Manual

DKA1, DMMK

Digital Weatherdisplays
for Reinhardt Weather Stations and Sensors

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DKA1

DMMK

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1.1 DKA1

The DKA1 displays the measured values of our weather stations series MWS 5(M), MWS 9-5, MWS 55 / 88(-2) / 10 and sensors series 1(M) und 55 such as time, date, temperature, humidity, pressure, windspeed, winddirection, precipitation, global radiation and 2 additional sensors (standard voltage in mV)

1.1.1 Contents of shipment

Shipment of DKA1 includes:

1 DKA1
1 cable with 7-pole plug for DKA1 and 9-pole SUB-D plug for serial port of PC (length 1.5m)

1 manual as PDF-file on USB-stick.

1.1.2 Safety instructions

DKA1 can only be used to display weather data of Reinhardt-weather stations.

The instrument must not be placed within reach of children and pets.

1.1.3 Operation conditions

Ambient temperature while operating DKA1 must not exceed +10°C and +35°C. The temperature during transport must be within 0°C and +50°C.
When water has condensed in the instrument, DKA1 has to be acclimatized at least 2 hours before operating it.

DKA1 is designed for operation in **clean, dry environment**. It must not be operated outside or in dusty or wet environment!
While operating DKA1, humidity must be within 20% and 70% relative humidity.

The supply voltage must be within 8VDC and 20VDC.

1.1.4 In case of complaints

In case of complaint please enclose a paper with error description and your telephone number or email address, when you send the DKA1 back to our company.

1.2 Commissioning of DKA1

Commissioning is easy:
Place the DKA1 on a solid surface (table, i.e.). Connect the cable with the power-supply to socket "Data Connection Data PC" and, if necessary, the 9-way SUB-D socket to a COM-port of your PC. (The circular connectors and the western Bell connectors are equivalent.)
Connect the power-supply to a power outlet 230VAC / 50Hz.
The DKA1 performs a short system diagnose and shows 4 minus signs. This means that no weather data are received yet.
Now you connect the cable for the weather station to the "Data WS" socket of DKA1 and finally you connect the cable to your weather station or sensor. The weather station or sensor is supplied by the same cable as DKA1.
(Only some special versions of DKA1 have got their own power supply)

NB

Please take care that you remove the plug from the MWS9-5 / 10 weather station, when no power supply is applied, for otherwise the internal backup batteries (lithium cells 2x3V - not rechargable) discharge and cause errors.

As soon as the first set of data is sent, DKA 1 displays all received weather data in a continuous flow.
In order to set the time correctly, you have to start the PC-software. The clock of the weather station is set to your computer clock.
If your weather station has a GPS-receiver, the clock is set automatically soon after operating power is applied.

1.2.1 Setting the Altitude by PC

By default, our weather stations give out the absolute pressure (altitude is set to 0 m). If you want to display the barometric pressure you may set the weather station to the correct altitude by a terminal software (hyperterminal.exe i.e.). Send the command !Oxxxx followed by carriage return and line feed (<CR><LF>) with xxxx for the altitude in meters.

NB

Please note, that the weather station is now already set to barometric pressure. You must not set the altitude in the software any other time, for the software would then display the wrong pressure. In this case you must set the altitude in the software to 0 meters.

1.2.2 Setting the Time Zone by PC

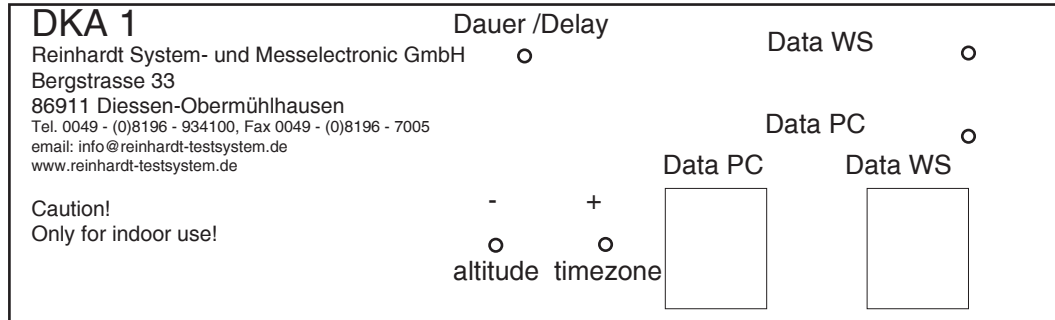For setting the time zone (Zeitzone), you use a terminal software to send the command !ZZxx followed by Carriage Return and Line Feed (CR LF) to the weather station, where xx is the deviation of your time from the UTC-time in hours. This only makes sense, if a GPS-receiver is connected!!

