministry of Health's order dated July 26, 2002 on the Good Distribution Practice procedures,
- The Ministry of Health's order dated December 19, 2002 on the sanitary requirements concerning means of transport of food, substances used in processing, additional permitted substances and other food ingredients.



## NPM /NETWORK POWER MANAGER/ – POWER STRIP WITH REMOTE CONTROL

Controlled power strip for remote control of power sockets. It may be used everywhere, where there is a need to remotely perform the so-called hard reset of devices or temporary shut down and switch the devices.

### Equipment and basic parameters:

- 8 computer sockets,
- each socket may be separately switched on and off,
- RJ45-LAN communication socket,
- internal DB9 modem and RS232 for connecting power strips in a set,
- dimensions: 19" x 2 U,
- max load of a single socket – 10 A,
- max total load of a power strip – 20 A,
- color: black.



The power strip is administered by dedicated software which allows the assignment of passwords and rights to control individual sockets. The software enables the naming of power strip and each socket for easier identification of power strips and devices connected to individual sockets.

Within one power strip, there is a possibility of granting/blocking access to each socket for individual users independently.

The power strip may operate in the master or slave mode – the work mode may be changed using the DIP switch. The provided cable may be used to connect power strip in the master/slave mode.

Power strip is designed for 19" enclosure. The front panel of the power strip is equipped with devices signaling the power strip's operation and the state of individual sockets, see fig. 1. The back part is equipped with RJ45 and DB9 communication sockets and 8 computer sockets with maximum load of 10 A – see the figure; the total power strip load cannot exceed 20 A.

Product available from ZPAS-NET on demand.



## MICROPROCESSOR PANEL G1 FOR FAN CONTROL

Basic function of device is to maintain specific temperature inside of the cabinet by measuring temperature in selected points and turning on fans or heaters. Device additionally make possible monitoring of set two-step sensors (for example sensor of door-opening) and recording history of events which can be transmitted by serial interface to master system (PC). Device can be operated with built in control panel or by PC serial port.

### Usable function:

- 6 relay outputs for fan control.
- 2 relay outputs for heater control.
- 3-levels control of fan unit work, by switching on 2, 4 or 6 fans depending on maximum temperature of sensors.
- Co-operating with 4 fans or 6 fans panel.
- 6 two-step inputs for sensors of fans failure.
- Function of even exhaustion of fans with programmed switching period.
- 8 voltage analogue inputs for external temperature sensors including 6 inputs for overheating sensors (fans' control) and 2 inputs for overcooling (heaters' control).
- 4 two-step inputs for events recording sensors events for example cabinet's door openings or shock.
- Events recording function like change of two-step input state, violate the alarm level of sensor temperature, failure of sensor, failure of fan, fading out of power supply (max. 100 events recorded).
- Internal device clock, settings and events memory, battery supplied.
- Asynchronous serial interface RS 232 or RS 485 for communication with master system for state of sensors monitoring, reading recorded events, reading and recording settings and system time of device.
- For each sensor, programmed and recorded settings of fan turning on level, hysteresis, alarm level and factors of measure errors corrections.
- LED two digital display to inform about sensors temperature of sensors.
- LCD display 2x16 signs with illumination and 4-buttons keyboard for programming and monitoring of device.
- Access to settings and configuration on panel (and by serial interface) protected by password.
- Manual fans and heaters control ability.

### Parameters:

- Power supply: 12 V DC, 1 A
- Relay outputs: 250 V AC/DC, 16 A
- Measuring range: from -50 °C to +99 °C
- Accuracy of measure: 1 °C
- Dimensions: 19" x 1 U x 150 mm



### Supply includes:

Control panel with fixing accessories for cabinet' s fastening. Temperature sensors have to be ordered separately.

