Driesen + Kern GmbH

Bedienungsanleitung / User Manual

DKRF400/-EXT/-EXT-D · DKRF415 · DKRF417



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1 Safety Notes

This user manual describes set up, operation and troubleshooting of transmitter series **DKRF400**, **DKRF415** and **DKRF417**. Should you encounter any problems with installation or operation, please refer to chapter **6 Troubleshooting** for help first.

If you have further questions or are unable to solve your problem with the help of this manual, then please refer to **Chapter 6.2** to learn more about how request support from Driesen+Kern GmbH.

Safety notes in this manual are marked as follows

	Warning	This entry indicates potential health hazards as well as risks of damage to the device.
	Caution	This entry gives warning of data loss, potentially unsucessful measurements or other application errors.
	Note	This entry shows usefule tips for correct measurements as well as information with a higher need for attention.

2 Introduction

DKRF400/DKRF415/DKRF417 series humidity/temperature transmitters consist of a range of different models. They can be equipped with either analog or digital outputs. Both the DKRF415 and DKRF417 are also available with a combined analog/digital output.



◄ **DKRF400 Standard** Transmitter:
Integrated sensor/electronics in probe tubing and connection cable.
Operating temp.: up to 80°C.

▼ **DKRF400 EXT** Transmitter:
Remote sensor, electronics integrated in tube, operating temp. up to 120°C.



▼ DKRF415 Standard

Compact, pressure resistant transmitter for robust applications. Pressure-tight up to 2 bar above ambient pressure. Operating temp.: up to 80°C.



▼ DKRF 417 Standard

For high-pressure applications. Pressure-resistant up to 30 bar above ambient pressure.
Operating temp.: up to 80°C.



All basic models provide **two** measured variables at the analog output.

- Eligible **measured variables** are:

Temperature	[°C]	standard
Relative humidity	[%]	standard
Dew point	[°C]	option
Absolute humidity	[g/m3]	option
Wet-bulb temperature	[°C]	option
Mixing ratio	[g/kg]	option

- Eligible **output signals**, which can be chosen when placing your order:

0 – 1	volts	
0 – 5	volts	
0 – 10	volts	
X – Y	volts	(upon request)

Transmitters with digital outputs are available with three different interfaces: **RS232**, **RS485** and **USB**.

Through these interfaces **almost all** measured values can be transmitted at the same time. An ASCII stream and a binary stream with checksum are used for data transmission.

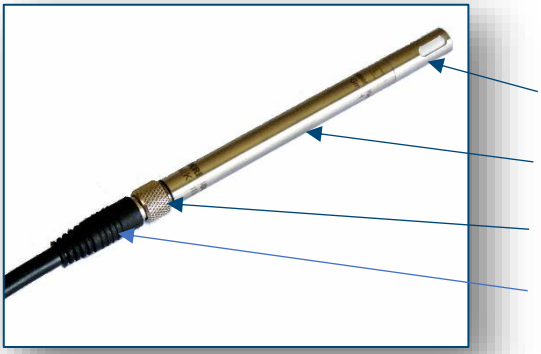
2.1 Box Content

When unpacking your package check the contents of your delivery with your invoice/delivery note.

- In addition to a **DKRF400/415/417-Standard** or **DKRF400-EXT** transmitter as well as the **Quick Start Guide** your delivery may include the following accessories:

Connection cable	2m, 5m (10m, 15m optionally) USB, RS232 or RS485 interface (optional)
Converter	RS485-RS232
Converter	RS485-USB
Flansch400	Mounting flange for duct installation
WM400	Wall mount
TR351	Radiation protector
Filter 400	Filter cap for protection against dust or liquids
DKRF47000312	Sintered filter for DKRF415

2.2 Device Layout



◄ DKRF400 Standard

Sensor head

Probe tube

Screw connection

Connection cable



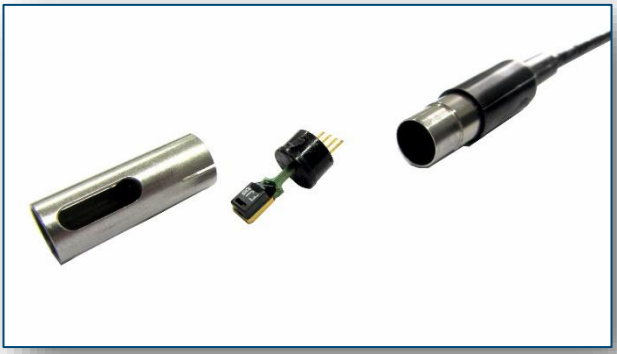
◄ **Open Sensor Head**

SHT75 Sensor

Cap with filter

Connector

▼ Filter cap of the **DKRF400-EXT** removed, SHT75 disconnected



Filter cap of the **DKRF415** contains a sintered filter which is screwed on.
The **DKRF417** has no filter and may only be used in clean air. The sensor can not be exchanged by the user.