Altitude and time zone can also be set directly on the display, if a weather station is connected (See next page).

1.3 Connections of DKA1

Below you see the rear of DKA1:

The operation elements Altitude and Zeitzone (timezone) are used to set the real altitude and the time zone at DKA1 itself. with delay you can set the dwell time of the displayed values.

```
DKA 1                                    Dauer /Delay              Data WS
Reinhardt System- und Messelectronic GmbH        o                          o
Bergstrasse 33
86911 Diessen-Obermühlhausen                          Data PC               o
Tel. 0049 - (0)8196 - 934100, Fax 0049 - (0)8196 - 7005
email: info@reinhardt-testsystem.de                  Data PC       Data WS
www.reinhardt-testsystem.de

Caution!                              -        +
Only for indoor use!                  o        o
                                   altitude  timezone
```

1.3.1 Setting the Altitude at DKA1

To set the altitude, insert a thin long round object (e.g. screwdriver) into the Altitude-hole and press the switch until "HIGH" is displayed and the display shows the set local altitude in meters. With + and - you can now set the local altitude to its correct value. About 10 seconds later, the local altitude is transmitted to the weather station and the display starts its normal mode.

1.3.2 Setting of Time Zone at DKA1

For setting the time zone, you press ZEITZONE until "Cloc" appears on the display. Then you proceed as when setting the altitude.

The time zone can be set between +12 and -12 hours with 0 standing for UTC-time (Greenwich) and +2 e.g. for CEST-time (Central European Summer Time), which is 2 hours ahead of the UTC-time.

NOTE

Setting the time zone only makes sense if a GPS-receiver is connected. Please note that the weather station clock is set back to 0:00 o'clock on 01.01.00 and after a short time is only set by the GPS-receiver.

With a connected PC, you can use any terminal-software to do these settings (see above).

The two data connections (Data WS and Data PC) are built-in twice, once as a 5-way circular connector and as a Western Bell socket. Both are wired in parallel; you connect the weather station and optionally a PC.
The data of the weather station are sent to DKA1 and with a PC connected, handed on to the PC. The data of the PC are also passed through DKA1 and are transmitted to the weather station for controlling.

1.3.3 Connection of 7-pole sockets

Connection of 5-pole and 7-pole sockets (Rear view !!):
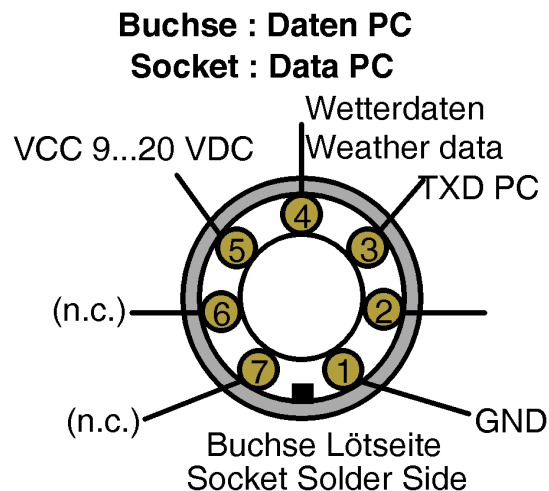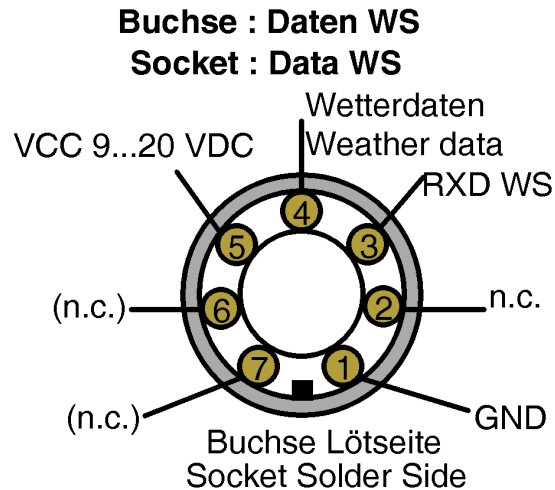
Buchse : Daten WS
Socket : Data WS

Wetterdaten
Weather data

VCC 9...20 VDC

RXD WS

(n.c.)

n.c.

