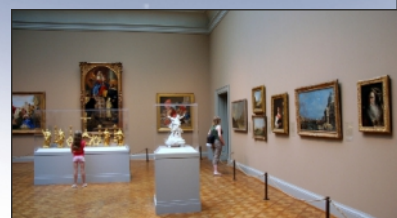
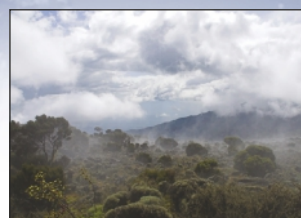
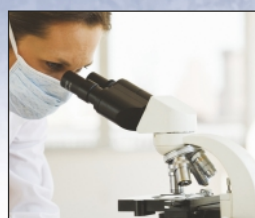
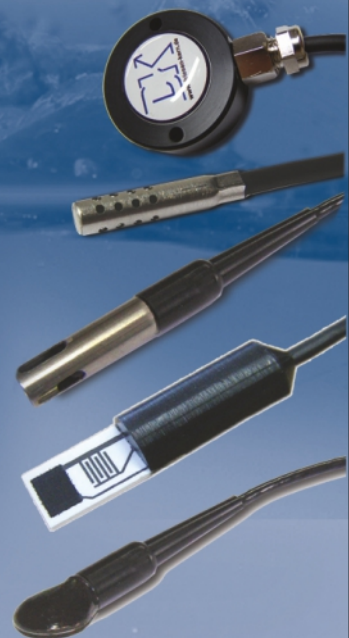


# Data logger series

## *Rugged „visual“*



humidity · CO<sub>2</sub> · temperature · condensation  
barometric pressure · light · differential pressure  
analogue signals (voltage · current · pulse)



## DK650-DK660 “rugged Visual” data logger - Entering a new dimension of data logging!



Made in Germany

Integrated sensors	3 flexible inputs
Humidity	Voltage
CO <sub>2</sub>	Current
Temperature	Resistance
Barometric pressure	Strain gauge
Differential pressure	Pulse
Light	Humidity & temperature (uses only 1 slot/input)
Acceleration	Thermocouple probes
	Soil moisture
	Condensation
	Water detection

### Modern data recording - fast, safe, versatile

The “rugged-Visual” series by Driesen+Kern GmbH sets standards for customizable data acquisition.

In addition to its six integrated sensors for humidity, temperature, barometric pressure, light, and differential pressure the device offers three input slots for external probes or analogue signals.

All three slots can be completely configured by the user - hence you don't need to tie yourself down beforehand, but rather you can customize the “rugged-Visual” according to your measuring task.

The robust logger stores up to 4 million readings and its freely selectable sampling interval reaches from 32 Hz to 24 hours.

Using modern low power technologies the device can perform continuous operation for up to 4 years with only one standard lithium battery. An internal back up system provides several days of continued logging in case the battery is completely drained. Of course, you can always replace the battery.

Simply start the “rugged Visual” logger with its button or set up a delayed start time with a computer, and see the values on the digital display!

If the LCD is always supposed to be on connect the logger to the external power supply (e.g. over USB).

## Originally “rugged”!

It offers IP65 protection - against splash water - by default and is outmost resistant thanks to its shock-proof materials.

## Synchronized Readings

The internal RTC always ensures a correct time-reference, allowing you to synchronize several loggers.

## Logging goes wireless

By default the sensors are connected by a cable to the “rugged Visual” logger. Optionally you can have a radio module installed, enabling you to also use one wireless sensor.

This helps you to collect data even from measuring sites which are difficult to access.