2.3 Application Areas & Limitations of Use



When measuring humidity and calibrating humidity measuring instruments the temperature balance between the sensor and the ambient air is of special importance. A small temperature difference of only ±1°C at ambient conditions of 20°C and 50%RH can cause a measuring error of ±3%RH. At 90%RH ambient humidity the error increases to ±5.4%RH.

Limitations of Use:

Several factors can influence measurements of relative humidity. The following information is supposed to help you prolong the life of your sensor and increase measurement accuracy. In case of doubt, please don't hesitate to contact us for further assistance.

2.3.1 Chemicals

The transmitters feature a capacitive humidity sensor with **CMOSens** technology. Together with some other protective measures this makes the sensor quite resistant against contamination. However, chemicals, especially cleaning agents, solvents and acids, can affect the measurement and even destroy the sensor.

Please note that in some cases these hazards may appear only at high temperatures or develop a harmful concentration only after long-term gas release. If and how measurements can be achieved with filters or bypasses in these cases needs to be assessed in the individual case.

2.3.2 High Humidity

In high humidity operating conditions a change in temperature of only a few degrees can cause condensation on the sensor. While the sensor may be subjected to temporary condensation it may not be subjected to regular and/or permanent condensation which causes corrosion within

the sensor and on the pcb tracks. The following measures should help prevent harmful operating conditions:

1. Remove sensor filter in order to improve drying. Please keep in mind that drying in unventilated places may take up to several hours.
2. Install a bypass with controllable conditions. If necessary, use a conversion to absolute humidity or dew point.
3. Install a baffle plate or immersion pipe in order to prevent the sensor from wetting.

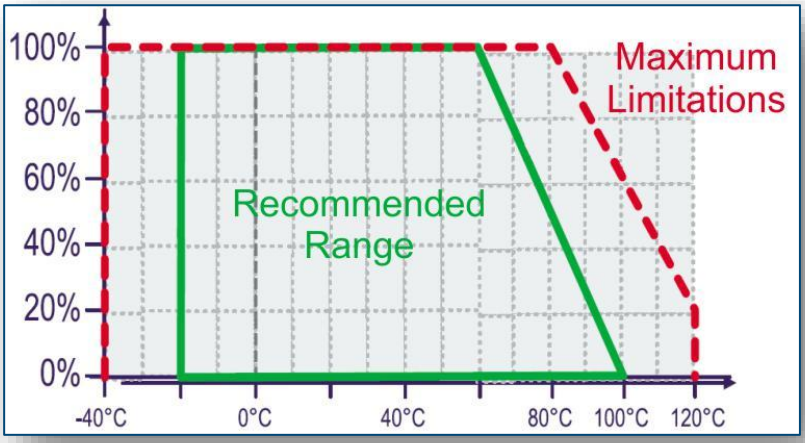
With occasional condensation, the sensor will work properly after the condensate has dried. If the condensate is contaminated with hazardous substances (e. g. acidifiers, solvents) sensor life may decrease and an irreversible drift in measurements may occur.

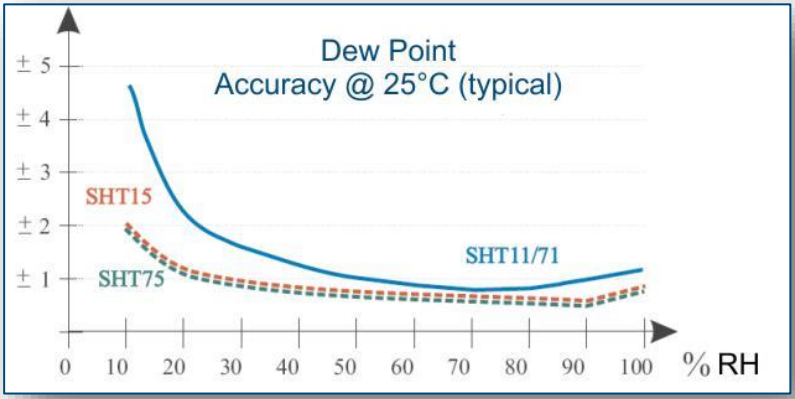


Special transmitter DKRF676 can be used in high humidity applications. It has a built-in sensor heating which prevents the sensor from condensation. In addition, it helps the sensor dry faster. Since the heating capacity is limited the sensor should still not be used in permanent water vapour or atomized spray. Use a baffle plate or immersion pipe to mitigate the conditions.