(n.c.)

GND

Buchse Lötseite
Socket Solder Side

Buchse : Daten PC
Socket : Data PC

Wetterdaten
Weather data

VCC 9...20 VDC

TXD PC

(n.c.)

(n.c.)

GND

Buchse Lötseite
Socket Solder Side

Connections GND, VCC and WETTERDATEN are wired directly in parallel.
The data at the TXD-PC connection of socket "Daten PC" are processed in DKA1 and are put out as RXD-WS at the"Daten WS" socket.
Therefore never mix up the sockets !!

1.3.4 Connection of western sockets

Connection of 6-pole western-sockets (Front view !!):
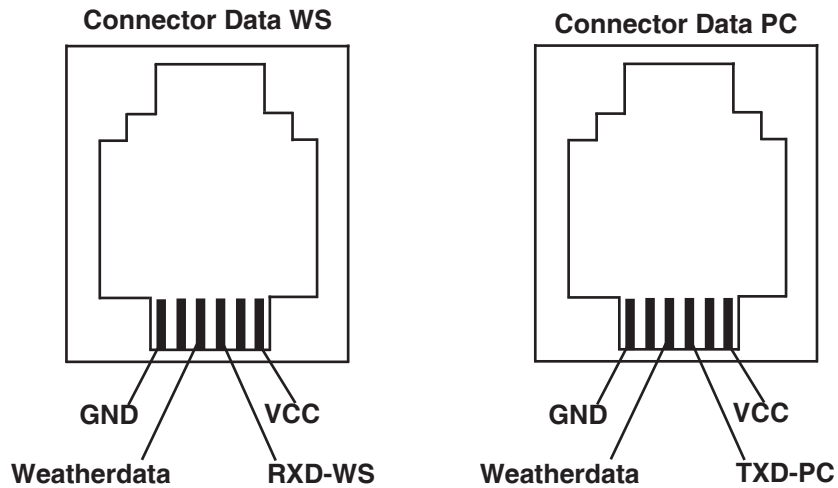
Connector Data WS

Connector Data PC

GND		VCC
Weatherdata		RXD-WS

GND		VCC
Weatherdata		TXD-PC

⚠️ Connections GND, VCC and WETTERDATEN are wired directly in parallel.
The data at the TXD-PC connection of socket "Daten PC" are processed in DKA1 and are put out as RXD-WS at the"Daten WS" socket.
This is why the sockets must never be mixed up !!

1.3.5 Standard cable 7-pole with power supply for DKA1

This cable is used to connect a power supply to DKA1 DATA_PC socket with 7-pole connector.
The weather station is connected by a 1:1 cable without power supply to DKA 1 DATA_WS socket.

Standardkabel für DKA1 mit Spannungsversorgung, 7-pol. RS232
Standard cable for DKA1 with power supply, 7-pol. RS232

Data MWS - > PC (ws / br) - (white / brown)

Data PC - > MWS (ge / gn) - (yellow / green)

VCC (rs) - (pink)

Netzteil
PSU   Vcc
        9..20V Volt DC

230 Volt AC   Gnd

PC Connector
SUB-D female

1 2 3 4 5
6 7 8 9

5   4   3
6   2
7   1

(Stecker von vorn)
(Connector front view)

GND (gr) - (grey)