## Overview

- LCD display
- Fast power-on up by the push of a button
- Up to 12 channels in one baby-sized device
  - 6 integrated sensors
  - 3 configurable sensor slots
- Optional wireless sensor
- Robust logger
  - Shock-proof, IP65 protected housing
- High accuracy (24 bit A/D!)
- Memory modes “Continuous” and “stop-when-full” for up to 4 million readings
- Battery level monitoring
- Battery life for 4 years
- Dual alarm function
  - LED and switching output
- Standard software InfraLog *-basic-* included in delivery or *-light/enhanced-* with comprehensive graphic features as an option

## Rugged-Visual models

	Humidity/ Temperature	Barometric Pressure	Differential Pressure	Light	CO <sub>2</sub>	3S
DK650						●
DK651	●					○
DK652				●		○
DK653		●				○
DK654			●			○
DK655	●	●				○
DK656	●		●			○
DK657	●	●		●		○
DK658	●		●	●		○
DK659	●	●	●	●		○
Dk660	●				●	○

○ Optional  
● Lieferumfang

**Order Code:** DK6xx- A -B -C -D -E

- A: 0 = integrated sensor only  
 3S<sup>1</sup> = 3 additional inputs for external sensors or analogue signals  
 3DMS= 3 additional slots for precise measurement of strain gauges, bridges
- B: 0 = LCD-display and immediate start button
- C: 0 = Alarm LED, only  
 AL = switching output
- D: 0 = no wireless functionality
- E: = differential pressure-schedule or CO<sub>2</sub>-schedule, see page 9  
 (For example 2000ppm or 1000Pa)

1 All three slots are user-configurable. Humidity/Temperature probes use obnly one slot. Thermocouple sensors can only be connected to modells Dk651, 655-659.



## Humidity and Temperature

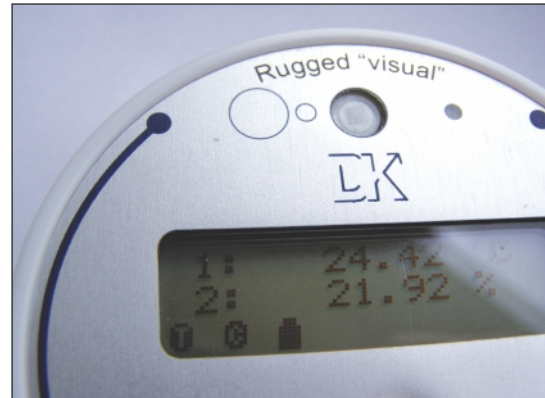
The internal humidity sensor is a precise sensor based on a capacitive measuring principle.

The sensor is protected by special semipermeable membrane and can be used even in rough environments.

It is insensitive to many chemical substances and has a state-of-the-art long-term-stability of better than  $\pm 1\%$  per year.

With its accuracy of up to  $\pm 1,8\%$  RH and  $0,3^\circ\text{C}$  it may well be used in applications with a high level of technical requirements.

It may be used in a range of  $-30\ldots+80^\circ\text{C}$  and  $0\ldots100\%$  RH except that prolonged wetting shall be avoided as with all humidity sensors. All instruments containing a humidity and temperature sensor are delivered with a certificate of conformity. Other options include calibration certificates according to ISO or DAkkS.



The humidity/temperature-sensor is integrated in DK651, DK655-660

## CO<sub>2</sub>

The model DK660 comes with one of the most modern CO<sub>2</sub>-sensors based on a patented NDIR (non-dispersive infrared) sensor.

This sensor gives accurate and reliable readings in a range of  $0\ldots2000\text{ppm}$  (optional  $0\ldots5000\text{ppm}$  or  $0\ldots10.000\text{ppm}$ ) and has an outstanding long-term stability.

This is particularly achieved by the sensor's autocalibration using the fact that in naturally as well as forced ventilated buildings the lowest measured value is calibrated to  $400\text{ppm}$  one a week. This technology has proven itself since many years and can be used inside as well as outside for example in climate outdoor studies in a range of  $-20$  bis  $+80^\circ\text{C}$ .

Due to the low power consumption of the sensor and the datalogger, unattended campaigns of several months can be conducted.

The logger can furthermore be used as a fresh air indicator.

It has three LEDs indicating the air quality in green ( $<1500\text{ppm}$ ) as good, yellow ( $1500\ldots2500\text{ppm}$ ) as medium and red ( $>2500\text{ppm}$ ) as poor. It will furthermore give the exact value in  $\text{ppm}$  when turned on.



The CO<sub>2</sub>-sensor is only integrated in DK660





### Differential pressure

The models DK654, 656, 658 and 659 are fitted with a differential pressure sensor. Many ranges can be selected to achieve utmost accuracy for the requested application. The piezo-electric sensor is available in several ranges, starting from a 1.000 Pa to a 5 bar range.

