

The HD2001 connection to the PC

The instrument HD2001 is equipped with a RS232 serial interface and with a second RS485 interface.

The choice can be made by means of a switch (position is pointed out in the manual).

Normally, the RS232 serial interface is used for the connection to the PC.

The command strings that are sent to the instrument do always contain an address field which allows to use several instruments connected through RS485, each instruments will respond only to the commands containing its address.

The address can be set up on the keyboard or, in case, through a serial command.

When the instrument is arranged for the serial RS232 communication with the PC, it works also as converter for the RS485 connection.

In this case, it analyses the command string that has been sent from the PC (on RS232) and if it not recognized as addressed to itself, it will be riconveyed on the RS485 connection. Vice versa, it copies the traffic viewed on the RS485 channel to the RS232 channel, without decoding the commands.

In this way, the PC (with standard connection RS232) can manage a whole net of instruments through RS485, applying to each of them with the assigned number. The communication is transmitted in half-duplex mode, this means that the PC needs to await the response to the previous command before sending a new one.

The communication is based on ASCII protocol.

Thus makes it possible to effect tests by using only the program Hyperterminal which is already part of Windows.

The commands that are sent to the instruments are set up by a string of characters ending with the sequence CrLf or LfCr (carriage-return + line feed or vice versa).

The decoding routine of the serial command waits for the termination of the command string before is starts analysing it.

The command string begins with the address record which is set up by character A, followed by 2 hexadecimal characters 00..FF and by Z, i.e.: A00Z ... AFFZ

It gets compared with the instrument's address.

The instrument gives ERROR RESPONSES only after decodification of a correct address. It doesn't give ERROR responses if the address doesn't correspond or if it is ABSENT.

In RS232 mode, if the command is recognized as not addressed to itself, the instrument buffers the command string and reconveyes it to the RS485 channel.

Therefore, it is reconveyed only after having been analysed.

A certain latency period needs to be taken into account. The timeout to be calculated is approx.

2 seconds.

Per default, the instrument responds to the address 00 if it is turned on in RS232 mode, while

it takes the number 01 if it is turned on in RS485mode.

It is possible to build up a net without further RS232<-->RS485 converters

It suffices that the first instrument, the nearest to the PC, is in RS232 mode,

from this one ahead, the others are put on the RS485 connection (3-wire, ground included), up to a max. Number of 64 instruments in direct mode, the maximum Baud rate is 9600, in case of very long connections it could be necessary to use a lower speed.

It is necessary to assign a different address to each instrument.

The address can be assigned through the front panel or through the serial connection.

It is not obligatory to have an instrument with RS232 mode in the connection. If undesired, it is possible to use a RS232<-->RS485 converter, available in the market.

In order to assign the address number "via cable", more precisely, without using the front panel commands, follow the procedure below:

Connect the first instrument in RS232 mode to the PC, its default address will be 00.

Connect also the first instrument in RS485 mode, its default number will be 01.

Modify the number of the first RS485 instrument with the command

A01ZW102, afterwards the first instrument will respond to the address 02

Connect the second RS485 instrument, now it will be this instrument that responds to the address 01

By sending the command A01ZW03, the address of this last instrument can be changed into 03 and so on.

Of course, this is true only if the instruments haven't already been set up before.

It is not necessary to enumerate the instruments in consecutive manner .

It is possible to use RS485 repeaters in order to extend the net.

Bear in mind the instrument work autonomously.

The max. interrogation speed is 8 instruments per second.

Command list:

AT RESET the Tnstrument sends the character # followed by CrLf on the enabled serial

connection with default Baudrate = 9600

If the command is wrong or not recognized, the instrument responds with ?CrLf

P0: "Ping" instrument responds with &CrLf

More precisely:

The Pc sends AxxZP0CrLf

Whereas xx stands for the hexadecimal address of the instrument
CrLf are carriage-return line-feed

The instrument replies with & for confirmation (followed by return-linefeed)

---o---o---o---

The following list omits the address string and the sequence CrLf.

S0: print measure, single line, at upcoming expiry of the internal clock.
(1 sec max. latency)

S1: Print hexadecimal computation : Temperature, RH, Pressure, wind power
Attention: the printing is synchronized to the first subsequent measurement, like
In the previous case

S2: Print decimal in compact form: Attention: the values are the last computed ones,
that is fast printing, but not synchronized.

G0: responds with string instrument type

G1: responds with serial number

G2: responds with User_code

G3: responds with firmware version

G4: responds with firmware date

T2: accepts 32 characters of user code

DA: accepts system date in hexadecimal format AAMMGHHmmss

Example: give to instrument 00 the date: 2006 October 27 hour 12:30:40
A00ZDA060A1B0C1E28CrLf

FA: responds with system date

FC: responds with calibration date

W0 followed by 00 or 01 sets the printing mode parameters

01 = automatic printing with established intervals

00 = printing only upon request (con S0,S1,S2)

In RS485 mode, it is not advisable to use automatic printing, as on the half-duplex line it becomes difficult to synchronize the commands.

In the following, the convention below is applied:
(xx=2 char Hex) (xxxx=4 char Hex)

W1xx establishes the access code = address
W2xx with xx=00 to 03 selects, for the print out, the values
0= NORMAL
1= MAX
2= MIN
3= AVG

Set up of the printing interval

WA0x PRINT INTERVAL with x FROM 0 TO C
1=5
2=10
3=15
4=30
5=60
6=120 =2 min
7=300 =5 min
8=600 =10 min
9=900 =15 min
A=1200 =20 min
B=1800 =30 min
C=3600 =60 min

choice °C- °F

WCxx 00 = °C 01=°F

Set up of alarm thresholds

WDxxxx templowlim
WExxxx temphilim
WFxxxx rhlowlim
WGxxxx rhhilim
WHxxxx dewlowlim
WIxxxx dewhilim
WLxxxx barlowlim
WMxxxx barhilim
WNxxxx bardeltalim
WOxxxx windlowlim
WPxxxx windhilim
WQxxxx alarmdelay

Set up of the alarm enabling mask

WRxxxx alarmmask position on 1 = alarm enabled

According to the sequence

bitwise

15, 1= enable alarm relay 0= DISABLE ALARM RELAY

14, n/a

13, n/a

12, n/a

11, n/a

10, temp_low

9, temp_hi

8, rh_low

7, rh_hi

6, dew_low

5, dew_hi

4, bar_low

3, bar_hi

2, delta_bar

1, wind_low

0, wind_hi

R0 reads parameter of which at W0

R1 reads parameter of which at W1

RC reads parameter of which at WC

RA reads parameter of which at WA

etc. for the remaining parameters

RR reads alarm_mask

R9 reads alarm status (pre-alarm mask, that is also if the alarm is disabled)

K1 carries out alarm reset max_min_avg, carries out also memory reset BAR (for calculation of trend-alarm)