Kabellänge - cable length : 1.5 m

Anschluss an DKA1
Connect to DKA1
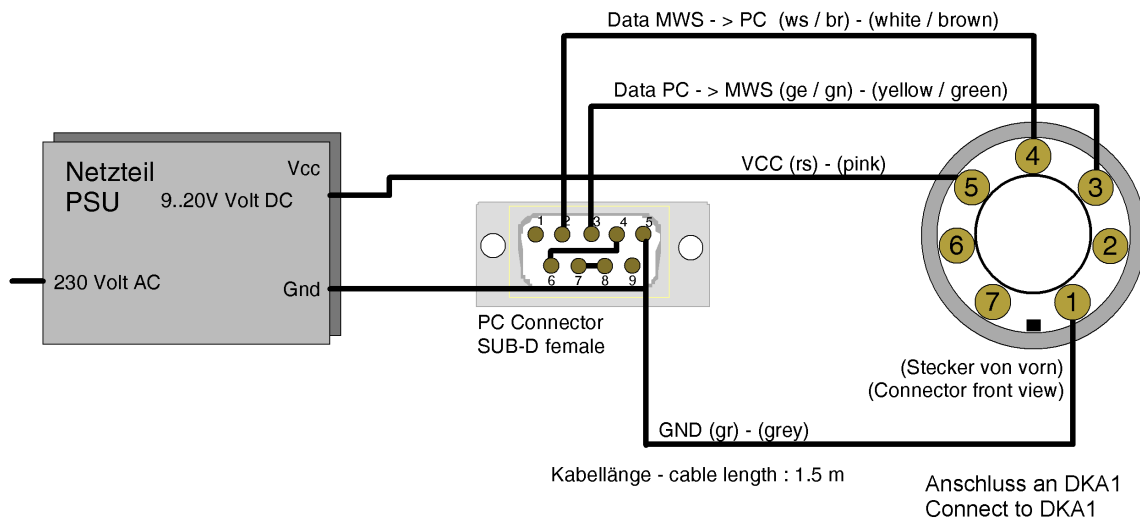
1.3.6 1:1 cable 7-pole DKA1 - DKA1

For connecting a weather station or 2 DKA1, one at DATA_PC socket, the other at DATA_WS socket.

1:1 Verbindungskabel DKA1 - DKA1, 2 x 7-pol. male ,RS232
1:1 connection cable DKA1 - DKA1, 2 x 7-pole male, RS232

(ge / gn) - (yellow / green)

(ws / br) - (white / brown)

VCC (rs) - (pink)

(Stecker von vorn)
(Connector front view)

(Stecker von vorn)
(Connector front view)

GND (gr) - (grey)

Kabellänge : bis 50m
Cable length : up to 50m
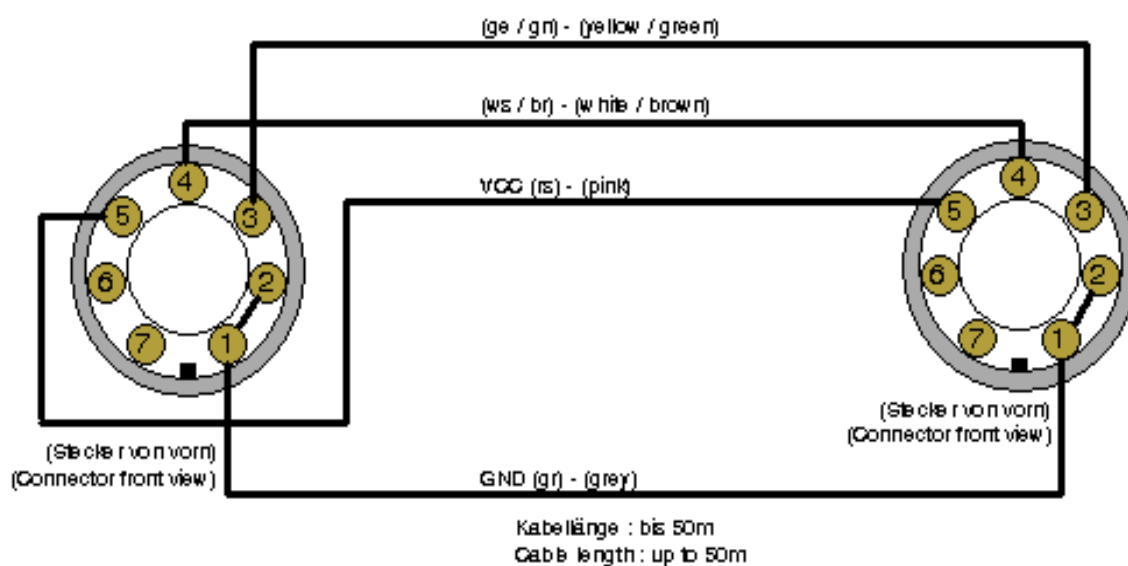
1.4 Technical Appendix for DKA1

