Transfer Protocol

Bayern-Hessen for Promo and Fidas

Description/Specification

– for people with specialist knowledge –

1 Transfer protocol Bayern-Hessen

Bi-directional data transfer via RS-232

The Bayern-Hessen protocol is a protocol with a standardized syntax. The protocol enables multiple devices to be combined and is used primarily in measuring networks. Via the serial interface RS-232, the measuring devices can transmit measured data, operating and error status indications, and they can receive commands.

Data transfer occurs in server-client mode. The measuring device is the client and a customer-specific application is the server. Standardized telegrams are transferred. The block check character (BCC) secures every telegram. The transferred characters are taken from the standard USASCII character set (0 - 9, A - Z). The maximum length of a telegram is 256 characters (including control characters and protocol frame).

When the protocol is activated, the device waits for incoming communication from an external computer. The device then reacts to valid commands with an appropriate response telegram.

All telegrams are assigned an address, the measuring device identification. The address can be used to address either the entire measuring station or to address individual measuring devices at the measuring station. Response telegrams are also assigned a measuring device identification to be able to identify and associate them.

Data format and data transfer

Data format:

- 1 start bit
- 8 data bits - no parity bit
  (alternative: 7 data bits, 1 parity bit = even),
- 1 stop bit

The parity bit (Bit7) is ignored.

Transfer type:

Half-duplex mode; polling process:
The customer-specific application is the server.

Transfer speed:

1200 Baud or higher.

Structure of a data protocol

Byte 001: STX (Start of Text)

Byte 002 - nnn: <TEXT> (max. 245 characters USASCII-encoded)

Byte nnn+1: ETX (End of Text)

Byte nnn+2/3: BCC (Block Check Character)

Telegram types

Telegram ID	Telegram length	Telegram type	Brief description
DA	Variable	Command	Measuring device requests data
ST (type 1)	19	Command in hex form	Control words output to one measuring device at the measuring station.
MD	Variable	Reply	Measuring device's reply to a request (DA)

Sample of a data request command

`hex(02) DA hex(03)` or `hex(02 44 41 03)`

The device's reply is made up of the following elements:

- 3 characters for the channel number
- 5 characters for algebraic sign and mantissa
- 3 characters for algebraic sign and exponent
- 2 characters for mode status
- 2 characters for error status
- 7 characters for a combination of the Palas device serial number and configurable specific serial number

Example of a reply from a *Fidas® 200* (channels 60 to 65) with the default configuration:

```
.MD06
060 +2086+02 40 00 6665728 xx
061 +9819-03 40 00 6665728 xx
062 +1770-02 40 00 6665728 xx
063 +2569-02 40 00 6665728 xx
064 +2914-02 40 00 6665728 xx
065 +3320-02 40 00 6665728 xx .28
```

Control characters for telegram ID ST

Control character	Meaning
A	Switch to “idle” mode.
K	Switch to “calib” mode.
M	Switch to “auto” mode.
R	Restart the device.

Output channels for telegram ID DA

Channel number	Content of data channel
0	Status bit - sensor flow
1	Status bit - coincidence
2	Status bit - suction pumps
3	Status bit - weather station
4	Status bit - IADS
5	Status bit - estimated raw channel deviation
6	Status bit - LED temperature
7	Status bit - operating modus
20	Velocity [m/s]
21	Coincidence [%]
22	Modus
23	Suction pump output [%]
24	IADS temperature [°C]
25	Estimated raw channel deviation [channels]
26	LED temperature [°C]
27	Flow rate [l/min]
28	Cn [P/cm³] – UF-CPC and ENVI-CPC only
29	Sauter Diameter [µm]
30	Temperature of heating unit 1 [°C]

Channel number	Content of data channel
40	Temperature [°C]
41	Relative humidity [%]
42	Wind speed [km/h]
43	Wind direction [°]
44	Precipitation intensity [l/m²/h]
45	Precipitation type
46	Temperature dew point [°C]
47	Air pressure [hPa]
48	Wind signal quality [%]
52	$PM_{2.5}$ [mg/m³] – 1 s average
53	PM_{10} [mg/m³] – 1 s average
54	PM_{1} [mg/m³] – 10 s average
55	$PM_{2.5}$ [mg/m³] – 10 s average
56	PM_{10} [mg/m³] – 10 s average
57	PM_{tot} [mg/m³] – 10 s average
58	$PM_{2.5}$ [mg/m³] – 60 s average
59	PM_{10} [mg/m³] – 60 s average
60	Cn [P/cm³]
61	PM_{1} ambient [mg/m³]
62	$PM_{2.5}$ ambient [mg/m³]
63	PM_{4} ambient [mg/m³]
64	PM_{10} ambient [mg/m³]
65	PM_{tot} ambient [mg/m³]
66	further PM values [mg/m³] with different algorithms
…	
100	
110 ff	ΔCn [P/cm³] size distribution with size intervals as shown by the device under Expert User Mode / Particle Size Distribution / Table (10 s average)

Assignment of byte for operating state

Bit	Meaning
1	“idle” mode
2	---
3	---
4	“calib” mode
5	---
6	---
7	“auto” mode
8	Temperature compensation active.

Assignment of byte for faults

Bit	Meaning
1	Sensor volume flow
2	Coincidence
3	Aerosol pumps
4	Weather station
5	IADS
6	Calibration
7	Temperature of LED
8	Operating mode