Driesen + Kern GmbH

Humidity & Temperature

Product Line

"Thanks to the variety of our products we can offer you the best solution for your humidity and temperature measurements."

Made in Germany

Contents

Humidity/Temperature Transducers

DKRF670 Industrial Series

DKRF670 Series

Capacitive CMOSens Technology

The DKRF670 Transdurcers feature the newest sensor technology and provide the fitting solution to a multitude of measurement problems which require high accuracy, fast response times and reliability.

The devices are highly resitant to dust and most chemicals. They are used in the process control of the pharmaceutical, food and automotive industries as well as in research laboratories.

The capacitive humidity sensor offers a very high accuracy of up to ±1.8% RH and the accuracy regarding temperature is ±0.1 K for a considerable scope.

Additional Temperature Probe

Oftentimes measurements away from the sensing head may be required. For this case the models DKRF671 and DKRF673 can be equipped with an additional external temperature probe. Probe DS-G lets you take measurements of the medium temperature and probe EU-G measures surface temperature.

Features
Robust sensor head
Designed for industrial applications
High accuracy for both temperature and humidity measurements
Calculated variables
Up to 120°C air temperature
USB interface
Three analogue output signals - user-defined scaling and programming
Fast response time (4 seconds)
Robust aluminium housing
Calibration certificate included in delivery

Flexible Output Signals

Three analogue output signals are available for a user-defined combination of the measured variables (relative humidity, temperature, absolute humidity, mixing ratio, dew point).

Every device comes with a USB port (RS232 and RS485 optionally available) for downloading the data, configuring analogue signals 0..1V, 0..5V, 0..10V as well as 4..20mA three-wire and specifying the measurement range.
Besides the analogue outputs readings can be donwloaded using control commands.

Robust Housing

The transducer's electronic circuits are integrated in a robust aluminium housing that is protected against dust and splash water according to protection class IP65.

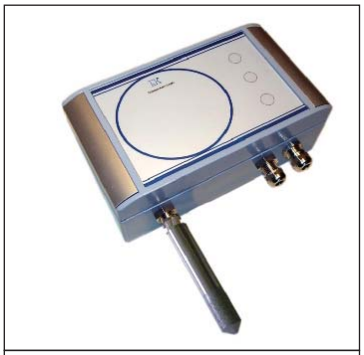
High Humidity Applications

If bedewing frequently occurs during measurements it is advised to use the DKRF676. It incorporates an integrated sensor heating, constantly keeping the sensor above condensation point.

An additional external temperature probe ensures the calculation of not only the dew point but also the relative humidity value.

Models

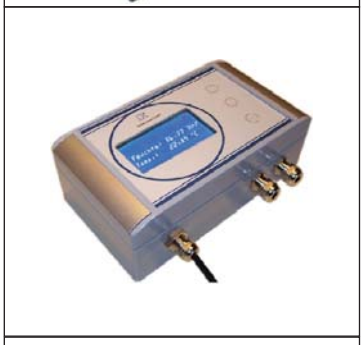
DKRF670 Industrial Series



DKRF671
Transducer for wall mounting
Used in clean rooms, production halls, greenhouses etc.
Range: -40...+60°C, 0...100% RH
Protection class: IP65

DKRF673
Transducer for direct process integration with a flexible sensor cable
Range: -40...+120°C, 0...100% RH
Pressure resistant probe up to 2 bar
Flexible sensor cables 2m, 5m, 10m or custom-made length up to 100m, protection class IP65

DKRF676
Transducer for high humidity applications. Sensor heats up subject to the ambient humidity keeping it above condensation point.
Range: -40...+120°C, 0...100% RH
2 flexible sensor cables up to 100m



Option: Digital Display
The devices can be delivered with an optional LCD with blue backlight. It displays the current values and their respective units.

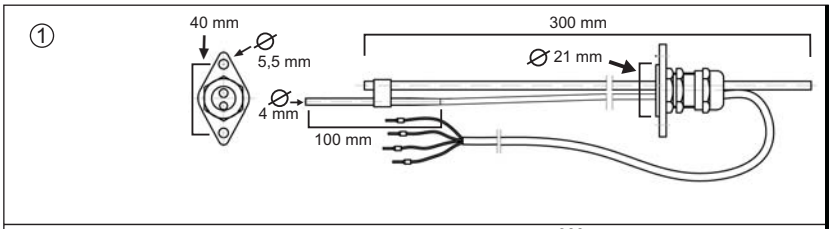
ETM1-G Magnetic surface probe

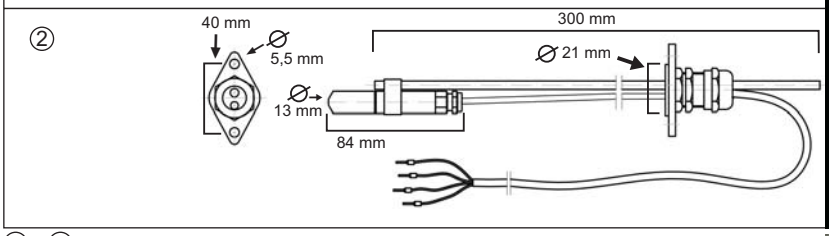
DS-G Medium temperature probe

Additional Temperature Probe
DKRF670 Series transducers can be equipped with an additional temperature probe. With the DKRF676 it is required for correct air temperature and relative humidity measurements compensating for the heated measuring head. For other models it can be used as an additional external probe for temperature measurements.
The DS-G probe is intended for meadium temperature (even in liquids) while the ETM1-G magnetic surface probe is designed for surface temperature.
Both probes have a measuring range of -40...+240°C.

Accessories

DKRF670 Industrial Series





①+②

Flange for 673 and 676:
Mounting flange (l=300mm) for installation in ducts or pipes

③

Radiation/Rain Protector TR351
d=77 mm, h=108 mm (optional)

④

S-Filter 600:
Sinter filter for DKRF67x (included)

Order Code

The following order code applies to the DKRF670er Series

DKRF671	DKRF671-AA-O1-O2-O3-FT-XX-AL-RS
DKRF673	DKRF673-AA-KL-O1-O2-O3-FT-XX-AL-RS
DKRF676	DKRF676-AA-KL-O1-O2-O3-XX-AL-RS (The additional temperature probe uses the same cable length as the humidity probe)

AA =Analogue Output	- 01	= 0...1VDC
	- 05	= 0...5VDC
	- 10	= 0...10VDC
	- 020	= 0...20mA
	- 420D	= 4...20mA three-wire
KL = Cable Length	- 2000	= 2m cable
	- 5000	= 5m cable
	- 10000	= 10m cable
	(Other sizes on request)	

If you require a different measuring range the device can be configured exempt from charges ex works or you can manually reconfigure the device via USB. Please specify the requested measuring range when placing your oder.

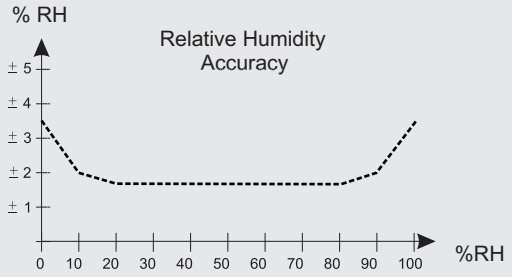
All DKRF670 transducers are fitted with a USB port.

O1 = Option1	STD	= Temperature (-40...+120°C)
	ABS	= Absolute humidity (0...30g/m³)
	TP	= Dew point(-5...+60 °C)
	WB	= Wet-bulb temperature (-40...80°C)
	X	= Mixing ratio (0...30g/kg)
O2 = Option2	STD	= Relative humidity (0..100%RH)
	ABS	= Absolute humidity (0...30g/m³)
	TP	= Dew point (-5...+60 °C)
	WB	= Wet-bulb temperature (-40...80°C)
	X	= Mixing ratio (0...30g/kg)
O3 = Option3	STD	= without additional output
	T	= Temperature (-40...+120°C)
	ABS	= Absolute humidity (0...30g/m³)
	TP	= Dew point (-5...+60 °C)
	WB	= Wet-bulb temperature (-40...80°C)
	X	= Mixing ratio (0...30g/kg)
FT = Temp. probe	STD	= without additional temp. probe
	DS2	= DS-G-2000 Process / 2m cable
	DS5	= DS-G-5000 Process / 5m cable
	DS10	= DS-G-10000 Process / 10m cable
	ETM 2	= ETM1-G-2000 Surface / 2m
	ETM 5	= ETM1-G-5000 Surface / 5m
	ETM10	= ETM1-G-10000 Surface / 10m
XX = Display	MD	= with LCD
	OD	= without LCD
AL=Alarm	0	= without alarm output
	1	= Alarm relay (60V/0,5A)
RS= additional Interface	STD	= without additional interface
	0	= RS232 interface
	1	= RS485 interface

Specifications DKRF670 Industrial Series

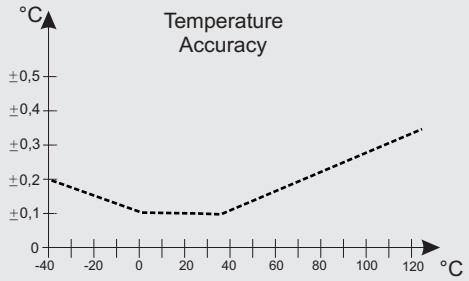
Relative Humidity

Sensor type:	capacitive CMOSens sensor element
Measuring range:	0..100% RH
Response time:	4 seconds without filter, 15 seconds with filter



Temperature

Sensor type:	High precision platinum measuring resistor
Measuring range:	DKRF671: -40... + 60°C DKRF673, 676: -40... +120°C
External temp. probe:	DS-G Sensor: -40...+240°C EU-G Sensor: -40...+240°C
Response time:	ca. T63/T90: 18 sec/ 100 sec, without filter, with light air movement, step: 27 --> 37°C
Storage temperature:	DKRF670 Series: -40... +60°C



Outputs

3x Analogue output:	0...1V, 0...5V, 0...10V, 0...20mA, 4..20mA (three-wire)
USB port: (Micro-USB Type B)	Configuration / programming, data readout e. g. with PC or notebook etc.
RS485 port:	DC isolated RS485 interface, optional
RS232 port:	Through interface, optional
Alarm output	Optional, Alarm relay (60V/0,5A), potential-free

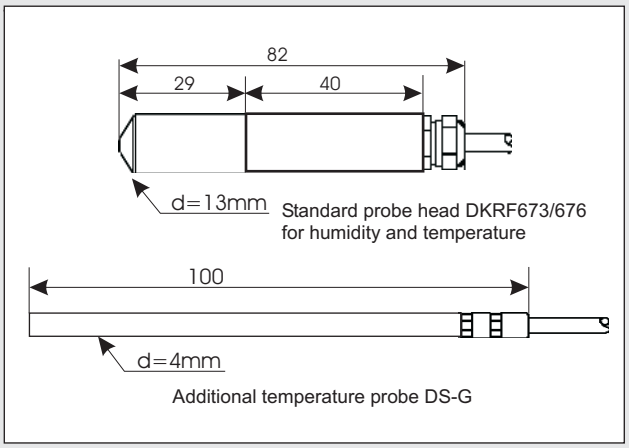
Calculated Variables

The calculated variables absolute humidity, dew point, mixing ratio and wet-bulb temperature are provided by the interface by default and can also be displayed through the analogue outputs.