2.3.3 High Temperature & High Humidity

The transmitter can be used within the range of 0...100%RH with the above mentioned restrictions. Temperature operating range is limited by the electronics, the sensor itself and its materials. In addition, the sensor may not be used when high temperature and high humidity occur **at the same time**.





Operation outside of the recommended range can increase the humidity signal of up to 3%. Afterwards the sensor will return to its previous calibration.

Do not use the transmitter outside of the maximum admissible limitations.

For high humidity/high temperature applications we recommend our DKRF676 transmitter which is optimized for high humidity and has a built-in sensor heating for condensation prevention.

2.3.4 Low Humidity

In low humidity (close to 0%RH) the sensor is a little less accurate than in usual humidity levels.

Also, the relative error (in relation to the actual reading) increases drastically in low humidity environments.

Dew point accuracy:

Suppose you are measuring at 50%RH. Sensor uncertainty is ±1.8%RH.

This means that the relative error is 1.8/50=3.6%.

Now, suppose you are measuring at 5%RH. Sensor uncertainty is about ±2.5%RH. This means that the relative error is 50%.

In conclusion, dew point calculation at low humidity will be very inaccurate. We recommend establishing a bypass when measuring at very low humidity levels with a humidity transmitter.

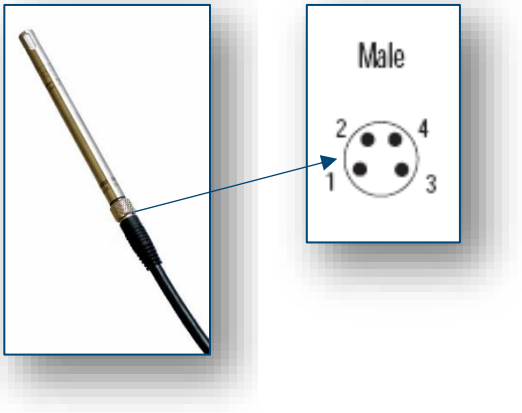
3 Hardware

3.1 Installation

Carefully choose the installation site. A continuous airflow is required for quick response times, and the ambient air should be free from contaminants or dusts. Also, condensation should be avoided. In any case, the transmitter should be installed vertically or with a slope towards the sensor so as to prevent condensation from accumulating on it.

3.2 Connecting the Transmitter

The transmitter consists of the tube including the sensor and electronics as well as the connection cable. At the bottom of the tube there is a 4-pin M8 male plug. (Exception: DKRF417, DKRF415 with PT100/PT1000 and other custom-made models.)

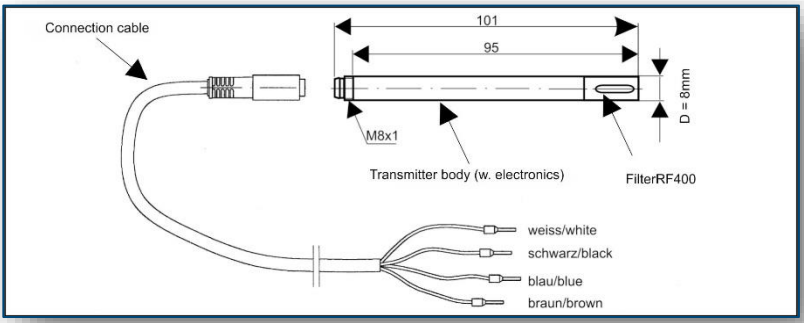


The connection cable has the suitable socket and can be secured by a screw connection.

Plug in the transmitter first, then screw the tube nut of the connection cable onto the screw thread of the transmitter. **Grasp the transmitter body firmly!**



▼**Layout** (4-core cable)



▼ Pinout (4-pin Plug)

Pin	Description
1	Voltage (-)
2	Vout Channel B
3	Voltage (+) 3-35V
4	Vout Channel A

▼ Wire Assignment (Connection Cable)

DKRF400 & DKRF415	DKRF 415 with PT100/PT100	DKRF417	Description
Brown	Brown	Brown	Voltage (-), GND
Black		Grey	Vout Channel A (Temp.)
Blue	Blue	Blue	Voltage (+), 3-35V
White	White	White	Vout Channel B (RH)
		Yellow	RS485 A
		Green	RS485 B
	Grey		PT100/PT1000 (1)
	Pink		PT100/PT1000 (1)
	Green		PT100/PT1000 (2)
	Yellow		PT100/PT1000 (2)
	Yellow/Green		Shielding

Supply Voltage: 3-35VDC (0-1V)
6-35VDC (0-5V)
11-35VDC (0-10V)

Supply voltage input is protected against polarity reversal. Both of the analog voltage outputs are also reverse-polarity protected and short-circuit proof to a certain degree. The analog probe's current consumption should not exceede 4mA due to the modern electronics.



We highly recommend not connecting supply voltage or GND to the outputs.