Both of the pressure ports on the side of the logger have a diameter of 3 mm. Compatible tubes with different lengths are optionally available.



### Barometric pressure

Some of the rugged visual loggers have an integrated barometric pressure sensor, which measures within a wide dynamic range of 600 to 1100hPa.

The models DK653, 655, 657, 659 can therefore be used for measuring barometric pressure combined with other climatic parameters.



### Light sensor (lux)

Four models of the RuggedVisual-series measure light by an integrated lux-sensor. These are DK652, 657, 658 and 659.

The response curve of this sensor has been optimised for the human eye response to light and measures in lux units. This is preferred for human and animal studies. Optionally we offer scientific sensors for UV, pyranometer, PAR etc. Which may be connected to the analogue inputs (-3S required).



### Option 3S and 3DMS

If the -3S option is ordered, the logger obtains three additional sensor slots. These are user-configurable and may be used for analogue signals. Furthermore they can be used for many of the special sensors that we offer (i.e. temperature, bedewing, water ingress and combined humidity/temperature). Option -3DMS needs to be ordered, if strain gauges or very low signals are going to be measured.

## Sensors, probes for DK65X-3S/3DMS

### Temperature sensors for DK65X-3S

Driesen+Kern GmbH manufactures several standard temperature sensors for the DK65X-3S. Furthermore a large selection of sensors is available (see separate spec sheet)



**DS-325 standard probe**  
D=4mm, L=100mm

**CM-325 standard probe**  
D=4mm, L=50mm



**CO-325 Air temperature probe**  
D=4mm, L=17mm  
mit extrem schneller Ansprechzeit



**EU-325 standard probe**  
L=20mm, W=10mm

**EUM-325 Surface temperature**  
with magnet L=25mm, W=14mm



**MT-315 Thermocouple probe**  
D=3mm, L=200mm  
for high temperatures (1200°C)  
(other probe see separate datasheet)

### Combined humidity-/temperature probes for DK65X-3S



**RFT-325** - Measures humidity and temperature. Operating range: -20 and +80°C, or -40 to +120°C with cable type G. Dimensions: d=8x35mm



**DKRF300-325** - Measures humidity and temperature. Operating range: -20 and +80°C, Dimensions: d=8x101mm



**RFTXS-325** - miniaturised sensor for measuring for example in screed. max. +80°C  
D=4,6mm, L=200mm,



**RFTXXS-325** - Especially small probe with dimensions d=4mm and l=20mm. Sensor cable: 2m



**RFTO-325** - Probe for humidity and temperature at walls and boundary layers. D=30mm x H=10mm



**RFTW-325** - Special probe for measuring humidity/temperature in confined spaces or wall surfaces. Dimensions: l=45mm, W=20mm



**DKRF370-325** Humidity-/temperature sensor for pressure applications max. 100bar, G3/8" thread, Range -20/+80°C L=100mm, D=13mm



**Tr351 Radiation screen** for RFT-325 and DKRF300-325. Minimises influence from solar radiation and protects against rain. (D=77mm/H=108mm)



**SHS-325** - Detects incipient bedewing. Signal "1" if condensation occurs, "0" if not. Operating range: 0...50°C Dimensions: 60 x 10mm



**SHSW-325** - Detects water ingress. (Pipe burst, flooding) Signal "1" if moistened "0" if not. Operating range: 0...50°C Dimensions: 60 x 10mm

### Cable specifications

The standard probes come with a PVC cable type V and can be used under operating conditions -20...+80°C. If desired, special cables made of Teflon® (type G) can be used which allow operation from -75...+250°C. The RFT and RFT-XXS probes can operate within the range of -40...+120°C with a Teflon® cable.

**Example:** DS-325-V-2000 for the DS-probe with a 2m PVC cable or DS-325-G-2000 with 2m Teflon® cable.



## Sensors, probes and accessories

### Current clamps, displacement, force, weather sensors

Driesen+Kern GmbH offers a wide range of probes to connect to the DK65X logger.

