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# *DATALOGGER  EKO 21*

*for wind & meteorology monitoring: special version  EKO21B*

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## *Universal, Multi Channel, Versatile, Compact, Ultra Low Power, Field Proof, with optional Ethernet & Internet Connection (wireless) Data Transfer --- E-mail or SMS alarm notification*



*INTERNET ENABLED !*

## With Compact Flash (CF) Memory Card:  16…512 Mbyte**!**
### (a non volatile "solid state hard disk", also used in e.g. digital camera's)

*By integrating the latest technology in a unique smART design, a versatile, reliable and simple-to-operate instrumentation computer has been created, foolproof without any buttons: just "Plug-in & Play!"*

## THE NEW AND ECONOMIC WAY OF DATA LOGGING & CONTROL
The use of the Compact Flash Memory Card datalogger EKO 21 will **reduce your operational costs** for data logging & control:

- **NO TRAINING REQUIRED:** just insert a prepared memory card and the operation starts automatically.

- **SHORT INSTALLATION TIME:** easy installation will give quick and successful results.

- **COMPLETE READY-FOR-USE  SYSTEMS** are supplied, no engineering or programming required: configuration adjustable in software and in hardware: input &output boards available for any signal and sensor (with control options). Tailor-made systems are possible: dataloggers available for only 1 input (up to 16 inputs in only one cabinet) and expandable up to 128 channels, using expansion units.

- **NO ADDITIONAL EQUIPMENT OR TECHNICIAN REQUIRED:** even an untrained person can replace the memory card at a remote site and return it for data processing.

- **NO SPECIAL CARD READER REQUIRED:** the card can be read in a standard CF or PC Card drive (PCMCIA, or RS 232).

- **COMMUNICATION & INTERNET:** automatic data transfer to PC (also by wireless remote internet connection via GPRS modem) alarm reporting by e-mail, datalogger networks possible over **Ethernet** or with automatic downloading or by telephone or GSM/GPRS

- **EASY TROUBLE-SHOOTING:** diagnostics is indicated by LEDs, while test signals are available for simulation of sensors & signals and additional information is obtained via the RS 232 interface of a (notebook) PC.

- **SECURITY OF RECORDED DATA:** data will not be lost as the memory is real non-volatile, even after a power failure or system crash. The configuration data of the system is also written at the card.

- **LOW POWER:** only a small battery pack is required for 1 year operation (also under high or low temperature conditions), it can also operate in the field by using a small solar power pack.

- **EXPERIENCE:** The EKO21 has been designed with the experience in dataloggers over 20 years

The EKO 21 is an affordable high quality easy to operate instrument,  with powerful performance.

## APPLICATIONS: measurement and control (industrial and field applications) e.g.:

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|---|---|---|
| *feasibility studies | *research | *renewable energy projects |
| *meteorology (weather stations) | *ecology | *energy management |
| | | |
| *environmental technology | *agriculture (agro-meteorology) | *process monitoring & control |
| *wind farm monitoring | *hydrology | *water level monitoring |
| *wind recording | *building physics | *solar energy projects |
| *wind energy evaluation | *product testing | *monitoring of machines |

*Our world-wide experience with a wide range of applications gives us the expertise to solve your specific datalogging problem.*

## FEATURES:

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|---|---|---|
| *ultra low power system | *versatile sensor excitations | *compact design (multi-layer with SMD technology) |
| *Compact Flash memory 16..512Mb | *alarm outputs for control/e-mail | *control software for Win 95/98/NT/2000/XP |
| *non-volatile memory | *tailor made systems possible | *data processing software available |
| ***Ethernet/Internet** options | *modems (telephone or GSM) | *available from 1 up to 128 inputs |
| *automatic downloading | *versatile input boards | *wireless remote internet connection via GPRS modem |

## SENSORS & INPUT SIGNALS: (direct interface with available sensor excitation and sensor polynome linearisation)

| | | |
|---|---|---|
| *anemometers (wind speed) | *temperature (thermistor/Pt100) | *status |
| *wind vane (wind direction) | *pressure | *current (0/4..20 mA) |
| *humidity | *solar radiation | *voltage (e.g. 0..5/10 V) |
| *pollution sensors | *mV inputs (differential/isolated) | *puls counters (up to 8) |
| *power, voltage, current (AC/DC) | *frequency | *serial input (RS232, RS422 etc) |

*optional built-in 5 stage lightning protection possible (up to 20.000A)*
*optional low-power interface electronics for a wide range of sensors and signals can be implemented inside the logger.*

## CONTROL OUTPUTS

Up to 8 outputs are available for control applications (e.g. multiple set points for alarms and switching).
Alarm outputs can switch hardware or send an alarm message by SMS (via GSM modem to mobile phone)
Moreover a special GSM timer will switch on a GSM modem when data is automatically downloaded.

