



# Data Loggers

## FOR ACCURATE DATA ACQUISITION AND REAL TIME MEASUREMENT DISPLAY

A data logger for every Kipp & Zonen radiometer  
Hand-held real time values or unattended long term data storage  
Complete data acquisition solutions

### INTRODUCTION

Kipp & Zonen measurement instruments are suitable for many applications in meteorology, renewable energy, hydrology, climatology and more. All these different applications have something in common: the need for accurate data acquisition of the measurement signals.

Kipp & Zonen offers a range of data acquisition systems and display units for this purpose. Our solutions are user friendly and are selected to offer optimal compatibility with our instruments.

Kipp & Zonen data loggers and display units have very sensitive inputs with high resolution and use the instrument calibration factor (sensitivity) to convert the input voltage into radiation values in  $W/m^2$ , or other units appropriate to the type of radiometer. They all have software for the configuration of logging functions and download and storage of the data on a Windows™ computer. The data files are in ASCII and can be easily exported to spreadsheets.

The data loggers are grouped into three categories for easy selection of the correct system for your application.

## MAXIMUM PORTABILITY

Field tests or surveys often require the availability of real time values from our instruments. You might want to study a process in action or make decisions on in-situ measurement values which must also be stored for later reference purposes. In this case a Kipp & Zonen measurement instrument combined with a portable hand-held display unit is of great value. The METEON irradiance meter and data logger offers exactly this or PAR sensor.

**METEON** is an accurate hand-held display unit and data logger for Kipp & Zonen measurement instruments. Its small size, long battery life and universal input make it an ideal tool for many test and field applications. METEON comes in a carrying case that also has space for a pyranometer.

Configuration with a computer is simple, using the supplied software and USB interface cable. Just select the radiometer type from a list, enter its sensitivity, and the correct measuring range is automatically selected. Once METEON is configured, connect the radiometer, switch on, and the large 4-digit display directly shows the correct values in  $W/m^2$  or  $\mu mol/m^2s$ . It can also display negative values, so can be used with the NR Lite2 net radiometer. This makes it a perfect tool for convenient use in the field.

The great advantage of the METEON is the integrated data logging function that can store data for up to 3500 samples. It stores minimum, maximum and average values per logging interval. The low power consumption enables the METEON to record at least 50 days of data using 2x AA type batteries.



## LOW POWER DATA LOGGING

Certain applications require measurement data to be collected from just a single sensor or a small number of instruments with minimal power consumption. For example long term measurements in remote locations where no power infrastructure is available. In these cases having many input channels or a complex data acquisition system is not necessary or even desirable. On the other hand you do not want to trade-off measurement accuracy.

**LOGBOX SD** data logger combines a low power data acquisition system with high measurement accuracy in a compact weather-proof enclosure. The LOGBOX SD is ideal for unattended operation even if no power is available. The data logger runs for over 3 months on 4x AA type batteries or, if available, from an external power supply of 4 to 20 VDC such as a battery or solar panel. The LOGBOX SD is supplied with a 512 MB SD-memory card for many months of data storage. Its enclosure is weather-proof, rated at IP 65, and is supplied with an adjustable mounting bracket, allowing for easy installation on virtually any surface or meteorological mast.

LOGBOX SD is supplied with user-friendly computer software to make configuration fast and simple, using RS 232 serial communication. All Kipp & Zonen radiometer settings are pre-defined and can be selected from a pull-down list. Any other sensor can be programmed by selecting an input range and defining the calculation to convert to the correct engineering units.

The LOGBOX SD, for example, records the data of a complete four component net radiometer like the CNR 4, including temperature, with excellent accuracy. Naturally the LOGBOX SD accepts inputs from all our solar instruments.



## ADVANCED DATA ACQUISITION

Our measurement equipment offers the highest performance available on the market for testing and scientific research. To ensure the highest quality of automated measurement data acquisition Kipp & Zonen offers advanced systems based on the COMBILOG data logger. Because of its excellent performance and ease of use we recommend COMBILOG for our higher quality solar radiation monitoring stations, in particular those complying with the requirements of the Baseline Surface Radiation Network (BSRN).

**COMBILOG** is compatible with the full range of Kipp & Zonen solar radiometers and industry standard meteorological instruments for wind, temperature, pressure, rainfall, etc. It can also accept 0 - 20 mA and 4 - 20 mA current signals and take the outputs from our Large Aperture Scintillometers. For ease of use, it comes with configuration examples for our instruments.