For other wire assignments (e. g. custom made) please refer to appendix B.

3.3 Digital Interfaces

3.3.1 Connection via RS485 Interface

DKRF400, **DRFK415** and **DKRF417** can be purchased with a connection cable for the RS485 interface. This cable comes with open ends to best suit your systems requirements. Thanks to the RS485 interface at least 56 transmitters of the same model plus one master can be connected without additional electronics assembly.

▼ Pinout (4-pin Plug)

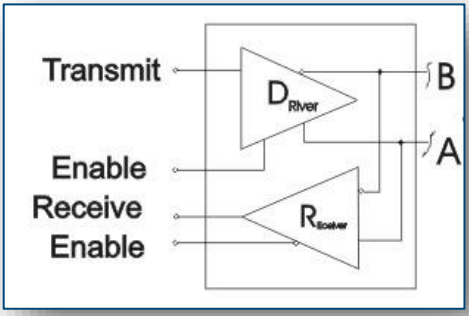
Pin	Description
1	Voltage (-)
2	RS485-A, (non-inverting I/O)
3	Voltage (+) 3-35V
4	RS485-B (inverrting I/O)

▼ Wire Assignment (Connection Cable

DKRF400 & DKRF415	DKRF415 mit PT100/PT1000	DKRF417	Description
Brown	Brown	Brown	Voltage (-), GND
White	White	Yellow	RS485-A (non-inverting)
Blue	Green	Blue	Voltage (+), 3-35V
Black	Yellow	Green	RS485-B (inverting I/O)
		Grey	Vout Channel A (Temp.)
		White	Vout Channel B (RH)
	Yellow/Green		Shielding

FSee wire assignments in appendix B for custom made products.

▼ Typical Cicuit of an RS485 Interface



Bus specifications:
Standard RS485, two-wire, half-duplex,
-7V to +10V Common-Mode Input Voltage Range

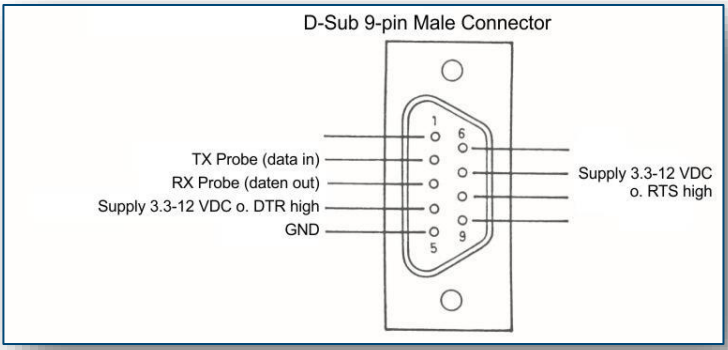
Operating and testing several DKRF400/DKRF415/DKRF417 can be made easy by a radial array using the RS485-RS232 converter. The converter uses the power supply from the interface (with only a few connected probes) and offers excellent signal processing. See **Chapter 3.2** for the pinout. Refer to **Chapter 4** for the command syntax.

3.3.2 Connection via RS232 Interface

DKRF400, **DKRF415** and **DKRF417** can be ordered with a connection cable for the RS232 interface which comes with a 9-pin SUB-D plug which is compatible with common RS232 computer ports.

The RS232 port of the PC can supply power to the transmitter directly by switching DTR- and/or RTS to a logic high signal or by feeding a separate voltage to both of these pins. (3.3-12V) Current consumption is negligible as it is below 1mA.

▼ RS232 Pinout



Accessing the transmitter via PC does not require any programming experience and no additional drivers. Just connect the transmitter to the RS232 interface and run a terminal application (e. g. PuTTY). Select the right COM port, interface parameters should already be preselected by the terminal application (refer to **appendix A** for details). The serial data stream (ASCII) will now be displayed on the screen.

3.3.3 Connection via USB Interface

DKRF400, **DKRF415** and **DKRF417** can be ordered with a connection cable for the USB interface which comes with a standard USB plug which is compatible with all common computers. Power is supplied directly through the USB port. It needs no further set up. However, USB drivers for your operating system have to be installed.
Download the suitable drivers from our website:
Software Updates (www.driesen-kern.com ► Software Updates)

Make sure to first install the USB drivers before connecting the transmitter to your computer. Communication is established thorugh a virtual COM port which is automatically assigned once the operating system has detected the probe.

Go to **Start\Settings\Bluetooth & other devices** to find the entry: **Silicon Labs CP210x USB to UART Bridge (COMx)**
COMx is the respective port which has been assigned by the operating system and which you need to select in the terminal application.