## STANDARD VERSIONS

**Laboratory** versions are suitable for operation in the laboratory (external powered with 220V supply, without extra cabinet)
**Industrial** versions are suitable for operation in harsh industrial environments and are used for machine & energy system monitoring.
**Field** versions are battery (or solar) powered, designed for long unattended operation at remote sites, even under tropical conditions.

## WIND & METEOROLOGY LOGGER type EKO 21B: (refer to separate datasheet of EKO21B for details)

A special field version is the EKO 21B, an essential tool for **meteorology, wind energy projects,** suitable for feasibility studies and evaluation of **wind energy projects** and for **environmental studies: our specialty!**

Before considering an investment in wind turbines, a feasibility study can be carried out using the EKO 21B, with channel specifications:

* **wind speed**, range 0-50 m/s, resolution 0.01 m/s, recording average, minimum, maximum and standard deviation (turbulence intensity)
* **wind direction,** range 0-360 degrees, resolution 0.5 degree, recording polar average
* **optional inputs:** (virtually unlimited) extra anemometer, wind vanes, temperature, atmospheric pressure, power, energy etc.

Meets IEA/IEC/AWAE/WMO *) standards. Calibration certificate available with European MEASNET procedure, calibration accuracy within 0.1 m/s. The most accurate and versatile windlogger for a very attractive price! Refer articles about wind monitoring at our web site.

**Ask your supplier for other available versions (e.g. energy monitors) and special designs.**

## POWERFUL PERFORMANCE & EASY TO OPERATE

The EKO 21 is an accurate, reliable and versatile instrument, designed for the professional user. The quality and the accuracy of the system meet international standards (IEA/IEC/WMO) as well as the **CE-mark requirements *).** The waterproof system is ready for use and no engineering or programming is required. Complete tailor-made systems can be designed to meet any specific requirement, including any desired control function, such as remote alarm reporting. Average values can be recorded (with selectable record and sample interval) and optional minimum , maximum and standard deviation. Connecting the sensors and signals is straightforward, using the connectors at the cabinet. By using the control software of the EKO 21 the memory card can be prepared for logging in a PC Card drive (PCMCIA): entering logger parameters in the memory card (set the sample & record interval, identification text, synchronized logging etc.). The calibration data of wind speed sensors (anemometers): the offset and slope can be entered in software accurately. The EKO21 datalogger can function synchronized with real time clock (e.g. record start 12:00h) in order to carry out better correlation and regression analysis between other datalogger systems or existing (meteo) data. Even in case of a power failure or poor batteries **the recorded data will not be lost.** As soon as the power supply is restored again the logging process will continue: the logger will regard the period of power down as a pause. A non-volatile real-time clock ensures that each value is recorded with its corresponding time and date thereby eliminating any confusion.

**A highly reliable way of datalogging!**

## DATA TRANSFER & DATA COMMUNICATION

Data can be downloaded from memory card to PC in ASCII format via a PC Card drive or a RS 232 interface (optional infra red).

Other communication links can also be used: modem, telephone, GSM/**GPRS** or cellular network, **Ethernet/Internet**, satellite, or wireless connection to E-mail, internet (alarms also to SMS of mobile phone with specified alarm message) with automatic data transfer (also for datalogger networks).

A synchronized internal timer can switch on the GSM modem so data can be downloaded automatically with a remote PC and modem. The automatic download software will contact the logger only when the GSM modem is switched on.

So there are several ways to transfer the recorded data to the office for data processing:

**Connectivity Options**
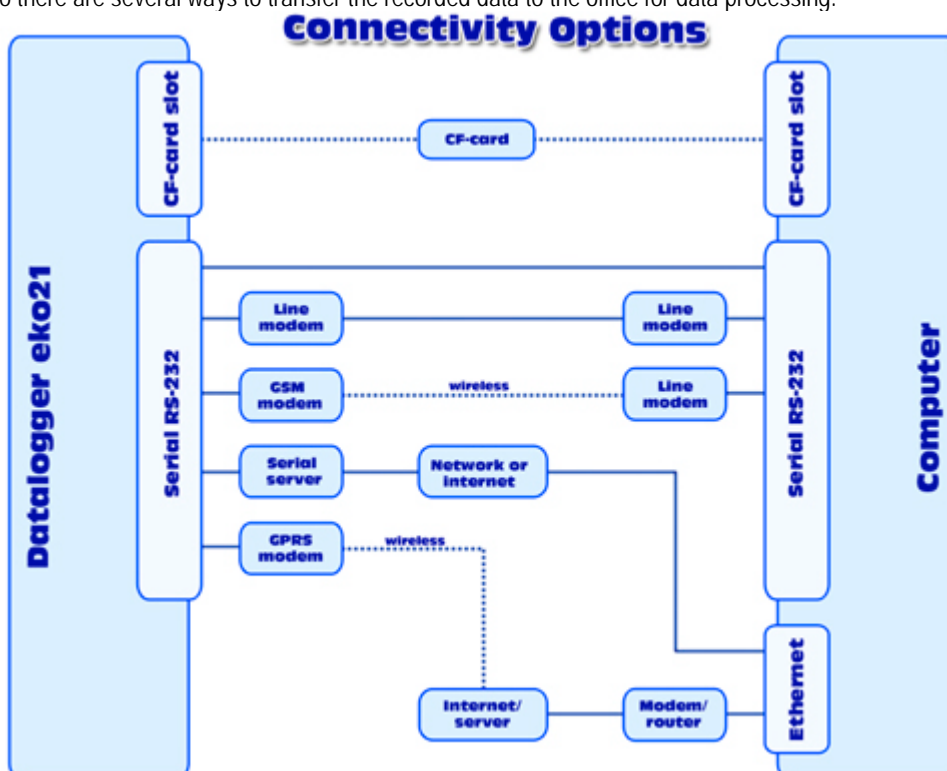
1) A local (untrained) person replaces the memory card and send it by post to the office

2) A local person can download the data into a laptop PC (by PC Card/PCMCIA drive or serial RS232 interface)
3) If a telephone line is available the data transfer (and system check) is possible by using remote control software and modem
4) If a GSM/GPRS network (for data communication) is available the data transfer (and system check) is possible by using our GSM modem and software. In this case an additional power supply (solar panel) is required.
5) By **Ethernet** connection, using the optional Ethernet Connection of the EKO 21
6) Wireless remote internet connection via GPRS modem for automatic downloading of datafile to FTP server and current values to website: data is send direct from datalogger to website/FTP server!
7) Radio or satellite communication (not recommended in areas with mountains), range with standard equipment (without license) is about 20-50 km (with good antenna and no obstacles between transmitter and receiver).

Also automatic downloading, single station or in datalogger network (up to 1000) is a possible option!

## DATA PROCESSING

Standard software packages (e.g. Excel ) can be used for data processing according to the specific requirements of the user (graphs, tables, statistics, calculations etc.). The ASCII file can also be imported or converted to many other software packages.

Especially for **wind energy and meteorology** standard data processing utilities and services are available, running under Windows to obtain: Wind rose, wind energy rose, frequency distribution, Weibull parameters, energy output calculation of planned wind turbine, determination of the power curve of wind turbines, refer to separate datasheet. With the measured standard deviation of the wind speed the turbulence intensity of the wind (the "quality of the wind") can be determined, refer to separate datasheet.

Also available data processing functions: (examples available)

- Weibull fit function, with graphic presentation of best Weibull fit of the measured frequency distribution
- Other Weibull related calculations (e.g. energy pattern factor)
- Correlation and regression analysis (with other meteo stations in order to calculate long term values)
- Data processing software & services according to customer specifications (also the WASP program).

**On request your supplier can advice you upon special data processing services and software.**

## EASY TO SERVICE

Trouble-shooting and system checks are very easy to carry out. The status LEDs indicate the condition of the batteries, status of memory card and input signals. The system can also be tested without connecting the sensors or signals; special test signals simulate sensor signals at pre-defined levels. By using the RS 232 serial interface of a (notebook) PC additional information such as instantaneous and last recorded values, supply voltage and available free memory of the card is obtained. Memory card and batteries are easy to replace even by an untrained person. Thanks to the modular structure of the instrument all system parts can be exchanged easily.

## OPTIONS

Powerful options are available, such as remote control (e.g. GSM-connection), as well as accessories: transducers, software, cable, notebook PC's, Compact Flash Card drive for desktop PC, batteries, modems, calibration certificate, spare parts etc. A wide range of sensors can be supplied: wind speed, wind direction, density of air, temperature, humidity, airflow, rainfall, atmospheric pressure, solar radiation, power, voltage etc.