Certificate of Calibration: included in delivery

General Technical Data

Dimensions: see figure



Probe head:	Stainless steel 1.4571

Current consumption and supply voltage:

Output: 0..1V	6...35VDC, 2.5 mA
Output: 0..5V	6...35VDC, 2.5mA
Output: 0..10V	11...35VDC, 3.0 mA
Output: 4..20mA	11...35VDC, 22mA/Output

Max load:	max. 500 Ohm
Load for voltage output:	0..1V --> min. 2kOhm 0..5V/0..10V --> min. 10kOhm
Dimensions:	160 x 90 x 60mm
Protection class:	IP65 (NEMA 4)
Cable gland:	2x PG7 for output signal, 1x PG7 for sensor cable
Cable cross section:	0.25...1.5mm²

Humidity/Temperature Transducers

DKRF470 Series for Sophisticated Applications

Designed for Demanding Applications

The DKRF470 Series of transducers was designed for sophisticated measurement applications such as in process automation, HVAC in public swimming pools or greenhouses.
Based on the latest capacitive sensor technology the devices provide a precise and yet affordable solution to a variety of your measuring tasks.
They are extremely resistant to dust as well as most chemicals and provide high accuracy and reliability (+/- 1.8% RH/+/-0.3°C).

A traceable Certificate of Calibration (ISO9001) as well as DKD Certificates can be provided.

The Special Probe ...

of our DKRF47x Series is pluggable and exchangeable. It provides a calibrated digital output signal and can be reordered with a Certificate of Calibration.

SK470 replaceable, calibrated probe for DKRK471/472/473 (right).

SK474 replaceable, calibrated probe for DKRF474 (left). DNV inspection document optional.

That is why you don't need to send back your device for recalibration thus avoiding downtimes.
The entire measuring chain can be checked with digital CalSticks.

Robust Housing

The transducer's electronic circuits are integrated in a robust aluminium housing that is protected against dust and splash water according to protection class IP65.
This makes it perfectly suitable even for applications in wet areas such as public swimming pools, environmental chambers or in the food industry.

Flexible Output Signals

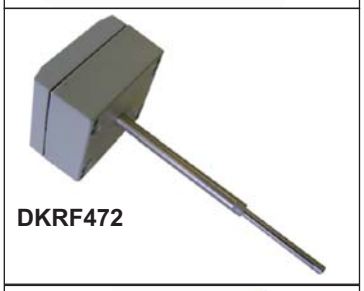
Two analogue output signals are available for a user-defined combination of the measured variables (relative humidity, temperature, absolute humidity, mixing ratio, dew point). Analogue signals 0..1V, 0..5V, 0..10V as well as 4..20mA two- or three-wire type are selectable.

Features
Exchangeable, digital probe
High accuracy
5 models for various requirements
Two analogue outputs allow for a user-defined combination of measurement variables
Extra fast response time (4 seconds)
LCD optional
Robust aluminium housing

Models

DKRF470 Series

DKRF471
Transducer for wall mounting. Suitable for operation in clean rooms, laboratories, greenhouses and museums.
Measurement range: -40...+60°C, 0...100% RH
Protection class: IP65
Exchangable digital probe SK473.



DKRF472
Designed for duct installation such as in pipelines, ventilation ducts or environmental chambers.
Measurement range: -40...+80°C, 0...100% RH
Protection class: IP65
Exchangable digital probe SK473.

DKRF473
Transducer for direct process integration e. g. in HVAC applications, environmental chambers, drying plants etc.
Measurement range: -40...+80°C, 0...100% RH
Flexible sensor cable 2m, 5m or custom-made up to 100m
Protection class: Ip65
Exchangable digital probe SK473.

DKRF473-EXT
For higher temperatures and with small probe (d=8mm, l=40mm). Range: -40...+120°C, 0...100% RH
Flexible sensor cable 2m, 5m or custom-made up to 100m.
Exchangeable cable and probe (MK473).

DKRF473-EXT-XXS
with extra small dimensions (d=4mm, l=20mm), flexible sensor cable 2m, 5m.
Range: -40...+120°C, 0...100% RH.

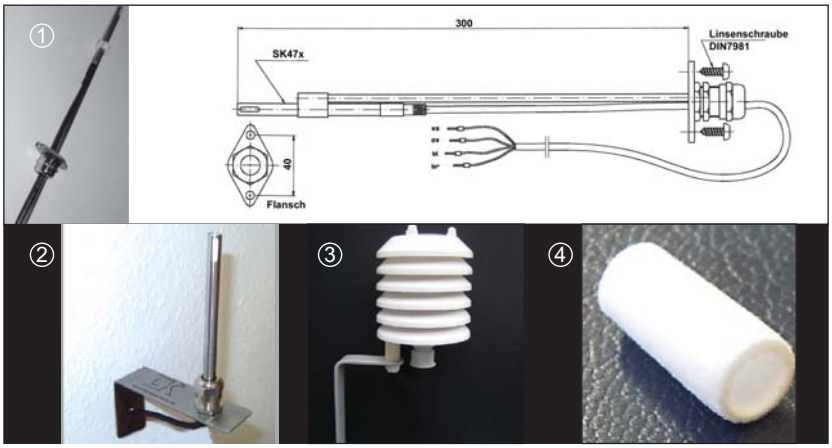
DKRF473-EXT-D
Pressure-resistant probe for up to 30bar with M8 thread (optional G1/2”), (see figure for dimensions),
Range: -40...+120°C, 0...100% RH.

DKRF474
Designed for measurement tasks in pressurised environments of up to 100 bar (pressure condensation point), can be used at up to 80°C.
Exchangeable probe SK474.

Digital Display (Optional)
All models of the DKRF470 Series are available with a LCD (blue backlight) which displays the current readings and their respective units.

Accessories

DKRF470 Series



① **Flange 400:** Mounting flange (l=300mm) for installation in ducts/pipes

② **WM400:** Wall mount for DKRF473 stainless steel angle joint with screw fitting

③ **TR351: Radiation/ Rain Protector** For humidity/temperature transducers d=77 mm, h=108 mm

④ **Filter 400:** Filter cap for additional protection against dust or liquids.

Calculated and Derived Values

While measuring humidity and temperature the microprocessor controls of the probes allow for a calculation of other parameters.

These are: dewpoint, absolute humidity, wet-bulb temperature and mixing ratio.
The variables are provided at the analogue output and shown on the display.

Order Code

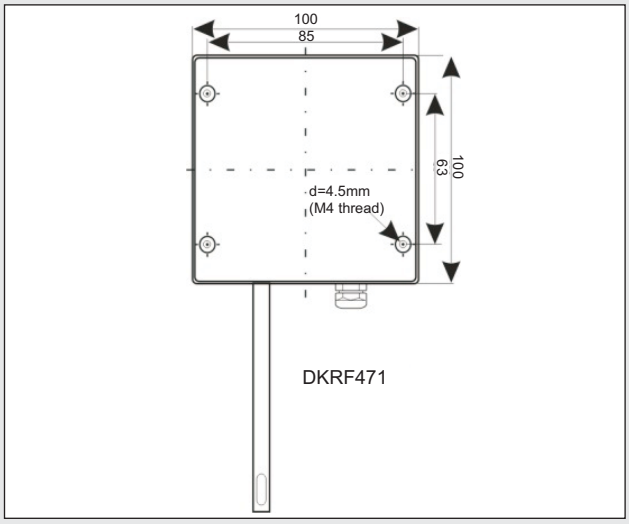
The following order code applies to the various models of the DKRF470 Series

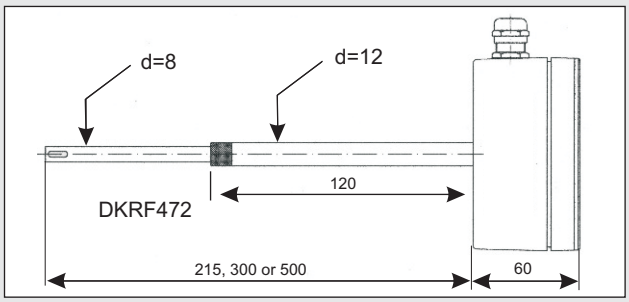
DKRF471	DKRF471-AA-OPT1-OPT2-XX
DKRF472	DKRF472-AA-OPT1-OPT2-XX-MKL
DKRF473	DKRF473-AA-KL-OPT1-OPT2-XX
DKRF473-EXT	DKRF473-EXT-AA-KL-OPT1-OPT2-XX
DKRF473-EXT-XXS	DKRF473-EXT-XXS-AA-KL-OPT1-OPT2-XX
DKRF473-EXT-D	DKRF473-EXT-D-AA-KL-OPT1-OPT2-XX
DKRF474	DKRF474-AA-KL-OPT1-OPT2-XX