Product name	Package	Catalogue number
Microprocessor panel G1 for fan control	1 pc	2408-1-3
Temperature sensor with 2 m wire	1 pc	CT-G1

**Software for communication with panel G1 by serial port can be downloaded from web site [www.zpas.pl](http://www.zpas.pl)**

## LIST OF AVAILABLE OVERSEE M-BUS SYSTEM ELEMENTS

Element name	Symbol
<b>Central units</b>	
MICRO XL v.1 (3 x RS232, RAM 1024kB, M-Bus Master10) unit	MICRO XL-1
MICRO XL v.2 (like MICRO-XL1 + SMS + GAS-MODEM) unit	MICRO XL-2
MICRO XXL unit	MICRO XXL
MICRO LCD terminal	MIC LCD
<b>BMS elements – Control Mbus</b>	
I/O module 3T, 3DI, 3DO without DST	TIO-333
I/O module 3T, 6DO without DST	TIO-306
TIO and CTIO submersion sensor	DST
Outside temperature sensor	CZ
Room temperature sensor	CP
I/O module 3T, 3DI, 2DO without DST	CTIO-332
I/O module 3DI, 2DO without LCD	CTIO-032
I/O module 4AI, 4DI, 4DO (20 mA)	AIO-444
I/O module 4AI, 4DI, 4DO (20 mA)	AIO-804
Option – Pt 1000/500/100 for AIO-444/804/800	4xPt 1000
I/O module 4DI, 8DO	AIO-048
I/O module 8AI (0-20 mA)	AIO-800
I/O module 8DI with pulse adder	AIO-080
I/O module 24AI,(26DI),32DO	AIO-24/32
I/O module 8DO	AIO-008
I/O module with 2 analog outputs	DA2
PWM/A converter	PWM/A
2 x TRIAK power module	TRIAC 2
2 x Relay power module	P-2
4 x TRIAK power module + 2 x Relay	P2T4
8 x 24 VDC/1A power module	OUT 8
4xTRIAK power module + 4 x Relay	P4T4
8 x Relay power module	P8T0
8xTRIAK Power module	P0T8
<b>M-Bus transmission converters</b>	
M-Bus Master 60	M60i
M-Bus Master 10	M10i
M-Bus Slave – RS232	S3i
M-Bus Master 400	M 400
M-BUS SUPERVISOR	M-SUP
<b>Konwertery transmisji</b>	
RS 485 isolated	RS485i
RS 485 not isolated	RS485
CL 20/RS 232 isolated	CL20
Transceiver GPRS without TC65	GPRS
TC65 JAVA module	TC65
Media converter RS232/Ethernet	KRT-17
<b>Power packs</b>	
12 VDC / 1A power pack	Z12 VDC / 1
24 VDC / 1.5A power pack	Z24 VDC / 1.5
UPS 24 VDC/1.5 A with 7VAh battery	UPS24 VDC
<b>Software – Licenses</b>	
LMC – graphical panels	PANEL-GRAF
LMC – Logic Master Control	LMC
<b>Other</b>	
220 VAC / 0-20 mA voltage converter	P220
Matrix, LED 64 lighter	LED64

## LIST OF AVAILABLE OVERSEE 1-WIRE SYSTEM ELEMENTS

Element name	Symbol/Code
<b>Sensors with 1-Wire output</b>	
Temperature	T 1 / 901-0101
Temperature/humidity sensor	THP110 / 901-0102
Temperature sensor with recorder	F1R / 901-0118
Temperature/humidity sensor with recorder	TH11R / 901-0119
1-Wire smoke detector	F1 / 901-0106
Short circuit/flooding detector	I2 / 901-0103
Pulse counter	LDI2 / 901-0104
20 VDC measurement converter	PP20V / 901-0113
20 mA measurement converter	PP20MA / 901-0114
<b>Sensors without 1-Wire output</b>	
Motion detector	CZV / 901-0120
Smoke detector	CZF / 901-0121
Broken pane detector	CZS / 901-0122
1p 10A phase decay sensor	CZF-BS / 901-0123
<b>1-Wire converters</b>	
RS232/1-Wire converter	KR/W / 901-0100
RS232/Ethernet converter	KR/E / 901-0124
USB/1-Wire converter	KU/W / 901-0108
1-Wire/Fiber converter	W/F 901-0109
<b>1-Wire control elements</b>	
Relay switch	O2 / 901-0115
Driver	WS / 901-0112
<b>1-Wire network expansion elements</b>	
1-Wire switch	SW6 / 901-0107
Galvanic separation module	SS / 901-0110
<b>Additional devices and elements</b>	
12 VDC 1A power pack	Z12 / 901-0112
MW / 901-0127 micro switch with bracket	901-0127
Recorder reader	R1 / 901-0126
1-Wire siren (small)	S / 901-0125
1-Wire integrator	LPO 211
Additional integrator elements:	
L2 pulse counter	LPO 200
Two-state input (DI) + Temperature	LPO 010
Two-state output (DO) with NO key	LPO 001