A small number of probes are listed below. If you do not find a suitable sensor here, you may be able to connect others as well. Feel free to contact us if you need any assistance to select your sensors.



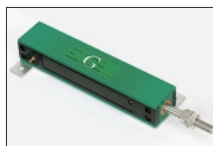
#### Current clamp MN-89

Range: 0,5..240A  
Opening: D=20mm



#### Electrical transducer

For measuring high voltage/current  
Model Uw : U<sub>max</sub>= 650V (AC)  
Model UgT : U<sub>max</sub>=600V (DC)  
Model IgT : I<sub>max</sub> = 5A (DC)



#### LP-50F Wegsensor

zur Erfassung z.B. von Längen-  
änderungen  
Gesamtlänge: L=129mm  
Messbare Dehnung bis 50mm



#### K25 Force sensors (-3DMS only)

Torque, force, load sensors  
0,02 to 50 KN  
Accuracy class: 0,1%/0,2%



#### Radiation sensors

Wwe offer a wide range of radiation  
i.e. LUX, UV, PAR, Pyranometer



**EC5 -Soil Moisture probe** Special  
sensor to measure moisture in soil by  
volumetric water content



#### ARG100 Rain gauge

affordable tipping bucket  
raingauge.  
area: 506,7cm<sup>2</sup>  
sensitivity: 0,2mm



#### Young 52202/52203 Rain gauge

With heating option, tipping bucket  
according WMO recommendation  
area: 200cm<sup>2</sup>  
sensitivity: 0,1mm



#### WG3400 low-cost wind speed sensor 0,5..35m/s

Accuracy 0,5m/s / 5%  
(connects directly to "-3S", no  
additional power supply needed)



#### WR3124 low cost wind direction sensor with potentiometer

Resolution: 0,5°  
(connects directly to "-3S", no  
additional power supply needed)

### Accessories for "Rugged Visual" datalogger



**Wallmount** including one wire and  
seal for easy mounting and  
securing the logger on a wall.  
Set of wires and numerised seals  
(50pcs each) Wandhalterung zur  
einfachen available as well.

#### Included in delivery:

datalogger, 1 battery, software InfraLog -basic-,  
USB-cable, manual, certificate of conformity  
If option -3S or -3DMS is ordered: 3 connection cables  
type DKC-S



#### Carrying case

For three logger DK65X/660 as well  
as cable, USB stick and probes



Optionally, a traceable calibration  
certificate can be ordered with the  
logger.

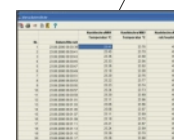
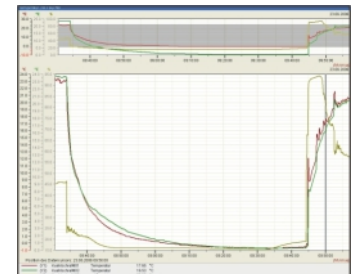
## Software *InfraLog* for Windows V5 for all rugged-Series



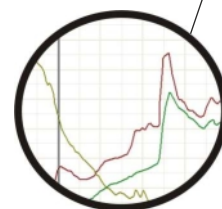
The software InfraLog provides EASY, SECURE & CONVENIENT control for all Driesen+Kern products. After establishing a connection between your logger and PC, InfraLog automatically detects the device. InfraLog V5 offers a multitude of features for the data logger series "rugged Visual". InfraLog is available in three versions: Basic (included in delivery), Light and Enhanced (both optionally available) each with a different number of features, including password protection and language options. It may be installed on all modern Windows-versions using a PC, notebook or windows-based tablet.