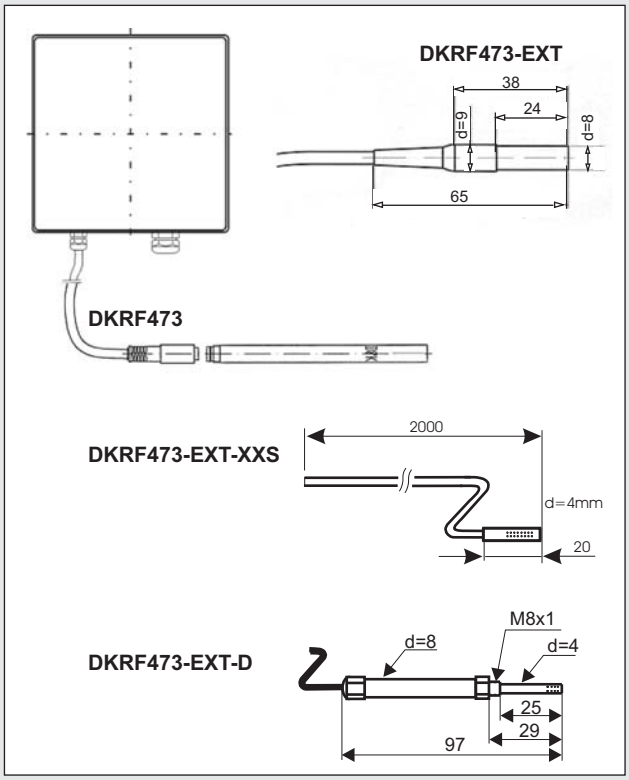
-AA =Analogue output	- 01	= 0...1VDC
	- 05	= 0...5VDC
	- 10	= 0...10VDC
	- 020	= 0...20mA
	- 420Z	= 4...20mA two-wire
	- 420D	= 4...20mA three-wire
-KL = Cable length	-2000	= 2m cable
	-5000	= 5m cable
	(other sizes on request)	
-OPT1 = Option1	STD	= Channel1 rel. humidity
	ABS	= Abs. humidity (0...30g/m³)
	TP	= Dew point (-5...+60 °C)
	WB	= Wet-bulb temperature (-40...80°C)
	X	= Mixing ratio (0...30g/kg)
-OPT2 = Option2	STD	= Channel2 Temperature
	ABS	= Abs. humidity (0...30g/m³)
	TP	= Dew point (-5...+60 °C)
	WB	= Wet-bulb temperature (-40...80°C)
	X	= Mixing ratio (0...30g/kg)
-XX = Display	MD	= with LCD
	OD	= without LCD
-MKL (only DKRF472) = Length of probe head	-215	= 215mm
	-300	= 300mm
	-500	= 500mm

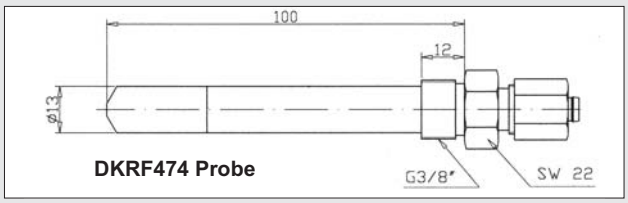
Special requests:
If you require a different measuring range the device can be configured ex works. Please specify the requested measuring range when placing your oder.

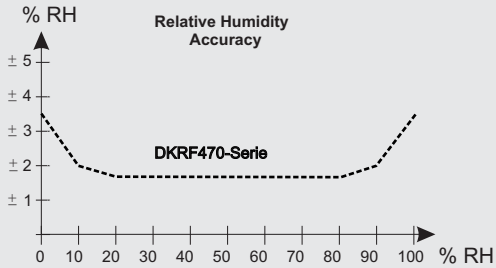
Specifications DKRF470 Series

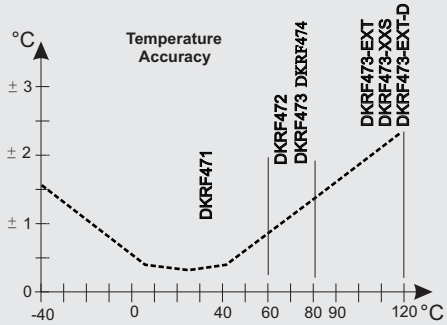












Relative Humidity

Sensor type:	Capacitive sensor element
Range:	0..100% RH
Response time:	4 seconds without filter, 15 seconds with filter

Temperature

Sensor type:	Semi-conductor sensor	
Range:	DKRF471:	-40... +60°C
	DKRF472, 473, 474:	-40... +80°C
	DKRF473-EXT/XXS/EXTD:	-40...+120°C
Storage temp.:	DKRF470 Series:	-40... +60°C
Response time:	approx. 35 seonds	

Outputs

2xAnalogue output:	0...1V, 0...5V, 0...10V, 0...20mA, 4..20mA (three-wire), 4...20mA (two-wire)

Calculated Variables

Absolute humidity, dew point, mixing ratio
Measurement range: see page 9, other measurement ranges on request

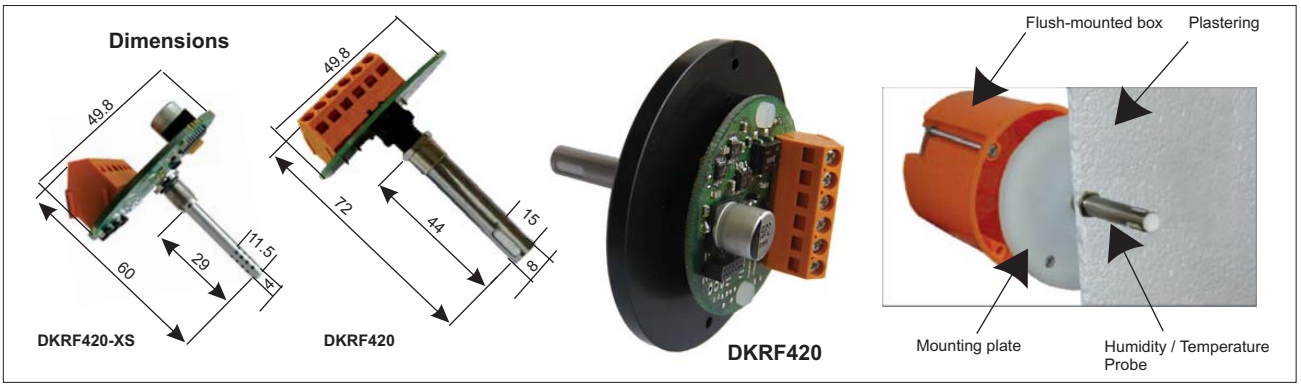
General Technical Data

Current consumption and supply voltage:

Output: 0..1V	6...25VDC, 1.5mA
Output: 0..5V	6...25VDC, 1.5mA
Output: 0..10V	11...25VDC, 1.9 mA
Output: 4-20mA	11...25VDC, 22mA/Output
Max. load:	max. 500 Ohm
Load for voltage output:	0..1V --> min. 2kOhm 0..5V/0..10V --> min. 10kOhm
Housing:	Aluminium AlSi12 DIN 1725
Protection class:	IP65 (NEMA 4)
Cable gland:	PG9 for the output signal PG7 for the sensor cable
Cable cross section:	0.25...1.5mm²

Humidity/Temperature Transducers

DKRF420/420-XS for Flush Mounting



Feuchte-/Temperatur- Messwertgeber

The DKRF420 and DKRF420-XS are transducers for humidity and temperature and come with an analogue output.The DKRF420-XS is the smaller and even more inconspicious model.
Their benefits become evident when used in museums and historic buildings or in pharmaceutical and medical laboratories.

The transducer's electronic components completely immerse into the flush-mounted box (required mounting depth: 30 mm). It is covered by a mounting plate and can be plastered leaving only the small stainless steel probe stick out of the wall.

Exchangeable Probe

The DKRF420 and DKRF420-XS respectively feature a precise sensor which offers long-term stability and a measurement accuracy of ±1.8% and ±0.3°C. It is easy to maintain and can be exchanged or replaced without recalibration at a reasonable price without removing the entire transducer.

Order Code

The following order code applies to the DKRF420 Series

DKRF420-AA-KL
DKRF420-XS-AA-KL

AA =Analogue output	- 01	= 0...1VDC
	- 05	= 0...5VDC
	- 10	= 0...10VDC
	- 420Z	= 4...20mA two-wire
	- 420D	= 4...20mA three-wire

Note: The DKRF420Z and DKRF420D cannot operate with the probe connected directly. Both devices require a sensor cable.

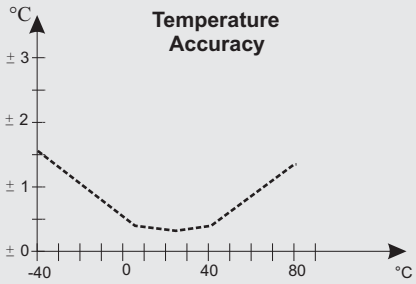
-KL = Cable length	-DC	= without cable
	-2000	= 2m cable
	-5000	= 5m cable
	-Xxxx	= customized

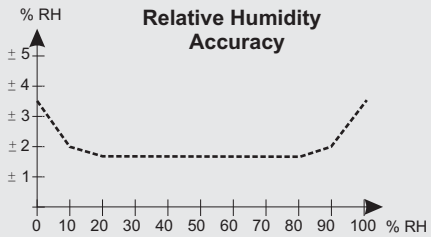
Specifications

Measuring range:

Relative humidity:	0 ... 100% RH
Temperature:	-40 ... +80°C
Dimensions:	d=49.8mm, h=30mm
Mounting plate	d= 71mm, h=4.9mm
Supply Voltage/Current Consumption	
Output: 0..1V	3.0...25VDC, 800µA
Output: 0..5V	6.0...25VDC, 1.5 mA
Output: 0..10V	11...25VDC, 1.9 mA
Load for voltage output:	> 2KOhm
Output:	
4..20mA three-wire	11...25VDC, 2x 22 mA
4..20mA two-wire	11...25VDC, max. 2 x 20 mA
Max. Load:	500 Ohm
Response time:	
1/e (63%):	35 seconds

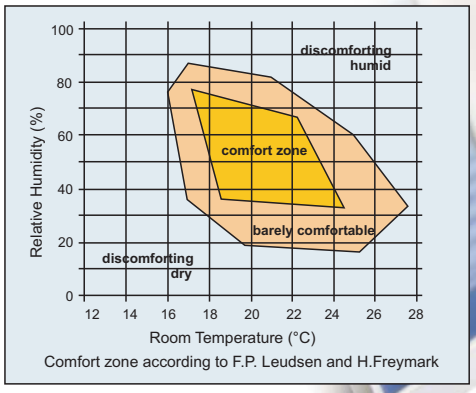
Supply voltage: 12-24 VDC or 12-24VAC
Design: round PCB, d=49.8mm,
Sensor fitting: plug-in type at the front
Sensor type: Digital, calibrated sensor in stainless steel sleeve (d=8mm, l= ca. 35mm)





Flush Mounting Sensors

DKRF425, Available for Several Product Ranges



Comfort zone according to F.P. Leudsen and H.Freymark

With their Flush Mounting Line Driesen+Kern GmbH offer a selection of sensors for building automation. The probes fit into standard flush-mounted boxes and are compatible to switch product ranges of several manufacturers. This makes them well suited for integration in existing building concepts.
The sensorsmeasure tempeature, humidity, CO2 concentration and light intensity (further details regarding CO2 and light intensity can be found in the separate data sheet). Both analogue output and an optional switching output are available. The standard models are configured for products of Gira and Busch-Jaeger. Compatibility with other products available on request.