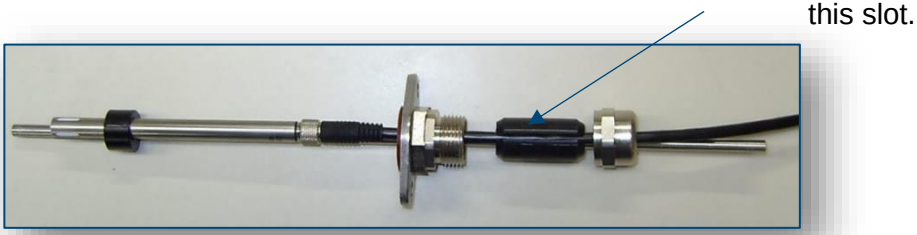
After a connection has been established the transmitter is automatically set to MeterMode which means that a serial data stream is being transmitted every 2 seconds. See **Chapter 4** for the commands with which to control the transmitter.

3.4 Installation with Accessories

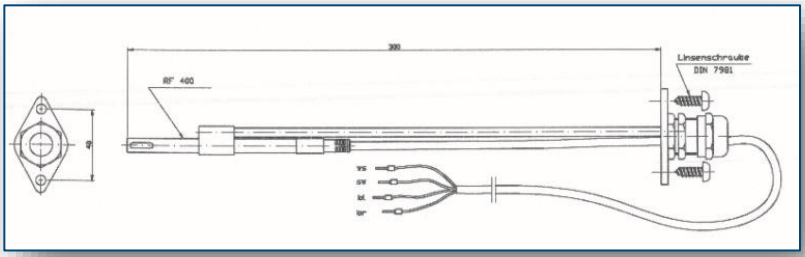
3.4.1 Using the Mounting Flange

Use mounting flange Flansch400 when installing the **DKRF400** or **DKRF415** in a duct.

▼ **Mounting Flange**



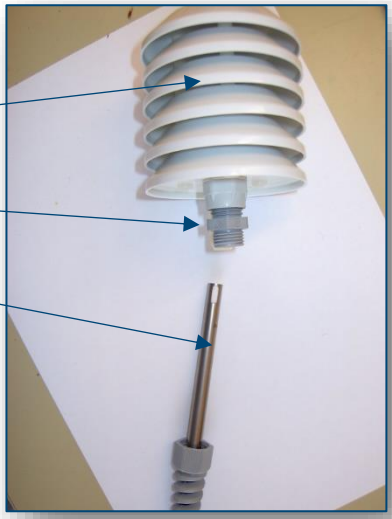
▼ **DKRF400 with Mounting Flange**, layout



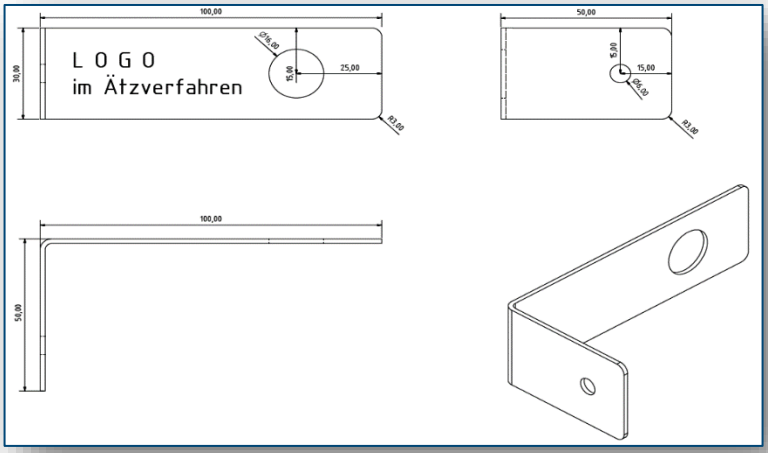
3.4.2 Using the Wall Mount

Installation on walls is made easy and ensures metrologically correct measurements by using the **wall mount**. Remember to use our **radiation protector** when setting up the transmitter outside.

Radiation Protector TR351 ►



▼ Wall Mount WM400



4 Operation

After successful installation on site and having connected the transmitter to the cable you can set the device into operation.



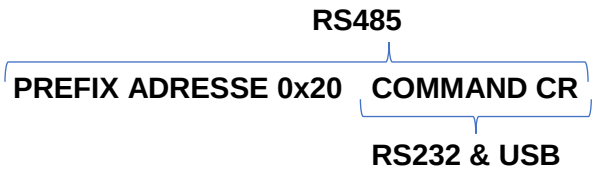
After connection with a computer has been established for the first time the transmitter is automatically set to MeterMode in which it will send readings every 2 seconds.
If the transmitter has the RS485 interface it will **not** automatically switch to MeterMode as the transmitter needs to be given an address first.

Refer to **appendix A** for the ASCII mode transmission specifications.