INFRALOG FEATURES	BASIC	LIGHT	ENHANCED (Professional)
Automatic device detection	•	•	•
Conversion from base units of measurement into customizable physical values	•	•	•
Load/save device settings	•	•	•
Upgrade device firmware via USB	•	•	•
Save readings to your PC's hard drive or network storage	•	•	•
Customize InfraLog's appearance	•	•	•
Symbols and Icons indicate logger status (logging/alarm/battery)	•	•	•
Total control (settings, start, stop, download etc.)	•	•	•
Measurement input configuration	•	•	•
Download data without stopping the logger	•	•	•
Online readings	•	•	•
Export to Excel (fast conversion)	•	•	•
Calculate absolute humidity, dewpoint etc.	•	•	•
Supports USB 2.0 for download rates of 1 Mbit (100 000 readings in 20 s)	•	•	•
Menu languages (German, English, Spanish, French)	•	•	•
Compatible with Windows 7, 8 & 10	•	•	•
Formula compiler calculates any measured variable	•	•	•
y/t charts (readings over time)	•	•	•
Three scalable axes	•	•	•
Zooming function	•	•	•
Meter readings at the cursor	•	•	•
Display as spreadsheets	•	•	•
Combine a series of measurement in one chart	•	•	•
Definition of thresholds	•	•	•
Statistics (min, max and average values)	•	•	•
y/x charts (values over values)	•	•	•
Generate daily, weekly, monthly and annual reports	•	•	•
Specify beginning and end of analyzed period	•	•	•
Input of analysis interval	•	•	•
Print settings	•	•	•

Well-arranged charts with overview and up to three Y-axes



Meter-reading at the cursor



Zooming function



## Specifications

### General

<b>Operating temperature</b> <b>DK650-652:</b> <b>DK653-660:</b>	-30...+80°C* -20...+80°C*
<b>Dimensions:</b> <b>DK650-DK659:</b> <b>DK660:</b>	d=80mm, h=40mm d=80mm, h=65mm
<b>Battery life:</b> <b>DK650-DK659:</b>	4 years @ 1 minute 230 days @ 10 seconds 25 days @ 1 second
<b>DK660:</b>	2 years @ 10 minutes 1/2 year @ 1 minute
<b>Interval:</b>	1 sec...24 hours 2Hz - 4Hz, analog signal up to 16Hz (3 slots simultaneously)
<b>FastMode:</b>	32Hz or 64Hz (only on one slot with the other two slots disabled)
<b>Housing material:</b>	Robust, shock-proof POM composed synthetic material, IP65
<b>Memory Capacity:</b>	4 million readings

\*The LCD may have temporary malfunction if the temperature <-20°C or >70°C

### Sensors and inputs

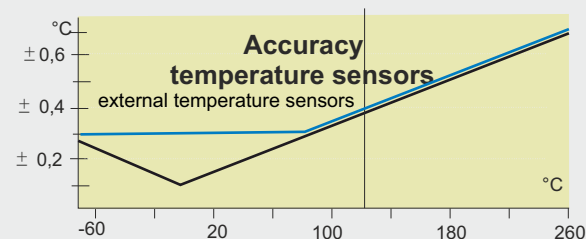
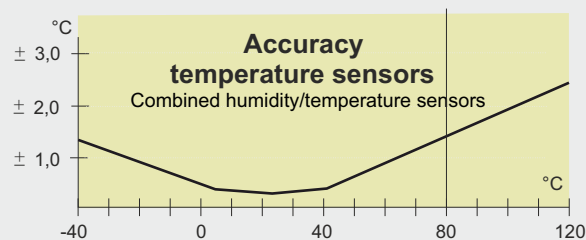
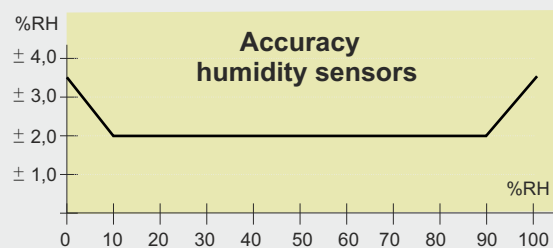
	Range	Resolution	Accuracy
<b>Temperature (internal):</b>	-40...+90°C	0,01 K	see diagram
<b>Temperature (external):</b> (Pt100 or Pt1000)	-70...+250°C	0,01 K	see diagram
<b>Temperature (Thermocouple</b> Type K,T,J,B,E,N,R,S )	-100...+1300°C	0,05 K	KI.I/II
<b>Humidity:</b> (Internal/external)	0...100%rF	0,01%rF	s. graph
<b>CO<sub>2</sub>:</b> (optional 5000ppm, or 10.000ppm)	0...2000ppm	1ppm	+/-50ppm +3% of rdg.
<b>Barometric pressure:</b>	10...1300hPa	0,1 hPa	+/-1,5 hPa <sup>1</sup>
<b>Differential pressure:</b> <b>Standardrange</b>	+/-1000 Pa	0,25Pa	+/-5Pa
<b>Further optional ranges:</b> +/-2000Pa, +/-5000Pa, +/-100mbar, +/-200mbar, +/-500mbar, +/-1bar 0...2bar, 0...5bar		0,025% of range	+/-0,5% of range
<b>Light:</b>	0...40.000 Lux	1 Lux	+/- 20% of rdg