It works well in living areas, offices, conference rooms and centres etc. The latest, long-term stable sensor technology of the flush-mounted sensor ensures precise measurements for many years without the need for recalibration.

Flush-mounted Module for RH
Humidity/Temperature

Temperatur and humidity are the most important measurement parameters for ventilation and air conditioning of buildings.They are essential for the well-being of the people inside. The diagram shows the relationship between room temperature and humidity for the thermal comfort at a medium surface temperature of 19.5 to 23°C and up to 0.2m/s flow of air. At lower temperatures the plane representing the comfort zone will shift to the right..

The humidity sensor DKRF-425 for flush mounting measures relative humidity and temperature in the air. It gives out a signal of 0...10V which corresponds to 0...100% and 0...50°C respectively.

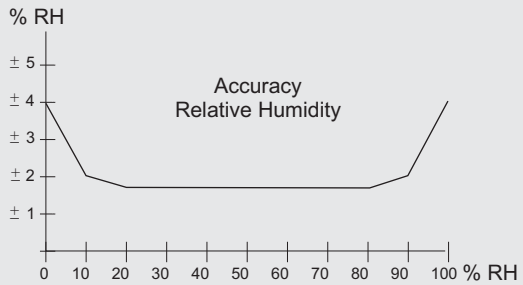
Order Code

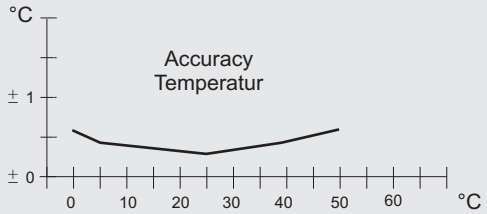
The following order code applies to the DKRF425 sensors
DKRF425-AA-MOD-FC

AA =Analogue output	- 01	= 0...1V
	- 05	= 0...5V
	- 10	= 0...10V
MOD = Model	- G55	= Gira System55
FC = Colour code	- RS	= Pure white, silk-matt
	- R	= Pure white, glossy
	- CG	= Creme, glossy
	- SM	= Matte silver

Specifications

Supply:	12....35 VDC / 12...24 VAC
Relative Humidity:	
Measuring range:	0...100% RH (non-condensing)
Accuracy:	see diagram
Output:	0...10V (0...1V/5V optional)
Temperature:	0...50°C
Accuracy:	see diagram
Output:	0...10V (0...1V/5V optional)





Humidity/Temperature Probe

DKRF415 with Analogue Output - Robust & Pressure-resistant

Probe
DKRF415

For High Demands

The DKRF415 humidity/temperature probe was specifically designed to work in areas with elevated pressure levels and in vacuum.

The probe's operating range is 0...100% RH and it tolerates temporary condensation. It delivers accurate readings (up to ±1.8%RH / ±0.3°C) even when working in compressed air up to 2 bar.

Two separate analogue outputs each provide a linear signal of 0...1V, 0...5V, 0...10V. A passive output for temperature (PT100/PT1000) is additionally available.

Applications
The DKRF415 humidity/temperature probe provides reliable readings even in challenging environmental conditions:
* **Compressed Air Systems**
* **Engine Test Benches**
* **Industrial Automation Technology**
* **Incubators**
* **Artificial Weathering / Climate Chambers**
* **Greenhouses**

Potential use
e. g. air conditioning and ducts/pipes

Low Maintenance

The probe features a high-precision sensor (SHT75DK) with long-term stability which can be delivered as a completely calibrated spare part.
In addition, the probe can be calibrated and adjusted with the MHT Series HumidityChecks (see page 25).

Among other applications, the DKRF415 can be used for applications with compressed air systems.

Digital Output

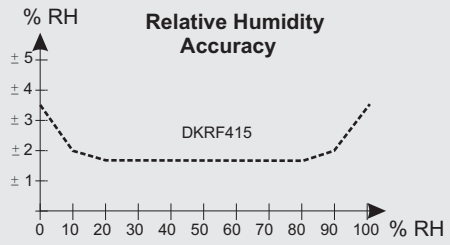
In addition to the analogue outputs the DKRF415 offers an RS485 port through which up to 255 probes can be linked together as a network.
The signals can be converted for processing through an RS232 or USB interface. Both interfaces provide access for scaling the analogue outputs as well as calibrating or adjusting the transducer.

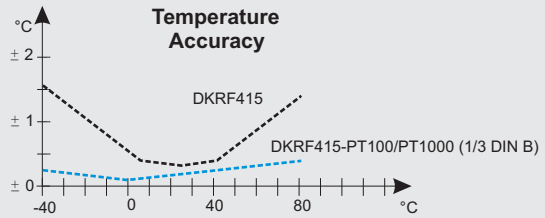
Calculated Variables

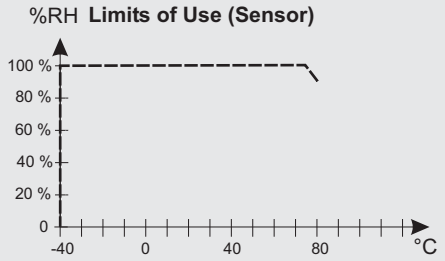
In addition to the variables relative humidity and temperature the transducer also provides calculated variables such as dew point, absolute humidity and mixing ratio. These variables can be output either digitally or through the analogue outputs.

Features
Compact, pressure-resistant humidity and temperatur transducer
Exchangeable high-precision sensor (±1.8%RH / ±0.3°C without recalibration!)
Tolerates temporary condensation
2xOutput (0...1V, 0...5V, 0...10V) or passive PT100/PT1000 output
Operating range -40...+80°C
Low power consumption, cost-efficient

Specifications







Humidity

Measuring range:	0...100% RH
Accuracy:	see diagram
Output signal:	0...1VDC/0...5V/0...10V

Temperature

Measurement range:	-40... +80°C
Accuracy:	see diagram
Output signal:	0-1VDC/0-5V/0-10V (or passive PT100/PT1000)
Pressure tolerance:	300 mbar - 2 bar
Interface:	RS485, addressable RS232 w. converter USB w. converter
Dimensions:	d=13mm, l=200mm
Housing:	Stainless steel
Cable length:	Plug-in PVC cable 2m, 5m or 10m
Wires:	open cable ends (Connector optional)

Supply:	11...35VDC
Current consumption: Output: 0...1V/0...5V/0...10V	approx. 2mA
Settling time:	80 msec
Output load:	> 2KOhm
Refresh (output)	1x per second
Response time:1/e (63%)	4 seconds (without filter) 15 seconds (with filter) 1 Sinter filter, included in derlivery
Outputs:	RS485 port for configuration/calibration as well as data transfer USB or RS232 interface optionally available
Humidity	Analogue output for rel. humidity or calculated variable can be selected upon ordering or later configured through the interface
Temperature	Analogue output for temperature or passive PT100/PT1000 output

Order Code

The following order code applies to the DKRF415
DKRF415-AA-KL-OPT1-OPT2

AA =Analogue output	- 01	= 0...1VDC
	- 05	= 0...5VDC
	- 10	= 0...10VDC
	- RS232	= RS232
	- USB	= USB
-KL = Cable length	-2000	= 2m cable
	-5000	= 5m cable
	-10000	= 10m cable
-OPT1 = Option1	STD = Rel. humidity	(0...100%RH)
	ABS = Abs. humidity	(0...30g/m³)
	TP = Dew point	(-5...+60 °C)
	WB = Wet-bulb temp.	(-40...80°C)
	X = Mixing ratio	(0...30g/kg)
-OPT2 = Option2	STD = Temperature	(-40...+80°C)
	ABS = Abs. humidity	(0...30g/m³)
	TP = Dew point	(-5...+60 °C)
	WB = Wet-bulb temp..	(-40...80°C)
	X = Mixing ratio	(0...30g/kg)
	PT100 = PT100 (Drei-Leiter) *	
	PT1000 = PT1000 (Drei-Leiter) *	

* When chosing PT100 or PT1000 one active analogue output is inapplicable. The second output will still be set to the predefined value of AA.

Special requests:
I f you require a different measuring range the device can be configured ex work. Please specify the requested measuring range when placing your oder!

Accessories:

DKRF41500032	Compression fitting PG13,5/metal
DKRF41500045	Cert. of Calibration (rel. humidity+temp.)
DKRF41500300	Interface RS485-->RS232
DKRF41500310	Interface RS485-->USB

Miniaturized Humidity/Temperature Probe

DKRF417 for Compressed Air Applications up to 30 bar

Designed for High Pressure Applications

The DKRF417 humidity and temperature transducer ist the best choice for measurements at very high pressure levels. It is pressure-resistant up to 30 bar. Thanks to its small dimensions and M8 thread it is very well suited for applications within compressed air lines with small diameter.

The probe's operating range is 0...100% RH and it tolerates temporary condensation. It delivers highly accurate readings of up to ±1.8%RH / ±0.3°C.

Two separate analogue outputs each provide a linear signal of 0...1V, 0...5V, 0...10V.

