Instructions for use

HtMonit
Universal monitoring software

1 Introduction

HtMonit is universal monitoring software providing for:

- Monitoring of 1 to 4 instruments of the Ht series (Ht200, Ht205, HtIndustry, Ht40A, Ht40AL, Ht40B, Ht40T, Ht40P, Ht60B, Ht60M, Ht700, Ht100, HtCeramic) or EM24-DIN,
- Display of monitored values on the screen,
- Display of monitored values graphically,
- Archiving of all measured values,
- Print of diagrams and spreadsheets,
- Programming of regulators Ht200, Ht205, HtIndustry, Ht40A, Ht40AL, Ht40P and HtCeramic,
- Uploading data from data loggers of Ht200, Ht205, HtIndustry, Ht100, Ht40P and HtCeramic,
- Database backup,
- Database export,
- …

2 Guide for getting software with records for a batch to work

In this chapter you can find the description of all the tasks that you need to do for proper installation of this application.

Connection of devices to PC

In this chapter you will find the description how to connect devices with PC, recommended convertors, setting of addresses in devices, … .

Installation of software HtMonit

Brief guide-book for the installation of software HtMonit on PC, recommended configuration of PC.

First start-up of the software, entering of licence number

Description of possibilities for running a software, registration and limitation if a software is not registered.

Setting of monitored devices

Setting of communication line, reading of configuration of the monitored devices, … .

In further chapters, you will find these items:

- In the window „**Overview**" there is a work with graph, programming of devices, operation of datalogger, … .
- In the window „**Setting**" how to set all the parameters.
- In the window „**Backup**" there is a description of back-up of database and recovery of data.
- In the chapter „**LAN – brief description of network**" the main terms of LAN net will be explained.

2.1 How to link devices with PC

The communication line EIA485 is used for the connection of devices to PC. Personal computers are not generally equipped with this line, for that reason the connection must be realized with the external convertor.
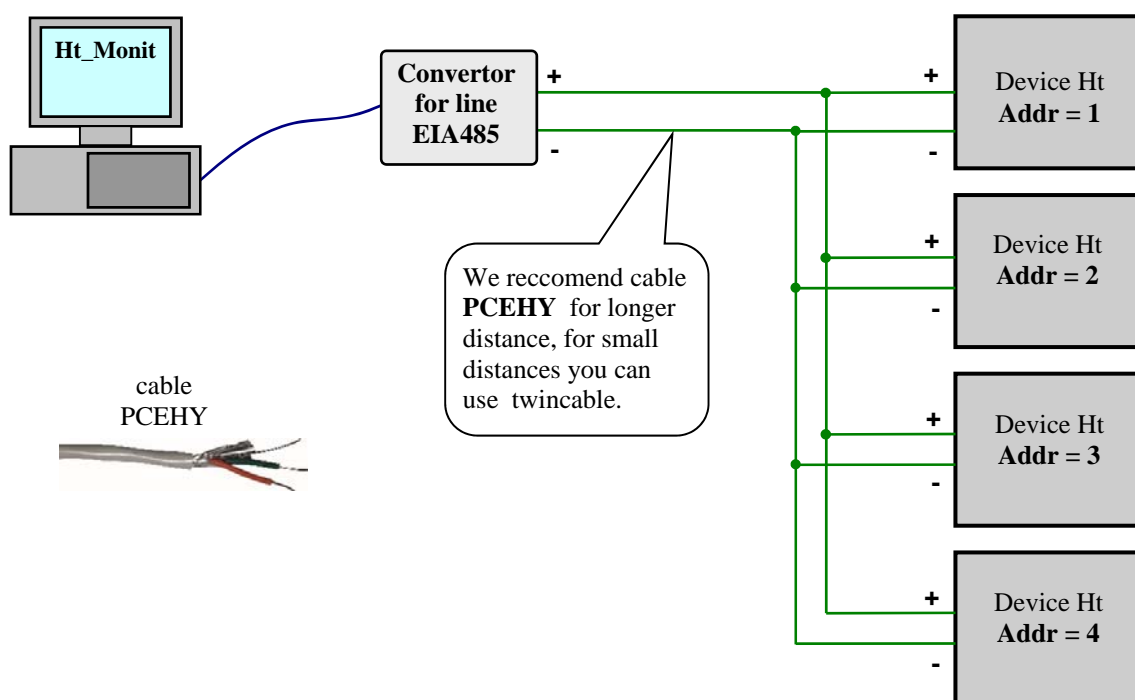We recommend to use the following convertors:

- **RS232/EIA485**, for example type **UC485**. If a PC is not fitted with the interface RS232, it is possible to use the extending card with this interface.
- **LAN/EIA485**, for example type **GNOME485**. This interface is most difficult to set.
- **USB/EIA485**, e.g. type **SB485**. USB interface is the least reliable and you should choose it only in case if you can´t use interface RS232 or LAN.

Wiring of devices with the line EIA485

The devices are interconnected with the transducer via an EIA485 line. The basic properties of the line include:
• Maximum line length 1200m,
• Parallel connections of the devices,
• Maximum length of branch line to a device is about 1.5m,
• EIA485 line must not be placed next to power conductors

We reccomend cable **PCEHY** for longer distance, for small distances you can use twincable.

cable PCEHY

The devices listed in the following table can be linked on the communication line EIA485 via the description below:

Device	EIA485 (+)	EIA 485 (-)	EIA 485 (Shielded)
Convertor	RxTx+	RxTx-	GND
Ht200	T+/R+ … term.5 (Comm1) term.8 (Comm2)	T-/R- … term.4 (Comm1) term.7 (Comm2)	Com … term.6 (Comm1) term.9 (Comm2)
Ht205	T+/R+ … term.5 (Comm1) term.8 (Comm2)	T-/R- … term.4 (Comm1) term.7 (Comm2)	Com … term.6 (Comm1) term.9 (Comm2)
Ht Industry	T+/R+ … term.5 (Comm1) term.8 (Comm2)	T-/R- … term.4 (Comm1) term.7 (Comm2)	Com … term.6 (Comm1) term.9 (Comm2)
HtCeramic	T+/R+ … term. 5	T-/R- … term. 4	Com … term. 6
Ht40	T+/R+ … term. 5	T-/R- … term.4	Com … term. 6
Ht60	T+/R+ … term.5	T-/R- … term. 4	Com … term. 6
Ht700	T+/R+ … term. 5	T-/R- … term. 4	Com … term.6
Ht 100	T+/R+ … term. 22	T-/R- … term.21	Com … term. 23
EM24-DIN	B+ … term. 42	A- … term. 41	GND … term. 43

Setting of addresses in devices

Set the addresses 1 to 4 on the monitored devices:
- The first device …   „**Addr = 1**"
- The second device …   „**Addr = 2**"
- The third device …   „**Addr = 3**"
- The fourth device …   „**Addr = 4**"

Addresses in devices should be set in **configuration level**, menu for setting of communication line.

LAN interface, convertor GNOME485

The convertor is linked to LAN line with the cable UTP (connector RJ45). The power supply of the convertor is secured with
external supply source.

The devices can be linked via this line EIA485 to the convertor. If there are long distances among the devices, one single convertor can be used for each device. In case that it is possible to connect more devices (maximum number is 4) through the communication line EIA485, then you can use one convertor GNOME485 for these devices.
Each convertor must have its sole IP address and number of the communication port. The data transfer can be secured with the password. The configuration of convertor can be performed within the scope of local group of network through
the setting in the window „Setting".

Interface RS232, convertor UC485

The convertor is connected to the RS232 communication line of the computer (connector CANON 9) via an extension cord.
The convertor is powered from an external power source. All devices must be linked to one convertor.

Typical setting of convertor UC485

2.2 Installation of software HtMonit

The software is designed for single computer installation. All licensing agreements (licensed right, limitation of liability, licence termination, …) are presented in the context of the software installation. By installing the monitoring software HtMonit, you express your agreement with the licensing conditions.

Recommended configuration of PC

- Hardware of computer complying with the demands of OS.
- RAM 1024MB, HDD 80GB.
- CD drive.
- Serial port for connection of EIA485 line transducer or Ethernet.
- Keyboard, mouse.
- Monitor with minimum resolution 1024 x 768 pixels.
- Backup source with the function of system switch off after power cut.
- OS WINDOWS 7 or higher
- Antivirus program.

Instalace programu

- Put the CD with the universal monitoring software to the CD drive.
- Confirm the installation.
- Unless automatic installation starts, start the install.exe program (saved on the CD).
- Proceed according to hints of the software installation.

2.3 First start-up and entering the licence number

Start the program using one of the following option:
• Directory "C:\HTH8\Ht_Monit\" contains an executable file "HT_MonitEv.exe". Start the program by double clicking this file with mouse.
• you can start the software "HtMonit" from the desktop of PC
• via menu "Start / Programs / HtMonit".
If the program is not registered, during the start there is a registration window shown, see picture below.
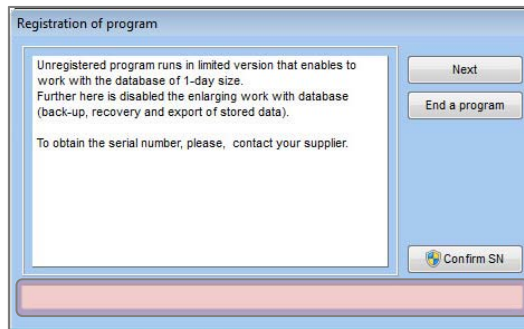
The "Continue" button is inactive for the first 5 seconds.
After elapse of the given time interval, the application may be used further without setting the serial number in the restricted version. The registration window will be shown again after the next application start.
If you have purchased a licence from your supplier then you have received a serial number used for the software registration, enter the serial number into the window in lower part of screen (the area marked with the red broken line in the screenshot above) and click the button "Confirm SN". If the entered number is correct, the program will be closed and the next start up will directly open the unrectricted version. In the case of a wrong number setting nothing will happen.
The application may be ended up with the "End a Program" button without entering the serial number.

If the software is registered, it allows only monitoring of devices without the access to old data and it makes possible –data batch records for limited period of max. 10 minutes.

2.4 Setting of the monitored devices

In the dialogue window „Setting", you will choose the type of the communication for every section individually (serial communication, LAN communication).

If the device is not set in the particular section, leave the setting „No communication".

In left-hand lower part of the window you will set the parameters and features of the communication lines.
Detailed information about setting can be found on page 19.
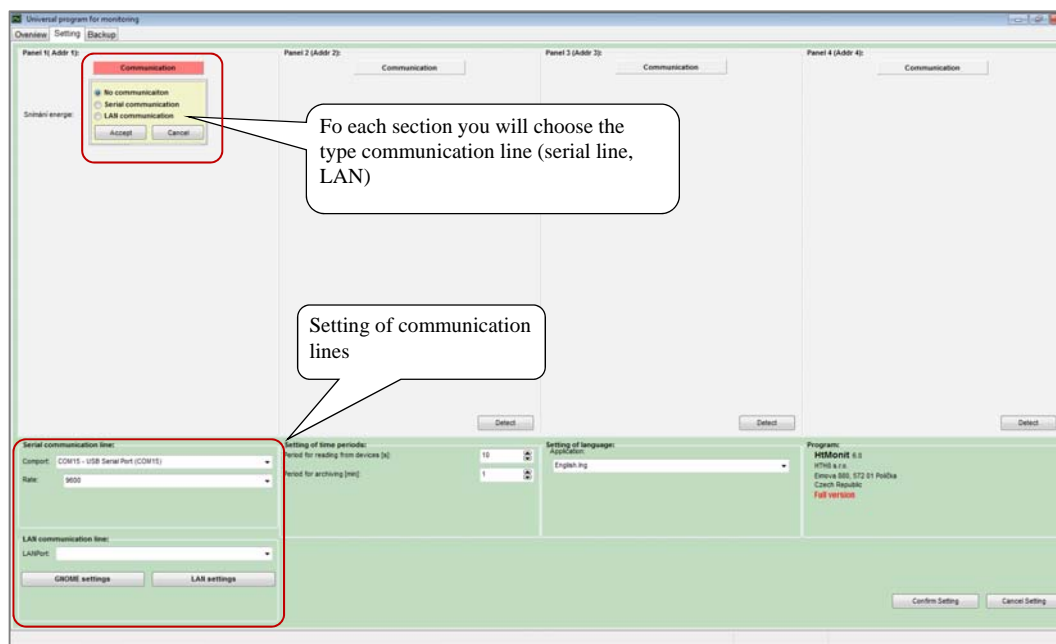
After setting of communication lines, you should carry out the detection of the linked devices.
If the addresses (1,2,3,4) are set properly on the devices (1, 2, 3, 4) and the devices are linked, the configuration of device will be shown. You will store the new setting by clicking the button „Confirm setting".
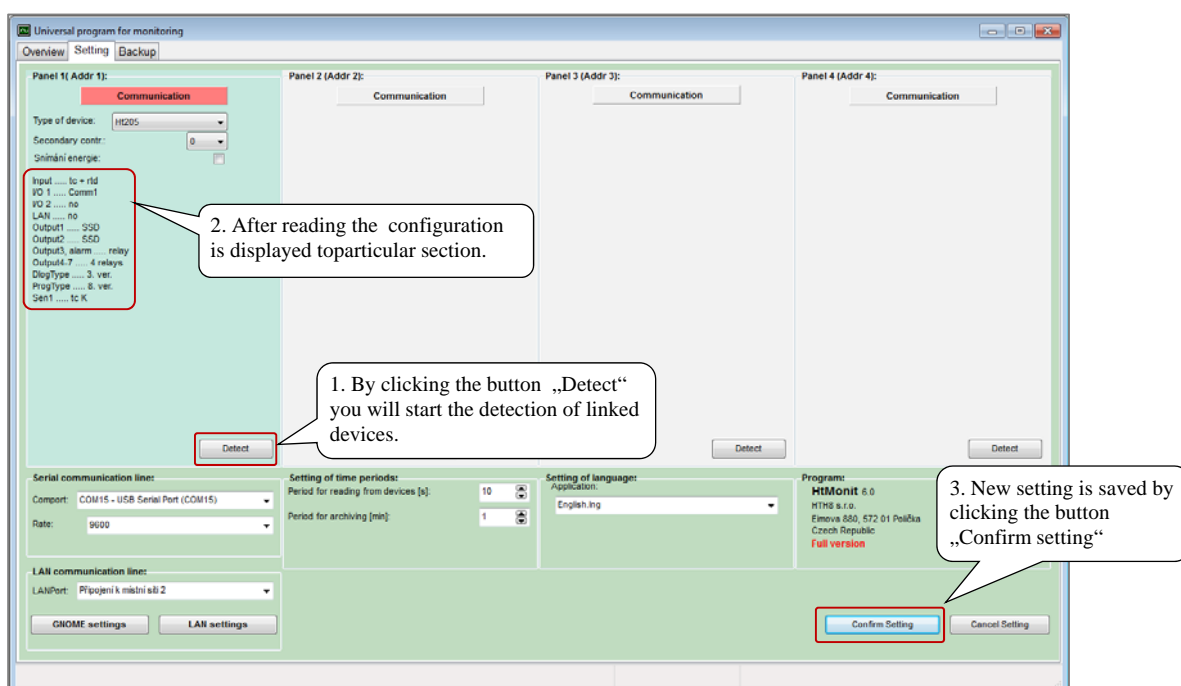
If you switch over to the panel „Overview", the measured values of the monitored devices are displayed.
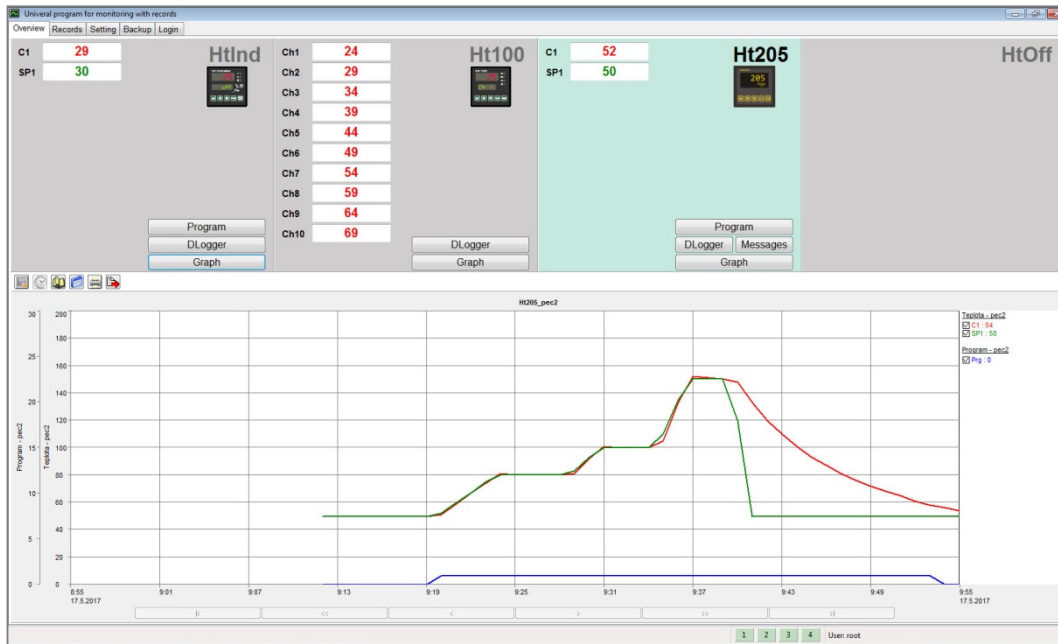
Then you can start to set the graphs, see the description from page 10.

3 Panel „Overview"

After starting the software, the "Overview" window will be shown. In this window, the values that are read from devices, are displayed in numerical as well as graphic format, see the picture below.
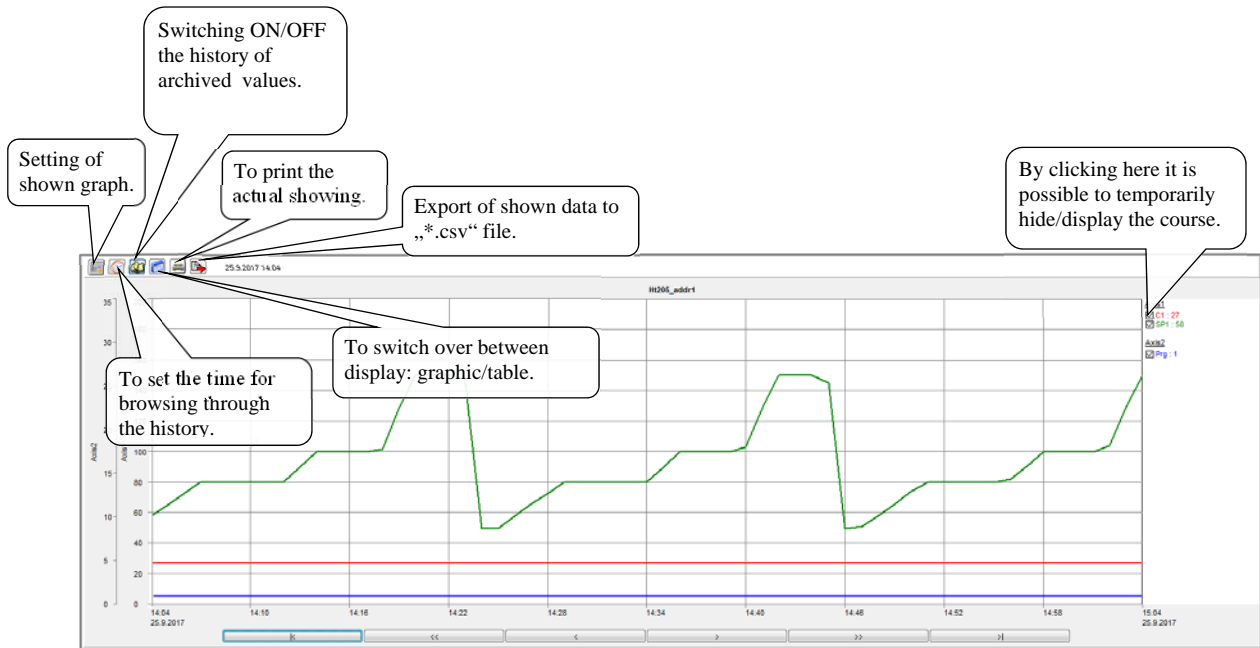

Shows type of monitored device.

No device on the address 4.

Showing of values indicated on device.

Operation of programs in devices.

Operation of dataloggers in devices.

Setting of active graph.

Graphic display of measured values for active panel.
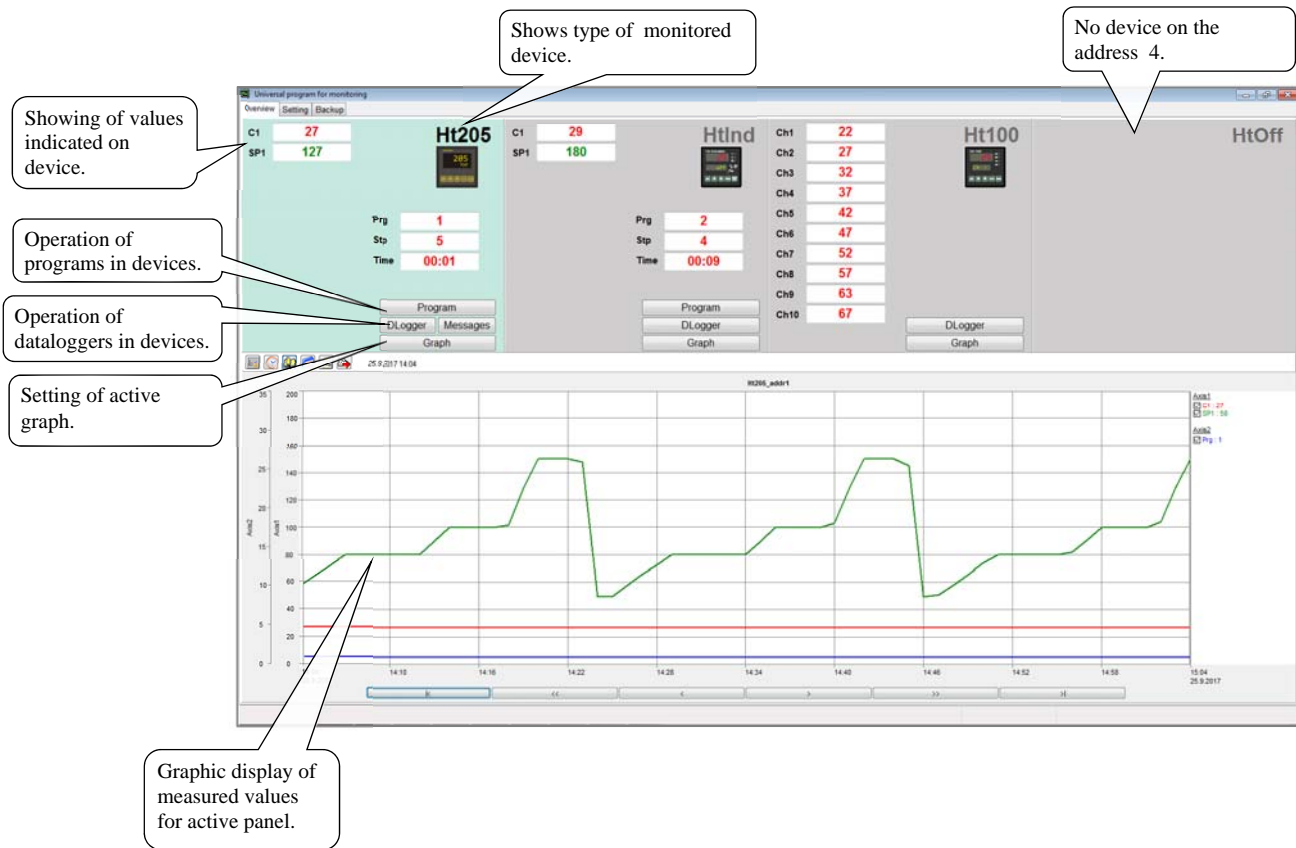
In the upper section of the window there are four separate sections displaying the indicated values for the connected devices.

The first panel on the left corresponds to the device connected to address 1, the second section from the left is for the device with the address 2, and so on as far as address 4. The graph in the bottom part of the panel always shows the course of the values from one section. If there are negative values in the graph, it means that these values can express the error messages of the line, see the table below. You can change over the graph with the button „Graph". The section, for which the graph is displayed, has the coloured background.

Devices Ht	-1000	Value is not measured/read
	-1001	Stp value is switched OFF
	-1002	Error of input sensor or sensor is not set
	-1003	Error in communication with device
	-1004	Reading of values from unknown register of the device
Devices EM24	-2147483644	Error in communication with device

Graph

The time course of monitored values is displayed in the graph. Setting of graph is intuitive, description can be found on the following pages.
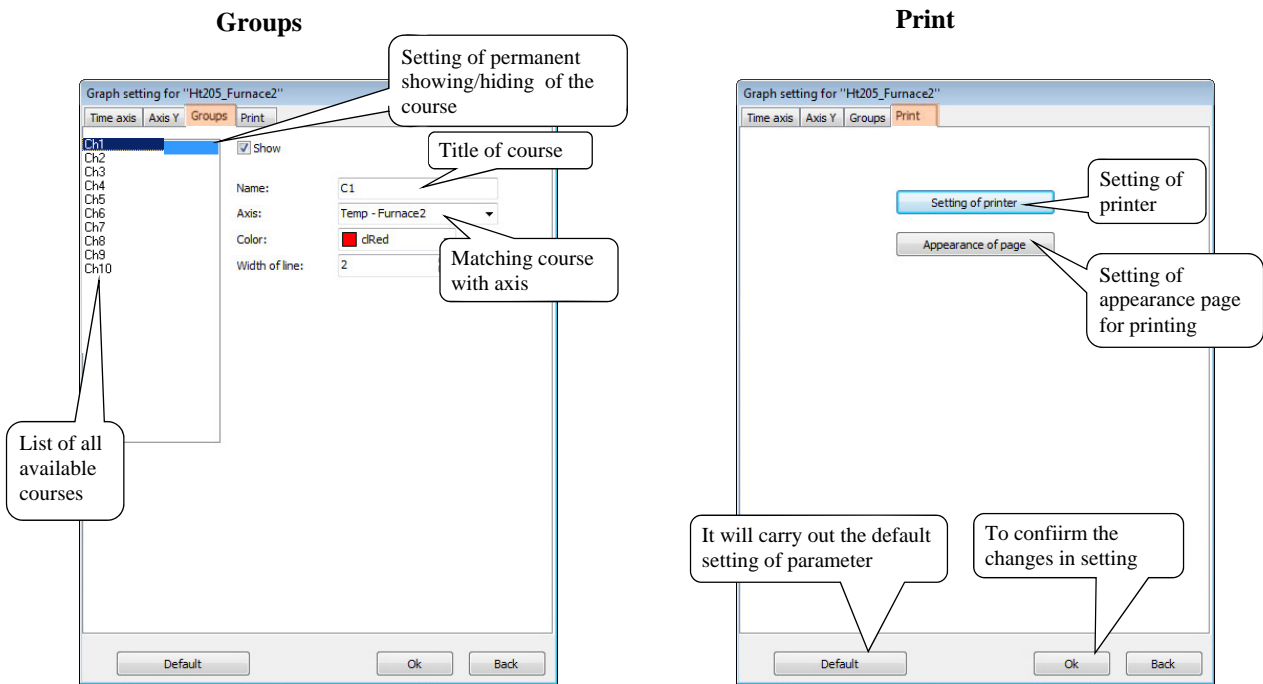

Switching ON/OFF the history of archived values.

Setting of shown graph.

To print the actual showing.

Export of shown data to „*.csv" file.

By clicking here it is possible to temporarily hide/display the course.

To set the time for browsing through the history.

To switch over between display: graphic/table.

Setting of graph

After you enter the menu „GRAPH SETTING" the window with 4 flags is open where you can set the parameters of showing. The first marker „TIME AXIS" is intended for setting of the time axis (figures shown at the axis, division of the axis into uniform stages and definition of the length of the time axis). In the second marker „AXIS Y", it is possible to set the features of axis „Y" (if the axis is shown, description of axis, units, range from to, number of uniform stages of axis and setting of the primary axis) see picture below.

Time axis

Title of graph

Number of steps in grid

Data that will be shown

Axis Y

Showing/hiding of axis in the graph

Title of axis

Units shown in the legend and at the title of axis

List of available axes

In the third marker „GROUPS" you can set the parameters of individual courses (if the course is shown, title of the course, colour and width of line). The fourth marker „PRINT" includes options for printing the graph.

Groups

- Setting of permanent showing/hiding of the course
- Title of course
- Matching course with axis
- List of all available courses

Print

- Setting of printer
- Setting of appearance page for printing
- It will carry out the default setting of parameter
- To confiirm the changes in setting

The requested changes will actuate after the confirmation with the button „OK".

Switching ON/OFF the history of measured values

In mode of showing „HISTORY" there is a cursor shown in the graph that helps you browse through the recorded course of measured values. The recorded values on the position of the cursor are displayed in the right-hand part of the graph. Below the graph you can find the navigation buttons activated that will make you possible to move the cursor back and forward, see the picture below.

- Position of cursor on time axis
- Cursor
- Meaured values on the position of cursor
- You return to beginning of history
- It shifts the history by one time length to left
- It shifts cursor by one measured sample to left
- It shifts cursor by one measured sample to right
- It shifts the history by one time length to right
- You return to end of history
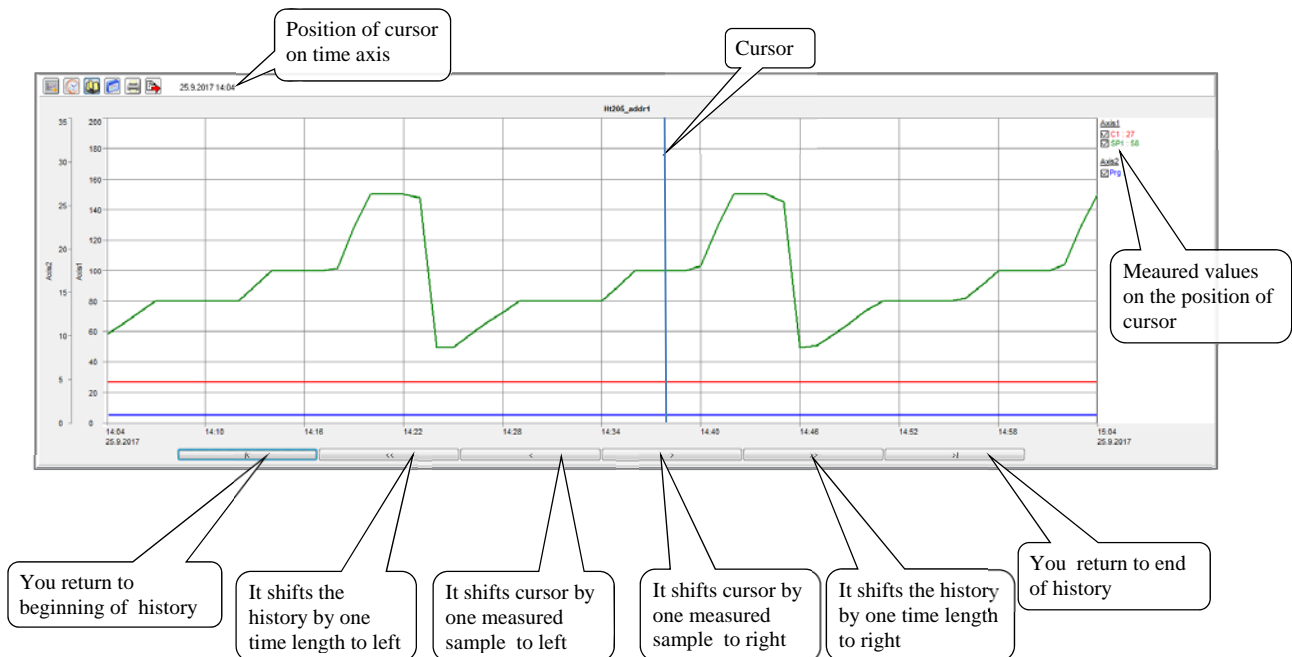
You can move the cursor by clicking of PC mouse in the frame of visible screen.

Setting of time and date for browsing through the history

This function is active only in mode of history of measured values. By entering the date and time the showing of the course of values is achieved from the defined term.

Switching over of graphic showing

With help of this function you can switch over between the showing „graph / table of measured values". Values are written to the table according to the actual showing of the graph (from the oldest time sample). To make it easier the browsing through the table there are buttons shown in the right-hand part. If the table is shown in history of measured values, it is possible to use the function „definition of time for browsing through the history" after you enter the initial setting of the first value in the table.

It moves showing of table by one screen up

It shifts the cursor in the table by one line up

It shifts the cursor in the table by one line down

It moves showing of table by one screen down

Print

In case of using this function, the actual showing (graph or table) will be sent on the printer. The actual setting of the appearance of the page will be used for printing that was defined in „GRAPH SETTING".

Export of data

This exports data from visual part of the graph into „*.csv" file.

Click the button for data export. It opens the window for selection of storing of exported file.

Choose the place for storing of exported file and cklick the button „Save".
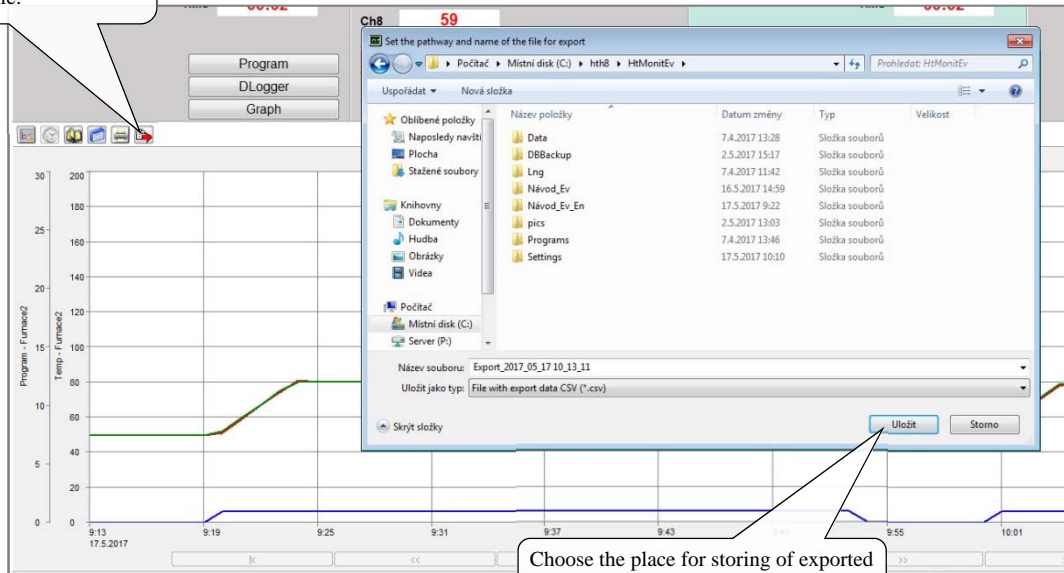
Exported data are stored in „*.csv" file and they can be open for example in program MS Excel.

3.1 How to define a program in the device

If a programmable controller is detected by the software, then the button "Program" is displayed in the panel corresponding to this controller. When you press this button, the window for operator how to handle the program in this device is opened, see picture below.
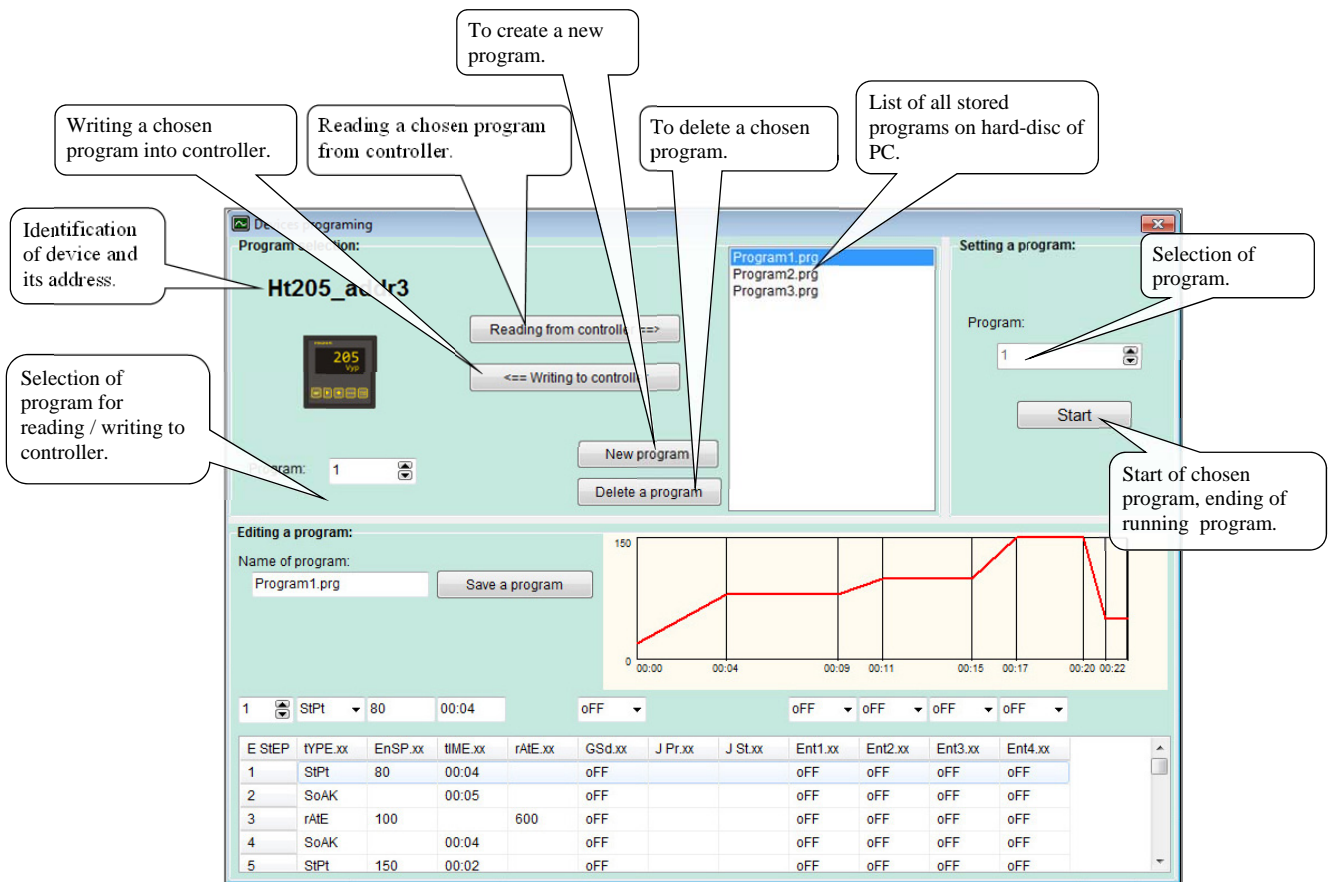
How to read the program from the controller

Set the number of the program that you want to read from the controller in the part of the window „Program". After clicking the button „Reading from controller", the program from the controller is read from the controller to PC.
The read program from the controller is shown in the part of the window „Editing a program". You can give the name to a program and then store it in PC.

How to write a program to controller

Choose the program that you want to write to the controller in the part of the window „Program".
In the text box „Program", you should set the number of the program in the controller, on which you want to save the program.
By clicking the button „Writing to controller", you will make a copy from PC to controller.

To start / end a program

In the part of the window „Setting a program", it is possible to make a remote start of the chosen program or end the running program. The meaning of the button is changed depending on the state of the device that you control.
The meaning of the button is changed with time delay (it is recovered with the period of reading values from the devices).

Editing a program

For making and editing a program, the window „Editing a program" is intended, see following picture.

Principles for programming is described in the manual for controller.

Procedure of programming is as follows:

- For editing a new program, press the button „New program". It will create a blank editing form. If you wish to modify the program saved on hard-disc of PC, you need to choose the requested program from the list of programs. If you wish to reedit the program from the controller, you will choose the number of the program and click the button „Reading from controller".
- Enter the title of program, under which the program will be saved on hard-disc of PC.
- Choose or enter the number of the step for editing and set the parameters for this step (type of step, stp value, …). Entering of time data is in the format „hh:mm", whereas if 2 figures are set, it is possible to enter the symbol „:". However, if the third figure is set and the separate symbol „:" was not inserted, then the separate symbol is inserted automatically. The parameters that have no meaning for the edited step are not displayed.
- After you finish editing a program, you should save it on hard-disc by clicking the button „Save a program". If the file with the same title exists on hard-disc of PC, the user is informed about it by notice with option to cancel the editing or to permit the re-writing the file.
- In case of need, you should choose the number of the program in the controller and by clicking the button „Writing to controller", the program is written on the defined position in the controller.

Notice: When you write the program into the controller that includes the program step with stp value beyond the operational range of stp value of the controller „SP1 Lo" and „SP1 hI", this value will not be written and it comes to the error in writing a program into the controller.

3.2 Operation of datalogger in device

If the device is equipped with datalogger, the button there is the button „DLogger" shown in the relevant panel. By clicking this button, the window for operation of datalogger is shown, see picture below.
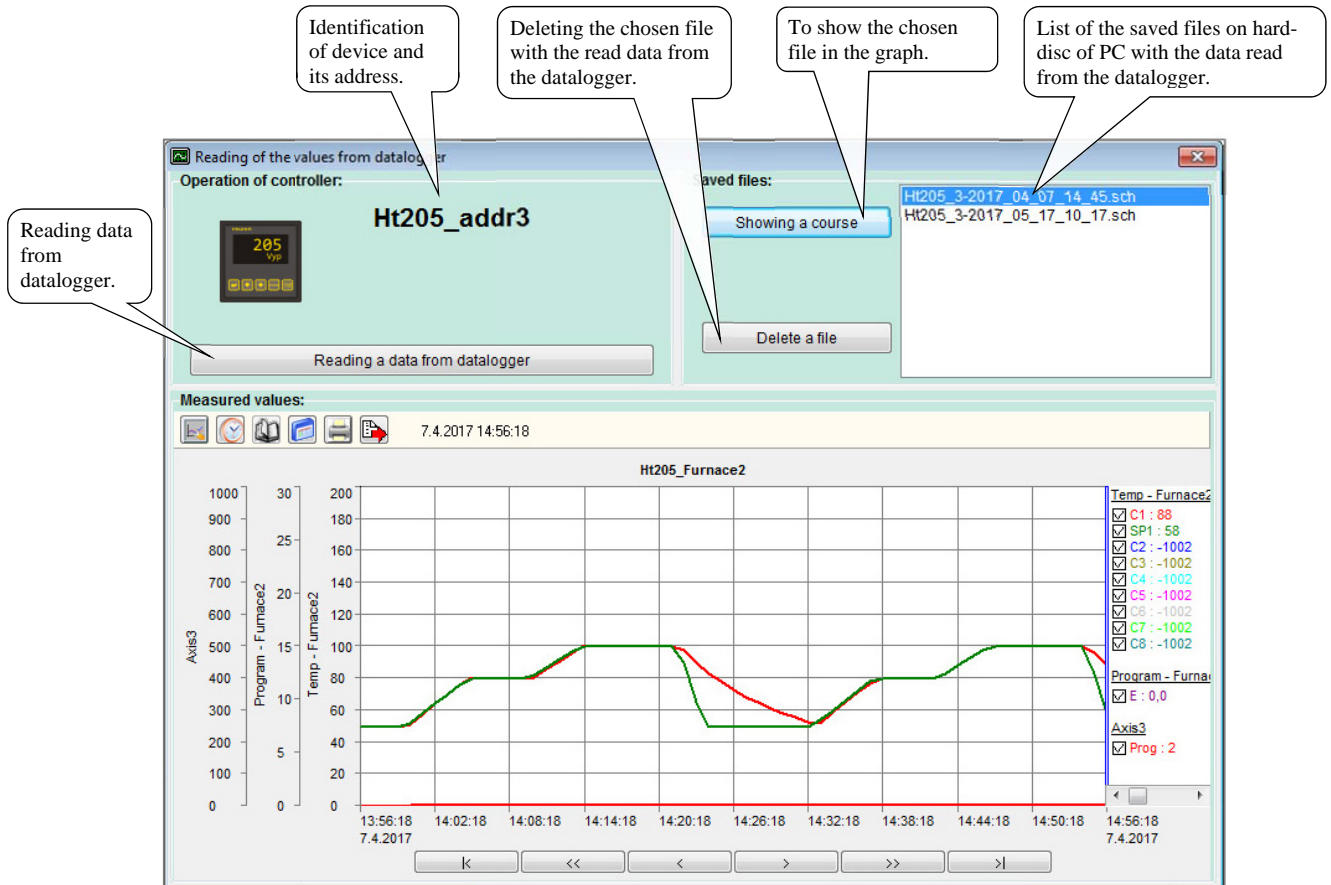
How to transmit data from device to PC

Reading data from the device starts by clicking the button „Reading a data from datalogger". The transmission is indicated in the panel of the part „Operation of controller". When the data transmitting is finished, data are saved on the hard-disc in PC with the title DEVICE_ADDRESS_YEAR_MONTH_DAY_HOUR_MINUTE.
The transmitted data are saved on the hard-disc into the folder „C:\HTH8\Ht_Monit\Data\DLogg\".
Rate of transmission depends on the period for reading values from devices (the longer the period is, the faster the reading data from datalogger is).

How to view old data

In the panel of the part „Saved files", the list of saved files on hard-disc in PC is shown. By choosing the file and clicking the button „Showing a course", the course is shown in the lower part of the panel.

Deleting the file with data from the hard-disc of PC

If the file on the list is chosen, then it is possible to delete it by clicking the button „Delete a file", then the file is deleted from the hard-disc in PC. To recover these data that were deleted in this way is not possible anymore.

4 Panel „Setting"

For the software to function properly, it is necessary to perform the proper setting so that it should correspond to the requirements on monitoring. The appearance of the window is given below.

Setting the type of comunnication on address 1.

Setting the type of the communication on address 2.

Type of connected device (software will read it itself by clicking the button „Detect").

Configuration of the connected device.

Device can work with Slave controllers (system Master – Slave), here you can choose the number of controllers

Setting of the time periods.

Setting of language of application and protocol.

Setting of serial communication line.

Setting of LAN interface and convertor GNOME.

All changes in the setting must be confirmed.

4.1 Setting of type of communication

For each section it is possible to set the way of communication with devices.

No communication is set, the devices is not monitored.

For monitoring of values from the devices, the serial communication interface will be used which will be defined by setting the serial communication line.


For monitoring of values LAN interface will be used.

This interface can be used in the connection with the convertor GNOME (LAN/EIA485) or with the devices Ht200, Ht205, equipped with LAN interface.

Convertor GNOME can be configured (IP address, port, alternatively password) via software HtMonit.
Devices Ht200, Ht205 must be configured in menu of device (configuration level, menu „LAN")

4.2 Setting of serial communication line

Set the communication port that is intended for serial communication line

Set the baudrate.
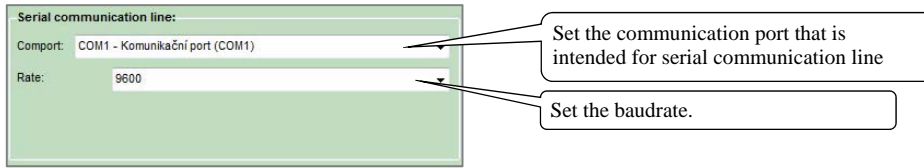
Setting of communication line must be confirmed by clicking the button „Confirm setting".

4.3 Seeting of LAN interface

For proper function of LAN interface you need to set the following:

- Choose the LAN interface on PC, through which the communication will run.

Choose the LAN interface, through which the communication will run. Confirm it by the button „Confirm setting".
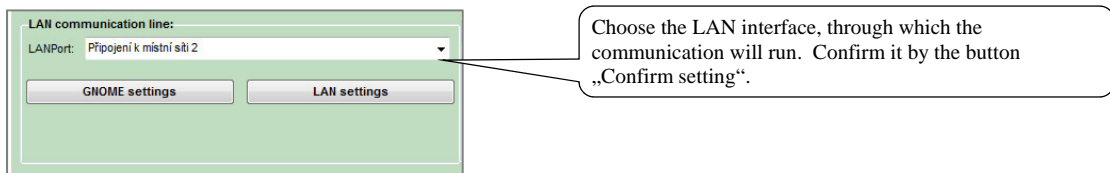
- Match *IP address and port number* for the communication of PC with convertor GNOME (LAN/EIA485) or with devices Ht200, Ht205. Matching must be realized by the network administrator, who must also ensure the passage of data through LAN network (by setting Firewall, sub-networks, …).
- Set the convertor GNOME, controllers Ht200/205.
- Set the matched IP address, number of the port and password (if the password is used) in the window for setting of communication of all monitored devices.

    With help of one convertor GNOME you can connect one as well as more devices.

    Even if you use single convertors GNOME, addresses 1 to 4 must be set in devices 1 to 4.
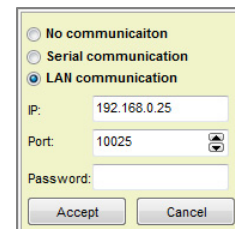
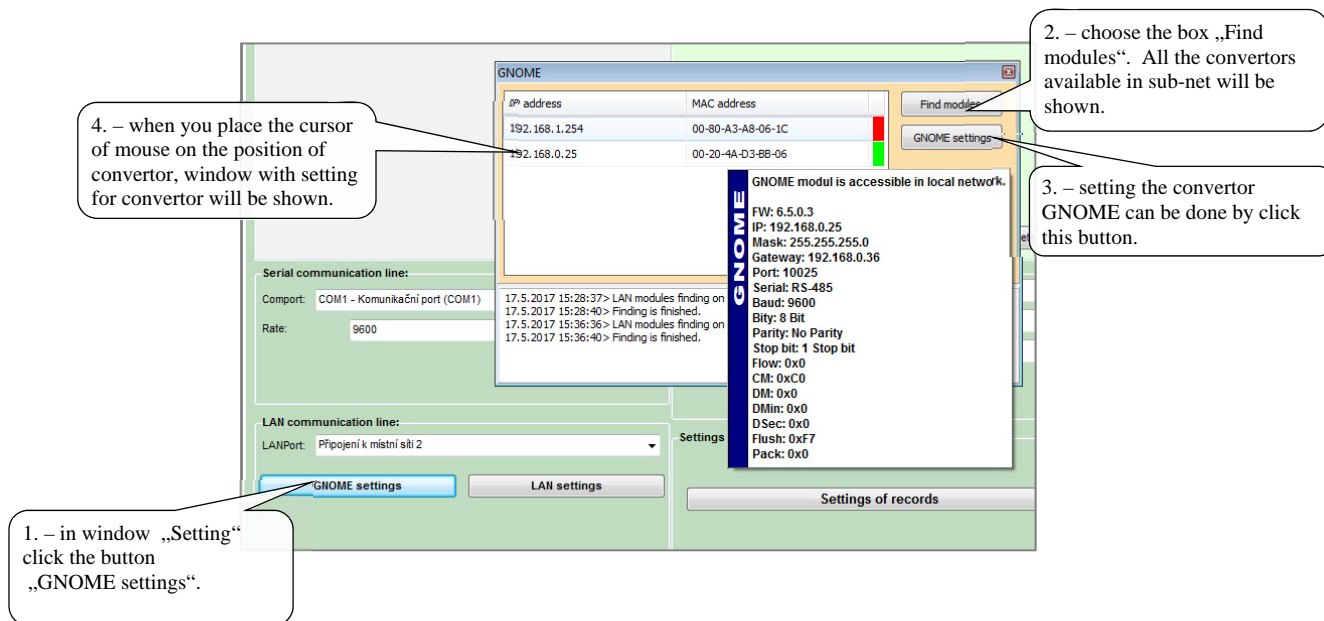Brief description of network LAN can be found on page 23.

Setting of LAN interface in devices Ht200, Ht205

The setting will be performed in the configuration level of device, menu LAN.
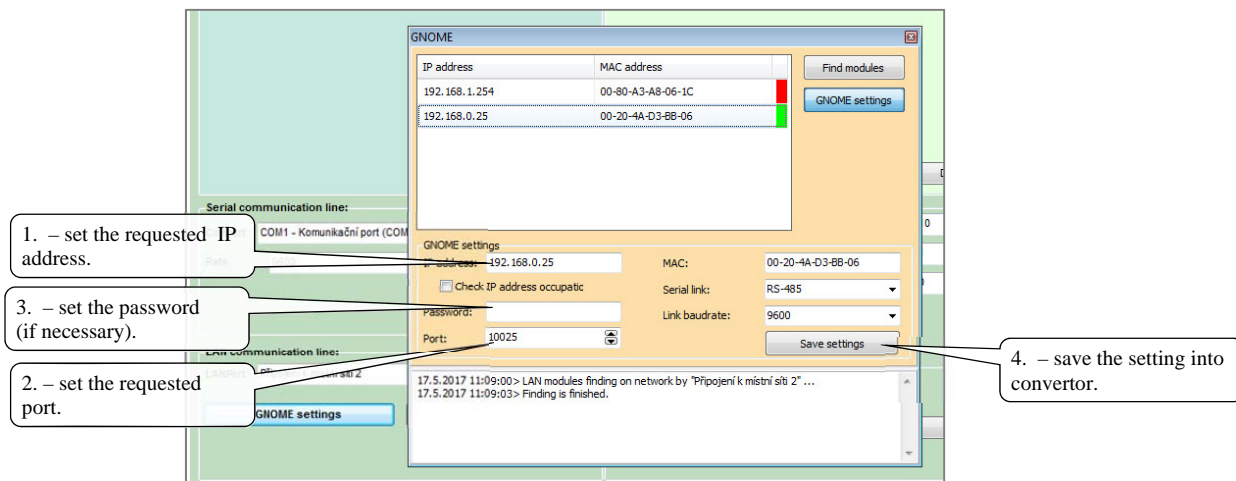
```
Conf/LAN

>IP      192.168.0.100
 SNET   255.255.255.0
 IPG      192.168.0.0
 Port          10000
 LAN restrict    Read
```

How to set the convertor GNOME

For the convertor GNOME you can set IP address and number of port with help of tools in software HtMonit.

2. – choose the box „Find modules". All the convertors available in sub-net will be shown.

4. – when you place the cursor of mouse on the position of convertor, window with setting for convertor will be shown.

3. – setting the convertor GNOME can be done by click this button.

1. – in window „Setting" click the button „GNOME settings".

Window for setting the convertor GNOME

1. – set the requested IP address.

3. – set the password (if necessary).

2. – set the requested port.
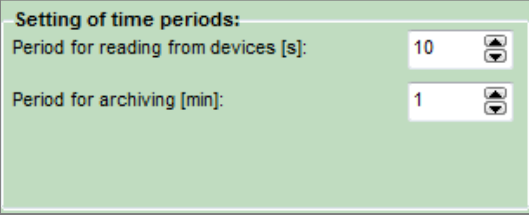
4. – save the setting into convertor.

If the convertor GNOME is linked through sub-network and it is not displayed in the list (initial address of convertor is 192.168.1.254), you can proceed during its setting in the following way:

- Enter the MAC address of the convertor,
- Set the requested IP address and number of port,
- Save the setting,
- If the setting was not successful, try to save the new setting again.

4.4 Setting of time periods

You can set in the window:
- Period for reading from devices.
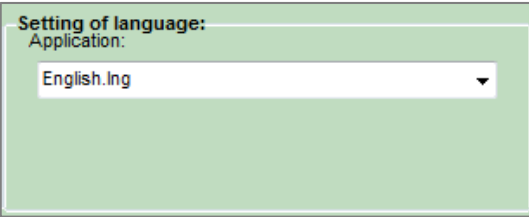- Period for archiving.

Setting of time periods:

Period for reading from devices [s]: 10

Period for archiving [min]: 1

4.5 Setting of language for appliaction and protocol

You can define freely:
- Language for application.
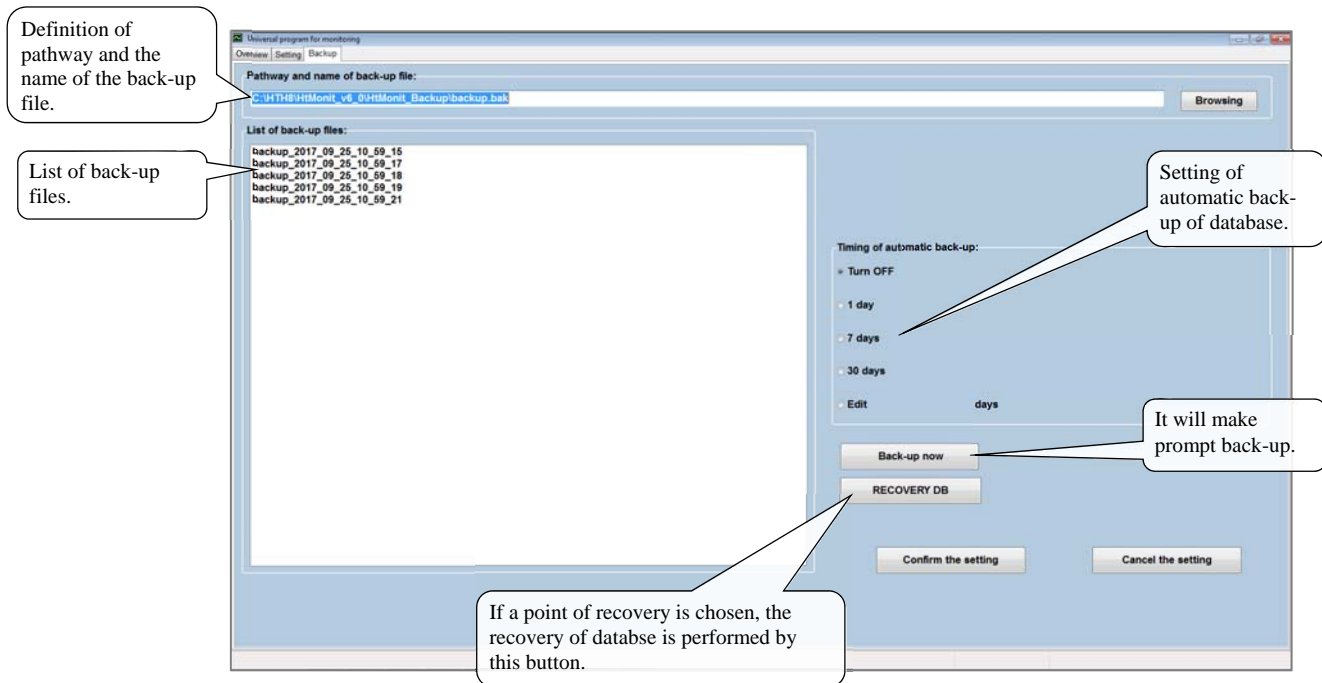
Setting of language:
Application:

English.lng

5 Panel „Back up"

Software is equipped with integrated tools for work with inner database.
The main functions are:
- Back up of internal database,
- Recovery of internal database from the back-up files.

Back up of database

Software enables automatic back-up of internal database. Setting can be carried out in the section „Timing of automatic back-up".
The main parameter is to define the pathway and name of the back-up file.
During the back-up, date and time of the back-up is added to the name of the file. In section „ Timing of automatic back-up"
It is possible to set the time interval of individual back-ups.
The new file, which contains the copy of total internal database, is created with each back-up.

Recovery of database

In section „List of back-up files", you will choose the database and click the button „RECOVERY DB".
The main database of software is rewritten by this operation.

6 LAN – brief description of network

The interconnection of all communication devices within the frame of internet, company or home networks is solved with help of infrastructure of network (mutual interconnection of all devices is practically impossible). For creating the network infrastructure, these network components are used (routers, switches, hubs, …), that ensure the data transfer in network. Indication of possible network infrastructure with description of terms is given in the picture below.
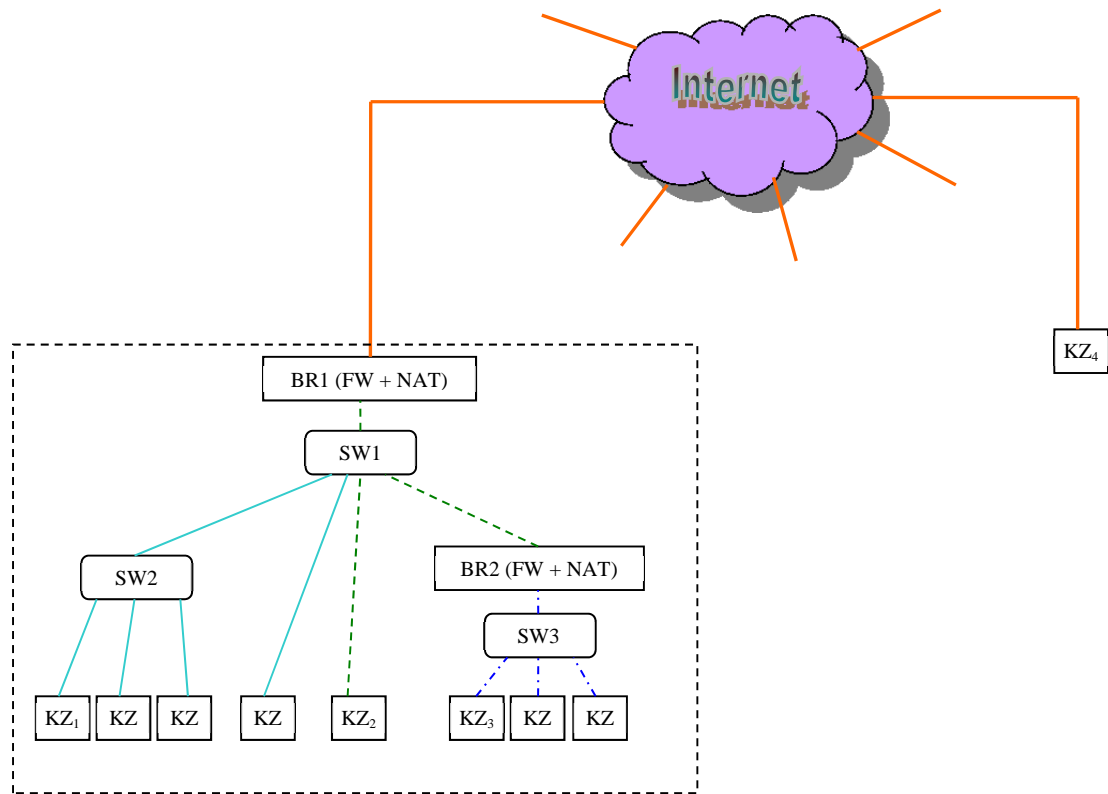

BR	- router (server, hw router, …),	──	public connection
SW	- switch,	─ ─	subnet 1
KZ	- end device (PC, device, …),	──	subnet 2
FW	- FireWall,	─ ∙ ─	subnet 3
NAT	- translation of addresses and ports.		

Example of net typology.

Each device linked to internet must be defined by the unique identification element, which is **IP** address. Devices can be linked to internet directly or with help of **routers**, which ensures the translation of addresses. Behind the router you can use practically any structure with large number of end devices (local network). From point of internet, this structure is hidden and it appears only as one device. The local network can be further divided into various groups either physically, with help of routers, or logically, with help of group of addresses defined with the mask of network.

If the communication between 2 the end devices is requested, this communication is defined by source IP and end IP address. The both devices can exchange large amount of various information, for that reason one physical interconnection is divided into many virtual connections. Then it appears as if there were many independent connections. Each of these virtual lines (port) is marked with own number, i.e. **number of port.** If we concentrate on the transmission of one sort of specific information (communication with device) during this transmission, this communication is defined with help of **IP address of source, destination IP address and number of port**. The data receiving on the end device ca be described with the following picture.

- IP address = number of house,
- Number of port = number of flat
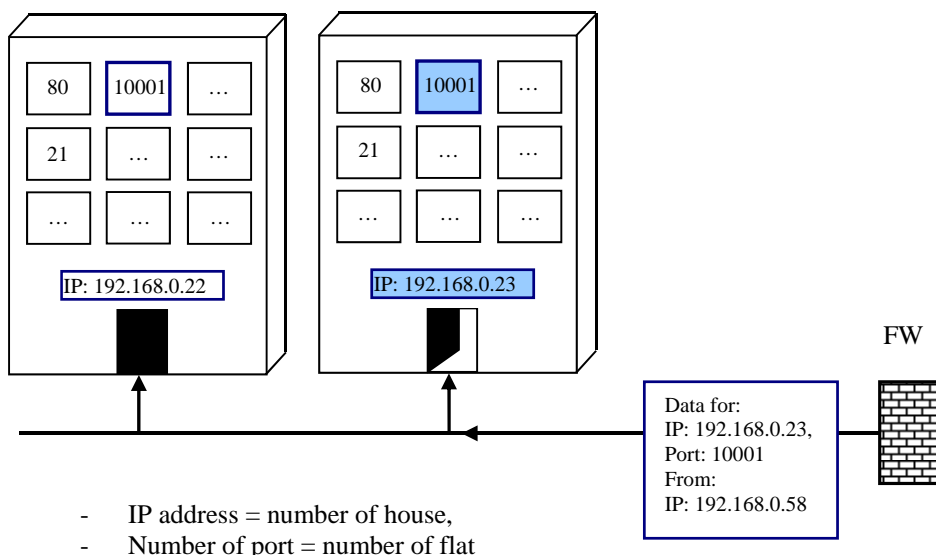
Data transfer and function of network elements will be explained on 2 examples, where typology of network is given in the picture on page above.

Example 1. Communication between devices (end devices - KZ_1 and $KZ_{2)}$. The first mentioned device will send data to switch SW2, which will hand over data to switch SW1. SW1 moves data further. BR1 will find out from these incoming data that the end IP address is inside the network and for that reason the data do not go through to internet. SW1 will deliver data to KZ_2. During transmitting the reply from KZ_2 back, data go through SW1 to SW2 and KZ_1. If there is a network component that restricts the communication (FireWall), then this component must be set in the way so that it would enable the passage of the requested data.

Example 2. The communication between devices KZ_1 and KZ_4. Data from KZ_1 moves on in a similar way as in the example above up to SW1. Here data are handed over to BR1, which finds out the destination address inside the internal network. It records the address of source KZ_1 and end KZ_4 and it will change in data the source address from KZ_1 to its own address BR1. These data changed in this manner moves on internet. KZ_4 will receive the data and during the replying data are sent on the address BR1. The router will receive data and it will find out the source address of the reply KZ_4 and on basis of the stored information, it will send the reply to the address KZ_1.

If the communication is initiated from the opposite side, which means from KZ_4 to KZ_1 , the situation is more complicated. The address KZ_1 can´t be put directly (not public address) into the destination address, but the address of input gate BR1 must be given here. After BR1 receives data, it does not know where these data to put further on. For these purposes NAT must be used on the input gate. NAT will ensure re-routing of ports. The re-routing is defined by entering for example the number of port 10000 on internal address corresponding to the address KZ_1. For sending data from KZ_4 to $KZ_{1,}$ the address BR1 and the communication port 10000 must be used.

In the communication route, you can use the filter (FireWall) that can restrict the communication. If it comes up to the input of FireWall **FW** the communication with prohibited IP address or with the prohibited number of port, data are not transmitted further. The components must be configured in the way so as not to block the requested communication.

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