1.4.1 Content of EEPROM of DKA1

```
EEPROM@  |  Default value  |  comment
```

EEPROM@	Default value	comment
0	006	index of baudrate
1	005	Time of datastring (< = datalogger request)
2	010	Number of sensors to display
3	004	Delay (* 0,5s) of displayed text before each sensor
4	000	Display-flags: Caution! Restart recommended.
		Bit0 = Illumination is not faded out.
		Bit1 = Skip info, No output of "DATA", READ", "CLOC",.....
5	000	
6	000	
7	064	Illumination On threshold
8	192	Illumination Off threshold
9	000	Time offset hour (high)(timezone)
10	000	Time offset hour (low)(timezone)
11	000	Altitude (high)
12	000	Altitude (low)
13	001	Memory address where the flashing dot is displayed.
14	"2"	Millennium
15	"0"	Millennium

Data information of module (DKA1):

1. Byte:
   Hi-Nibble: Memory offset (address) of Module
   Lo-Nibble: memory offset of preferred module which determines, if it is displayed or not.

2. Byte:
   Hi-Nibble: Memory offset of Module
   Lo-Nibble: Bit0 = display sensor text (Hieroglyphs)
                Bit1 = Sensor text only displayed, when it is dark.

3. Byte:
   Hi-Nibble: Bit4 = Display the dot (1=on)
                Bit5 = Do not display the value, if value is zero (delete sensor memory)
                Bit6 = Recognise preferred sensor in 1st Byte
                Bit7 = Delay for this sensor devided by 2
   Lo-Nibble: Integers (from left) (Bits0-3),

4. and 5. Byte: Sensor-identifier for this module is compared to 1st and 2nd sensor digit
(i.e. TE0.0 1.digit=T)
special case: Sign ~ (=0x7E) in 3rd Byte ->
   Is 4th Byte also ~, then sensor is skipped.
   Otherwise the sign in 4th Byte is compared to 3rd sensor digit
   (i.e.: compared with date 12.01.04, 3rd sensor digit = 1.dot)

16 (0)	|	000 (00h)	000	002	"~"	":"	|	Time
21 (1)	|	016 (10h)	000	146	"~"	"."	|	Date
26 (2)	|	033 (20h)	000	196	"~"	"%"	|	Year (preferred sensor is date)
31 (3)	|	048 (30h)	016	019	"T"	"E"	|	Temperature
36 (4)	|	064 (40h)	032	019	"F"	"E"	|	Humidity
41 (5)	|	080 (50h)	048	004	"D"	"R"	|	Pressure
46 (10)	|	160 (A0h)	128	004	"Z"	"A"	|	Additional A
51 (6)	|	103 (67h)	064	068	"W"	"R"	|	Wind direction
56 (7)	|	112 (70h)	080	051	"W"	"G"	|	Wind speed
61 (8)	|	128 (80h)	096	019	"R"	"E"	|	Precipitation
66 (9)	|	144 (90h)	112	004	"S"	"O"	|	Sun
71 (11)	|	176 (B0h)	144	004	"Z"	"B"	|	Additional B
76 (12)	|	192 (C0h)	160	004	"Z"	"C"	|	Additional C
81 (13)	|	208 (D0h)	176	002	"~"	"~"	|	Unused sensor
86 (14)	|	224 (E0h)	192	002	"~"	"~"	|	Unused sensor
91 (15)	|	240 (F0h)	208	002	"~"	"~"	|	Unused sensor
96... 127	|	255					|	Unused

2.1 DMMK

DMMK Multi-Meteo Display displays the measured values of our weather stations and sensors such as time, temperature, humidity, pressure, windspeed, winddirection, precipitation, global radiation and 2 additional sensors (standard voltage in mV). The DMMK is designed for operation in dry environment (indoor use only).

2.1.1 Content of shipment

Shipment of DMMK includes:

1 DMMK
1 Powersuppy unit 15V 1.6A with cable for supplying the DMMK
1 connection cable (serial cable with 9-pole Sub-D male and 9-pole Sub-D female) for connection of DMMK to a PC or another display
1 manual in PDF-format (on CD-ROM)

2.1.2 Safety instructions

DMMK can only be used to display weather data of Reinhardt-weather stations.

The instrument must not be placed within reach of children and pets.

2.1.3 Operation conditions

Ambient temperature while operating DMMK must not exceed +5°C and +35°C. The temperature during transport must be within 0°C and +50°C.
When water has condensed in the instrument, DMMK has to be acclimatizedfor at least 2 hours before operating it.