4.1 Command Syntax for the Digital Interface

Command syntax for the digital interfaces includes the command consisting of several ASCII characters as well as a carriage return as terminator. The RS485 interface requires a prefix and an address before the command. The address consists of several ASCII characters in plain text, too (ranging from 0...255). Upon delivery the address is 0 by default. Address and command are separated by a space (ASCII code 32dez or 0x20hex). There is no checksum function.

Command syntax:



The prefix is optional and is used for synchronization on the bus. It is comprised of 3 bytes and looks as follows:

?#: = ASCIICode 0x3Fhex 0x23hex 0x3Ahex

The address has to follow immediately and without a space after the prefix.

4.2 Commands

Command	Function	
Meter	Non-recurring transmission of readings	
MeterMode	Periodic transmission of readings every 2 seconds. May not be used with more than one RS485 client on the same bus and is meant for evaluation of single transmitters only.	
s	Quits MeterMode	
trigger	Starts measurement and saves it	Only RS485
read	Transmits the saved readings	
config	Changes the RS485 address	

The following paragraphs provide you with more details on the commands. In the given example it is assumed that the address is 0 as is by default.

[SPACE]	=	ASCIICode 32dez / 0x20hex
[CR]	=	ASCIICode 13dez / 0x0dhex
[TAB]	=	ASCIICode 09dez / 0x09hex

Syntax of the sensor response is as follows:

Sensor reading [SPACE]°C[TAB]**Sensor reading** [SPACE]%[CR]

Sensor reading **always has a constant length** of 8 characters including integer places, 2 decimal places and decimal separator. Algebraic sign (only –) is shown if necessary. Free places are filled with space characters.

4.3 Commands in Detail

In a terminal application the carriage return at the end of a command has to be produced by hitting enter.

Non-recurring data transmission of sensor readings

Command	Meter[CR]
Response	23.82 °C[TAB]43.25 %[CR]

Non-recurring data transmission of sensor readings @ RS485

Command	0[SPACE]Meter[CR]
Response	23.82 °C[TAB]43.25 %[CR]

Stopping MeterMode

Command	s[CR]
Response	..stopped[CR]

Starting MeterMode

Command	MeterMode[CR]
Response	..enabled[CR]

Changing the RS485 address

Command	0[SPACE]config[CR]
Response	TransmitMode[CR][LF] (1)..analogue[mV][CR][LF] (2)..RS485[CR][LF] (8)..RS232[CR][LF] 1 >
Transmitter is waiting for input.	
	Enter 2[CR] for RS485 mode.
Transmitter responds:	
	RS485Address 0 >
Transmitter is waiting for input.	
	Enter digit between 0...255: 12[CR]
Transmitter responds:	
	[CR][LF]12[CR][LF]StartupInfo 1 >

Transmitter is waiting for input.

Enter 0 (disabled/hidden) or 1 (enabled/shown):
1[CR]

Transmitter responds:

[CR][LF]...wait for RESET!

After 5 seconds the device resets itself and shows the startupinfo (if enabled). It is now ready for use with the new address 12.



Caution: Entering values deviating from the valid range causes the transmitter to respond with:
[CR][LF]…out of range![CR][LF]>
Repeat with a valid input.



Caution: Entering values which are not numerary causes the transmitter to respond with:
[CR][LF]…incorrect![CR][LF]>
Repeat with a valid input.

4.4 Notes on Using the RS485 Interface

After connection with a computer has been established for the first time the transmitter is automatically set to MeterMode in which it will send readings every 2 seconds.
If the transmitter has the RS485 interface it will **not** automatically switch to MeterMode as the transmitter needs to be given an address first.

The transmitter performs an internal sytsems check upon POR (power on reset/switching on) and outputs certain parameters through the RS485 interface. It includes the current RS485 address. The startupinfo screen looks like this:

```
RESET
-MTAA-DKrF400
Enhanced Architecture HW.V. 2.0
SW.V. 2.01 build May 01 2005 13:24:14C 412A-2809
(c) Driesen+Kern GmbH Bad Bramstedt Germany
SNr: F1134
Range: -40.0 -  120.0          0.0 -  100.0
status: 0240      02      00      00      01      00      80      25
```



Current RS485 address, in this case 0

Changing the address on a windows computer requires a terminal application and an RS485 to RS232 converter. The latter can be purchased from Driesen+Kern GmbH. Commands for changing the address and disabling the startupinfo are described incChapter **4.3 Commands in Detail**.

As a terminal application you can use open source programs or freeware such as PuTTY.

Do not use **config** during RS485 operation. It is meant for one-time parametrization of the transmitter with a terminal program.

5 Maintenance & Care

DKRF400, **DKRF415** and **DKRF417** transmitters are very low-maintenance thanks to their design. With the **DKRF400** and **DKRF415** the user can change the sensor and the filter as well as verfy the readings.