#### Included in delivery:

Data logger, 1 battery, Software *InfraLog -basic-*,  
USB cable, user's guide, Certificate of conformity

#### Optionally available:

Software *InfraLog -light or enhanced*, calibration certificate,  
wall holder, carry case, lead seal set



-- external probes without calibration

--external probes EU,DS,CO  
with physical calibration

## Specifications

The logger will be supplied with three additional, flexible inputs if the option „-3S“ has been ordered. These can be used for measuring analogue signals (voltage, current, pulses) as well as signals from a large number of sensors such as temperature, humidity, light, wind, pressure and many more (see page 7/8 for available sensors).

If the option “-3DMS” is ordered, the DK65X can be supplied with three special inputs which can be used for very low signals, strain gauge measurement or other wheatstone bridges.

The logger supplies a stabilised output current for these type of measurements.

### High impedance mode for voltages

Range (mV):	+/- 5	+/-10	+/-20	+/- 50	+/-100	+/-1000
Resolution ( $\mu\text{V}$ ) <sup>2</sup> :	0,15	0,3	0,6	0,8	1,5	15
Input impedance (GOhm):	1					
Accuracy:	0,1% of chosen range					

<sup>2</sup> The maximum sampling rate in high impedance mode is 1Hz.

### Strain gauge (bridge circuits) (for full bridges of 60...700Ohm)

Range (mV):	+/- 5	+/-10	+/-20	+/- 50	+/-100
Resolution ( $\mu\text{V}$ ) <sup>1</sup> :	0,15	0,3	0,6	0,8	1,5
Input impedance MOhm	2,5				
Accuracy	0,1% of chosen range				

<sup>1</sup> When logging at 32Hz, the resolution is then 10x of the above values.

### Single ended voltage signals

Range (mV):	0-10	0-20	0-50	0-100	0-1V	0-2,5	0-5V	0-10V
Resolution ( $\mu\text{V}$ ) <sup>3</sup> :	0,58	0,58	0,76	1,54	15,4	38,9	76,9	154
Input impedance (MOhm):	2,5	2,5	2,5	2,5	2,5	0,1	0,1	0,1
Accuracy:	0,1% of chosen range							

<sup>3</sup> Single ended signals can be sampled at a maximum rate of 32 Hz.  
The maximum resolution is 10x of the values specified above.

### Current

Range (mA):	0 - 24mA
Resolution ( $\mu\text{A}$ ):	0,36 $\mu\text{A}$
Input impedance (Ohm):	10
Accuracy:	0,1% of chosen range

### Pulsecount (potential-free)

Range	0...65.000 pulses per interval	0...100 Hertz
Resolution	1Pulse / 1 Hz	1Pulse / 1 Hz
Accuracy	1Pulse / 1 Hz	1Pulse / 1 Hz

### Pulsecount (voltage pulses, max 24V)

Range	0...65.000 pulses per interval	0...1300 Hertz
Resolution	1Pulse / 1 Hz	1Pulse / 1 Hz
Accuracy	1Pulse / 1 Hz	1Pulse / 1 Hz

### Connecting analogue inputs

#### Voltage/current:

Signals within a range of 0...1V can be connected with the standard cable DKC-S.

Signals with higher voltage (max. 24V) need to be connected with the voltage divider cable DKC-U.

When measuring current signals the DKC-I cable is required.

#### Pulse count

:Potential-free signals or pulses with a low level of <0.5 VDC and a high level between 2 and 3 VDC can be connected with the standard cable DKC-S (included in delivery).

Higher levels up to 24V need to be routed through the DKC-P cable.





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