Applications

The DKRF417 humidity/temperature probe provides reliable readings even in challenging environmental conditions:
* **Compressed Air Systems**
* **Engine Test Benches**
* **Industrial Automation Technology**

Digital Output

In addition to the analogue outputs the DKRF417 offers an RS485 port through which up to 255 probes can be linked together as a network.

Humidity/temperature probe DKRF417 can be used in compressed air systemd, among other applications

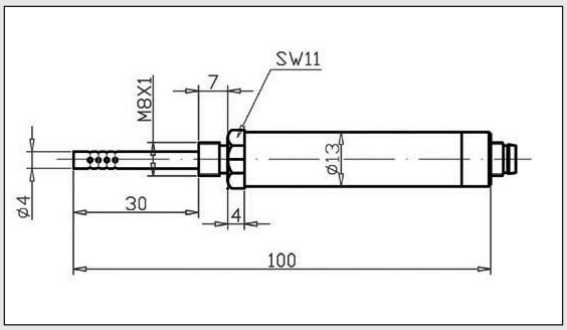
The signals can be converted for processing through an RS232 or USB interface. Both interfaces provide access for scaling the analogue outputs as well as calibrating or adjusting the transducer.

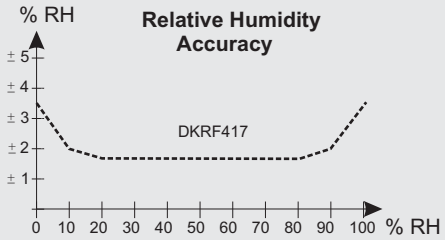
Calculated Variables

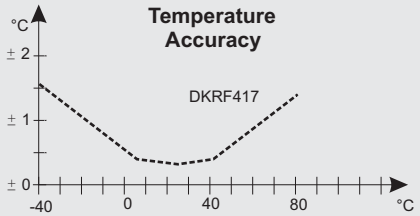
In addition to the variables relative humidity and temperature the transducer also provides calculated variables such as dew point, absolute humidity and mixing ratio. These variables can be output either digitally or through the analogue outputs.

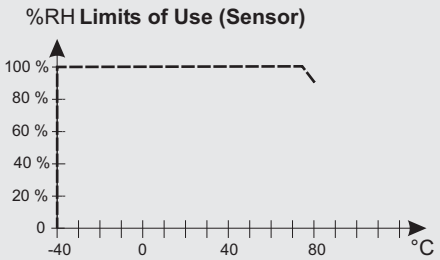
Features
Compact, pressure-resistant transducer for relative humidity and temperature
M8 thread
Pressure-resistant up to 30 bar
Tolerates temporary condensation
2x Output (0...1V, 0...5V, 0...10V)
Operating range -40...+80°C
Low power consumption, cost-efficient

Specifications









Humidity

Measuring range:	0...100% RH
Accuracy:	see diagram
Output signal:	0...1VDC/0...5V/0...10V

Temperature

Measurement range:	-40...+80°C
Accuracy:	see diagram
Output signal:	0-1VDC/0-5V/0-10V (or passive PT100/PT1000)
Pressure tolerance:	0...30bar
Interface:	RS485, addressable RS232 w. converter USB w. converter
Dimensions:	see figure above
Housing:	Stainless steel
Cable length:	Plug-in PVC cable, 2m, 5m or 10m,
Wires:	open cable ends (connector optional)

Supply:	11...35VDC
Current consumption: Output: 0...1V/0...5V/0...10V	approx. 2mA
Settling time:	80 msec
Output load:	> 2KOhm
Refresh (output)	1x per second
Response time:1/e (63%)	4 seconds (without filter) 15 seconds (with filter) 1 Sinter filter, included in derlivery
Outputs:	RS485 port for configuration/calibration as well as data transfer USB or RS232 interface optionally available
Humidity	Analogue output for rel. humidity or calculated variable can be selected upon ordering or later configured through the interface

Order Code

The following order code applkies to the DKRF417
DKRF417-AA-KL-OPT1-OPT2

AA =Analogue output	- 01	= 0...1VDC
	- 05	= 0...5VDC
	- 10	= 0...10VDC
	- RS232	= RS232
	- USB	= USB
-KL = Cable length	-2000	= 2m cable
	-5000	= 5m cable
	-10000	= 10m cable
-OPT1 = Option1	STD = Rel. humidity	(0...100%RH)
	ABS = Abs. humidity	(0...30g/m³)
	TP = Dew point	(-5...+60 °C)
	WB = Wet-bulb temp.	(-40...80°C)
	X = Mixing ratio	(0...30g/kg)
-OPT2 = Option2	STD = Temperature	(-40...+80°C)
	ABS = Abs. humidity	(0...30g/m³)
	TP = Dew point	(-5...+60 °C)
	WB = Wet-bulb temp..	(-40...80°C)
	X = Mixing ratio	(0...30g/kg)

Special requests:
I f you require a different measuring range the device can be configured ex work. Please specify the requested measuring range when placing your oder!

Accessories:

DKRF41500045	Certificate of Calibration (relative humidity and temperature)
DKRF41500300	Interface RS485-->RS232
DKRF41500310	Interface RS485-->USB

Low-Cost Humidity/Temperature Probe

DKRF400 with Analogue Output

DKRF400
with Analogue Output

DKRF400-EXT

DKRF400-EXT-D

Applications

The humidity / temperature probe DKRF400 was designed for applications where cost-efficient solutions and high accuracy are essential:

* **HVAC**
* **Weather Stations**
* **Data Logger**
* **Automation Processes**
* **Environmental Chambers/Climate Cabinets**
* **Measuring Instruments**

Reasonably Priced and Precise

The DKRF400 probe can operate within a range of 0...100% RH and offers an accuracy of ±1.8% RH between 20 to 80% RH.
Even in rough conditions beyond this range it provides very accurate readings.
The DKRF400 standard probe can operate at a temperature range of -40...+80°C whereas the DKRF-EXT's range is expanded to +120°C. The probe's accuracy is ±0.3°C at 25°C.
Two separate analogue outputs each provide a linear signal of 0...1V / 0...5V or 0...10V.

Features
Miniaturized sensor design combines relative humidity and temperature
Exchangeable high-precision probe (±1.8%RH / ±0.3°C without recalibration!)
2x Analogue output (0...1V, 0...5V, 0...10V)
Fast response time (4 seconds)
Low power consumption --> perfectly suitable for data loggers!
Large measuring range (-40...+120°C)
Reasonably priced
Robust plug-in probe made from stainless steel

Miniaturized Design

The DKRF400 probe distinguishes itself through its miniaturised and robust design. The probe's small dimensions (d=8mm, l=101mm) permit its use in a variety of applications. The housing is made of stainless steel and can be equipped with cables of different sizes.

The **EXT** model has a stepped sensor head and can operate at termperatures of up to 120°C.

The **EXT-D** model features a pressure-resistant sensor head for up to 30bar with an M8 thread.
Range: -40...+120°C, 0...100%RH

The **EXT-OSS** model comes without the protective sleeve, thus making it suitable for measurements in confined spaces.
Dimensions: 13.5 x 3.1 x 5.08mm.

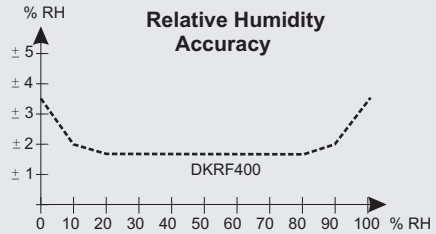
Miniaturized Sensor
SHT75DK

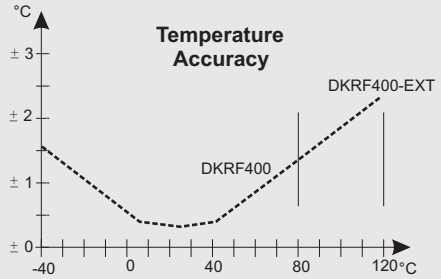
Low Maintenance

The probe features the miniaturised sensor SHT75DK which can be delivered as a calibrated spare part.

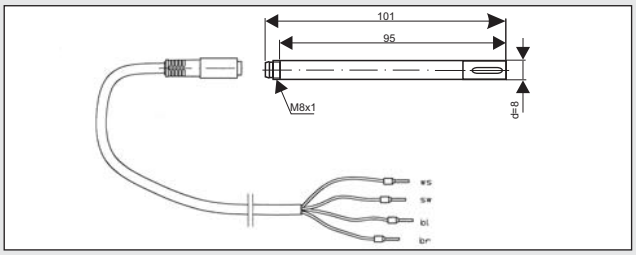
The plug-in sensor can be exchanged without recalibration on site by the user or maintenance personnel.

Specifications

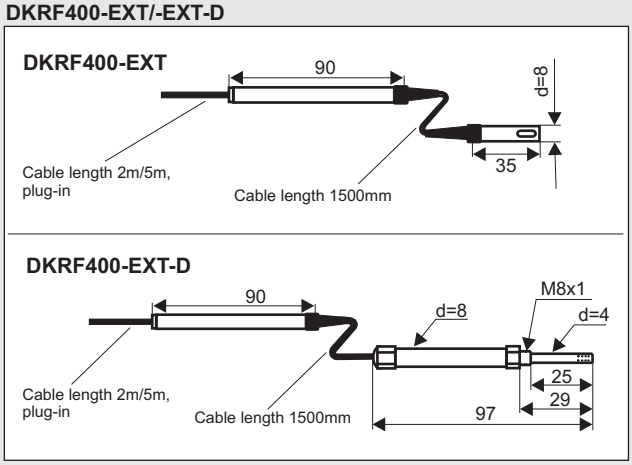




DKRF400



DKRF400-EXT/-EXT-D



Humidity

Measuring range:	0...100% RH
Temperature	
Measuring range:	
DKRF400	-40... +80°C
DKRF400-EXT/EXT-D	-40...+120°C
Probe dimensions:	d=8mm, l=101mm
Housing:	Stainless steel
Weight:	12 g
Cable:	PVC
Weight (w. 2m cable):	62 g
Cable:	2m or 5m (standard)
Wires:	Open cable ends (connectors optional)
Supply:	
Output: 0...1V	3.0...30VDC, 800µA
Output: 0...5V	6.0...30VDC, 1.5 mA
Output: 0...10V	11...30VDC, 1.9 mA
Settling time:	80 msec
Output load:	> 2KOhm
Refresh (output)	1x per second
Response time: 1/e (63%)	4 seconds (without filter) 15 seconds (with filter, 1 Filter 400 included in delivery)