5.1 Calibration

The transmitters are based on a combined humidity and temperature sensor. Calibration of this sensor is meant to be done in the calibration lab of Driesen+Kern GmbH. Please return the transmitter as a whole but without the cable. **Please note that removing the sensor for calibration is at your own risk and should be done in exceptional cases and by trained personnel only.**

5.2 Returning the Device for Annual Calibration

The recommended calibration interval is 1 year as is typical for the industry. In order for us to process your calibration order most efficiently, please download the **Service & Support Request Form** from our website and fill out all the necessary information. You can find the writable PDF here:
www.driesen-kern.com ► Contact Us ► Support

Return the transmitter to this address for calibration and include the filled out form:

Driesen + Kern GmbH
Abt. Service
Am Hasselt 25
D-24576 Bad Bramstedt

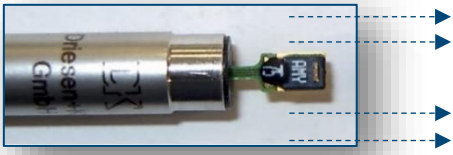
5.3 Changing Sensor & Filter (DKRF400 & DKRF415)

Please refrain from removing the sensor yourself unless it is damaged or calibration cannot be performed in any other way. Changing sensors is to be done by trained personnel only, and at your own risk.

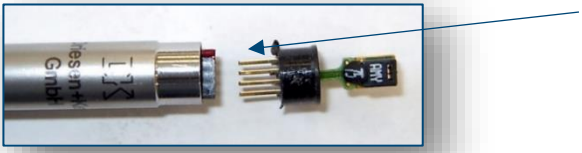
▼ Remove filter cap, while turning it slightly (**DKRF400**) or unscrewing it (**DKRF415**).



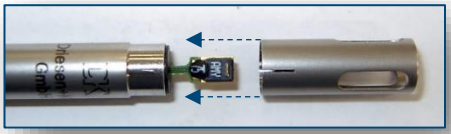
▼ Remove the sensor by carefully pulling it out.



▼ Insert the new sensor (red marking on the socket helps with aligning it), change the filter from the filter cap.



▼ Reattach filter cap (**DKRF400**) or screw it on (**DKRF415**), done!



5.4 Verify Measurements with Humidity Checks

Verifying your measurements can easily be achieved with the help of our Humidity Checks MHT0, MHT33 and MHT75.



◄ MHT Series Humidity Checks

The humidity checks are small, handy and can operate in any position. They allow you to test a variety of humidity measuring instruments such as probes, transmitters and indicating instruments.
The MHT Humidity Checks are designed to be used in the field (e. g. industrial plants) as well as in laboratories.

Transmitter inserted into a Humidity Check ►



In order to correctly varify your humidity measurements a temperature balance has to be established between the salt solution, ambient air within the chamber and the transmitter or probe itself.

($T_{Solution}$ = $T_{Air\ in\ chamber}$ = T_{Probe}!).
Avoid differences in temperature. Only when these three temperature values match, the entire system is balanced. Keep in mind that increasing the temperature of one part of the system from +5°C to +20°C might take a while.

In case the Humidity Check and the transmitter or probe have been in the same room together for a longer period, 20-30 minutes should be enough to establish the temperature balance.
In the field you could help this process by putting both the Humidity Check and the transmitter into a box.
The Humidity Check shows the exact humidity value in relation to temperature of the reference solution. Usually, transmitters and probes use combined humidity and temperature sensors. Check the temperature shown by your device and compare the value to the table on the Humidity Check, the humidity value next to it is the reference value your instrument should be showing.

Adhering to the following instructions will help you achieve an accuracy of up to ±2%RH.

Warning

	The solutions contained in the Humidity Checks are harmful in contact with skin and must not be consumed.
	Make sure that no liquid is present within the small chamber before inserting the transmitter/probe since this would damage the sensor. Moisture may have accumulated due to condensation, dropping the tester or by damage to the diffusion filter.
	Protect the Humidity Checks from sun exposure and infrared radiation.
	Do not touch the assembly during temperature compensation! (Thermal transfer!)
	Close the Humidity Checks after each use.



Use a rubber plug with the proper hole diameter for your probe/transmitter head.



Make sure that the sensor is completely inside of the chamber before use.

6 Troubleshooting

Should you experience any problems during installation or operation of the transmitter, please try to solve the issue with the help of this manual first. If you are unable to solve your problem with the help of the following troubleshooting guide, please contact Driesen+Kern GmbH for support – refer to **Chapter 6.2** for details.