DMMK is designed for operation in **clean, dry environment**. It must not be operated out of doors or in dusty or wet environment!
While operating DMMK, humidity must be within 20% and 70% relative humidity.

The supply voltage must be within 8VDC and 28VDC.

2.1.4 In case of complaints
In case of complaint please enclose a paper with error description and your telephone number or email address, when you send the DMMK back to our company.

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REINHARDT System- und Messelectronic GmbH
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2.2 Commissioning of DMMK

Commissioning is easy:
1. Mount the DMMK at the wall, or place it on a plane table.
2. Connect the cable of the power supply to socket "Power" and, if necessary, the 9-pole SUB-D male into the "DATA PC" socket of DMMK and the 9-pole SUB-D female to a COM-port of your PC or to the "DATA WS" input of another display.
3. Connect the power-supply to a power outlet 230VAC / 50Hz.
4. DMMK now performs a short system diagnose and lights each segment of the single displays. DMMK then displays "no data" which means that no weather data are received yet.
5. Connect the cable for the weather station to the "DATA WS" socket of DMMK. Finally connect the cable to your weather station or sensor and plug in the PSU for the weather station to a power outlet 230VAC / 50Hz..

NB

Please take care that you remove the plug from the MWS9-5 weather station, when no power supply is applied, otherwise the internal backup batteries (3x1.2V NiMh-accus) discharge and cause errors.
As soon as the first set of data is sent, DMMK displays all received weather data on its displays. In order to set the time correctly, you have to start the PC-software. The clock of the weather station is set to your computer's clock.
If your weather station has got a GPS-receiver (MWS 5MV, MWS8, MWS 9-5 and sensors with data logger), the clock is set automatically soon after operating power is applied.

2.2.1 Setting the Altitude by PC

By default, our weather stations give out the absolute pressure (altitude is set to 0 m). If you want to display the barometric pressure you may set the weather station to the correct altitude by a terminal software (hyperterminal.exe i.e.). Send the command !Oxxxx followed by carriage return and line feed (<CR><LF>) with xxxx for the altitude in meters.

NB

Please note, that the weather station is now already set to barometric pressure. You must not set the altitude in the software any other time, for the software would then display the wrong pressure. In this case you must set the altitude in the software to 0 meters.
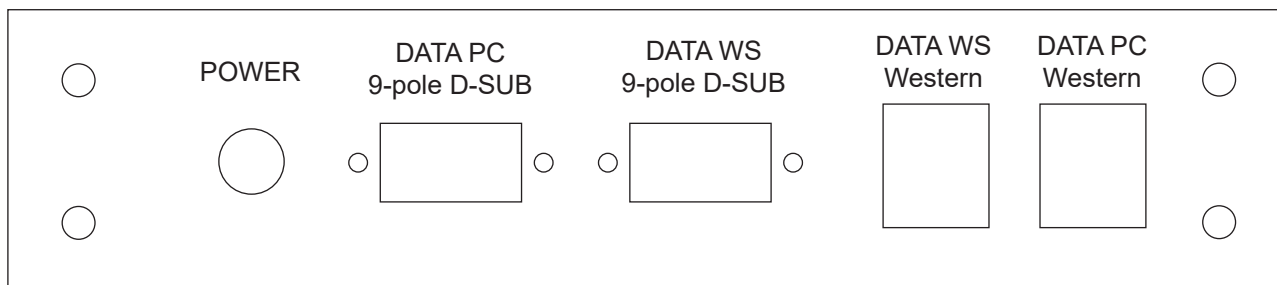
2.2.2 Setting the Time Zone by PC

For setting the time zone (Zeitzone), you use a terminal software to send the command !ZZxx followed by Carriage Return and Line Feed (CR LF) to the weather station, where xx is the deviation of your time from the UTC-time in hours. This only makes sense, if a GPS-receiver is connected!!