Order Code

The following order code applies to the DKRF400-Serie

Standard probe
DKRF400 DKRF400-AA-KL

Probe with external sensor head
DKRF400-EXT DKRF400-EXT-AA-KL

Probe with pressure-resistant sensor head
DKRF400-EXT-D DKRF400-EXT-D-AA-KL

AA = Analogue output	- 01	= 0...1V
	- 05	= 0...5V
	- 10	= 0...10V
-KL = Cable length	-2000	= 2m cable
	-5000	= 5m cable

Also available:

Extra cables: RS232/RS485, USB:	Other cable sizes on request see DKRF400-Digital datasheet for further details
Tp, X, Wb, AbsF, WindChill:	Optional outputs for dew point, mixing ratio, wet-bulb temperature abs. Humidity und WindChill are available on request.
Accessories	
Flansch400:	Mounting flange (l=300mm) for installatio in ducts or pipes (see image on page 9).
WM400:	Wall mount for DKRF400, elegant stainless steel angle joint (see image on page 9).
Spare parts	
Filter400:	Replacement filter for DKRF400
SHT75DK:	Replacement sensor for DKRF400

Humidity/Temperature Probe

DKRF400-Digital with Digital Output

Models DKRF400-RS232 · DKRF400-RS485 · DKRF400-USB

Applications

The humidity/temperature probe DKRF400 is available as one of three models with digital outputs. On offer are RS232, RS485 and USB connectors. Each model can be easily connected to existing devices and facilities with the respective interface. The output provides a standard ASCII stream with basic protocols.

* **Computers**
* **Hand-held Instruments**
* **Industrial Controls**
* **Ethernet Modules**
* **Web Servers**
* **Data Loggers**
* **Weather Stations**
* **Environmental Chambers/Climate Cabinets**

Precise Measurements

The DKRF400 probe was specifically designed for applications which require small dimensions yet very high accuracy and fast response times.

All three models are available in EXT- and EXT-D design (see page 17, DKRF400 with Analogue Output).

The probe's measurement range goes from 0..100%RH and it operates at temperatures between -40...+80°C. The -EXT model has an enhanced temperature limit of +120°C which is achieved by a temperature-resistant cable allowing for the sensor to operate remote from the probe body. Its accuracy is up to ±1.8% RH and ±0.3°C.

Connection to a Computer

Through the various digital interfaces the probe can easily be connected to industrial control systems or a computer:

- The DKRF400 can easily be connected to the RS232 interface of a PC. Power supply is then provided by the computer.
Communication can be established with the Windows Terminal Server which makes the current readings accessible. The DKRF400-RS232 cable can be as long as 100 m.

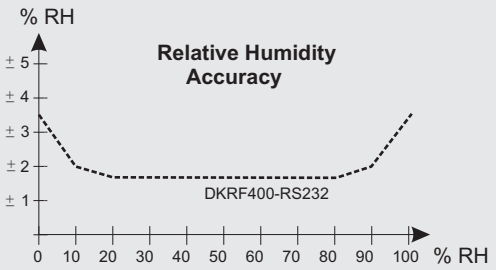
- The DKRF400-USB probe can be directly connected to the USB port of your computer. It will be detected automatically and set up for communication. Using USB hubs up to 127 probes can be connected to a single computer.

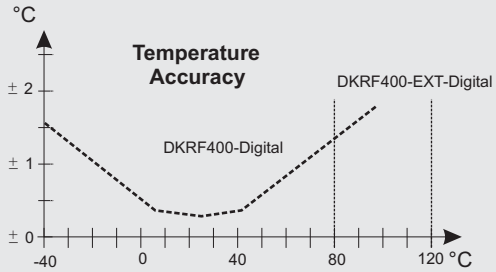
Building a Network with RS485

The RS485 interface offers a cost-efficient solution for the **addressable networking** of up to 255 DKRF400-RS485 probes, e. g. in industrial plants. The maximum admissible cable length is up to 800 m.
A basic protocol allows for the separate download and automatisation of the sensors.

Features
Miniaturized sensor design combines relative humidity and temperature
Calculated variables: dew point, absolute humidity, wet-bulb temerature, mixing ratio
Digital output for direct connection to a PC, Ethernet module or other devices
Adressable thanks to RS485 interface
High-precision probe (±1.8%RH / ±0.3°C)

Specifications





The probe features the miniaturized sensor SHT75DK which can be delivered as a calibrated spare part.

The plug-in sensor can be exchanged without recalibration on site by the user or maintenance personnel.

Humidity

Measuring range:	0...100% RH
Accuracy:	see diagram

Temperature

Measuring range:	
DKRF400	-40... +80°C
DKRF400-EXT/EXT-D	-40...+120°C
Accuracy:	see diagram

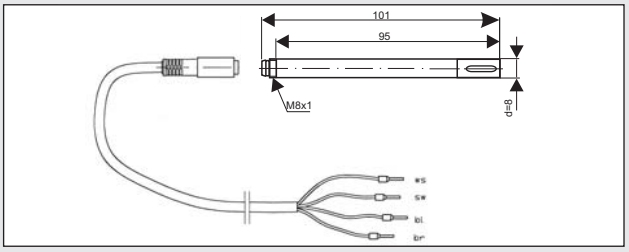
Calculated Variables

The following variables can be calculated from the relative humidity and temperature data:

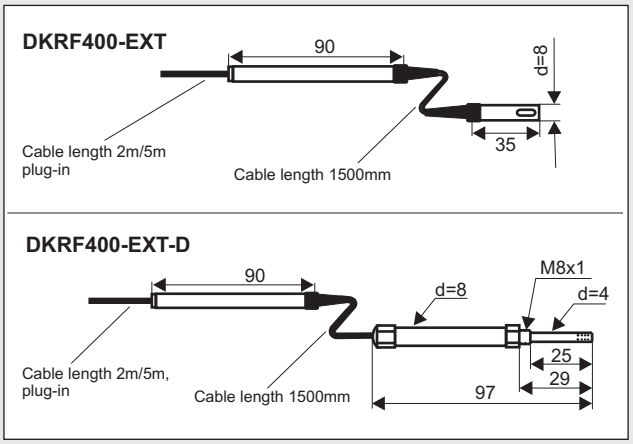
Absolute humidity
Dew point
Mixing ratio
Wet-bulb temperature
WindChill (optional)

Probe dimensions:	d=8mm, l=101mm
Housing:	Stainless steel
Sensor cable (DKRF400-EXT):	PUR
Cable length:	2m, 5m (standard) up to 10m (USB) on request up to 100m (RS232) on request up to 800m (RS485) on request

DKRF400



DKRF400-EXT/-EXT-D



Power supply:	
DKRF400-RS232	5-25 VDC (or through RS232 interface)
DKRF400-USB	Directly through USB interface
DKRF400-RS485	3-25 VDC
Current consumption:	
DKRF400-RS232	< 6.5mA
DKRF400-RS485	< 400µA
DKRF400-USB	< 30mA (max)
Settling time:	80 msec
Refresh rate (output)	max. 1x per second
Response time:1/e (63%)	4 sec (without filter) 15 sec (with filter)

Order Code

Standard probe with RS232 interface

(2 m cable)	DKRF400-RS232-2000
(5 m cable)	DKRF400-RS232-5000

Standard probe with RS485 interface

(2 m cable)	DKRF400-RS485-2000
(5 m cable)	DKRF400-RS485-5000

Standard probe with USB interface

(2 m cable)	DKRF400-USB-2000
(5 m cable)	DKRF400-USB-5000

Use the code -EXT or -EXT-D to order the model with the external sensor head.
e. g. DKRF400-EXT-RS232-2000

Humidity/Temperature Probe

DKRF410-XS / DKRF410-XXS
Extra Small Diameter

Probe DKRF410-XS

Micro Sensor for Humidity and Temperature

The Micro Sensor DKRF410 is available as one of two models which are especially suitable for humidity and temperature measurements in areas difficult to access such as insulation, concrete walls, floor screed, product and packaging tests.

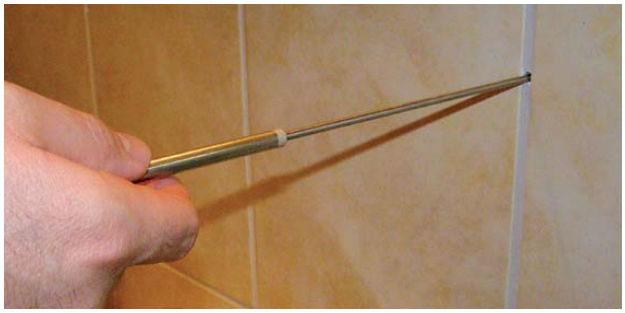
The DKRF410 probe has a range of 0...100% RH and offers an accuracy of up to ±2% RH. At the same time temperature measurements with a range of -40...+80°C can be undertaken.

Two separate analogue outputs each provide a linear signal of 0...1V / 0...5V or 0...10V.