The COMBILOG offers 16 bit resolution, excellent linearity, and temperature compensation to ensure optimal data collection accuracy. The COMBILOG is very flexible. Up to 8 analog and 6 digital channels are available to connect all Kipp & Zonen and other instruments. Any of the 8 analogue input channels can be configured to measure voltage or current and can be single-ended or differential. Any channel can measure temperature using a resistance sensor, such as 10 K thermistors or Pt-100, in 2, 3, or 4-wire modes.

The 6 digital channels can be used as counters, to measure frequency and gray codes, or as outputs for measurement or instrument control purposes. Using the built in arithmetic functions, extensive computation of data can be performed in the data logger itself; such as albedo, long-wave infrared calculation, net radiation, statistical functions and more.

In case more than 8 channels are required, up to four COMBILOG data loggers can be connected in series using the

RS 485 bus in a master-slave configuration. This means that all data from the entire data logger chain is easily accessible through one single interface.

Additional features include a DIN-rail mounting, status LED's, and a built-in display and menu control for viewing readings and setup of main logging parameters.



## BUILDING A COMBILOG SYSTEM

Kipp & Zonen has selected a range of complete configurations for the COMBILOG data logger to meet specific operational requirements. Whether you require a data logger in a compact enclosure to protect the system from harsh weather conditions or a complete solution for autonomous operation, our data acquisition systems offer

the appropriate solution. Each configuration has been designed with easy setup and installation in mind and is optimised for Kipp & Zonen solar instrumentation.

In the table below an overview is provided of complete data acquisition solutions to suit many kinds of applications.

Data acquisition solution	Included in configuration	Options
Compact system, 1x COMBILOG data logger Stainless steel enclosure Weather-proof to IP 65 38 x 38 x 21 cm	Over voltage protection Power terminals Cable glands USB, Ethernet, RS232 and RS485 communication	GSM Modem (other types on request) Mains to 12 V DC power adapter Back-up battery and charger Solar powered back-up battery Data processing and graphical display software
Extended system, 2x COMBILOG data loggers Stainless steel enclosure Weather-proof to IP 65 50 x 50 x 21 cm	DIN-rail mountings Configuration software	

## SPECIFICATION TABLE

The comparison table shows the specifications, dimensions and options of the three data loggers and helps selection of the right type for a specific application.

Specifications	METEON	LOGBOX SD	COMBILOG
Analog inputs	1 differential Voltage	8 single ended or 3 differential + 2 single ended Voltage Resistance	8 Single ended or differential Voltage Resistance Current
Digital inputs	N/A	4 Frequency Counter Time	6 Frequency Counter 8 bit Graycode Digital State
Programmable outputs	N/A	N/A	6 (digital), 0.1 A Open collector, 18 VDC max.
AD conversion resolution	16 bits	12/24 bits	16 bits
Accuracy	0.1 %	Down to 0.05 %	Down to 0.003 %
Input ranges	6.25 to 200 mV	6 inputs, 20 mV to 2.5 V 2 inputs, 3V	6.25 mV to 10 V 60 µA to 25 mA 200 Ω to 20 kΩ
Operating temperature	-10 °C to +40 °C	-40 °C to +60 °C	-40 °C to +85 °C (display -20 °C to +60 °C)
Display	4 digits / data / low battery	N/A	2x 16 characters
Supply voltage	3 V (2x AA battery, included)	6 V (4x AA battery, included) or 4 to 20 VDC external	10 to 30 VDC
Communication interfaces	USB 1.1 / 2.0	RS 232	USB, Ethernet, RS 232 and RS 485
Data Logger memory / expansion	3518 samples	128 kB RAM / 512 MB SD card (included)	7 MB RAM / SD card (not included)
Logged information	Min Max Average	Data samples Polynomial functions	Data samples Average values Math processed values
Environmental protection	IP 40	IP 65	IP 20
Options	N/A	N/A	IP 65 enclosure options Backup battery (mains or solar panel) GSM modem (other types on request)
Included software	Configuration, data download and graphical display	Configuration and data download	Configuration and data download
Optional software	N/A	N/A	COMGRAPH - Graphical display
Mounting	Supplied in carrying case	With mounting bracket for poles and walls	DIN-rail mounting
Dimensions (W x H x D) (Logger only)	70 x 146 x 25 mm	115 x 90 x 50 mm	189 x 90 x 83 mm
Weight (Logger only)	0.175 kg	0.37 kg	0.72 kg

Note: The performance specifications quoted are worst-case and/or maximum values



Go to [www.kippzonen.com](http://www.kippzonen.com) for your local distributor

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Kipp & Zonen B.V. reserve the right to alter specifications of the equipment described in this documentation without prior notice

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