6.1 Causes & Solutions

Symptom	Potential Cause	Possible Solution
Not working	Cable wired incorrectly	Regard the wire assignment when connecting the transmitter. Refer to **Chapter 3.2**.
	No DC voltage supplied	Regard the specifications of your transmitter!
	Defective/wrong cable	Use the correct cable. Check for any cable breaks.
	Wrong address	RS485 transmitters need to receive an address before use. Use a terminal application such as PuTTY to change a transmitter's address. See **Chapter 4.3**.
Implausible readings	Filter contaminated	Check and clean the filter. Unless the conditions are too harmful, take measurements without the filter for a short period to see if the readings appear to be more plausible. If this is the case, change the filter. Refer to **Chapter 5.3** to learn how to.
	Error in measurement system next in line	Check the output signal with a digital voltmeter. If the readings are correct the input amplifier of the measuring system next in line may be damaged (extremely rare). A 100Ohm in-

		line resistor at the transmitter output might solve the issue.
Permanent min/max readings	Defective cable	Change the cable.
	Defective sensor	Change the sensor.
Humidity reading too high	Filter cap saturated with water	Keep in mind to install the transmitter with a slope towards the sensor in order to allow for accumulated condesate to drip down. We highly recommend a vertical installation. If necessary, take short measurements without the filter to see if the readings improve. Should the filter indeed have been saturated with water, you need to dewater it at your own risk and with appropriate measures. Drain ONLY the filter, not the sensor itself as this will cause damage to it!
Irregular MeterMode interval	This is a feature, not a bug!	To prevent the transmitter from warming up too much, it will transmit at a slower interval if measured values don't deviate or deviate just a little. Significant changes in readings causes the transmitter to send them at a faster interval again.

6.2 Support (Online)

Of course, not every problem can be solved with our guide. In this case, as well as for calibration or repair orders, you can fill out a support form from our website. This form helps us quickly determine how to help you solve your issue as fast as can be.
You can download the writable PDF here:

www.driesen-kern.com ► Contact us ► Support

Fill out the form on your computer and send it back to us via support@driesen-kern.de. If you want to return your device for calibration or repairs, please include the form in your delivery.

Appendices

A. Communications Protocol

- Transmission Specifications for ASCII mode

Baud rate:	9600
Data bits:	8
Parity:	none
Stop bits:	1
Encoding:	ASCII characters, 1 Byte per character
Probe echo:	off

B. Wire Assignment

	DKRF400 & DKRF415 (analog)	DKRF400 & DKRF415 (analog) FK1*	DKRF400 & DKRF415 (analog) FK2*	DKRF400 & DKRF415 (digital)
Voltage (-), GND	Brown	Schwarz	Brown	Brown
Channel A (Temp.)	Black	Green	Yellow	
Voltage (+), 3-35V	Blue	Red	Green	Blue
Channel B (RH)	White	Yellow	White	
RS485 A				White
RS485 B				Black
PT100/PT1000 (1)				
PT100/PT1000 (1)				
PT100/PT1000 (2)				
PT100/PT1000 (2)				
Shielding	Green / Yellow			

* = A fixed cable can be ordered as a custom version.

	DKRF400 & DKRF415 (digital) FK2*	DKRF400 & DKRF415 (8-core)	DKRF415-RSV	DKRF415 with PT100/ PT1000	DKRF417
Voltage, GND	Brown	Brown or Red	Brown	Brown	Brown
Vout Channel A (Temp.)		Grey or Black	Grey		Grey
Voltage (+), 3-35V	Green	Blue	Blue	Blue	Blue
Vout Channel B (RH)			White	White	White
RS485 A	White	Yellow	Yellow		Yellow
RS485 B	Yellow	Green	Green		Green
PT100/PT1000 (1)				Grey	
PT100/PT1000 (1)				Pink	
PT100/PT1000 (2)				Green	
PT100/PT1000 (2)				Yellow	
Shielding	Green / Yellow				

* = A fixed cable can be ordered as a custom version.

C. Certificate of Conformity

Certificate of Conformity

Driesen + Kern GmbH

Physikalisch-Technische-Messgeräte

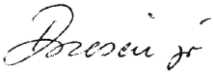
Products:

Data loggers and instruments of Series DK300, DK320, DK500, DK812,

transmitters of Series DKRF400, DKRF410, DKRF415, DKRF417

This is to certify that above products are calibrated using dedicated equipment which is calibrated according to ISO/IEC 17025 and calibrated by comparison against natural standards, natural physical constants, consensus standards, or by ratio type measurements using self-calibrating techniques.
All measuring and testing equipment is subject to regular inspection.

Bad Bramstedt, January 2018





Oliver Driesen

(Managing Director)

Jens Uwe Voigt

(Test Equipment Management)

Notes:

Visit us at www.driesen-kern.com



Driesen + Kern GmbH