Applications

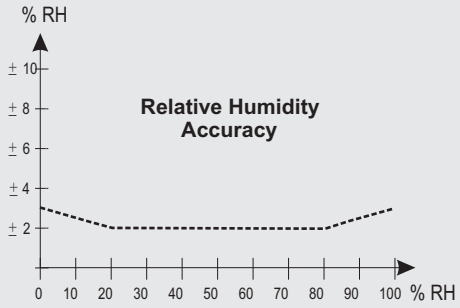
The humidity / temperature Probe DKRF410 qualifies for a variety of applications:

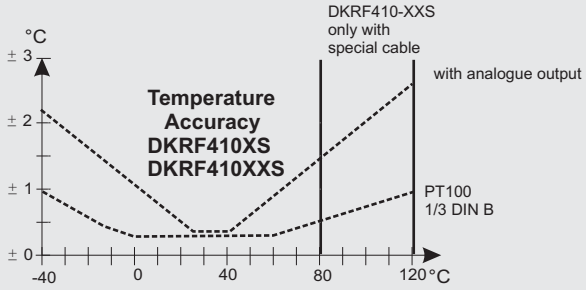
* **Physical and Biological Surveys for the Construction Industry**
* **Construction Drying and Assessment of Water Damage**
* **Museums**
* **Environmental Studies (e. g. Botanical Applications)**
* **Environmental Chambers / Climate Cabinets**
* **Drying Chambers / Incubators**



Features
Micro Probe for humidity and temperature
Model XS with thin probe tube (d=4.7mm)
Model XXS with cable probe (d=4mm)
2x Analogue output (0...1V, 0...5V, 0...10V)
Fast response time
Low power consumption --> perfectly suitable for the use with data loggers!
Large temperature range (-40...+80°C)

Specifications





Measuring Range:

Humidity:	0...100% RH (all models)
Temperature:	-40..+80°C (410XS)
	-40..+80°C (410XXS with cable V)
	-40..+120°C (410XXS with cable G)

Output signal: 0...1V / 0...5V / 0...10V

If you require a 4-20 mA output signal the DKRF 473 industrial transmitter can be used with the -XS and -XXS probe. The DKRF410 is also available with digital outputs (RS232, USB, RS485). See the DKRF400-Digital sheet for further details.

Probe dimensions:	See figure
Housing:	Stainless steel
Cable:	PVC
Length of cable probe (XXS):	2m
Cable length:	2m, 5m
Wires:	Open cable ends (Connectors optional)

Supply:	
Output: 0...1V	3.0...30VDC, 800µA
Output: 0...5V	6.0...30VDC, 1.5 mA
Output: 0...10V	11...30VDC, 1.9 mA
Settling time:	80 msec
Oputput load:	> 2KOhm
Refresh rate (output)	1x per second
Response time:1/e (63%)	4 seconds

Order Code

The following order code applies to the DKRF410 probe:

DKRF410-M-AA-KM-KL-V

M = Model/Design:	XS - probe or XXS- probe
AA = Analogue output:	01 = 0...1VDC
	05 = 0...5VDC
	10 = 0...10VDC
	PT= PT100, passive (only DKRF410-XS)
KM= Cable material:	V = PVC max 80°C
	G = PFA max 120°C
KL = Cable length:	2000 = 2m cable
	5000 = 5m cable
	Other sizes on request.
V = Versions number:	V2 product update 2012

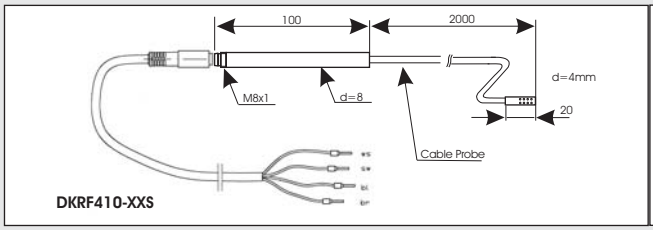
Also available:

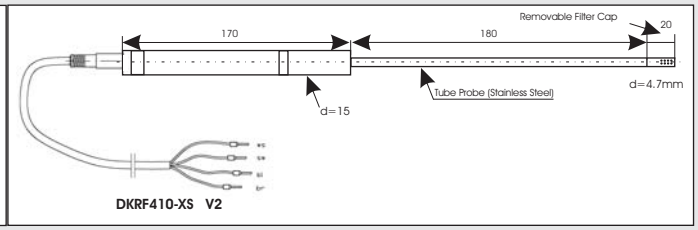
Tp, X, Wb,	Optional outputs for dew point, mixing ratio, wet-bulb temperature
AbsF, WindChill:	abs. humidity und WindChill are available on request.

Accessories:

Calibration Kit MHT (Basic or Professional)

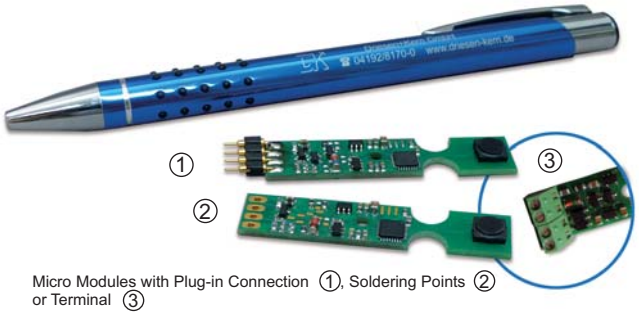
The **Basc Calibration Kit** contains of 3 Humidity Checks (11.3%, 33.1%, 75.5%), while the **Professional Kit** comes with 6 Humidity Checks (0.8%, 11.3%, 33.1%, 54.4%, 75.5%).





Micro-Modules for Humidity/Temperature

DKRF4001/DKRF4002 (CMOS-UART) for OEM Applications



Micro Modules with Plug-in Connection ①, Soldering Points ② or Terminal ③

Micro Modules

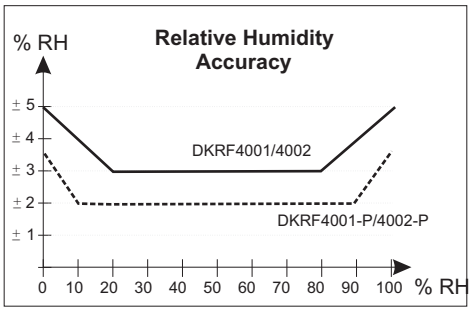
The DKRF4001 and DKRF4002 micro-modules are specifically designed to be used in OEM application fields. The DKRF4001 provides two calibrated linear outputs for 0...1/0...5/0...10 VDC. The DKRF4002 module offers a CMOS-UART interface for digital communication. Communication relies on standard parameters of the serial port interface (9600 baud, 8, N, 1; duplex, bidirectional).
The sensor modules can perform measurements at 0...100%RH and between -20...+80°C.

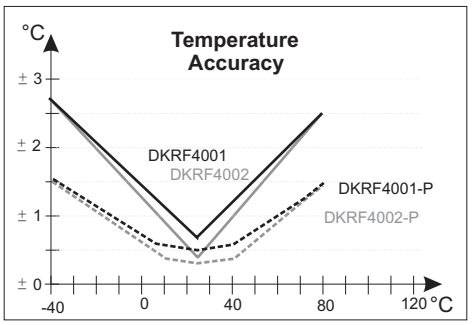
Protective Filter Cap

The modules can operate even under rough conditions. The standard filter cap protects the sensor against dust and liquids.

Optional Terminal

By default, the micro module provides soldering joints. A connection terminal is also optionally available.





Order Code

The following order code applies to the DKRF4001/4002 modules: **DKRF MOD-AA-MB-C**

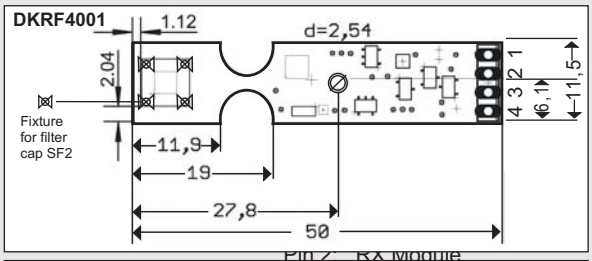
MOD = Output:
- 4001 = Analogue output, standard accuracy
- 4001P = Analogue output, improved accuracy
- 4002 = Digital output, standard acuracy
- 4002P = Digital output, improved accuracy

AA = Analogue Output:
- 01 = 0... 1VDC
- 05 = 0... 5VDC
- 10 = 0...10VDC
- 00 = without analogue output

MB = Measuring range:
- 2080 = Range -20 ...+80°C
- xxxx = Range of probe

C = Connection
- STD = Soldering points
- AK = Terminal
- SL = Plug-in connection

Specifications



Pinout DKRF4001
Pin 4: GND
Pin 3: $+U_B$
Pin 2: rFout
Pin 1: Tout

Pin 2: RX Module
Pin 1: TX Module

Bonding: Soldering point, 1.27 mm grid
Pins or connection terminal optional
Height: h= 4 mm without filter cap

Relative humidity DKRF 4001/DKRF4002

DAC resolution: 0.04% RH

Temperature DKRF 4001
Measurement range: -20...+80°C
Accuracy: ±0.6°C @ 25°C Standard
±0.4°C @ 25°C only DKRF4001-P
DAC resolution: 0.04°C

Temperature DKRF4002
Measurement range: -20...+80°C
Accuracy: ±0.4°C @ 25°C Standard
(±0.3°C @ 25°C only DKRF4002-P)

Analogue output (DKRF4001): 0...1V / 0...5V / 0...10V

Supply DKRF4001:
Output: 0..1V 3.0...25VDC, 3mA
Output: 0..5V 6.0...25VDC, 3.5 mA
Output: 0..10V 11...25VDC, 4 mA
Supply:
DKRF4002: 5.0...25VDC, 400µA

Optionally available variables: dewpoint, absolute humidity

Low-Cost Humidity/Temperature Probe

DKRF4050/DKRF4060

Features

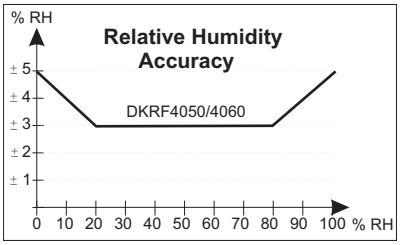
- Capacitive humidity probe with excellent accuracy
- Analogue output signals 0...1V/5V/10V (4050)
- Digital CMOS-UART interface (4060)
- Designed for low-cost integration
- Drift-free and long-term stable sensor

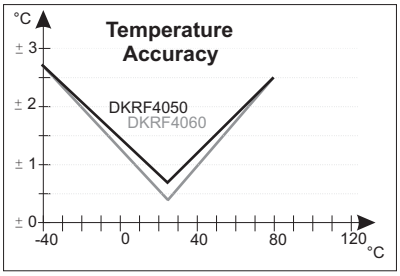
Well-priced and Compact

With the DKRF4050 and DKRF4060 Driesen+Kern GmbH well-priced instrument for humidity and temperature. With its G3/8" connection thread the compact cable probe (d=24.5mm, l=46mm) can easily be installed in plants and facilities.
Alternatively, an extension for the probe is available with which the probe can be attached to a compression fitting.