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**GENERAL SPECIFICATIONS:** (subject to change without prior notice)

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| - memory | : standard: Compact Flash Memory Card (CF) non-volatile memory card 16 Mbyte (available up to at least 512 Mb), the card can be read in an CF card slot or PCMCIA slot (of e.g. laptop) by using a low cost CF-PCMCIA adaptor or external CF card reader for desktop PC is available (for USB or parallel ports) |
| - logged values | : each value use a 16 bits word (2 bytes), additional for date and time 6 bytes, so n channels use: 6+2n bytes (AD converter 10, 12 up to 16 bits) example: memory card 16Mbyte, 10 channels, available number of logged values is: 615000 |
| - digital processing | : digital processing in 16/32 bits, for calculations like: average, minimum, maximum, standard deviation |
| - ambient temp. | : -35 to +70 °C (with industrial cards -40 to +85 °C and lithium battery pack) |
| - humidity | : max. 100% ; wc (if tropicalized), meets IEC 68-2-30 |
| - internal battery 1) | : basic battery one 9 volt battery types: Alkaline/Lithium/NiMh (or external 6-15 V DC power supply or external lithium battery pack) |
| - battery life | : with one 9 volt basic battery: up to 3 months (depending on application), with **external battery** pack: <br> * up to 12 months (lithium battery pack, also appropriate at high or low temperatures) <br> * up to 2 years (alkaline battery pack) <br> * unlimited using a solar power pack |
| - clock | : non-volatile real time clock; accuracy at 20 C: typ. 1 sec/day |
| - record interval | : adjustable in hh:mm:ss (special model for fast measurements available) |
| - sample interval | : adjustable in seconds (special model for fast measurements available) |
| - Ethernet port | : optional, built-in cabinet with IP address |
| - GPRS modem | : optional with **wireless internet connection** (datafiles and current values automatically to FTP server or website) |
| - RS232-output | : 9 pin sub D connector; format RS 232 C, baud rate: standard 9600 (up to 38k4) Option: Infrared interface. |
| - inputs | : **Basic unit**: up to 8 versatile inputs, using input boards, optional up to **8 additional** in/outputs for extra analog input (0/5 V, 4..20 mA or temperature) and/or outputs for alarm and control functions. Input boards are available for a versatile mix of analog , digital (status), puls counter (max 14) inputs and ultra low-power interface electronics for a wide range of sensors and signals e.g.: DC voltage (e.g. mV, 0..1/5/10 V ), DC current (0/4..20 mA), wind speed, wind direction, temperature, atmospheric pressure, solar radiation or **any other sensor or signal**. Optional: 5 stage lightning protection possible (up to 20.000A) and isolated inputs. Sensor-inputs are supplied including sensor and calibration. The first 24 analog input channels can calculate average, minimum, maximum and standard deviation of the input signal during each record interval. |

# EKOPOWER

Measuring & Monitoring Systems for Energy & Environment

| | |
|---|---|
| | **By using expansion units** expandable with up to 16 extra input boards for each expansion unit, total up to 128 channels. |
| | **Please specify number and type of channels at order:** |
| - outputs | : up to 8 (software adjustable: alarm levels, set point, 1 GSM timer etc.) open collector output, SMS message option |
| - excitation | : excitation voltages for sensors are available (several voltages, also isolated and for switching sensors on and off, with lightning protection) |
| - cabinet | : metal box 165x145x50 mm, weight < 1 kg (excluding batteries) |
| | optional waterproof (IP65) vandalism resistant field case with lock: **stainless steel** (30*30*21 cm) or **polyester** (25*30*15 cm) |
| - dimensions | : - software: control software available for Windows 95/98/NT/2000/XP with functions: |
| | - reading values (current & recorded values, with graph) |
| | - reading the status of the logger (power supply voltage, available memory, serial number, etc.) |
| | - downloading recorded values: reading the memory card or by serial RS 232 link (automatic downloading possible; password required) |
| | - configuration of the logger: type and number of channels, ranges, units, etc (password required) |
| | - prepare the memory card for logging: adjusting logger parameters like sample and record interval, time and date, synchronization, etc |
| | - data processing software available (for Excel) |
| | 1) external power supply possible (9/12/24 V DC adaptor or solar panel) may be used, with backup battery |

<u>WHATEVER YOUR SPECIFIC DATALOGGING REQUIREMENTS ARE:</u>
<u>YOUR SUPPLIER WILL OFFER YOU THE SOLUTION</u>

fol21-nov /2004: some mentioned options may not yet be available

*) WMO: World Meteorological Organization, IEA: International Energy Agency, AWEA: American Wind Energy Association,
IEC: International Electro technical Committee, CE: in Conformity with European laws for Safety & Electro Magnetic Compatibility (EMC)

Available from your supplier: