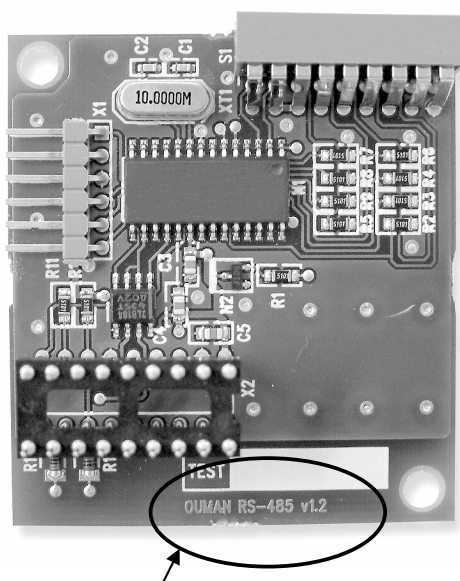


EH-485

Bus adapter card for heating controller EH-200 and air handling controller EH-105

Connection and operating instructions (rev.1.2)

Via the EH-485 bus adapter card it is possible to connect max 31 pcs of EH-200 and EH-105 controllers into same RS-485 based network. Networked controllers can be connected to Ounet BMS system or they can be controlled by mobile phone using SMS. In latter case network master device EH-686/EH-60 is needed.



Check the version marked in the card!

Contents

1.	INSTALLING THE EH-485 CARD INTO THE EH-200 AND EH-105 CONTROLLERS	2
2.	POSITIONING THE EH-485 CARD`S DIP SWITCHES	2
2.1	Device address	2
2.2	Speed.....	3
2.3	Using of biasing resistors	3
3.	RS-485 NETWORK CABLING	4
4.	RS-485 NETWORK CABLING, AN EXAMPLE	5

1. Installing the EH-485 card into the EH-200 and EH-105 controllers

Install the card with the controller switched off. Remove the plugs covering the screws on the cover of the controller. Detach the covers from the case, first the connection space cover and then the larger lower cover. Carefully turn the lower cover 90 degrees so that the PC board at the bottom of the case is visible. The display unit on the lower cover is connected to the bottom card by a flat cable. **Do not let the lower cover hang by the flat cable.**

There is a microcircuit on a socket on the other end of the PC board near the screw connectors. The circuit code, N20, (on the EH-200 controllers) or N16 (on the EH1-05 controller) is printed on the PC board next to the microcircuit. Carefully detach the microcircuit from the socket.

Install the two plastic stand-offs that come with the EH-485 card into the holes in the bottom card. Align the EH-485 card so that the double row pin connector goes to the empty socket of N20 (EH-200) or of N16 (EH-105) and the plastic stand-offs on the bottom card fit into the holes in the EH-485 card. Press the EH-485 card carefully into place so that the pins go into the socket and the stand-offs will be locked.

In order to use the interface, the DIP switches on the EH-485 card must be positioned correctly. The switches can be positioned during installation with the controller's covers open or later with the covers in place. If the DIP switches are positioned later, the display unit must be detached from the lower cover. The DIP switches are then visible through the display unit opening and their position can be changed.

2. Positioning the EH-485 card's DIP switches

The address of the device (1-31) and the network speed (4800, 9600, 19200 or 38400) in the RS-485 network is defined, and biasing resistors are taken into use by using the DIP switches.

2.1 Device address

Each device in the EH-485 network must have an individual device address. The address is defined with the card's DIP switches 3-7. Switch 3 is the least significant bit on the address and switch 7 is the most significant bit.

Maximum quantity of devices and addresses in the same network is 31 pcs. **The address 0 is not allowed.**

The address is defined as follows:

DIP switch positions, 1 = ON					Address
DIP 7				DIP 3	
0	0	0	0	1	1
0	0	0	1	0	2
0	0	0	1	1	3
0	0	1	0	0	4

0 0 1 0 1	5
0 0 1 1 0	6
0 0 1 1 1	7
0 1 0 0 0	8
0 1 0 0 1	9
0 1 0 1 0	10
0 1 0 1 1	11
0 1 1 0 0	12
0 1 1 0 1	13
0 1 1 1 0	14
0 1 1 1 1	15
1 0 0 0 0	16
1 0 0 0 1	17
1 0 0 1 0	18
1 0 0 1 1	19
1 0 1 0 0	20
1 0 1 0 1	21
1 0 1 1 0	22
1 0 1 1 1	23
1 1 0 0 0	24
1 1 0 0 1	25
1 1 0 1 0	26
1 1 0 1 1	27
1 1 1 0 0	28
1 1 1 0 1	29
1 1 1 1 0	30
1 1 1 1 1	31

2.2 Speed

The speed must be the same for all the devices connected to the network. The speed is defined with the EH-485 card`s DIP switches 8-9 as follows:

DIP9	DIP8	Speed
0	0	4800
0	1	9600
1	0	19200
1	1	38400

2.3 Using of biasing resistors

In RS-485 network, only one device at a time can write in to the network, the other devices are listening. For this reason there are situations when no device writes in to the network but they all are listening. The biasing resistors ensure that the network remains stable in this situation. This is especially important if the network is long and if there is external interference.

Biasing resistors must be taken into use in **two (and only two)** devices per network. The devices in question must be positioned at both ends of the network. Biasing resistors are taken into use using the EH-485 card's DIP switches 1-2 as follows:

DIP1 DIP2

0	0	Biasing resistors are not in use
1	1	Biasing resistors are in use

3. RS-485 network cabling

A twisted pair cable must be used for network cabling, e.g., Datajamak 2x(2+1)x0.24. EH-485 card is not a galvanic isolated interface, so devices in the same network must have same zero (ground) potential. A two pair twisted cable should be used, one pair for connecting devices signal grounds together and other pair for actual signal. The network must be like a chain, with the cable going from one device to the next and there must not be any stubs (max. length of stub 0.5m). The maximum length of the whole network is 1200m. **120 ohm terminating resistors are connected to both ends of the network between signal pair's wires (between screw connectors A and C).**

The network cable is connected to each EH-200 and EH-105 device in the network in the same way using screw connectors A,C and B. The meaning of the signals is as follows:

<u>Screw connector pin number</u>	<u>Meaning</u>	<u>Connect</u>
A	RS-485 Data +	Signal pair's other wire
C	RS-485 Data -	Signal pair's other wire
B	Signal ground	Network cable's other pair

Terminating resistors are connected to both ends of the network between pins A and C.

The twisted pair cable's protective shield can be connected if needed in to protective earth in order to eliminate interference. The connection is made **only from the other end of the protective shield**, e.g., always from the cable leaving the controller.

4. RS-485 network cabling, an example