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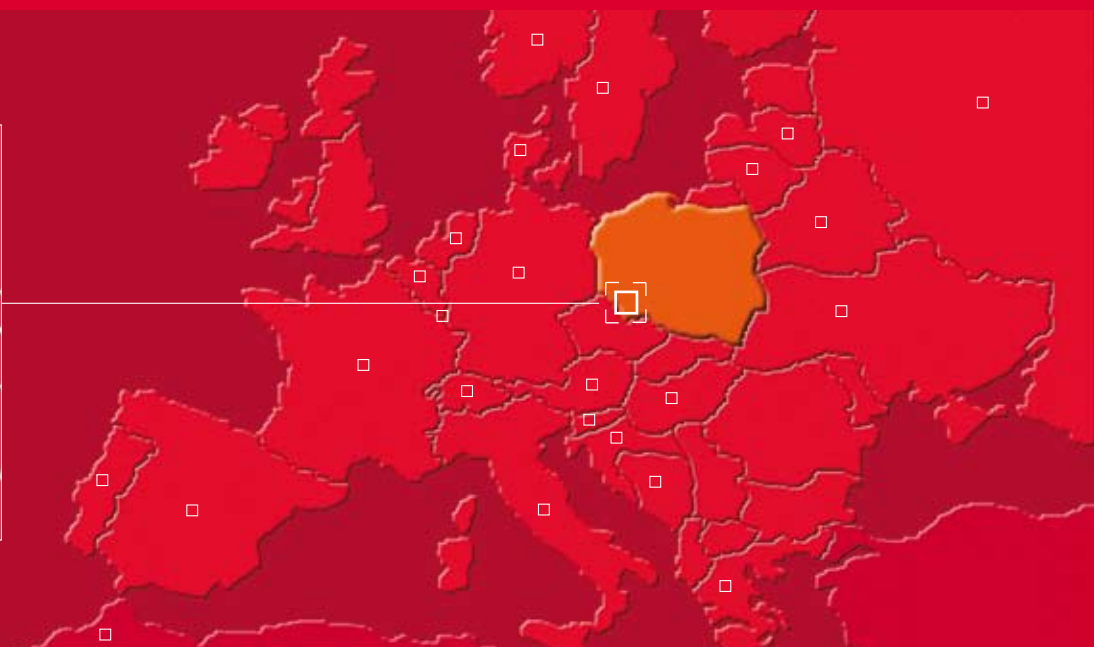
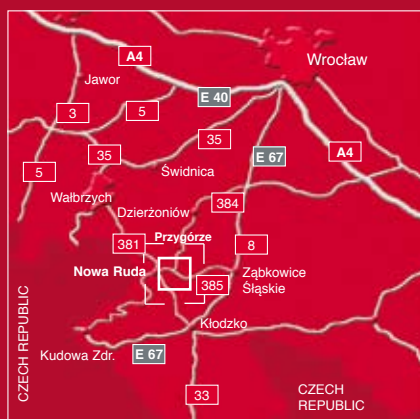
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**ZPAS-NET Sp. z o. o.**

Przygórze 209 · 57-431 Wolibórz · Poland

Phone +48 [0] 74 872 01 22

Fax +48 [0] 74 872 58 56

info@zpas.net · www.zpas.net

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