Altitude and time zone can also be set directly on the display, if a weather station is connected (See next page).
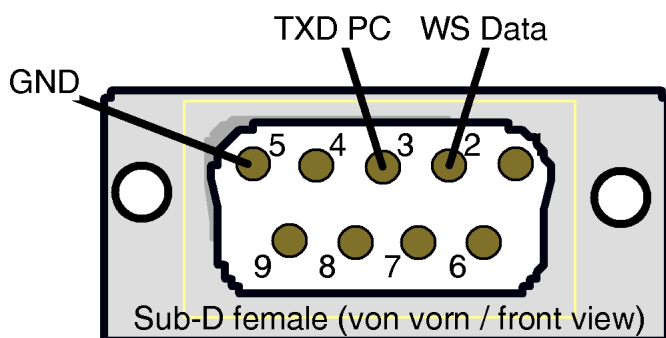
2.3 Connections of DMMK

Below you can see the connections of DMMK

```
  ○      POWER     DATA PC      DATA WS     DATA WS   DATA PC    ○
                  9-pole D-SUB 9-pole D-SUB  Western   Western
  ○                                                              ○
```
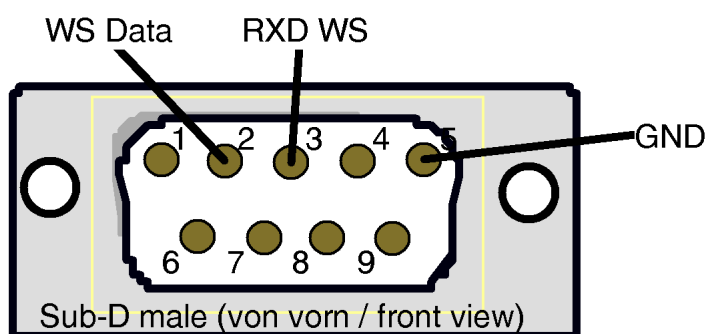
The data of the weather station are sent to DMMK and with a PC connected, handed on to the PC. The data of the PC are also passed through DMMK and are transmitted to the weather station for controlling.

2.3.1 Data connectors DMMK (9-pole SUB-D)
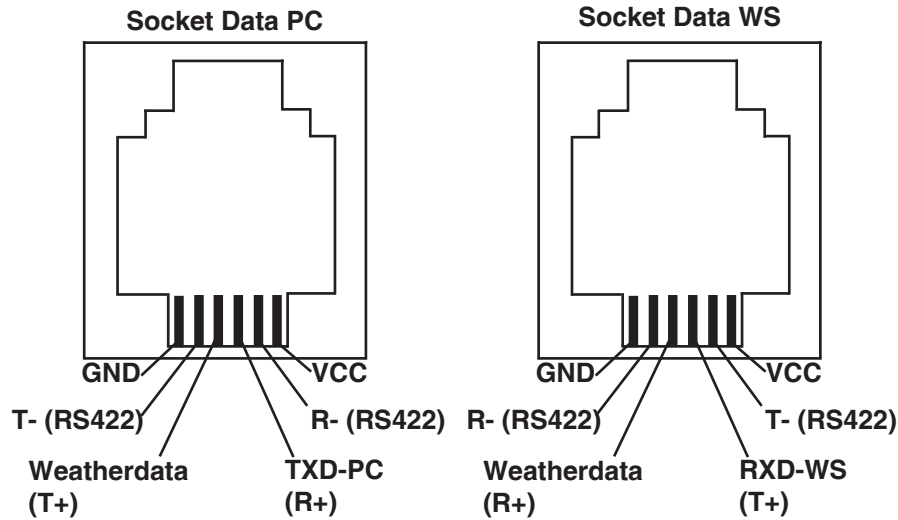
Data PC
(RS232)

GND   TXD PC   WS Data

5 4 3 2

9 8 7 6

Sub-D female (von vorn / front view)

Data WS
(RS232)

WS Data   RXD WS

1 2 3 4 5   GND

6 7 8 9

Sub-D male (von vorn / front view)

2.3.2 Connection of Westernconnectors DMMK

(Front view)

Socket Data PC

Socket Data WS

GND   **VCC**

T- (RS422)   **R- (RS422)**

Weatherdata (T+)   **TXD-PC (R+)**

GND   **VCC**

R- (RS422)   **T- (RS422)**

Weatherdata (R+)   **RXD-WS (T+)**
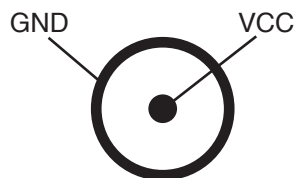
The pins for GND, VCC und WEATHERDATA are connected parallel.
Data at pin TXD-PC of connector "Data PC" are processed in the DMMK and given out at "Data WS" as RXD-WS.
For this case you must not confuse the both connectors !!