Two models are available:
The DKRF4050 with 2 linear analogie outputs 0...1V/0...5V or 0...10V and the DKRF4060 with a CMOS-UART interface. As standard, the probes deliver readings for relative humidity and temperature. Output of other calculated variables such as dew point, absolute humidity or wet-bulb temperature can also be configured.

Accuracy





Specifications

Dimensions:	d=24.5mm , l=46mm
Probe tube (optional)	d=23.5mm, l=200mm
Connection cable:	4 wire, PUR, (2m,5m)

DKRF4050 Analogue Probe

Measuring range:	-20…+80°C
Analogue output:	0...1V/0...5V/0...10V
Supply (0...1V)	3.0...25VDC, 3mA
Supply (0...5V)	6.0...25VDC, 3.5mA
Supply (0...10V)	11...25VDC, 4 mA
DAC resolution:	0.04%RH / 0,04°C

DKRF4060 Digital Probe

Measuring range:	-20…+80°C
Supply:	5.0...35VDC, 400µA
Logic level:	0= 0V, 1= 2.5V
Communication:	9600 baud, 8 bits, no parity, 1 stopbit, no flux control
Output format:	automatically after power on reset [-]xxx.xx_°C TAB xxx.xx_%CRLF

Command	**Function**
Meter [CR]	Sends sensor data for humidity and temperature once
MeterMode [CR]	Periodically sends sensor data for humidity and temperature every 2 seconds
S [CR]	Stops MeterMode

Order Code

Order Code: DKRF40X0-A-KL

X=	5= Analogue output 6= RS232-CMOS-UART
A=	01 = 0... 1 VDC 05 = 0... 5 VDC 10 = 0...10 VDC 00 = RS232-CMOS-UART
KL=	2000 = 2 meter 5000 = 5 meter

Humidity/Temperature Probe DKRF300 + DKRF300-0835

with Digital Two-wire Sensirion Sensor

Humidity/Temperature Probe

The DKRF300 and DKRF300-0835 probes are based on the combined humidity and temperature Sensor SHT75 by Sensirion.

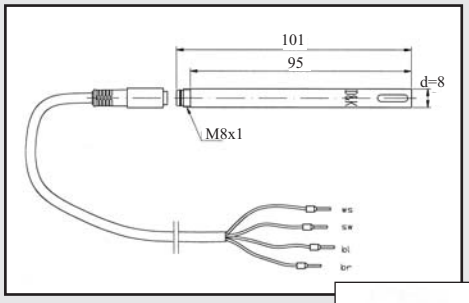
Their filter protects the sensor against splash water and dust. Being of robust design the stainless steel probe body offers additional protection.

This humidity/temperature sensor provides the digital two-wire signal by Sensirion (see SHT75DK data sheet for further information).

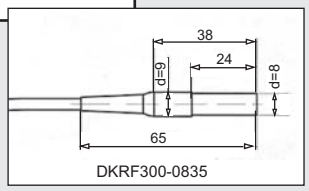
Features

Combined miniature sensor for humiditiy and tenmperature
Exchangeable high-precision probe + dust filter (±1.8%RH / ±0.3°C without recalibration!)
Calibrated digital output signal through two-wire interface
Fast response time (4 seconds)
Low power consumption
Large temperature range -40...+120°C
Robust plug-in probe made of stainless steel (DKRF300) or miniaturized probe with connection cable (DKRF300-0835)

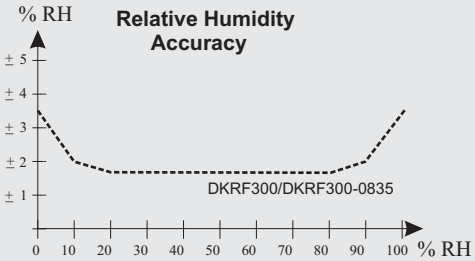
Specifications

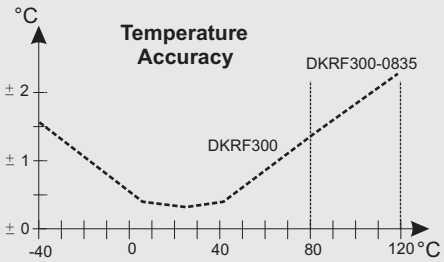


DKRF300
with connection cable



DKRF300-0835





Accessories
Mounting flange, Certificate of Calibration,
Calibration Kit MHT, Radiation/Rain protector TR351 for outdoor use,
Cable: 2m, 5m or customised

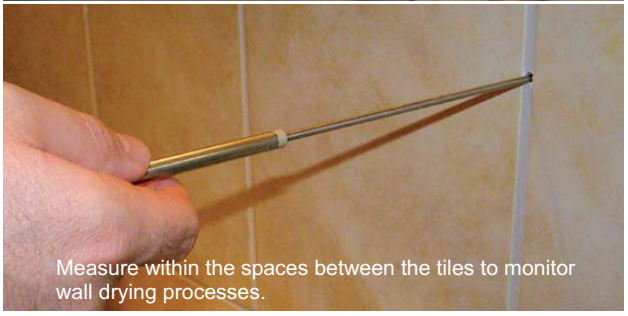
Miniaturized Humidity/Temperature Probe

DKRF310-XS + DKRF310-XXS with Digital Two-wire Sensirion Sensor

Miniaturized Sensor

The DKRF310XS and DKRF310XXS probes are based on the combined humidity and temperature Sensor SHT21 by Sensirion (see separate data sheet for further details).
The sensor can either be integrated into a miniaturized small stainless steel sleeve (D=4mm, L=20mm) or be delivered as a tube probe.
It provides an I²C output signal (description in SHT21 data sheet).

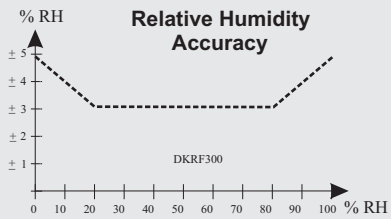

Avoid mould formation indoors by measuring in walls.

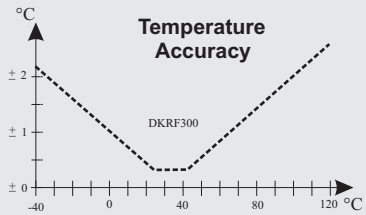

Measure within the spaces between the tiles to monitor wall drying processes.

Features

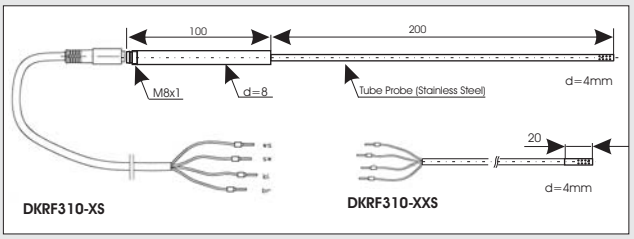
Miiaturized sensor for humidity and temperature
Excellent accuarcy (±2%RH / ±0.3°C without recalibration!)
Calibrated digital output signal through I^2C interface
Fast response time (4 seconds)
Low power consumption
Temperature range -40...+80°C (120°C on request)

Specifications





DKRF310-XS / DKRF310-XXS
Dimensions: d=4mm, l=20mm with cable (open ends)
Cable: 400mm, 2000mm, 5000mm (standard)



Accessories
Certificate of Calibration, Calibration Kit MHT

Humidity Calibration Kit MHT

Available as Basic or Professional Kit

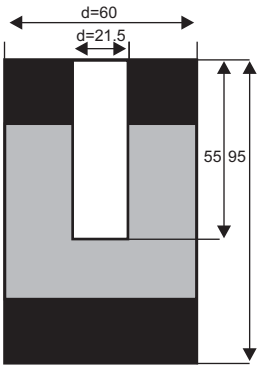
On-Site Calibration of Your Instruments

The MHT Series Humidity Checks allow you to test and calibrate a variety of humidity measuring instruments such as probes, hand-held instruments or transducers.
The Humidity Check contains a saturated salt solution which maintains an equilibrium humidity within the cartridges for every salt solution.
The equilibrium humidity of each salt solution has been agreed upon in international interlaboratory comparison.
Using different salts it is possible to manufacture reference cartridges for the entire measurement range of 0...100%RH.

Independent of Orientation

The MHT Humidity Checks were designed to be used in the field as well as in laboratories. They are small, handy and can operated in any position. This allows you to calibrate humidity probes without removing them from their respective facilities.

Special adapters for probes with different diameters hermetically seal the Humidity Checks during calibration.



MHT Humidity Check Dimensions

Dimensions in mm

Features

Calibration of humidity probes independent of orientation
Accuracy of up to ±2% RH viable
Miniaturized climate chambers
Hermetically sealed by universal adapter
Certificate of Calibration available

Order Code

The following MHT Humidity Checks are available:

Single MHT Humidity Checks

Order no.: MHT0	Humidity Check	0.8 % RH
Order no.: MHT11	Humidity Check	11.3 % RH
Order no.: MHT33	Humidity Check	33.1 % RH
Order no.: MHT54	Humidity Check	54.0 % RH
Order no.: MHT75	Humidity Check	75.5 % RH
Order no.: MHT97	Humidity Check	97.5 % RH

The Basic Kit contains 3 Humidity Checks whereas the Professional Kit comes with 6 Humidity Checks.

Basic Calibration Kit:
Order no.: MHT00050 — 3 Humidity Checks (MHT11, MHT33, MHT75)

Professional Calibration Kit:
Order no.: MHT00051 — 6 Humidity Checks (MHT0, MHT11, MHT33, MHT54, MHT75, MHT97)

Included in delivery are:
Calibration manual,
1x universal adapter for 7...13 mm, carrying case with insulation material for stable temperature conditions and fixation during calibration.

Also available:

Humidity Check Certificate of Calibration

Order no.: MHT00040	for MHT Humidity Checks
Order no.: MHT00041	for the Basic Kit
Order no.: MHT00042	for the Professional Kit

Adapter for probes with different diameters, with compression fitting:

Order no.: MHT00255	Universal adapter (Probe diameter 4...7 mm)
Order no.: MHT00260	Universal adapter (Probe diameter 7...13 mm)
Order no.: MHT00270	Universal adapter (Probe diameter 12-20 mm)

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