2.3.3 Connection of Powersocket DMMK

GND   VCC

2.4 Technical Appedix for DMMK

2.4.1 Content of EEPROM of DMMK

EEPROM@	Default value	comment
0	006	index of baudrate
1	005	Time of datastring (< = datalogger request)
2	000	Reserved (Compatibility to DKA1)
3	000	Reserved (Compatibility to DKA1)
4	000	Reserved (Compatibility to DKA1)
5	000	
6	000	
7	007	Illumination On threshold
8	010	Illumination Off threshold
9	000	Time offset hour (high)(timezone)
10	000	Time offset hour (low)(timezone)
11	000	Altitude (high)
12	000	Altitude (low)
13	001	Memory address where the flashing dot is displayed.
14	"2"	Reserved (Compatibility to DKA1)
15	"0"	Reserved (Compatibility to DKA1)

Data information of module (DMMK):
1. Byte = Memory offset (address) of Module in Hi-Nibble,
2. Byte = unused (Compatibility to DKA1)
3. Byte = Integers (from left) in Lo-Nibble (Bits0-3),
    Hi-Nibble: Bit4 = Display the dot (1=on)
4. and 5. Byte: Sensor-identifier for this module is compared to 1st and 2nd sensor digit
    (i.e. TE0.0 1.digit=T)
    special case: Sign ~ (=0x7E) in 3rdByte ->
        Is 4thByte also ~, then sensor is skipped.
        Otherwise the sign in 4thByte is compared to 3rdsensor digit
        (i.e.: compared with date 12.01.04, 3.sensor digit = 1.dot)

16	000	000	002	"~"	":"	Time
21	016	000	018	"~"	"."	Date
26	032	000	019	"T"	"E"	Temperature
31	048	000	019	"F"	"E"	Humidity
36	064	000	004	"D"	"R"	Pressure
41	080	000	004	"W"	"R"	Wind direction
46	096	000	019	"W"	"G"	Wind speed
51	112	000	019	"W"	"S"	Wind Peak
56	128	000	004	"S"	"O"	Global radiation
61	144	000	019	"R"	"E"	Precipitation
66	160	000	004	"L"	"X"	reserved for additional sensor
71	176	000	004	"Z"	"A"	reserved for additional sensor
76... 127	255					Unused

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3 Commands for DMMK and DKA1 (V1.13)

All digital displays are designed to be controlled by the echo of our weather stations. This means you do not have to send the commands directly to the display. You just establish the standard connection from the PC to the weather station and from the weather station to the display.

Command	Comment
<!Bx	Sets the Baudrate. possible values:
	x=0: 1200 Bd (inaccurate)
	x=1: 1200 Bd (inaccurate)
	x=2: 1200 Bd (inaccurate)
	x=3: 2400 Bd
	x=4: 4800 Bd
	x=5: 9600 Bd
	x=6: 19200 Bd
	x=7: 38400 Bd
	x=8: 76800 Bd !!! (not PC-conform) !!!
	x>8: 9600 Bd
<!C	Shows READ (DATA) at the display, deletes all sensor values.
	The display shows current data when the values are sent in periods >= 500ms
	(time of datastring).
<?D	Shows READ (DATA) at the display, deletes all sensor values.
	The display shows current data when the values are sent in periods >= 500ms
	(time of datastring).
<!U	Shows CLOCK on the displayuntil the next datastring arrives at the display.
<?Y	Shows READ (DATA) at the display, deletes all sensor values.
	The display shows current data when the values are sent in periods >= 500ms
	(time of datastring).
<!?	Shows READ (DATA) at the display, deletes all sensor values.
	The display shows current data when the values are sent in periods >= 500ms
	(time of datastring).
<!#xTEXT	Give out the string TEXT to the module x (if the strings can be displayed).
	This actually only makes sense for DMMK, because DKA1
	need too much time for one flow.
<!(x/y	Writes the value y into EEPROM-cell x , where :
	x=0...127, y=0...255
<!(x/"T	Writes the value of „T"into EEPROM-cell x , where
	x=0...127, T=ASCII(32)...ASCII(127)
<!)x	Reads EEPROM-cell x and displays its value for 2 seconds.
	x=0...127,output Bytevalue 0...255

I&OE / Specifications subject to change without prior notice !
06/23